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前　言

《图书情报专题研究》的宗旨是为我校师生开展学术研究提供有价值的参考信息，此项工作由图书馆信息咨询服务部承担。“最新学科研究热点与前沿”根据学校所购买的数字资源，通过分析其深层次的功能，从数据库中组织整理出了与我校学科领域相关的最新学科热点研究论文、最新研究前沿及最新国际会议信息等，以期能对我校师生开展学术研究、项目立项、开题等学术研究活动提供帮助。

本期收集整理了如下七个方面的热点文献和前沿信息：

1、Nature Latest Research，Nature Physics 最新研究进展；

2、IEL Top25，IEL 数据库下载最多的 25 篇论文；

3、ESI（Essential Science Indicators）HOT PAPERS，按照 ESI 某一学科热点论文被引频次排名选取前 25 篇；

4、ESI（Essential Science Indicators）HIGHLY CITED PAPERS，按照 ESI 某一学科高被引论文被引频次排名选取前 25 篇；

5、AIAA、AAS、IAF 最新会议，由 AIAA、AAS、IAF 主站提供的最新会议信息，可供相关研究者参考；

6、ACM 最新会议，根据 ACM 主页所提供的最新会议信息整理所得，可供相关研究者参考；

7、IQPC 最新会议，由国际质量与竞争力中心（IQPC：International Quality and Productivity Center）提供的最新国际会议，内容涉及国防、能源、工业、科技、电信等领域。IQPC 是国际顶级的会议展览策划公司，于 1973 年成立于美国，旨在为全球业务主管提供量身定制的会议、大型会展以及培训课程，积极为行业人士的相互交流创建平台，使业内人士能够随时掌握行业发展的最新趋势及技术创新。

如果您对我们的栏目设置、内容编排等有好的意见和建议，欢迎与我们联系(电话：88492928)，我们将积极采纳，使这份电子刊物日臻完善，共同为把我校建成学科特色鲜明的世界一流大学而努力。

图书馆

2019 年 12 月

目　录

NatureLatest Research(Physics)

来源：https://www.nature.com/nphys/

1. **标题：**Sixfold enhancement of superconductivity in a tunable electronic nematic system
作者：Chris Eckberg, Daniel J. Campbell, Tristin Metz, John Collini, Halyna Hodovanets, Tyler Drye, Peter Zavalij, Morten H. Christensen, Rafael M. Fernandes, Sangjun Lee, Peter Abbamonte, Jeffrey W. Lynn & Johnpierre Paglione
摘要：The electronic nematic phase—in which electronic degrees of freedom lower the crystal rotational symmetry—is commonly observed in high-temperature superconductors. However, understanding the role of nematicity and nematic fluctuations in Cooper pairing is often made more complicated by the coexistence of other orders, particularly long-range magnetic order. Here we report the enhancement of superconductivity in a model electronic nematic system that is not magnetic, and show that the enhancement is directly born out of strong nematic fluctuations associated with a quantum phase transition. We present measurements of the resistance as a function of strain in Ba1−xSrxNi2As2 to show that strontium substitution promotes an electronically driven nematic order in this system. In addition, the complete suppression of that order to absolute zero temperature leads to an enhancement of the pairing strength, as evidenced by a sixfold increase in the superconducting transition temperature. The direct relation between enhanced pairing and nematic fluctuations in this model system, as well as the interplay with a unidirectional charge-density-wave order comparable to that found in the cuprates, offers a means to investigate the role of nematicity in strengthening superconductivity.
链接：https://www.nature.com/articles/s41567-019-0736-9

2. **标题：**Distributed quantum sensing in a continuous-variable entangled network
作者：Xueshi Guo, Casper R. Breum, Johannes Borregaard, Shuro Izumi, Mikkel V. Larsen, Tobias Gehring, Matthias Christandl, Jonas S. Neergaard-Nielsen & Ulrik L. Andersen
摘要：Networking is integral to quantum communications1 and has significant potential for upscaling quantum computer technologies2. Recently, it was realized that the sensing performances of multiple spatially distributed parameters may also be enhanced through the use of an entangled quantum network3,4,5,6,7,8,9,10. Here, we experimentally demonstrate how sensing of an averaged phase shift among four distributed nodes benefits from an entangled quantum network. Using a four-mode entangled continuous-variable state, we demonstrate deterministic quantum phase sensing with a precision beyond what is attainable with separable probes. The techniques behind this result can have direct applications in a number of areas ranging from molecular tracking to quantum networks of atomic clocks.
链接：https://www.nature.com/articles/s41567-019-0743-x

3.**标题：**Chip-to-chip quantum teleportation and multi-photon entanglement in silicon

作者：Daniel Llewellyn, Yunhong Ding, Imad I. Faruque, Stefano Paesani, Davide Bacco, Raffaele Santagati, Yan-Jun Qian, Yan Li, Yun-Feng Xiao, Marcus Huber, Mehul Malik, Gary F. Sinclair, Xiaoqi Zhou, Karsten Rottwitt, Jeremy L. O'Brien, John G. Rarity, Qihuang Gong, Leif K. Oxenlowe, Jianwei Wang & Mark G. Thompson

摘要：Integrated optics provides a versatile platform for quantum information processing and transceiving with photons1,2,3,4,5,6,7,8. The implementation of quantum protocols requires the capability to generate multiple high-quality single photons and process photons with multiple high-fidelity operators9,10,11. However, previous experimental demonstrations were faced by major challenges in realizing sufficiently high-quality multi-photon sources and multi-qubit operators in a single integrated system4,5,6,7,8, and fully chip-based implementations of multi-qubit quantum tasks remain a significant challenge1,2,3. Here, we report the demonstration of chip-to-chip quantum teleportation and genuine multipartite entanglement, the core functionalities in quantum technologies, on silicon-photonic circuitry. Four single photons with high purity and indistinguishablity are produced in an array of microresonator sources, without requiring any spectral filtering. Up to four qubits are processed in a reprogrammable linear-optic quantum circuit that facilitates Bell projection and fusion operation. The generation, processing, transceiving and measurement of multi-photon multi-qubit states are all achieved in micrometre-scale silicon chips, fabricated by the complementary metal–oxide–semiconductor process. Our work lays the groundwork for large-scale integrated photonic quantum technologies for communications and computations.

链接：https://www.nature.com/articles/s41567-019-0727-x

4.**标题：**Nanoscale imaging of equilibrium quantum Hall edge currents and of the magnetic monopole response in graphene

作者：Aviram Uri, Youngwook Kim, Kousik Bagani, Cyprian K. Lewandowski, Sameer Grover, Nadav Auerbach, Ella O. Lachman, Yuri Myasoedov, Takashi Taniguchi, Kenji Watanabe, Jurgen Smet & Eli Zeldov

摘要：Although the recently predicted topological magnetoelectric effect1 and the response to an electric charge that mimics an induced mirror magnetic monopole2 are fundamental attributes of topological states of matter with broken time-reversal symmetry, so far they have not been directly observed in experiments. Using a SQUID-on-tip3, acting simultaneously as a tunable scanning electric charge and as an ultrasensitive nanoscale magnetometer, we induce and directly image the microscopic currents generating the magnetic monopole response in a graphene quantum Hall electron system. We find a rich and complex nonlinear behaviour, governed by the coexistence of topological and non-topological equilibrium currents, that is not captured by the monopole models2. Furthermore, by imaging the equilibrium currents of individual quantum Hall edge states, we reveal that the edge states, which are commonly assumed to carry only a chiral downstream current, in fact carry a pair of counterpropagating currents4, in which the topological downstream current in the incompressible region is counterbalanced by a non-topological upstream current flowing in the adjacent compressible region. The intricate patterns of the counterpropagating equilibrium-state orbital currents provide insights into the microscopic origins of the topological and non-topological charge and energy flow in quantum Hall systems.

链接：https://www.nature.com/articles/s41567-019-0713-3

5.**标题**：Sub-femtosecond electron transport in a nanoscale gap

作者：Markus Ludwig, Garikoitz Aguirregabiria, Felix Ritzkowsky, Tobias Rybka, Dana Codruta Marinica, Javier Aizpurua, Andrei G. Borisov, Alfred Leitenstorfer & Daniele Brida

摘要：The strong fields associated with few-cycle pulses can drive highly nonlinear phenomena, allowing the direct control of electrons in condensed matter systems. In this context, by employing near-infrared single-cycle pulse pairs, we measure interferometric autocorrelations of the ultrafast currents induced by optical field emission at the nanogap of a single plasmonic nanocircuit. The dynamics of this ultrafast electron nanotransport depends on the precise temporal field profile of the optical driving pulse. Current autocorrelations are acquired with sub-femtosecond temporal resolution as a function of both pulse delay and absolute carrier-envelope phase. Quantitative modelling of the experiments enables us to monitor the spatiotemporal evolution of the electron density and currents induced in the system and to elucidate the physics underlying the electron transfer driven by strong optical fields in plasmonic gaps. Specifically, we clarify the interplay between the carrier-envelope phase of the driving pulse, plasmonic resonance and quiver motion.

链接：https://www.nature.com/articles/s41567-019-0745-8

6. **标题**：Crossover from two-dimensional to three-dimensional superconducting states in bismuth-based cuprate superconductor

作者：Jing Guo, Yazhou Zhou, Cheng Huang, Shu Cai, Yutao Sheng, Genda Gu, Chongli Yang, Gongchang Lin, Ke Yang, Aiguo Li, Qi Wu, Tao Xiang & Liling Sun

摘要：To decipher the mechanism of high-temperature superconductivity, it is important to know how the superconducting pairing emerges from the unusual normal states of cuprate superconductors1,2,3,4, including the pseudogap5,6, strange metal7,8 and anomalous Fermi liquid9 phases. A long-standing issue is how the superconducting pairing is formed and condensed in the strange metal phase, because this is where the superconducting transition temperature is highest. Here, we use state-of-the-art high-pressure measurements to report the experimental observation of a pressure-induced crossover from two- to three-dimensional (2D to 3D) superconducting states in optimally doped $Bi2Sr2CaCu2O8+\delta$ bulk superconductor. By analysing the temperature dependence of the resistance, we find that the 2D superconducting transition exhibits a Berezinskii–Kosterlitz–Thouless-like behaviour10. The emergence of this 2D superconducting transition provides direct evidence that the strange metal state is predominantly 2D-like. This is important for a thorough understanding of the phase diagram of cuprate superconductors.

链接：https://www.nature.com/articles/s41567-019-0740-0

7.**标题**：Non-Gaussian quantum states of a multimode light field

作者：Young-Sik Ra, Adrien Dufour, Mattia Walschaers, Clément Jacquard, Thibault Michel, Claude Fabre & Nicolas Treps

摘要：Advanced quantum technologies require scalable and controllable quantum resources1,2. Gaussian states of multimode light, such as squeezed states and cluster states, are scalable quantum systems3,4,5, which can be generated on demand. However, non-Gaussian features are indispensable in many quantum protocols, especially to reach a quantum computational advantage6. Embodying non-Gaussianity in a multimode quantum state remains a challenge as non-Gaussian operations generally cannot maintain coherence among multiple modes. Here, we generate non-Gaussian quantum states of a multimode light field by removing a single photon in a mode-selective manner

from a Gaussian state7. To highlight the potential for continuous-variable quantum technologies, we first demonstrated the capability to generate negativity of the Wigner function in a controlled mode. Subsequently, we explored the interplay between non-Gaussianity and quantum entanglement and verify a theoretical prediction8 about the propagation of non-Gaussianity along the nodes of photon-subtracted cluster states. Our results demonstrate large-scale non-Gaussianity with great flexibility along with an ensured compatibility with quantum information protocols. This range of features makes our approach ideal to explore the physics of non-Gaussian entanglement9,10 and to develop quantum protocols, which range across quantum computing11,12, entanglement distillation13 and quantum simulations14.

链接：https://www.nature.com/articles/s41567-019-0726-y

8.**标题：**Solids of quantum Hall skyrmions in graphene

作者：H. Zhou, H. Polshyn, T. Taniguchi, K. Watanabe & A. F. Young

摘要：Partially filled Landau levels host competing electronic orders. For example, electron solids may prevail close to integer filling of the Landau levels before giving way to fractional quantum Hall liquids at higher carrier density1,2. Here, we report the observation of an electron solid with non-collinear spin texture in monolayer graphene, consistent with solidification of skyrmions3—topological spin textures characterized by quantized electrical charge4,5. We probe the spin texture of the solids using a modified Corbino geometry that allows ferromagnetic magnons to be launched and detected6,7. We find that magnon transport is highly efficient when one Landau level is filled ($\nu=1$), consistent with quantum Hall ferromagnetic spin polarization. However, even minimal doping immediately quenches the magnon signal while leaving the vanishing low-temperature charge conductivity unchanged. Our results can be understood by the formation of a solid of charged skyrmions near $\nu=1$, whose non-collinear spin texture leads to rapid magnon decay. Data near fractional fillings show evidence of several fractional skyrmion solids, suggesting that graphene hosts a highly tunable landscape of coupled spin and charge orders.

链接：https://www.nature.com/articles/s41567-019-0729-8

9.**标题：**Electrical charging overcomes the bouncing barrier in planet formation

作者：Tobias Steinpilz, Kolja Joeris, Felix Jungmann, Dietrich Wolf, Lothar Brendel, Jens Teiser, Troy Shinbrot & Gerhard Wurm

摘要：In protoplanetary disks, solid objects (so-called planetesimals) are formed from dust. Micrometre-sized dust grains grow into millimetre-sized aggregates. Once those aggregates have diameters exceeding a few centimetres, they become subject to concentration mechanisms such as the streaming instability, permitting the formation of self-gravitating clusters, which might eventually collapse into kilometre-sized planetesimals. However, for the streaming instability to set in, clumps spanning sizes from centimetres to decimetres are required in the centre of a protoplanetary disk. In the size range between millimetres and centimetres, aggregates bounce off each other rather than sticking together, and growth is stalled. Here we show in microgravity experiments that collisions between millimetre-sized grains lead to sufficient electrical charging for aggregation to bridge this gap between the bouncing barrier and the onset of the streaming instability. We computationally simulate aggregation and find that models agree with the experimental data only if electrical charging is present. We therefore propose that collisional charging may promote early growth in the size gap that current models of planetesimal formation cannot account for.

链接：https://www.nature.com/articles/s41567-019-0728-9

10.标题：Long-range ballistic propagation of carriers in methylammonium lead iodide perovskite thin films

作者：Jooyoung Sung, Christoph Schnedermann, Limeng Ni, Aditya Sadhanala, Richard Y. S. Chen, Changsoon Cho, Lee Priest, Jong Min Lim, Hyun-Kyung Kim, Bartomeu Monserrat, Philipp Kukura & Akshay Rao

摘要：The performance of semiconductor devices is fundamentally governed by charge-carrier dynamics within the active materials1,2,3,4,5,6. Although advances have been made towards understanding these dynamics under steady-state conditions, the importance of non-equilibrium phenomena and their effect on device performances remains elusive7,8. In fact, the ballistic propagation of carriers is generally considered to not contribute to the mechanism of photovoltaics (PVs) and light-emitting diodes, as scattering rapidly disrupts such processes after carrier generation via photon absorption or electric injection9. Here we characterize the spatiotemporal dynamics of carriers immediately after photon absorption in methylammonium lead iodide perovskite films using femtosecond transient absorption microscopy (fs-TAM) with a 10 fs temporal resolution and 10 nm spatial precision. We found that non-equilibrium carriers propagate ballistically over 150 nm within 20 fs of photon absorption. Our results suggest that in a typical perovskite PV device operating under standard conditions, a large fraction of carriers can reach the charge collection layers ballistically. The ballistic transport distance appears to be limited by energetic disorder within the materials, probably due to disorder-induced scattering. This provides a direct route towards optimization of the ballistic transport distance via improvements in materials and by minimizing the energetic disorder. Our observations reveal an unexplored regime of carrier transport in perovskites, which could have important consequences for device performance.

链接：https://www.nature.com/articles/s41567-019-0730-2

11.标题：Primary gas-pressure standard from electrical measurements and thermophysical ab initio calculations

作者：Christof Gaiser, Bernd Fellmuth & Wladimir Sabuga

摘要：Mechanical standards for measuring gas pressure up to 7 MPa based on a piston–cylinder system are known with relative uncertainties on the order of 1 ppm (ref. 1). The challenges in an experimental realization lie in determining the effective area of special pressure balances and in accounting for the pressure distortion. Comparisons of the mechanical pressure standard with independent methods to exclude sources of systematic uncertainty are currently available only around 0.1 MPa at the required uncertainty levels. Here, such an independent cross-check is performed up to 7 MPa based on electrical measurements of helium gas. Enabled by recent progress in ab initio calculations, pressure can be accessed through measurement of the dielectric constant. By using theoretical values for the polarizability and the virial coefficients of helium, the change in capacitance and hence the pressure can be determined up to 7 MPa. The relative uncertainty of this method is below 5 ppm and can serve as a new primary pressure standard complementary to the mechanical pressure standard. This answers the long-standing question whether a pressure standard based on capacitance measurements could be devised2.

链接：https://www.nature.com/articles/s41567-019-0722-2

12.**标题：**The ergodicity problem in economics
作者：Ole Peters
摘要：The ergodic hypothesis is a key analytical device of equilibrium statistical mechanics. It underlies the assumption that the time average and the expectation value of an observable are the same. Where it is valid, dynamical descriptions can often be replaced with much simpler probabilistic ones — time is essentially eliminated from the models. The conditions for validity are restrictive, even more so for non-equilibrium systems. Economics typically deals with systems far from equilibrium — specifically with models of growth. It may therefore come as a surprise to learn that the prevailing formulations of economic theory — expected utility theory and its descendants — make an indiscriminate assumption of ergodicity. This is largely because foundational concepts to do with risk and randomness originated in seventeenth-century economics, predating by some 200 years the concept of ergodicity, which arose in nineteenth-century physics. In this Perspective, I argue that by carefully addressing the question of ergodicity, many puzzles besetting the current economic formalism are resolved in a natural and empirically testable way.
链接：https://www.nature.com/articles/s41567-019-0732-0

13.**标题：**Impact of the Langdon effect on crossed-beam energy transfer
作者：David Turnbull, Arnaud Colaïtis, Aaron M. Hansen, Avram L. Milder, John P. Palastro, Joseph Katz, Christophe Dorrer, Brian E. Kruschwitz, David J. Strozzi & Dustin H. Froula
摘要：The prediction that laser plasma heating distorts the electron distribution function away from Maxwellian and towards a super-Gaussian distribution dates back four decades1. In conditions relevant to inertial confinement fusion, however, no direct evidence of this so-called ‘Langdon effect’ has previously been observed. Here we present measurements of the spatially and temporally resolved Thomson scattering spectrum that indicate the presence of super-Gaussian electron distribution functions consistent with existing theory2. In such plasmas, ion acoustic wave frequencies increase monotonically with the super-Gaussian exponent3. Our results show that the measured power transfer between crossed laser beams mediated by ion acoustic waves requires a model that accounts for the non-Maxwellian electron distribution function, whereas the standard Maxwellian calculations overpredict power transfer over a wide region of parameter space. Including this effect is expected to improve the predictive capability of crossed-beam energy transfer modelling at the National Ignition Facility in California and may restore a larger operable design space for inertial confinement fusion experiments. This is also expected to motivate further inquiry in other areas affected by non-Maxwellian electron distribution functions, such as laser absorption, heat transport and X-ray spectroscopy.
链接：https://www.nature.com/articles/s41567-019-0725-z

14.**标题:**Accessing scrambling using matrix product operators
作者：Shenglong Xu & Brian Swingle
摘要：Scrambling, a process in which quantum information spreads over a complex quantum system, becoming inaccessible to simple probes, occurs in generic chaotic quantum many-body systems, ranging from spin chains to metals and even to black holes. Scrambling can be measured using out-of-time-ordered correlators (OTOCs), which are closely tied to the growth of Heisenberg operators. We present a general method to calculate OTOCs of local operators in one-dimensional systems based on approximating Heisenberg operators as matrix product operators (MPOs). Contrary

to the common belief that such tensor network methods work only at early times, we show that the entire early growth region of the OTOC can be captured using an MPO approximation with modest bond dimension. We analytically establish the goodness of the approximation by showing that, if an appropriate OTOC is close to its initial value, then the associated Heisenberg operator has low entanglement across a given cut. We use the method to study scrambling in a chaotic spin chain with 201 sites. On the basis of these data and previous results, we conjecture a universal form for the dynamics of the OTOC near the wavefront. We show that this form collapses the chaotic spin chain data over more than 15 orders of magnitude.

链接：https://www.nature.com/articles/s41567-019-0712-4

15.**标题：**Quantum control of an oscillator using a stimulated Josephson nonlinearity

作者：Andrei Vrajitoarea, Ziwen Huang, Peter Groszkowski, Jens Koch & Andrew A. Houck

摘要：Superconducting circuits extensively rely on the Josephson junction as a nonlinear electronic element for manipulating quantum information and mediating photon interactions. Despite continuing efforts in pushing the coherence of Josephson circuits, the best photon lifetimes have been demonstrated in microwave cavities. Nevertheless, architectures based on quantum memories require a qubit element for logical operations at the cost of introducing additional loss channels and limiting process fidelities. Here, we directly operate the oscillator as an isolated two-level system by tailoring its Hilbert space. Implementing a flux-tunable inductive coupling between two resonators, we can selectively Rabi drive the lowest eigenstates by dynamically activating a three-wave interaction through parametric flux modulation. Measuring the Wigner function confirms that we can prepare arbitrary states confined in the single-photon manifold, with measured coherence times limited by the oscillator intrinsic quality factor. This architectural shift in engineering oscillators with stimulated nonlinearity can be exploited for designing long-lived quantum modules and offers flexibility in studying non-equilibrium physics with photons in a field-programmable simulator.

链接：https://www.nature.com/articles/s41567-019-0703-5

16.**标题：**Thermodynamic uncertainty relations constrain non-equilibrium fluctuations

作者：Jordan M. Horowitz & Todd R. Gingrich

摘要：In equilibrium thermodynamics, there exists a well-established connection between dynamical fluctuations of a physical system and the dissipation of its energy into an environment. However, few similarly quantitative tools are available for the description of physical systems out of equilibrium. Here, we offer our perspective on the recent development of a new class of inequalities known as thermodynamic uncertainty relations, which have revealed that dissipation constrains current fluctuations in steady states arbitrarily far from equilibrium. We discuss the stochastic thermodynamic origin of these inequalities, and highlight recent efforts to expand their applicability, which have focused on connections between current fluctuations and the fluctuation theorems.

链接：https://www.nature.com/articles/s41567-019-0702-6

17.**标题：**Light-induced charge density wave in LaTe3

作者：Anshul Kogar, Alfred Zong, Pavel E. Dolgirev, Xiaozhe Shen, Joshua Straquadine, Ya-Qing Bie, Xirui Wang, Timm Rohwer, I-Cheng Tung, Yafang Yang, Renkai Li, Jie Yang, Stephen Weathersby, Suji Park, Michael E. Kozina, Edbert J. Sie, Haidan Wen, Pablo Jarillo-Herrero, Ian R. Fisher, Xijie Wang & Nuh Gedik

摘要：When electrons in a solid are excited by light, they can alter the free energy landscape and access phases of matter that are out of reach in thermal equilibrium. This accessibility becomes important in the presence of phase competition, when one state of matter is preferred over another by only a small energy scale that, in principle, is surmountable by the excitation. Here, we study a layered compound, LaTe3, where a small lattice anisotropy in the a–c plane results in a unidirectional charge density wave (CDW) along the c axis1,2. Using ultrafast electron diffraction, we find that, after photoexcitation, the CDW along the c axis is weakened and a different competing CDW along the a axis subsequently emerges. The timescales characterizing the relaxation of this new CDW and the reestablishment of the original CDW are nearly identical, which points towards a strong competition between the two orders. The new density wave represents a transient non-equilibrium phase of matter with no equilibrium counterpart, and this study thus provides a framework for discovering similar states of matter that are 'trapped' under equilibrium conditions.
链接：https://www.nature.com/articles/s41567-019-0705-3

18.**标题：**Imaging emergent heavy Dirac fermions of a topological Kondo insulator
作者：Harris Pirie, Yu Liu, Anjan Soumyanarayanan, Pengcheng Chen, Yang He, M. M. Yee, P. F. S. Rosa, J. D. Thompson, Dae-Jeong Kim, Z. Fisk, Xiangfeng Wang, Johnpierre Paglione, Dirk K. Morr, M. H. Hamidian & Jennifer E. Hoffman
摘要：The interplay between strong electron interactions and band topology is a new frontier in the search for exotic quantum phases. The Kondo insulator SmB6 has emerged as a promising platform because its correlation-driven bulk gap is predicted to host topological surface modes entangled with f electrons, spawning heavy Dirac fermions1,2,3,4. Unlike the conventional surface states of non-interacting topological insulators, heavy Dirac fermions are expected to harbour spontaneously generated quantum anomalous Hall states5, non-Abelian quantum statistics6,7, fractionalization8 and topological order6,7,8. However, the small energy scales required to probe heavy Dirac fermions have complicated their experimental realization. Here we use high-energy-resolution spectroscopic imaging in real and momentum space on SmB6. On cooling below 35 K, we observe the opening of an insulating gap that expands to 14 meV at 2 K. Within the gap, we image the formation of linearly dispersing surface states with effective masses reaching 410 ± 20 me (where me is the mass of the electron). Our results demonstrate the presence of correlation-driven heavy surface states in SmB6, in agreement with theoretical predictions1,2,3,4. Their high effective mass translates to a large density of states near zero energy, which magnifies their susceptibility to the anticipated novel orders and their potential utility.
链接：https://www.nature.com/articles/s41567-019-0700-8

19.**标题：**The energy cost and optimal design for synchronization of coupled molecular oscillators
作者：Dongliang Zhang, Yuansheng Cao, Qi Ouyang & Yuhai Tu
摘要：A model of coupled molecular biochemical oscillators is proposed to study non-equilibrium thermodynamics of synchronization. Under general considerations, we find that chemical interactions within an ensemble of autonomous oscillators break detailed balance and thus cost energy. This extra energy cost, in addition to the energy dissipated for driving each individual oscillator, is necessary to power the coupling interactions such as oscillator–oscillator exchange reactions, which are responsible for correcting the phase error in each individual noisy oscillator with respect to the collective oscillation of the whole ensemble. By solving the steady-state distribution of the

many-oscillator system analytically and numerically, we show that the system reaches its synchronized state through a non-equilibrium phase transition as energy dissipation increases. The critical energy dissipation per period depends on both the frequency and strength of the exchange reaction, which reveals an optimal (efficient) design for achieving maximum synchronization with a fixed energy budget. We apply our general theory to the Kai system in the cyanobacterial circadian clock and predict a relationship between the KaiC ATPase activity and synchronization of the KaiC hexamers. The theoretical framework established here can be extended to study thermodynamics of collective behaviours in other non-equilibrium active systems.

链接：https://www.nature.com/articles/s41567-019-0701-7

20.**标题：**Determining eigenstates and thermal states on a quantum computer using quantum imaginary time evolution

作者：Mario Motta, Chong Sun, Adrian T. K. Tan, Matthew J. O'Rourke, Erika Ye, Austin J. Minnich, Fernando G. S. L. Brandão & Garnet Kin-Lic Chan

摘要：The accurate computation of Hamiltonian ground, excited and thermal states on quantum computers stands to impact many problems in the physical and computer sciences, from quantum simulation to machine learning. Given the challenges posed in constructing large-scale quantum computers, these tasks should be carried out in a resource-efficient way. In this regard, existing techniques based on phase estimation or variational algorithms display potential disadvantages; phase estimation requires deep circuits with ancillae, that are hard to execute reliably without error correction, while variational algorithms, while flexible with respect to circuit depth, entail additional high-dimensional classical optimization. Here, we introduce the quantum imaginary time evolution and quantum Lanczos algorithms, which are analogues of classical algorithms for finding ground and excited states. Compared with their classical counterparts, they require exponentially less space and time per iteration, and can be implemented without deep circuits and ancillae, or high-dimensional optimization. We furthermore discuss quantum imaginary time evolution as a subroutine to generate Gibbs averages through an analogue of minimally entangled typical thermal states. Finally, we demonstrate the potential of these algorithms via an implementation using exact classical emulation as well as through prototype circuits on the Rigetti quantum virtual machine and Aspen-1 quantum processing unit.

链接：https://www.nature.com/articles/s41567-019-0704-4

21. **标题：**Observation of a ferro-rotational order coupled with second-order nonlinear optical fields

作者：Wencan Jin, Elizabeth Drueke, Siwen Li, Alemayehu Admasu, Rachel Owen, Matthew Day, Kai Sun, Sang-Wook Cheong & Liuyan Zhao

摘要：Ferroic orders can be classified by the symmetry of their order parameters, and ferroelectric, ferromagnetic and ferro-toroidal orders have already been observed. The ferro-rotational order1,2,3, whose order parameter is an axial vector invariant under both time-reversal and spatial-inversion operations, is the final ferroic to be identified and has a vector order parameter. This order is closely related to a number of phenomena such as polar vortices4, giant magnetoelectric coupling5 and spin-helicity-driven ferroelectricity6, but it has received little attention so far. Here, using high-sensitivity rotational-anisotropy second-harmonic generation, we have exploited the electric quadrupole contribution to the second-harmonic generation to directly couple to this centrosymmetric ferro-rotational order in an archetype of type-II multiferroics, RbFe(MoO4)2. We found that two

domain states with opposite ferro-rotational vectors emerge with distinct populations at the critical temperature Tc ≈ 195 K and gradually evolve to reach an even ratio at lower temperatures. Moreover, we have identified the ferro-rotational order phase transition as weakly first order and have revealed its coupling field as a unique combination of the induced electric quadrupole second-harmonic generation and the incident fundamental electric fields.

链接：https://www.nature.com/articles/s41567-019-0695-1

22. **标题：**Light-induced anomalous Hall effect in graphene

作者：J. W. McIver, B. Schulte, F.-U. Stein, T. Matsuyama, G. Jotzu, G. Meier & A. Cavalleri

摘要：Many non-equilibrium phenomena have been discovered or predicted in optically driven quantum solids1. Examples include light-induced superconductivity2,3 and Floquet-engineered topological phases4,5,6,7,8. These are short-lived effects that should lead to measurable changes in electrical transport, which can be characterized using an ultrafast device architecture based on photoconductive switches9. Here, we report the observation of a light-induced anomalous Hall effect in monolayer graphene driven by a femtosecond pulse of circularly polarized light. The dependence of the effect on a gate potential used to tune the Fermi level reveals multiple features that reflect a Floquet-engineered topological band structure4,5, similar to the band structure originally proposed by Haldane10. This includes an approximately 60 meV wide conductance plateau centred at the Dirac point, where a gap of equal magnitude is predicted to open. We find that when the Fermi level lies within this plateau the estimated anomalous Hall conductance saturates around $1.8 \pm 0.4\ e^2/h$.

链接：https://www.nature.com/articles/s41567-019-0698-y

23. **标题：**Quenched nematic criticality and two superconducting domes in an iron-based superconductor

作者：Pascal Reiss, David Graf, Amir A. Haghighirad, William Knafo, Loïc Drigo, Matthew Bristow, Andrew J. Schofield & Amalia I. Coldea

摘要：The nematic electronic state and its associated critical fluctuations have emerged as a potential candidate for the superconducting pairing in various unconventional superconductors. However, in most materials their coexistence with magnetically ordered phases poses a significant challenge in determining their importance. Here, by combining chemical and hydrostatic physical pressure in FeSe0.89S0.11, we access a nematic quantum phase transition isolated from any other competing magnetic phases. From quantum oscillations in high magnetic fields, we trace the evolution of the Fermi surface and electronic correlations as a function of applied pressure and detect a Lifshitz transition that separates two distinct superconducting regions. One emerges from the nematic phase with a small Fermi surface and strong electronic correlations, while the other one has a large Fermi surface and weak correlations that promotes nesting and stabilization of a magnetically ordered phase at high pressures. The absence of mass divergence at the nematic quantum phase transition suggests that the nematic fluctuations could be quenched by the strong coupling to the lattice or local strain effects. A direct consequence is the weakening of superconductivity at the nematic quantum phase transition in the absence of magnetically driven fluctuations.

链接：https://www.nature.com/articles/s41567-019-0694-2

24. **标题：**Interacting topological edge channels

作者：Jonas Strunz, Jonas Wiedenmann, Christoph Fleckenstein, Lukas Lunczer, Wouter Beugeling, Valentin L. Müller, Pragya Shekhar, Niccolò Traverso Ziani, Saquib Shamim, Johannes Kleinlein, Hartmut Buhmann, Björn Trauzettel & Laurens W. Molenkamp

摘要：Electrical currents in a quantum spin Hall insulator are confined to the boundary of the system. The charge carriers behave as massless relativistic particles whose spin and momentum are coupled to each other. Although the helical character of those states is already established by experiments, there is an open question regarding how those edge states interact with each other when they are brought into close spatial proximity. We employ an inverted HgTe quantum well to guide edge channels from opposite sides of a device into a quasi-one-dimensional constriction. Our transport measurements show that, apart from the expected quantization in integer steps of 2e2/h, we find an additional plateau at e2/h. We combine band structure calculations and repulsive electron–electron interaction effects captured within the Tomonaga–Luttinger liquid model and Rashba spin–orbit coupling to explain our observation in terms of the opening of a spin gap. These results may have direct implications for the study of one-dimensional helical electron quantum optics, and for understanding Majorana and para fermions.

链接：https://www.nature.com/articles/s41567-019-0692-4

25. **标题：**Tomonaga–Luttinger liquid in the edge channels of a quantum spin Hall insulator

作者：R. Stühler, F. Reis, T. Müller, T. Helbig, T. Schwemmer, R. Thomale, J. Schäfer & R. Claessen

摘要：Quantum spin Hall insulators are two-dimensional materials that host conducting helical electron states strictly confined to the one-dimensional boundaries. These edge channels are protected by time-reversal symmetry against single-particle backscattering, opening new avenues for spin-based electronics and computation. However, the effect of the interelectronic Coulomb repulsion also has to be taken into account, as two-particle scattering is not impeded by topological protection and may strongly affect the edge state conductance. Here, we explore the impact of electronic correlations on highly localized edge states of the unique quantum spin Hall material bismuthene on SiC(0001) (ref. 1). Exploiting the advantage of having an accessible monolayer substrate system, we use STM/STS to visualize the close-to-perfect one-dimensional confinement of the edge channels and scrutinize their suppressed density of states at the Fermi level. On the basis of the observed spectral behaviour and its universal scaling with energy and temperature, we demonstrate the correspondence with a (helical) Tomonaga–Luttinger liquid. In particular, the extracted interaction parameter K is directly relevant to the fundamental question of the temperatures at which the quantized conductance (a hallmark of quantum spin Hall materials) will become obscured by correlations2.

链接：https://www.nature.com/articles/s41567-019-0697-z

IEL Top25

（来源：http://ieeexplore.ieee.org/）

1.标题：A Software Defined Fog Node Based Distributed Blockchain Cloud Architecture for IoT
出处：IEEE Access (Volume: 6)
Page(s): 115 – 124
作者：Pradip Kumar Sharma ; Mu-Yen Chen ; Jong Hyuk Park
摘要：The recent expansion of the Internet of Things (IoT) and the consequent explosion in the volume of data produced by smart devices have led to the outsourcing of data to designated data centers. However, to manage these huge data stores, centralized data centers, such as cloud storage cannot afford auspicious way. There are many challenges that must be addressed in the traditional network architecture due to the rapid growth in the diversity and number of devices connected to the internet, which is not designed to provide high availability, real-time data delivery, scalability, security, resilience, and low latency. To address these issues, this paper proposes a novel blockchain-based distributed cloud architecture with a software defined networking (SDN) enable controller fog nodes at the edge of the network to meet the required design principles. The proposed model is a distributed cloud architecture based on blockchain technology, which provides low-cost, secure, and on-demand access to the most competitive computing infrastructures in an IoT network. By creating a distributed cloud infrastructure, the proposed model enables cost-effective high-performance computing. Furthermore, to bring computing resources to the edge of the IoT network and allow low latency access to large amounts of data in a secure manner, we provide a secure distributed fog node architecture that uses SDN and blockchain techniques. Fog nodes are distributed fog computing entities that allow the deployment of fog services, and are formed by multiple computing resources at the edge of the IoT network. We evaluated the performance of our proposed architecture and compared it with the existing models using various performance measures. The results of our evaluation show that performance is improved by reducing the induced delay, reducing the response time, increasing throughput, and the ability to detect real-time attacks in the IoT network with low performance overheads.
链接：https://ieeexplore.ieee.org/document/8053750

2.标题：Millimeter Wave Mobile Communications for 5G Cellular: It Will Work!
出处：IEEE Access (Volume: 1)
Page(s): 335 - 349
作者：Theodore S. Rappaport ; Shu Sun ; Rimma Mayzus ; Hang Zhao ; Yaniv Azar ; Kevin Wang ; George N. Wong ; Jocelyn K. Schulz ; Mathew Samimi ; Felix Gutierrez
摘要：The global bandwidth shortage facing wireless carriers has motivated the exploration of the underutilized millimeter wave (mm-wave) frequency spectrum for future broadband cellular communication networks. There is, however, little knowledge about cellular mm-wave propagation in densely populated indoor and outdoor environments. Obtaining this information is vital for the design and operation of future fifth generation cellular networks that use the mm-wave spectrum. In

this paper, we present the motivation for new mm-wave cellular systems, methodology, and hardware for measurements and offer a variety of measurement results that show 28 and 38 GHz frequencies can be used when employing steerable directional antennas at base stations and mobile devices.
链接：https://ieeexplore.ieee.org/document/6515173

3.标题：Internet of Things for Smart Cities
出处：IEEE Internet of Things Journal (Volume: 1 , Issue: 1 , Feb. 2014)
Page(s): 22 – 32
作者：Andrea Zanella ; Nicola Bui ; Angelo Castellani ; Lorenzo Vangelista ; Michele Zorzi
摘要：The Internet of Things (IoT) shall be able to incorporate transparently and seamlessly a large number of different and heterogeneous end systems, while providing open access to selected subsets of data for the development of a plethora of digital services. Building a general architecture for the IoT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system. In this paper, we focus specifically to an urban IoT system that, while still being quite a broad category, are characterized by their specific application domain. Urban IoTs, in fact, are designed to support the Smart City vision, which aims at exploiting the most advanced communication technologies to support added-value services for the administration of the city and for the citizens. This paper hence provides a comprehensive survey of the enabling technologies, protocols, and architecture for an urban IoT. Furthermore, the paper will present and discuss the technical solutions and best-practice guidelines adopted in the Padova Smart City project, a proof-of-concept deployment of an IoT island in the city of Padova, Italy, performed in collaboration with the city municipality.
链接：https://ieeexplore.ieee.org/document/6740844

4.标题：Security for 5G Mobile Wireless Networks
出处：IEEE Access (Volume: 6)
Page(s): 4850 – 4874
作者：Dongfeng Fang ; Yi Qian ; Rose Qingyang Hu
摘要：The advanced features of 5G mobile wireless network systems yield new security requirements and challenges. This paper presents a comprehensive study on the security of 5G wireless network systems compared with the traditional cellular networks. The paper starts with a review on 5G wireless networks particularities as well as on the new requirements and motivations of 5G wireless security. The potential attacks and security services are summarized with the consideration of new service requirements and new use cases in 5G wireless networks. The recent development and the existing schemes for the 5G wireless security are presented based on the corresponding security services, including authentication, availability, data confidentiality, key management, and privacy. This paper further discusses the new security features involving different technologies applied to 5G, such as heterogeneous networks, device-to-device communications, massive multiple-input multiple-output, software-defined networks, and Internet of Things. Motivated by these security research and development activities, we propose a new 5G wireless security architecture, based on which the analysis of identity management and flexible authentication is provided. As a case study, we explore a handover procedure as well as a signaling load scheme to show the advantages of the proposed security architecture. The challenges and future directions of 5G wireless security are finally summarized.

链接：https://ieeexplore.ieee.org/document/8125684

5.标题：Massive MIMO for next generation wireless systems
出处：IEEE Communications Magazine (Volume: 52 , Issue: 2 , February 2014)
Page(s): 186 - 195
作者：Erik G. Larsson ; Ove Edfors ; Fredrik Tufvesson ; Thomas L. Marzetta
摘要：Multi-user MIMO offers big advantages over conventional point-to-point MIMO: it works with cheap single-antenna terminals, a rich scattering environment is not required, and resource allocation is simplified because every active terminal utilizes all of the time-frequency bins. However, multi-user MIMO, as originally envisioned, with roughly equal numbers of service antennas and terminals and frequency-division duplex operation, is not a scalable technology. Massive MIMO (also known as large-scale antenna systems, very large MIMO, hyper MIMO, full-dimension MIMO, and ARGOS) makes a clean break with current practice through the use of a large excess of service antennas over active terminals and time-division duplex operation. Extra antennas help by focusing energy into ever smaller regions of space to bring huge improvements in throughput and radiated energy efficiency. Other benefits of massive MIMO include extensive use of inexpensive low-power components, reduced latency, simplification of the MAC layer, and robustness against intentional jamming. The anticipated throughput depends on the propagation environment providing asymptotically orthogonal channels to the terminals, but so far experiments have not disclosed any limitations in this regard. While massive MIMO renders many traditional research problems irrelevant, it uncovers entirely new problems that urgently need attention: the challenge of making many low-cost low-precision components that work effectively together, acquisition and synchronization for newly joined terminals, the exploitation of extra degrees of freedom provided by the excess of service antennas, reducing internal power consumption to achieve total energy efficiency reductions, and finding new deployment scenarios. This article presents an overview of the massive MIMO concept and contemporary research on the topic.
链接：https://ieeexplore.ieee.org/document/6736761

6.标题：Application of Big Data and Machine Learning in Smart Grid, and Associated Security Concerns: A Review
出处：IEEE Access (Volume: 7)
Page(s): 13960 - 13988
作者：Eklas Hossain ; Imtiaj Khan ; Fuad Un-Noor ; Sarder Shazali Sikander ; Md. Samiul Haque Sunny
摘要：This paper conducts a comprehensive study on the application of big data and machine learning in the electrical power grid introduced through the emergence of the next-generation power system-the smart grid (SG). Connectivity lies at the core of this new grid infrastructure, which is provided by the Internet of Things (IoT). This connectivity, and constant communication required in this system, also introduced a massive data volume that demands techniques far superior to conventional methods for proper analysis and decision-making. The IoT-integrated SG system can provide efficient load forecasting and data acquisition technique along with cost-effectiveness. Big data analysis and machine learning techniques are essential to reaping these benefits. In the complex connected system of SG, cyber security becomes a critical issue; IoT devices and their data turning into major targets of attacks. Such security concerns and their solutions are also included in this paper.

Key information obtained through literature review is tabulated in the corresponding sections to provide a clear synopsis; and the findings of this rigorous review are listed to give a concise picture of this area of study and promising future fields of academic and industrial research, with current limitations with viable solutions along with their effectiveness.
链接：https://ieeexplore.ieee.org/document/8625421

7.标题：SoCodeCNN: Program Source Code for Visual CNN Classification Using Computer Vision Methodology
出处：IEEE Access (Volume: 7)
Page(s): 157158 - 157172
作者：Somdip Dey ; Amit Kumar Singh ; Dilip Kumar Prasad ; Klaus Dieter Mcdonald-Maier
摘要：Automated feature extraction from program source-code such that proper computing resources could be allocated to the program is very difficult given the current state of technology. Therefore, conventional methods call for skilled human intervention in order to achieve the task of feature extraction from programs. This research is the first to propose a novel human-inspired approach to automatically convert program source-codes to visual images. The images could be then utilized for automated classification by visual convolutional neural network (CNN) based algorithm. Experimental results show high prediction accuracy in classifying the types of program in a completely automated manner using this approach.
链接：https://ieeexplore.ieee.org/document/8882216

8.标题：Blockchains and Smart Contracts for the Internet of Things
出处：IEEE Access (Volume: 4)
Page(s): 2292 - 2303
作者：Konstantinos Christidis ; Michael Devetsikiotis
摘要：Motivated by the recent explosion of interest around blockchains, we examine whether they make a good fit for the Internet of Things (IoT) sector. Blockchains allow us to have a distributed peer-to-peer network where non-trusting members can interact with each other without a trusted intermediary, in a verifiable manner. We review how this mechanism works and also look into smart contracts-scripts that reside on the blockchain that allow for the automation of multi-step processes. We then move into the IoT domain, and describe how a blockchain-IoT combination: 1) facilitates the sharing of services and resources leading to the creation of a marketplace of services between devices and 2) allows us to automate in a cryptographically verifiable manner several existing, time-consuming workflows. We also point out certain issues that should be considered before the deployment of a blockchain network in an IoT setting: from transactional privacy to the expected value of the digitized assets traded on the network. Wherever applicable, we identify solutions and workarounds. Our conclusion is that the blockchain-IoT combination is powerful and can cause significant transformations across several industries, paving the way for new business models and novel, distributed applications.
链接：https://ieeexplore.ieee.org/document/7467408/

9.标题：A Survey of 5G Network: Architecture and Emerging Technologies
出处：IEEE Access (Volume: 3)
Page(s): 1206 - 1232

作者：A. Gupta ; R. K. Jha

摘要：In the near future, i.e., beyond 4G, some of the prime objectives or demands that need to be addressed are increased capacity, improved data rate, decreased latency, and better quality of service. To meet these demands, drastic improvements need to be made in cellular network architecture. This paper presents the results of a detailed survey on the fifth generation (5G) cellular network architecture and some of the key emerging technologies that are helpful in improving the architecture and meeting the demands of users. In this detailed survey, the prime focus is on the 5G cellular network architecture, massive multiple input multiple output technology, and device-to-device communication (D2D). Along with this, some of the emerging technologies that are addressed in this paper include interference management, spectrum sharing with cognitive radio, ultra-dense networks, multi-radio access technology association, full duplex radios, millimeter wave solutions for 5G cellular networks, and cloud technologies for 5G radio access networks and software defined networks. In this paper, a general probable 5G cellular network architecture is proposed, which shows that D2D, small cell access points, network cloud, and the Internet of Things can be a part of 5G cellular network architecture. A detailed survey is included regarding current research projects being conducted in different countries by research groups and institutions that are working on 5G technologies.

链接：https://ieeexplore.ieee.org/document/7169508

10.标题：Wireless Communications and Applications Above 100 GHz: Opportunities and Challenges for 6G and Beyond

出处：IEEE Access (Volume: 7)

Page(s): 78729 - 78757

作者：Theodore S. Rappaport ; Yunchou Xing ; Ojas Kanhere ; Shihao Ju ; Arjuna Madanayake ; Soumyajit Mandal ; Ahmed Alkhateeb ; Georgios C. Trichopoulos

摘要：Frequencies from 100 GHz to 3 THz are promising bands for the next generation of wireless communication systems because of the wide swaths of unused and unexplored spectrum. These frequencies also offer the potential for revolutionary applications that will be made possible by new thinking, and advances in devices, circuits, software, signal processing, and systems. This paper describes many of the technical challenges and opportunities for wireless communication and sensing applications above 100 GHz, and presents a number of promising discoveries, novel approaches, and recent results that will aid in the development and implementation of the sixth generation (6G) of wireless networks, and beyond. This paper shows recent regulatory and standard body rulings that are anticipating wireless products and services above 100 GHz and illustrates the viability of wireless cognition, hyper-accurate position location, sensing, and imaging. This paper also presents approaches and results that show how long distance mobile communications will be supported to above 800 GHz since the antenna gains are able to overcome air-induced attenuation, and present methods that reduce the computational complexity and simplify the signal processing used in adaptive antenna arrays, by exploiting the Special Theory of Relativity to create a cone of silence in over-sampled antenna arrays that improve performance for digital phased array antennas. Also, new results that give insights into power efficient beam steering algorithms, and new propagation and partition loss models above 100 GHz are given, and promising imaging, array processing, and position location results are presented. The implementation of spatial consistency at THz frequencies, an important component of channel modeling that considers minute changes and correlations over

space, is also discussed. This paper offers the first in-depth look at the vast applications of THz wireless products and applications and provides approaches ...
(View more)
链接：https://ieeexplore.ieee.org/document/8732419/

11.标题：SegNet: A Deep Convolutional Encoder-Decoder Architecture for Image Segmentation
出处：IEEE Transactions on Pattern Analysis and Machine Intelligence (Volume: 39 , Issue: 12 , Dec. 1 2017)
Page(s): 2481 - 2495
作者：Vijay Badrinarayanan ; Alex Kendall ; Roberto Cipolla
摘要：We present a novel and practical deep fully convolutional neural network architecture for semantic pixel-wise segmentation termed SegNet. This core trainable segmentation engine consists of an encoder network, a corresponding decoder network followed by a pixel-wise classification layer. The architecture of the encoder network is topologically identical to the 13 convolutional layers in the VGG16 network [1] . The role of the decoder network is to map the low resolution encoder feature maps to full input resolution feature maps for pixel-wise classification. The novelty of SegNet lies is in the manner in which the decoder upsamples its lower resolution input feature map(s). Specifically, the decoder uses pooling indices computed in the max-pooling step of the corresponding encoder to perform non-linear upsampling. This eliminates the need for learning to upsample. The upsampled maps are sparse and are then convolved with trainable filters to produce dense feature maps. We compare our proposed architecture with the widely adopted FCN [2] and also with the well known DeepLab-LargeFOV [3] , DeconvNet [4] architectures. This comparison reveals the memory versus accuracy trade-off involved in achieving good segmentation performance. SegNet was primarily motivated by scene understanding applications. Hence, it is designed to be efficient both in terms of memory and computational time during inference. It is also significantly smaller in the number of trainable parameters than other competing architectures and can be trained end-to-end using stochastic gradient descent. We also performed a controlled benchmark of SegNet and other architectures on both road scenes and SUN RGB-D indoor scene segmentation tasks. These quantitative assessments show that SegNet provides good performance with competitive inference time and most efficient inference memory-wise as compared to other architectures. We also provide a Caffe implementation of SegNet and a web demo at http://mi.eng.cam....
链接：https://ieeexplore.ieee.org/document/7803544

12.标题：Decentralizing Privacy: Using Blockchain to Protect Personal Data
出处：2015 IEEE Security and Privacy Workshops
作者：Guy Zyskind ; Oz Nathan ; Alex 'Sandy' Pentland
摘要：The recent increase in reported incidents of surveillance and security breaches compromising users' privacy call into question the current model, in which third-parties collect and control massive amounts of personal data. Bit coin has demonstrated in the financial space that trusted, auditable computing is possible using a decentralized network of peers accompanied by a public ledger. In this paper, we describe a decentralized personal data management system that ensures users own and control their data. We implement a protocol that turns a block chain into an automated access-control manager that does not require trust in a third party. Unlike Bit coin, transactions in our system are not strictly financial -- they are used to carry instructions, such as storing, querying and sharing data.

Finally, we discuss possible future extensions to block chains that could harness them into a well-rounded solution for trusted computing problems in society.
链接：https://ieeexplore.ieee.org/document/7163223

13.标题：Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications
出处：IEEE Communications Surveys & Tutorials
作者：Ala Al-Fuqaha ; Mohsen Guizani ; Mehdi Mohammadi ; Mohammed Aledhari ; Moussa Ayyash
摘要：This paper provides an overview of the Internet of Things (IoT) with emphasis on enabling technologies, protocols, and application issues. The IoT is enabled by the latest developments in RFID, smart sensors, communication technologies, and Internet protocols. The basic premise is to have smart sensors collaborate directly without human involvement to deliver a new class of applications. The current revolution in Internet, mobile, and machine-to-machine (M2M) technologies can be seen as the first phase of the IoT. In the coming years, the IoT is expected to bridge diverse technologies to enable new applications by connecting physical objects together in support of intelligent decision making. This paper starts by providing a horizontal overview of the IoT. Then, we give an overview of some technical details that pertain to the IoT enabling technologies, protocols, and applications. Compared to other survey papers in the field, our objective is to provide a more thorough summary of the most relevant protocols and application issues to enable researchers and application developers to get up to speed quickly on how the different protocols fit together to deliver desired functionalities without having to go through RFCs and the standards specifications. We also provide an overview of some of the key IoT challenges presented in the recent literature and provide a summary of related research work. Moreover, we explore the relation between the IoT and other emerging technologies including big data analytics and cloud and fog computing. We also present the need for better horizontal integration among IoT services. Finally, we present detailed service use-cases to illustrate how the different protocols presented in the paper fit together to deliver desired IoT services.
链接：https://ieeexplore.ieee.org/document/7123563

14.标题：A Survey on Transfer Learning
出处：IEEE Transactions on Knowledge and Data Engineering (Volume: 22 , Issue: 10 , Oct. 2010) Page(s): 1345 - 1359
作者：Sinno Jialin Pan ; Qiang Yang
摘要：A major assumption in many machine learning and data mining algorithms is that the training and future data must be in the same feature space and have the same distribution. However, in many real-world applications, this assumption may not hold. For example, we sometimes have a classification task in one domain of interest, but we only have sufficient training data in another domain of interest, where the latter data may be in a different feature space or follow a different data distribution. In such cases, knowledge transfer, if done successfully, would greatly improve the performance of learning by avoiding much expensive data-labeling efforts. In recent years, transfer learning has emerged as a new learning framework to address this problem. This survey focuses on categorizing and reviewing the current progress on transfer learning for classification, regression, and clustering problems. In this survey, we discuss the relationship between transfer learning and other related machine learning techniques such as domain adaptation, multitask learning and sample

selection bias, as well as covariate shift. We also explore some potential future issues in transfer learning research.
链接：https://ieeexplore.ieee.org/document/5288526

15.标题：A Survey of Data Mining and Machine Learning Methods for Cyber Security Intrusion Detection
出处：IEEE Communications Surveys & Tutorials (Volume: 18 , Issue: 2 , Secondquarter 2016)
Page(s): 1153 - 1176
作者：Anna L. Buczak ; Erhan Guven
摘要：This survey paper describes a focused literature survey of machine learning (ML) and data mining (DM) methods for cyber analytics in support of intrusion detection. Short tutorial descriptions of each ML/DM method are provided. Based on the number of citations or the relevance of an emerging method, papers representing each method were identified, read, and summarized. Because data are so important in ML/DM approaches, some well-known cyber data sets used in ML/DM are described. The complexity of ML/DM algorithms is addressed, discussion of challenges for using ML/DM for cyber security is presented, and some recommendations on when to use a given method are provided.
链接：https://ieeexplore.ieee.org/document/7307098

16.标题：Disease Prediction by Machine Learning Over Big Data From Healthcare Communities
出处：IEEE Access (Volume: 5)
Page(s): 8869 - 8879
作者：Min Chen ; Yixue Hao ; Kai Hwang ; Lu Wang ; Lin Wang
摘要：With big data growth in biomedical and healthcare communities, accurate analysis of medical data benefits early disease detection, patient care, and community services. However, the analysis accuracy is reduced when the quality of medical data is incomplete. Moreover, different regions exhibit unique characteristics of certain regional diseases, which may weaken the prediction of disease outbreaks. In this paper, we streamline machine learning algorithms for effective prediction of chronic disease outbreak in disease-frequent communities. We experiment the modified prediction models over real-life hospital data collected from central China in 2013-2015. To overcome the difficulty of incomplete data, we use a latent factor model to reconstruct the missing data. We experiment on a regional chronic disease of cerebral infarction. We propose a new convolutional neural network (CNN)-based multimodal disease risk prediction algorithm using structured and unstructured data from hospital. To the best of our knowledge, none of the existing work focused on both data types in the area of medical big data analytics. Compared with several typical prediction algorithms, the prediction accuracy of our proposed algorithm reaches 94.8% with a convergence speed, which is faster than that of the CNN-based unimodal disease risk prediction algorithm.
链接：https://ieeexplore.ieee.org/document/7912315

17.标题：Deep Residual Learning for Image Recognition
出处：2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
作者：Kaiming He ; Xiangyu Zhang ; Shaoqing Ren ; Jian Sun
摘要：Deeper neural networks are more difficult to train. We present a residual learning framework to ease the training of networks that are substantially deeper than those used previously. We explicitly

reformulate the layers as learning residual functions with reference to the layer inputs, instead of learning unreferenced functions. We provide comprehensive empirical evidence showing that these residual networks are easier to optimize, and can gain accuracy from considerably increased depth. On the ImageNet dataset we evaluate residual nets with a depth of up to 152 layers - 8× deeper than VGG nets [40] but still having lower complexity. An ensemble of these residual nets achieves 3.57% error on the ImageNet test set. This result won the 1st place on the ILSVRC 2015 classification task. We also present analysis on CIFAR-10 with 100 and 1000 layers. The depth of representations is of central importance for many visual recognition tasks. Solely due to our extremely deep representations, we obtain a 28% relative improvement on the COCO object detection dataset. Deep residual nets are foundations of our submissions to ILSVRC & COCO 2015 competitions1, where we also won the 1st places on the tasks of ImageNet detection, ImageNet localization, COCO detection, and COCO segmentation.
链接：https://ieeexplore.ieee.org/document/7780459

18.标题：Speech Recognition Using Deep Neural Networks: A Systematic Review
出处：IEEE Access (Volume: 7)
Page(s): 19143 - 19165
作者：Ali Bou Nassif ; Ismail Shahin ; Imtinan Attili ; Mohammad Azzeh ; Khaled Shaalan
摘要：Over the past decades, a tremendous amount of research has been done on the use of machine learning for speech processing applications, especially speech recognition. However, in the past few years, research has focused on utilizing deep learning for speech-related applications. This new area of machine learning has yielded far better results when compared to others in a variety of applications including speech, and thus became a very attractive area of research. This paper provides a thorough examination of the different studies that have been conducted since 2006, when deep learning first arose as a new area of machine learning, for speech applications. A thorough statistical analysis is provided in this review which was conducted by extracting specific information from 174 papers published between the years 2006 and 2018. The results provided in this paper shed light on the trends of research in this area as well as bring focus to new research topics.
链接：https://ieeexplore.ieee.org/document/8632885

19.标题：Peeking Inside the Black-Box: A Survey on Explainable Artificial Intelligence (XAI)
出处：IEEE Access (Volume: 6)
Page(s): 52138 - 52160
作者：Amina Adadi ; Mohammed Berrada
摘要：At the dawn of the fourth industrial revolution, we are witnessing a fast and widespread adoption of artificial intelligence (AI) in our daily life, which contributes to accelerating the shift towards a more algorithmic society. However, even with such unprecedented advancements, a key impediment to the use of AI-based systems is that they often lack transparency. Indeed, the black-box nature of these systems allows powerful predictions, but it cannot be directly explained. This issue has triggered a new debate on explainable AI (XAI). A research field holds substantial promise for improving trust and transparency of AI-based systems. It is recognized as the sine qua non for AI to continue making steady progress without disruption. This survey provides an entry point for interested researchers and practitioners to learn key aspects of the young and rapidly growing body of research related to XAI. Through the lens of the literature, we review the existing approaches

regarding the topic, discuss trends surrounding its sphere, and present major research trajectories.
链接：https://ieeexplore.ieee.org/document/8466590

20.标题：A Survey on 5G Networks for the Internet of Things: Communication Technologies and Challenges
出处：IEEE Access (Volume: 6)
Page(s): 3619 - 3647
作者：Godfrey Anuga Akpakwu ; Bruno J. Silva ; Gerhard P. Hancke ; Adnan M. Abu-Mahfouz
摘要：The Internet of Things (IoT) is a promising technology which tends to revolutionize and connect the global world via heterogeneous smart devices through seamless connectivity. The current demand for machine-type communications (MTC) has resulted in a variety of communication technologies with diverse service requirements to achieve the modern IoT vision. More recent cellular standards like long-term evolution (LTE) have been introduced for mobile devices but are not well suited for low-power and low data rate devices such as the IoT devices. To address this, there is a number of emerging IoT standards. Fifth generation (5G) mobile network, in particular, aims to address the limitations of previous cellular standards and be a potential key enabler for future IoT. In this paper, the state-of-the-art of the IoT application requirements along with their associated communication technologies are surveyed. In addition, the third generation partnership project cellular-based low-power wide area solutions to support and enable the new service requirements for Massive to Critical IoT use cases are discussed in detail, including extended coverage global system for mobile communications for the Internet of Things, enhanced machine-type communications, and narrowband-Internet of Things. Furthermore, 5G new radio enhancements for new service requirements and enabling technologies for the IoT are introduced. This paper presents a comprehensive review related to emerging and enabling technologies with main focus on 5G mobile networks that is envisaged to support the exponential traffic growth for enabling the IoT. The challenges and open research directions pertinent to the deployment of massive to critical IoT applications are also presented in coming up with an efficient context-aware congestion control mechanism.
链接：https://ieeexplore.ieee.org/document/8141874

21.标题：NutBaaS: A Blockchain-as-a-Service Platform
出处：IEEE Access (Volume: 7)
Page(s): 134422 - 134433
作者：Weilin Zheng ; Zibin Zheng ; Xiangping Chen ; Kemian Dai ; Peishan Li ; Renfei Chen
摘要：Blockchain, originated from Bitcoin system, has drawn intense attention from the academic community because of its decentralization, persistency, anonymity and auditability. In the past decade, the blockchain technology has evolved and became viable for various applications beyond the domain of finance. However, due to the complexity of blockchain technology, it is usually difficult and costly for most developers or teams to build, maintain and monitor a blockchain network that supports their applications. Most common developers or teams are unable to ensure the reliability and security of the blockchain system, which to a certain extent affects the quality of their applications. In this paper, we develop a BaaS platform called NutBaaS, which provides blockchain service over cloud computing environments, such as network deployment and system monitoring, smart contracts analysis and testing. Based on these services, developers can focus on the business

code to explore how to apply blockchain technology more appropriately to their business scenarios, without bothering to maintain and monitor the system.
链接：https://ieeexplore.ieee.org/document/8840920

22.标题：VINS-Mono: A Robust and Versatile Monocular Visual-Inertial State Estimator
出处：IEEE Transactions on Robotics (Volume: 34 , Issue: 4 , Aug. 2018)
Page(s): 1004 - 1020
作者：Tong Qin ; Peiliang Li ; Shaojie Shen
摘要：One camera and one low-cost inertial measurement unit (IMU) form a monocular visual-inertial system (VINS), which is the minimum sensor suite (in size, weight, and power) for the metric six degrees-of-freedom (DOF) state estimation. In this paper, we present VINS-Mono: a robust and versatile monocular visual-inertial state estimator. Our approach starts with a robust procedure for estimator initialization. A tightly coupled, nonlinear optimization-based method is used to obtain highly accurate visual-inertial odometry by fusing preintegrated IMU measurements and feature observations. A loop detection module, in combination with our tightly coupled formulation, enables relocalization with minimum computation. We additionally perform 4-DOF pose graph optimization to enforce the global consistency. Furthermore, the proposed system can reuse a map by saving and loading it in an efficient way. The current and previous maps can be merged together by the global pose graph optimization. We validate the performance of our system on public datasets and real-world experiments and compare against other state-of-the-art algorithms. We also perform an onboard closed-loop autonomous flight on the microaerial-vehicle platform and port the algorithm to an iOS-based demonstration. We highlight that the proposed work is a reliable, complete, and versatile system that is applicable for different applications that require high accuracy in localization. We open source our implementations for both PCs (https://github.com/HKUST-Aerial-Robotics/VINS-Mono) and iOS mobile devices.
链接：https://ieeexplore.ieee.org/document/8421746

23.标题：Color Balance and Fusion for Underwater Image Enhancement
出处：IEEE Transactions on Image Processing (Volume: 27 , Issue: 1 , Jan. 2018)
Page(s): 379 - 393
作者：Codruta O. Ancuti ; Cosmin Ancuti ; Christophe De Vleeschouwer ; Philippe Bekaert
摘要：We introduce an effective technique to enhance the images captured underwater and degraded due to the medium scattering and absorption. Our method is a single image approach that does not require specialized hardware or knowledge about the underwater conditions or scene structure. It builds on the blending of two images that are directly derived from a color-compensated and white-balanced version of the original degraded image. The two images to fusion, as well as their associated weight maps, are defined to promote the transfer of edges and color contrast to the output image. To avoid that the sharp weight map transitions create artifacts in the low frequency components of the reconstructed image, we also adapt a multiscale fusion strategy. Our extensive qualitative and quantitative evaluation reveals that our enhanced images and videos are characterized by better exposedness of the dark regions, improved global contrast, and edges sharpness. Our validation also proves that our algorithm is reasonably independent of the camera settings, and improves the accuracy of several image processing applications, such as image segmentation and keypoint matching.

链接：https://ieeexplore.ieee.org/document/8058463

24.标题：Object Detection With Deep Learning: A Review
出处：IEEE Transactions on Neural Networks and Learning Systems (Volume: 30 , Issue: 11 , Nov. 2019)
Page(s): 3212 - 3232
作者：Zhong-Qiu Zhao ; Peng Zheng ; Shou-Tao Xu ; Xindong Wu
摘要：Due to object detection's close relationship with video analysis and image understanding, it has attracted much research attention in recent years. Traditional object detection methods are built on handcrafted features and shallow trainable architectures. Their performance easily stagnates by constructing complex ensembles that combine multiple low-level image features with high-level context from object detectors and scene classifiers. With the rapid development in deep learning, more powerful tools, which are able to learn semantic, high-level, deeper features, are introduced to address the problems existing in traditional architectures. These models behave differently in network architecture, training strategy, and optimization function. In this paper, we provide a review of deep learning-based object detection frameworks. Our review begins with a brief introduction on the history of deep learning and its representative tool, namely, the convolutional neural network. Then, we focus on typical generic object detection architectures along with some modifications and useful tricks to improve detection performance further. As distinct specific detection tasks exhibit different characteristics, we also briefly survey several specific tasks, including salient object detection, face detection, and pedestrian detection. Experimental analyses are also provided to compare various methods and draw some meaningful conclusions. Finally, several promising directions and tasks are provided to serve as guidelines for future work in both object detection and relevant neural network-based learning systems.
链接：https://ieeexplore.ieee.org/document/8627998

25.标题：Deep Learning Approach for Intelligent Intrusion Detection System
出处：IEEE Access (Volume: 7)
Page(s): 41525 - 41550
作者：R. Vinayakumar ; Mamoun Alazab ; K. P. Soman ; Prabaharan Poornachandran ; Ameer Al-Nemrat ; Sitalakshmi Venkatraman
摘要：Machine learning techniques are being widely used to develop an intrusion detection system (IDS) for detecting and classifying cyberattacks at the network-level and the host-level in a timely and automatic manner. However, many challenges arise since malicious attacks are continually changing and are occurring in very large volumes requiring a scalable solution. There are different malware datasets available publicly for further research by cyber security community. However, no existing study has shown the detailed analysis of the performance of various machine learning algorithms on various publicly available datasets. Due to the dynamic nature of malware with continuously changing attacking methods, the malware datasets available publicly are to be updated systematically and benchmarked. In this paper, a deep neural network (DNN), a type of deep learning model, is explored to develop a flexible and effective IDS to detect and classify unforeseen and unpredictable cyberattacks. The continuous change in network behavior and rapid evolution of attacks makes it necessary to evaluate various datasets which are generated over the years through static and dynamic approaches. This type of study facilitates to identify the best algorithm which can

effectively work in detecting future cyberattacks. A comprehensive evaluation of experiments of DNNs and other classical machine learning classifiers are shown on various publicly available benchmark malware datasets. The optimal network parameters and network topologies for DNNs are chosen through the following hyperparameter selection methods with KDDCup 99 dataset. All the experiments of DNNs are run till 1,000 epochs with the learning rate varying in the range [0.01-0.5]. The DNN model which performed well on KDDCup 99 is applied on other datasets, such as NSL-KDD, UNSW-NB15, Kyoto, WSN-DS, and CICIDS 2017, to conduct the benchmark. Our DNN model learns the abstract and high-dimensional feature representation of the IDS data ...
链接：https://ieeexplore.ieee.org/document/8681044

ESI HOT PAPERS

(Engineering)

（来源：http://esi.incites.thomsonreuters.com）

1、被引频次：430
题目：A FLUORENE-TERMINATED HOLE-TRANSPORTING MATERIAL FOR HIGHLY EFFICIENT AND STABLE PEROVSKITE SOLAR CELLS
作者：JEON, NJ;NA, H;JUNG, EH;YANG, TY;LEE, YG;KIM, G;SHIN, HW;SEOK, SI;LEE, J;SEO, J
出处：NATURE ENERGY 3 (8): 682-+ AUG 2018
摘要：Perovskite solar cells (PSCs) require both high efficiency and good long-term stability if they are to be commercialized. It is crucial to finely optimize the energy level matching between the perovskites and hole-transporting materials to achieve better performance. Here, we synthesize a fluorene-terminated hole-transporting material with a fine-tuned energy level and a high glass transition temperature to ensure highly efficient and thermally stable PSCs. We use this material to fabricate photovoltaic devices with 23.2% efficiency (under reverse scanning) with a steady-state efficiency of 22.85% for small-area (-0.094 cm(2)) cells and 21.7% efficiency (under reverse scanning) for large-area (-1 cm(2)) cells. We also achieve certified efficiencies of 22.6% (small-area cells, -0.094 cm(2)) and 20.9% (large-area, -1 cm(2)). The resultant device shows better thermal stability than the device with spiro-OMeTAD, maintaining almost 95% of its initial performance for more than 500 h after thermal annealing at 60 degrees C.
地址：KRICT, DIV ADV MAT, DAEJEON, SOUTH KOREA;SUNGKYUNKWAN UNIV, DEPT ENERGY SCI, SUWON, SOUTH KOREA;ULSAN NATL INST SCI & TECHNOL, SCH

ENERGY & CHEM ENGN, ULSAN, SOUTH KOREA
电子邮件地址：jminlee@krict.re.kr; jwseo@krict.re.kr

2、被引频次：394
题目：DEEPLAB: SEMANTIC IMAGE SEGMENTATION WITH DEEP CONVOLUTIONAL NETS, ATROUS CONVOLUTION, AND FULLY CONNECTED CRFS
作者：CHEN, LC;PAPANDREOU, G;KOKKINOS, I;MURPHY, K;YUILLE, AL
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 40 (4): 834-848 APR 2018
摘要：In this work we address the task of semantic image segmentation with Deep Learning and make three main contributions that are experimentally shown to have substantial practical merit. First, we highlight convolution with upsampled filters, or 'atrous convolution', as a powerful tool in dense prediction tasks. Atrous convolution allows us to explicitly control the resolution at which feature responses are computed within Deep Convolutional Neural Networks. It also allows us to effectively enlarge the field of view of filters to incorporate larger context without increasing the number of parameters or the amount of computation. Second, we propose atrous spatial pyramid pooling (ASPP) to robustly segment objects at multiple scales. ASPP probes an incoming convolutional feature layer with filters at multiple sampling rates and effective fields-of-views, thus capturing objects as well as image context at multiple scales. Third, we improve the localization of object boundaries by combining methods from DCNNs and probabilistic graphical models. The commonly deployed combination of max-pooling and downsampling in DCNNs achieves invariance but has a toll on localization accuracy. We overcome this by combining the responses at the final DCNN layer with a fully connected Conditional Random Field (CRF), which is shown both qualitatively and quantitatively to improve localization performance. Our proposed "DeepLab" system sets the new state-of-art at the PASCAL VOC-2012 semantic image segmentation task, reaching 79.7 percent mIOU in the test set, and advances the results on three other datasets: PASCAL-Context, PASCAL-Person-Part, and Cityscapes. All of our code is made publicly available online.
地址：GOOGLE INC, MOUNTAIN VIEW, CA 94043 USA;UCL, LONDON WC1E 6BT, ENGLAND;JOHNS HOPKINS UNIV, DEPT COGNIT SCI, BALTIMORE, MD 21218 USA;JOHNS HOPKINS UNIV, DEPT COMP SCI, BALTIMORE, MD 21218 USA
电子邮件地址：lcchen@cs.ucla.edu; gpapan@google.com; kokkinos@cs.ucl.ac.uk; kpmurphy@google.com; alan.l.yuille@gmail.com

3、被引频次：386
题目：SEGNET: A DEEP CONVOLUTIONAL ENCODER-DECODER ARCHITECTURE FOR IMAGE SEGMENTATION
作者：BADRINARAYANAN, V;KENDALL, A;CIPOLLA, R
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 39 (12): 2481-2495 DEC 2017
摘要：We present a novel and practical deep fully convolutional neural network architecture for semantic pixel-wise segmentation termed SegNet. This core trainable segmentation engine consists of an encoder network, a corresponding decoder network followed by a pixel-wise classification layer. The architecture of the encoder network is topologically identical to the 13 convolutional layers in the VGG16 network [1]. The role of the decoder network is to map the low resolution

encoder feature maps to full input resolution feature maps for pixel-wise classification. The novelty of SegNet lies is in the manner in which the decoder upsamples its lower resolution input feature map(s). Specifically, the decoder uses pooling indices computed in the max-pooling step of the corresponding encoder to perform non-linear upsampling. This eliminates the need for learning to upsample. The upsampled maps are sparse and are then convolved with trainable filters to produce dense feature maps. We compare our proposed architecture with the widely adopted FCN [2] and also with the well known DeepLab-LargeFOV [3], DeconvNet [4] architectures. This comparison reveals the memory versus accuracy trade-off involved in achieving good segmentation performance. SegNet was primarily motivated by scene understanding applications. Hence, it is designed to be efficient both in terms of memory and computational time during inference. It is also significantly smaller in the number of trainable parameters than other competing architectures and can be trained end-to-end using stochastic gradient descent. We also performed a controlled benchmark of SegNet and other architectures on both road scenes and SUN RGB-D indoor scene segmentation tasks. These quantitative assessments show that SegNet provides good performance with competitive inference time and most efficient inference memory-wise as compared to other architectures. We also provide a Caffe implementation of SegNet and a web demo at http://mi.eng.cam.ac.uk/projects/segnet/.
地址：UNIV CAMBRIDGE, DEPT ENGN, MACHINE INTELLIGENCE LAB, CAMBRIDGE CB2 1TN, ENGLAND
电子邮件地址：vb292@eng.cam.ac.uk; agk34@eng.cam.ac.uk; cipolla@eng.cam.ac.uk

4、被引频次：298
题目：SOLAR CELL EFFICIENCY TABLES (VERSION 51)
作者：GREEN, MA;HISHIKAWA, Y;DUNLOP, ED;LEVI, DH;HOHL-EBINGER, J;HO-BAILLIE, AWY
出处：PROGRESS IN PHOTOVOLTAICS 26 (1): 3-12 JAN 2018
摘要：Consolidated tables showing an extensive listing of the highest independently confirmed efficiencies for solar cells and modules are presented. Guidelines for inclusion of results into these tables are outlined and new entries since July 2017 are reviewed, together with progress over the last 25 years. Appendices are included documenting area definitions and also listing recognised test centres.
地址：UNIV NEW SOUTH WALES, AUSTRALIAN CTR ADV PHOTOVOLTA, SYDNEY, NSW 2052, AUSTRALIA;NATL INST ADV IND SCI & TECHNOL, RES CTR PHOTOVOLTA RCPV, CENT 2,UMEZONO 1-1-1, TSUKUBA, IBARAKI 3058568, JAPAN;EUROPEAN COMMISS, JOINT RES CTR, DIRECTORATE ENERGY TRANSPORT & CLIMATE C, VIA E FERMI 2749, IT-21027 ISPRA, VA, ITALY;NATL RENEWABLE ENERGY LAB, 15013 DENVER WEST PKWY, GOLDEN, CO 80401 USA;FRAUNHOFER INST SOLAR ENERGY SYST, DEPT CHARACTERISAT & SIMULAT CALLAB CELLS, HEIDENHOFSTR 2, D-79110 FREIBURG, GERMANY
电子邮件地址：m.green@unsw.edu.au

5、被引频次：254
题目：LIGNOCELLULOSIC BIOMASS PYROLYSIS MECHANISM: A STATE-OF-THE-ART REVIEW
作者：WANG, SR;DAI, GX;YANG, HP;LUO, ZY

出处：PROGRESS IN ENERGY AND COMBUSTION SCIENCE 62: 33-86 SEP 2017

摘要：The past decades have seen increasing interest in developing pyrolysis pathways to produce biofuels and bio-based chemicals from lignocellulosic biomass. Pyrolysis is a key stage in other thermochemical conversion processes, such as combustion and gasification. Understanding the reaction mechanisms of biomass pyrolysis will facilitate the process optimization and reactor design of commercial-scale biorefineries. However, the multistate complexity of the biomass structures and reactions involved in pyrolysis make it challenging to elucidate the mechanism. This article provides a broad review of the state-of-art biomass pyrolysis research. Considering the complexity of the biomass structure, the pyrolysis characteristics of its three major individual components (cellulose, hemicellulose and lignin) are discussed in detail. Recently developed experimental technologies, such as Py-GC MS/FID, TG-MS/TG-FTIR, in situ spectroscopy, 2D-PCIS, isotopic labeling method, in situ EPR and PIMS have been employed for biomass pyrolysis research, including online monitoring of the evolution of key intermediate products and the qualitative and quantitative measurement of the pyrolysis products. Based on experimental results, many macroscopic kinetic modeling methods with comprehensive mechanism schemes, such as the distributed activation energy model (DAEM), isoconversional method, detailed lumped kinetic model, kinetic Monte Carlo model, have been developed to simulate the mass loss behavior during biomass pyrolysis and to predict the resulting product distribution. Combined with molecular simulations of the elemental reaction routes, an in-depth understanding of the biomass pyrolysis mechanism may be obtained. Aiming to further improve the quality of pyrolysis products, the effects of various catalytic methods and feedstock pretreatment technologies on the pyrolysis behavior are also reviewed. At last, a brief conclusion for the challenge and perspectives of biomass pyrolysis is provided. (C) 2017 Elsevier Ltd. All rights reserved..

地址：ZHEJIANG UNIV, STATE KEY LAB CLEAN ENERGY UTILIZAT, HANGZHOU 310027, ZHEJIANG, PEOPLES R CHINA;HUAZHONG UNIV SCI & TECHNOL, STATE KEY LAB COAL COMBUST, WUHAN 430074, HUBEI, PEOPLES R CHINA

电子邮件地址：srwang@zju.edu.cn

6、被引频次：235

题目：EFFICIENT AMBIENT-AIR-STABLE SOLAR CELLS WITH 2D-3D HETEROSTRUCTURED BUTYLAMMONIUM-CAESIUM-FORMAMIDINIUM LEAD HALIDE PEROVSKITES

作者：WANG, ZP;LIN, QQ;CHMIEL, FP;SAKAI, N;HERZ, LM;SNAITH, HJ

出处：NATURE ENERGY 2 (9): - SEP 2017

摘要：Perovskite solar cells are remarkably efficient; however, they are prone to degradation in water, oxygen and ultraviolet light. Cation engineering in 3D perovskite absorbers has led to reduced degradation. Alternatively, 2D Ruddlesden-Popper layered perovskites exhibit improved stability, but have not delivered efficient solar cells so far. Here, we introduce n-butylammonium cations into a mixed-cation lead mixed-halide FA(0.83)Cs(0.17)Pb(IyBr1-y)(3) 3D perovskite. We observe the formation of 2D perovskite platelets, interspersed between highly orientated 3D perovskite grains, which suppress non-radiative charge recombination. We investigate the relationship between thin-film composition, crystal alignment and device performance. Solar cells with an optimal butylammonium content exhibit average stabilized power conversion efficiency of 17.5 +/- 1.3% with a 1.61-eV-bandgap perovskite and 15.8 +/- 0.8% with a 1.72-eV-bandgap perovskite. The

stability under simulated sunlight is also enhanced. Cells sustain 80% of their 'post burn-in' efficiency after 1,000 h in air, and close to 4,000 h when encapsulated.

地址：UNIV OXFORD, DEPT PHYS, CLARENDON LAB, PARKS RD, OXFORD OX1 3PU, ENGLAND
电子邮件地址：henry.snaith@physics.ox.ac.uk

7、被引频次：174

题目：HIGH FABRICATION YIELD ORGANIC TANDEM PHOTOVOLTAICS COMBINING VACUUM- AND SOLUTION-PROCESSED SUBCELLS WITH 15% EFFICIENCY

作者：CHE, XZ;LI, YX;QU, Y;FORREST, SR

出处：NATURE ENERGY 3 (5): 422-427 MAY 2018

摘要：Multijunction solar cells are effective for increasing the power conversion efficiency beyond that of single-junction cells. Indeed, the highest solar cell efficiencies have been achieved using two or more subcells to adequately cover the solar spectrum. However, the efficiencies of organic multijunction solar cells are ultimately limited by the lack of high-performance, near-infrared absorbing organic subcells within the stack. Here, we demonstrate a tandem cell with an efficiency of 15.0 +/- 0.3% (for 2 mm(2) cells) that combines a solution-processed non-fullerene-acceptor-based infrared absorbing subcell on a visible-absorbing fullerene-based subcell grown by vacuum thermal evaporation. The hydrophilic-hydrophobic interface within the charge-recombination zone that connects the two subcells leads to > 95% fabrication yield among more than 130 devices, and with areas up to 1 cm(2). The ability to stack solution-based on vapour-deposited cells provides significant flexibility in design over the current, all-vapour-deposited multijunction structures.

地址：UNIV MICHIGAN, APPL PHYS PROGRAM, ANN ARBOR, MI 48109 USA;UNIV MICHIGAN, DEPT ELECT ENGN, ANN ARBOR, MI 48109 USA;UNIV MICHIGAN, DEPT COMP SCI, ANN ARBOR, MI 48109 USA;UNIV MICHIGAN, DEPT PHYS, ANN ARBOR, MI 48109 USA
电子邮件地址：stevefor@umich.edu

8、被引频次：171

题目：TAILORED INTERFACES OF UNENCAPSULATED PEROVSKITE SOLAR CELLS FOR > 1,000 HOUR OPERATIONAL STABILITY

作者：CHRISTIANS, JA;SCHULZ, P;TINKHAM, JS;SCHLOEMER, TH;HARVEY, SP;DE VILLERS, BJT;SELLINGER, A;BERRY, JJ;LUTHER, JM

出处：NATURE ENERGY 3 (1): 68-74 JAN 2018

摘要：Long-term device stability is the most pressing issue that impedes perovskite solar cell commercialization, given the achieved 22.7% efficiency. The perovskite absorber material itself has been heavily scrutinized for being prone to degradation by water, oxygen and ultraviolet light. To date, most reports characterize device stability in the absence of these extrinsic factors. Here we show that, even under the combined stresses of light (including ultraviolet light), oxygen and moisture, perovskite solar cells can retain 94% of peak efficiency despite 1,000 hours of continuous unencapsulated operation in ambient air conditions (relative humidity of 10-20%). Each interface and contact layer throughout the device stack plays an important role in the overall stability which, when appropriately modified, yields devices in which both the initial rapid decay (often termed burn-in) and the gradual slower decay are suppressed. This extensively modified device architecture and the

understanding developed will lead towards durable long-term device performance.
地址：NATL RENEWABLE ENERGY LAB, GOLDEN, CO 80401 USA;COLORADO SCH MINES, DEPT CHEM, GOLDEN, CO 80401 USA
电子邮件地址：joe.berry@nrel.gov; joey.luther@nrel.gov

9、被引频次：170
题目：SOLAR CELL EFFICIENCY TABLES (VERSION 52)
作者：GREEN, MA;HISHIKAWA, Y;DUNLOP, ED;LEVI, DH;HOHL-EBINGER, J;HO-BAILLIE, AWY
出处：PROGRESS IN PHOTOVOLTAICS 26 (7): 427-436 JUL 2018
摘要：Consolidated tables showing an extensive listing of the highest independently confirmed efficiencies for solar cells and modules are presented. Guidelines for inclusion of results into these tables are outlined and new entries since January 2018 are reviewed.
地址：UNIV NEW SOUTH WALES, AUSTRALIAN CTR ADV PHOTOVOLTA, SYDNEY, NSW 2052, AUSTRALIA;NATL INST ADV IND SCI & TECHNOL, RES CTR PHOTOVOLTA RCPV, CENT 2, UMEZONO 1-1-1, TSUKUBA, IBARAKI 3058568, JAPAN;EUROPEAN COMMISS, JOINT RES CTR, DIRECTORATE ENERGY TRANSPORT & CLIMATE C, VIA E FERMI 2749, IT-21027 ISPRA, VA, ITALY;NATL RENEWABLE ENERGY LAB, 15013 DENVER WEST PKWY, GOLDEN, CO 80401 USA;FRAUNHOFER INST SOLAR ENERGY SYST, CALLAB CELLS, DEPT CHARACTERISAT & SIMULAT, HEIDENHOFSTR 2, D-79110 FREIBURG, GERMANY
电子邮件地址：m.green@unsw.edu.au

10、被引频次：165
题目：BORON NITRIDE-BASED MATERIALS FOR THE REMOVAL OF POLLUTANTS FROM AQUEOUS SOLUTIONS: A REVIEW
作者：YU, SJ;WANG, XX;PANG, HW;ZHANG, R;SONG, WC;FU, D;HAYAT, T;WANG, XK
出处：CHEMICAL ENGINEERING JOURNAL 333: 343-360 FEB 1 2018
摘要：Water pollution, a worldwide issue for the human society, has raised global concerns on environmental sustainability, calling for high-performance materials in effective pollution treatments. Boron nitride (BN) with a structure similar to graphene possesses many extraordinary properties such as high surface areas, high oxidization resistance at high temperature, and high chemical stability. This review presents the outstanding removal percentage and environmental restoration of BN-based nanomaterials for the elimination of various pollutants from the last ten years. Notably, recent advances in the removal of organic/inorganic pollutants and interaction mechanism are outlined. BN-based materials can not only preferably remove contaminants, but also can be directly regenerated by burning in air. The BN-based materials have satisfactory sorption capacities for inorganic pollutants (e.g. heavy metal ions) and organic pollutants (e.g. dyes and pharmaceutical molecules). The interaction mechanisms between pollutants and BN-based materials are mainly surface complexation, p-p stacking, and electrostatic interactions. This paper is beneficial to further comprehend the interactions of pollutants with BN-based materials, which is also helpful for the improvement of BN-based materials and potential areas for future applications in environment remediation.
地址：NORTH CHINA ELECT POWER UNIV, COLL ENVIRONM SCI & ENGN, BEIJING

102206, PEOPLES R CHINA;NORTH CHINA ELECT POWER UNIV, DEPT ENVIRONM SCI & ENGN, BAODING 071003, PEOPLES R CHINA;KING ABDULAZIZ UNIV, FAC SCI, NAAM RES GRP, JEDDAH 21589, SAUDI ARABIA
电子邮件地址：wang730304@fg.com; xkwang@ncepu.edu.cn

11、被引频次：162
题目：REMOTE SENSING IMAGE SCENE CLASSIFICATION: BENCHMARK AND STATE OF THE ART
作者：CHENG, G;HAN, JW;LU, XQ
出处：PROCEEDINGS OF THE IEEE 105 (10): 1865-1883 SP. ISS. SI OCT 2017
摘要：Remote sensing image scene classification plays an important role in a wide range of applications and hence has been receiving remarkable attention. During the past years, significant efforts have been made to develop various data sets or present a variety of approaches for scene classification from remote sensing images. However, a systematic review of the literature concerning data sets and methods for scene classification is still lacking. In addition, almost all existing data sets have a number of limitations, including the small scale of scene classes and the image numbers, the lack of image variations and diversity, and the saturation of accuracy. These limitations severely limit the development of new approaches especially deep learning-based methods. This paper first provides a comprehensive review of the recent progress. Then, we propose a large-scale data set, termed "NWPU-RESISC45," which is a publicly available benchmark for REmote Sensing Image Scene Classification (RESISC), created by Northwestern Polytechnical University (NWPU). This data set contains 31 500 images, covering 45 scene classes with 700 images in each class. The proposed NWPU-RESISC45 1) is large-scale on the scene classes and the total image number; 2) holds big variations in translation, spatial resolution, viewpoint, object pose, illumination, background, and occlusion; and 3) has high within-class diversity and between-class similarity. The creation of this data set will enable the community to develop and evaluate various data-driven algorithms. Finally, several representative methods are evaluated using the proposed data set, and the results are reported as a useful baseline for future research.
地址：NORTHWESTERN POLYTECH UNIV, SCH AUTOMAT, XIAN 710072, SHAANXI, PEOPLES R CHINA;CHINESE ACAD SCI, XIAN INST OPT & PRECIS MECH, CTR OPT IMAGERY ANAL & LEARNING OPTIMAL, STATE KEY LAB TRANSIENT OPT & PHOTON, XIAN 710119, SHAANXI, PEOPLES R CHINA
电子邮件地址：junweihan2010@gmail.com

12、被引频次：156
题目：A NEW AND SIMPLE HSDT FOR THERMAL STABILITY ANALYSIS OF FG SANDWICH PLATES
作者：MENASRIA, A;BOUHADRA, A;TOUNSI, A;BOUSAHLA, AA;MAHMOUD, SR
出处：STEEL AND COMPOSITE STRUCTURES 25 (2): 157-175 OCT 10 2017
摘要：The novelty of this work is the use of a new displacement field that includes undetermined integral terms for analyzing thermal buckling response of functionally graded (FG) sandwich plates. The proposed kinematic uses only four variables, which is even less than the first shear deformation theory (FSDT) and the conventional higher shear deformation theories (HSDTs). The theory considers a trigonometric variation of transverse shear stress and verifies the traction free boundary

conditions without employing the shear correction factors. Material properties of the sandwich plate faces are considered to be graded in the thickness direction according to a simple power-law variation in terms of the volume fractions of the constituents. The core layer is still homogeneous and made of an isotropic material. The thermal loads are assumed as uniform, linear and non-linear temperature rises within the thickness direction. An energy based variational principle is employed to derive the governing equations as an eigenvalue problem. The validation of the present work is checked by comparing the obtained results the available ones in the literature. The influences of aspect and thickness ratios, material index, loading type, and sandwich plate type on the critical buckling are all discussed.

地址：UNIV DJILLALI LIABES SIDI BEL ABBES, FAC TECHNOL, CIVIL ENGN DEPT, MAT & HYDROL LAB, SIDI BEL ABBES, ALGERIA;UNIV ABBES LAGHROUR KHENCHELA, FAC SCI & TECHNOL, DEPT GENIE CIVIL, EL HAMMA, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, FAC TECHNOL, DEPT GENIE CIVIL, LAB STRUCT & MAT AVANCES GENIE CIVIL & TRAVAUX PU, SIDI BEL ABBES, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, LAB MODELISAT & SIMULAT MULTIECHELLE, SIDI BEL ABBES, ALGERIA;CTR UNIV RELIZANE, RELIZANE, ALGERIA;KING ABDULAZIZ UNIV, FAC SCI, DEPT MATH, JEDDAH, SAUDI ARABIA
电子邮件地址：tou_abdel@yahoo.com

13、被引频次：155

题目：PERFORMANCE AND COST OF MATERIALS FOR LITHIUM-BASED RECHARGEABLE AUTOMOTIVE BATTERIES

作者：SCHMUCH, R;WAGNER, R;HORPEL, G;PLACKE, T;WINTER, M

出处：NATURE ENERGY 3 (4): 267-278 APR 2018

摘要：It is widely accepted that for electric vehicles to be accepted by consumers and to achieve wide market penetration, ranges of at least 500 km at an affordable cost are required. Therefore, significant improvements to lithium-ion batteries (LIBs) in terms of energy density and cost along the battery value chain are required, while other key performance indicators, such as lifetime, safety, fast-charging ability and low-temperature performance, need to be enhanced or at least sustained. Here, we review advances and challenges in LIB materials for automotive applications, in particular with respect to cost and performance parameters. The production processes of anode and cathode materials are discussed, focusing on material abundance and cost. Advantages and challenges of different types of electrolyte for automotive batteries are examined. Finally, energy densities and costs of promising battery chemistries are critically evaluated along with an assessment of the potential to fulfil the ambitious targets of electric vehicle propulsion.

地址：UNIV MUNSTER, MEET BATTERY RES CTR, MUNSTER, GERMANY;GBH GESELL BATTERIE KNOW HOW MBH, NOTTULN, GERMANY;FORSCHUNGSZENTRUM JULICH, IEK 12, HELMHOLTZ INST MUNSTER, MUNSTER, GERMANY
电子邮件地址：tobias.placke@uni-muenster.de; m.winter@fz-juelich.de

14、被引频次：154

题目：NICKEL FERRITE BEARING NITROGEN-DOPED MESOPOROUS CARBON AS EFFICIENT ADSORBENT FOR THE REMOVAL OF HIGHLY TOXIC METAL ION FROM AQUEOUS MEDIUM

作者：NAUSHAD, M;AHAMAD, T;AL-MASWARI, BM;ALQADAMI, AA;ALSHEHRI, SM
出处：CHEMICAL ENGINEERING JOURNAL 330: 1351-1360 DEC 15 2017
摘要：Nickel ferrite bearing nitrogen-doped mesoporous carbon (NiFe2O4-NC) was prepared using polymer bimetal complexes and used for the removal of Hg2+ from aqueous medium. The nanocomposite was characterized using several analytical techniques such as SEM, TEM, FTIR, Raman, TGA/DTA, XRD, VSM, XPS and BET. The adsorption behavior of NiFe2O4-NC nanocomposites was investigated via adsorption kinetics, isotherms and thermodynamic. The adsorption isotherm could be well described with Langmuir model, with the maximum adsorption capacity of 476.2 mg g(-1) at 25 degrees C. The desorption results showed the best recovery of Hg2+ metal ion using 0.01 M HCl. The remarkable adsorption properties are mainly attributed to the synergetic chemical coupling effects between NiFe2O4 nanoparticles and nitrogen doped graphitized carbon. The presented cost-effective strategy is developed to prepared NiFe2O4 nanocrystals embedded in nitrogen-doped graphitized carbon matrix using a single source precursor offers prospects in developing highly effective magnetic adsorbent for removal of toxic pollutant form contaminated water.
地址：KING SAUD UNIV, COLL SCI, DEPT CHEM, BLDG 5, RIYADH, SAUDI ARABIA
电子邮件地址：tahamed@ksu.edu.sa

15、被引频次：154
题目：A SIMPLE ANALYTICAL APPROACH FOR THERMAL BUCKLING OF THICK FUNCTIONALLY GRADED SANDWICH PLATES
作者：EL-HAINA, F;BAKORA, A;BOUSAHLA, AA;TOUNSI, A;MAHMOUD, SR
出处：STRUCTURAL ENGINEERING AND MECHANICS 63 (5): 585-595 SEP 10 2017
摘要：This study aimed to presents a simple analytical approach to investigate the thermal buckling behavior of thick functionally graded sandwich by employing both the sinusoidal shear deformation theory and stress function. The material properties of the sandwich plate faces are continuously varied within the plate thickness according to a simple power-law distribution in terms of the volume fractions of the constituents. The core layer is still homogeneous and made of an isotropic material. The thermal loads are considered as uniform, linear and non-linear temperature rises across the thickness direction. Numerical examples are presented to prove the effect of power law index, loading type and functionally graded layers thickness on the thermal buckling response of thick functionally graded sandwich.
地址：UNIV DJILLALI LIABES SIDI BEL ABBES, FAC TECHNOL, CIVIL ENGN DEPT, MAT & HYDROL LAB, SIDI BEL ABBES, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, LAB MODELISAT & SIMULAT MULTIECHELLE, SIDI BEL ABBES, ALGERIA;CTR UNIV RELIZANE, RELIZANE, ALGERIA;KING ABDULAZIZ UNIV, FAC SCI, DEPT MATH, JEDDAH, SAUDI ARABIA;UNIV SOHAG, FAC SCI, MATH DEPT, SOHAG, EGYPT
电子邮件地址：tou_abdel@yahoo.com

16、被引频次：145
题目：ORB-SLAM2: AN OPEN-SOURCE SLAM SYSTEM FOR MONOCULAR, STEREO, AND RGB-D CAMERAS
作者：MUR-ARTAL, R;TARDOS, JD
出处：IEEE TRANSACTIONS ON ROBOTICS 33 (5): 1255-1262 OCT 2017

摘要：We present ORB-SLAM2, a complete simultaneous localization and mapping (SLAM) system for monocular, stereo and RGB-D cameras, including map reuse, loop closing, and relocalization capabilities. The system works in real time on standard central processing units in a wide variety of environments from small hand-held indoors sequences, to drones flying in industrial environments and cars driving around a city. Our back-end, based on bundle adjustment with monocular and stereo observations, allows for accurate trajectory estimation with metric scale. Our system includes a lightweight localization mode that leverages visual odometry tracks for unmapped regions and matches with map points that allow for zero-drift localization. The evaluation on 29 popular public sequences shows that our method achieves state-of-the-art accuracy, being in most cases the most accurate SLAM solution. We publish the source code, not only for the benefit of the SLAM community, but with the aim of being an out-of-the-box SLAM solution for researchers in other fields.

地 址：UNIV ZARAGOZA, INST INVEST INGN ARAGON I3A, ZARAGOZA 50018, SPAIN;OCULUS RES, REDMOND, WA 98052 USA

电子邮件地址：raul.murartal@oculus.com; tardos@unizar.es

17、被引频次：145

题目：CHEMISTRY OF PERSULFATES IN WATER AND WASTEWATER TREATMENT: A REVIEW

作者：WACLAWEK, S;LUTZE, HV;GRUBEL, K;PADIL, VVT;CERNIK, M;DIONYSIOU, DD

出处：CHEMICAL ENGINEERING JOURNAL 330: 44-62 DEC 15 2017

摘要：Persulfate decontamination technologies either utilizing radical driven processes or direct electron transfer are very powerful tools for the treatment of a broad range of impurities, including halogenated olefins, BTEXs (benzene, toluene, ethylbenzene and xylenes), perfluorinated chemicals, phenols, pharmaceuticals, inorganics and pesticides. Furthermore, the reactivity of persulfates is extremely dependent on the related activation techniques and the composition of the treated water matrix. Direct reactions of peroxydisulfate (PDS) or peroxymonosulfate (PMS) are rather slow and mostly unsuitable for pollutant degradation. However, PDS or PMS decompose at elevated temperatures under UV radiation, and radiolysis treatment as well as in presence of reduced metal ions to form sulfate radicals (SO4 center dot-). (SO4 center dot-)-based oxidation can also form secondary oxidants for instance carbonate radicals, hydroxyl radicals, superoxide radicals or singlet oxygen which can influence both transformation efficiency and product formation. The formation of such species is extremely subjected on the water matrix composition and can hardly be predicted. One important aspect in dealing with PDS or PMS is their analysis, which is often prone for interference by other matrix components and hampered by the low stability of PDS and PMS in aqueous systems. Numerous methods for analysis of PDS and PMS are available. The present work also provides an overview on these methods.

地址：TECH UNIV LIBEREC, CTR NANOMAT ADV TECHNOL & INNOVAT, STUDENTSKA 1402-2, LIBEREC 46117 1, CZECH REPUBLIC;UNIV DUISBURG ESSEN, FAC CHEM, INSTRUMENTAL ANALYT CHEM, UNIV STR 5, D-45141 ESSEN, GERMANY;IWW WATER CTR, MORITZSTR 26, D-45476 MULHEIM AN DER RUHR, GERMANY;CTR WATER & ENVIRONM RES ZWU, UNIV STR 5, D-45141 ESSEN, GERMANY;UNIV BIELSKO BIALA, INST ENVIRONM PROTECT & ENGN, DEPT ENVIRONM MICROBIOL & BIOTECHNOL, WILLOWA 2, PL-43309 BIELSKO BIALA, POLAND;UNIV CINCINNATI, ENVIRONM ENGN

& SCI PROGRAM, ENGN RES CTR 705, CINCINNATI, OH 45221 USA
电子邮件地址：stanislaw.waclawek@tul.cz; dionysios.d.dionysiou@uc.edu

18、被引频次：142
题目：ROOM-TEMPERATURE GAS SENSING OF ZNO-BASED GAS SENSOR: A REVIEW
作者：ZHU, L;ZENG, W
出处：SENSORS AND ACTUATORS A-PHYSICAL 267: 242-261 NOV 1 2017
摘要：Novel gas sensors with high sensing properties, simultaneously operating at room temperature are considerably more attractive owing to their low power consumption, high security and long-term stability. Till date, zinc oxide (ZnO) as semiconducting metal oxide is considered as the promising resistive-type gas sensing material, but elevated operating temperature becomes the bottleneck of its extensive applications in the field of real-time gas monitoring, especially in flammable and explosive gas atmosphere. In this respect, worldwide efforts have been devoted to reducing the operating temperature by means of multiple methods In this communication, room-temperature gas sensing properties of ZnO based gas sensors are comprehensively reviewed. Much more attention is particularly paid to the effective strategies that create room-temperature gas sensing of ZnO based gas sensors, mainly including surface modification, additive doping and light activation. Finally, some perspectives for future investigation on room-temperature gas-sensing materials are discussed as well.
地址：CHONGQING UNIV, COLL MAT SCI & ENGN, CHONGQING, PEOPLES R CHINA
电子邮件地址：wenzeng@cqu.edu.cn

19、被引频次：140
题目：SMC DESIGN FOR ROBUST STABILIZATION OF NONLINEAR MARKOVIAN JUMP SINGULAR SYSTEMS
作者：WANG, YY;XIA, YQ;SHEN, H;ZHOU, PF
出处：IEEE TRANSACTIONS ON AUTOMATIC CONTROL 63 (1): 219-224 JAN 2018
摘要：In this technical note, the sliding-mode control (SMC) problem is investigated for T-S fuzzy-model-based nonlinear Markovian jump singular systems subject to matched/unmatched uncertainties. To accommodate the model characteristics of such a hybrid system, a novel integral-type fuzzy sliding surface is put forward by taking the singular matrix and state-dependent projection matrix into account simultaneously, which is the key contribution of the note. The designed surface contains two important features: 1) local input matrices for different subsystems in the same system mode are allowed to be different; and 2) the matched uncertainties are completely compensated, and the unmatched ones are not amplified during sliding motion. Sufficient conditions for the stochastic admissibility of the corresponding sliding-mode dynamics are presented, and a fuzzy SMC law is constructed to ensure the reaching condition despite uncertainties. The applicability and effectiveness of our approach are verified by simulations on an inverted pendulum system.
地址：SHANGHAI UNIV ENGN SCI, SCH ELECT & ELECT ENGN, SHANGHAI 201620, PEOPLES R CHINA;BEIJING INST TECHNOL, DEPT AUTOMAT CONTROL, BEIJING 100081, PEOPLES R CHINA;ANHUI UNIV TECHNOL, SCH ELECT ENGN & INFORMAT, MAANSHAN 243002, PEOPLES R CHINA;SHANGHAI JIAO TONG UNIV, SCH AERONAUT & ASTRONAUT, SHANGHAI 200240, PEOPLES R CHINA

电子邮件地址：wyy676@126.com; xia_yuanqing@bit.edu.cn; haoshen10@gmail.com; zhoupf@sjtu.edu.cn

20、被引频次：133

题目：DISSIPATIVITY-BASED FUZZY INTEGRAL SLIDING MODE CONTROL OF CONTINUOUS-TIME T-S FUZZY SYSTEMS

作者：WANG, YY;SHEN, H;KARIMI, HR;DUAN, DP

出处：IEEE TRANSACTIONS ON FUZZY SYSTEMS 26 (3): 1164-1176 JUN 2018

摘要：This paper is concernedwith dissipativity-based fuzzy integral sliding mode control (FISMC) of continuous-time Takagi-Sugeno (T-S) fuzzy systems with matched/unmatched uncertainties and external disturbance. To better accommodate the characteristics of T-S fuzzy models, an appropriate integral-type fuzzy switching surface is put forward by taking the state-dependent input matrix into account, which is the key contribution of the paper. Based on the utilization of Lyapunov function and property of the transition matrix for unmatched uncertainties, sufficient conditions are presented to guarantee the asymptotic stability of corresponding sliding mode dynamics with a strictly dissipative performance. A FISMC law is synthesized to drive system trajectories onto the fuzzy switching surface despitematched/unmatched uncertainties and external disturbance. A modified adaptive FISMC law is further designed for adapting the unknown upper bound of matched uncertainty. Two practical examples are provided to illustrate the effectiveness and advantages of developed FISMC scheme.

地址：SHANGHAI UNIV ENGN SCI, SCH ELECT & ELECT ENGN, SHANGHAI 201620, PEOPLES R CHINA;ANHUI UNIV TECHNOL, SCH ELECT ENGN & INFORMAT, MAANSHAN 243002, PEOPLES R CHINA;POLITECN MILAN, DEPT MECH ENGN, I-20156 MILAN, ITALY;SHANGHAI JIAO TONG UNIV, SCH AERONAUT & ASTRONAUT, SHANGHAI 200240, PEOPLES R CHINA

电子邮件地址：wyy676@126.com; haoshen10@gmail.com; hamidreza.karimi@polimi.it; dengpingduan@yeah.net

21、被引频次：129

题目：A FACILE SURFACE CHEMISTRY ROUTE TO A STABILIZED LITHIUM METAL ANODE

作者：LIANG, X;PANG, Q;KOCHETKOV, IR;SEMPERE, MS;HUANG, H;SUN, XQ;NAZAR, LF

出处：NATURE ENERGY 2 (9): - SEP 2017

摘要：Lithium metal is a highly desirable anode for lithium rechargeable batteries, having the highest theoretical specific capacity and lowest electrochemical potential of all material candidates. Its most notable problem is dendritic growth upon Li plating, which is a major safety concern and exacerbates reactivity with the electrolyte. Here we report that Li-rich composite alloy films synthesized in situ on lithium by a simple and low-cost methodology effectively prevent dendrite growth. This is attributed to the synergy of fast lithium ion migration through Li-rich ion conductive alloys coupled with an electronically insulating surface component. The protected lithium is stabilized to sustain electrodeposition over 700 cycles (1,400 h) of repeated plating/stripping at a practical current density of 2 mA cm(-2) and a 1,500 cycle-life is realized for a cell paired with a Li4Ti5O12 positive electrode. These findings open up a promising avenue to stabilize lithium metal with surface layers having targeted properties.

地址：UNIV WATERLOO, DEPT CHEM, WATERLOO, ON N2L 3G1, CANADA;BASF SE, D-67056 LUDWIGSHAFEN, GERMANY;HUNAN UNIV, COLL CHEM & CHEM ENGN, CHANGSHA 410006, HUNAN, PEOPLES R CHINA
电子邮件地址：lfnazar@uwaterloo.ca

22、被引频次：129
题目：ACTIVATION OF PERSULFATE (PS) AND PEROXYMONOSULFATE (PMS) AND APPLICATION FOR THE DEGRADATION OF EMERGING CONTAMINANTS
作者：WANG, JL;WANG, SZ
出处：CHEMICAL ENGINEERING JOURNAL 334: 1502-1517 FEB 15 2018
摘要：Sulfate radical-based advanced oxidation processes (AOPs) have been received increasing attention in recent years due to their high capability and adaptability for the degradation of emerging contaminants. Persulfate (PS, S2O82-) and peroxymonosulfate (PMS, HSO5-) can be activated by thermal, alkaline, ultraviolet light, activated carbon, transition metal (such as Fe-0, Fe2+, Cu2+, Co2+, Ag+), ultrasound and hydrogen peroxide to form sulfate radical (SO4 center dot-), which is strong oxidant and capable of effectively degrading emerging pollutants. Sulfate radical-based AOPs have a series of advantages in comparison with (OH)-O-center dot-based methods, for example: higher oxidation potential, higher selectivity and efficiency to oxidize pollutants containing unsaturated bonds or aromatic ring, wider pH range. Therefore, sulfate radicals are capable of removing the emerging contaminants more efficiently. In this review paper, various methods for the activation of PS and PMS were introduced, including, thermal, alkaline, radiation, transition metal ions and metal oxide, carbonaceous-based materials activation and so on; and their possible activation mechanisms were discussed. In addition, the application of activated PS and PMS for the degradation of emerging contaminants and the influencing factors were summarized. Finally, the concluding remarks and perspectives are made for future study on the activation of PS and PMS. This review can provide an overview for the activation and application of PS and PMS for the degradation of emerging contaminants, as well as for the deep understanding of the activation mechanisms of PS and PMS by various methods.
地址：TSINGHUA UNIV, COLLABORAT INNOVAT CTR ADV NUCL ENERGY TECHNOL, INET, BEIJING 100084, PEOPLES R CHINA;TSINGHUA UNIV, STATE KEY JOINT LAB ENVIRONM SIMULAT & POLLUT CON, BEIJING 100084, PEOPLES R CHINA;TSINGHUA UNIV, BEIJING KEY LAB RADIOACT WASTES TREATMENT, BEIJING 100084, PEOPLES R CHINA
电子邮件地址：wangjl@tsinghua.edu.cn

23、被引频次：125
题目：VIBRATION ANALYSIS OF NONLOCAL ADVANCED NANOBEAMS IN HYGRO-THERMAL ENVIRONMENT USING A NEW TWO-UNKNOWN TRIGONOMETRIC SHEAR DEFORMATION BEAM THEORY
作者：MOUFFOKI, A;BEDIA, EAA;HOUARI, MSA;TOUNSI, A;MAHMOUD, SR
出处：SMART STRUCTURES AND SYSTEMS 20 (3): 369-383 SEP 2017
摘要：In this work, the effects of moisture and temperature on free vibration characteristics of functionally graded (FG) nanobeams resting on elastic foundation is studied by proposing a novel simple trigonometric shear deformation theory. The main advantage of this theory is that, in addition

to including the shear deformation influence, the displacement field is modeled with only 2 unknowns as the case of the classical beam theory (CBT) and which is even less than the Timoshenko beam theory (TBT). Three types of environmental condition namely uniform, linear, and sinusoidal hygrothermal loading are studied. Material properties of FG beams are assumed to vary according to a power law distribution of the volume fraction of the constituents. Equations of motion are derived from Hamilton's principle. Numerical examples are presented to show the validity and accuracy of present shear deformation theories. The effects of hygro-thermal environments, power law index, nonlocality and elastic foundation on the free vibration responses of FG beams under hygro-thermal effect are investigated.

地址：UNIV DJILLALI LIABES SIDI BEL ABBES, FAC TECHNOL, DEPT GENIE CIVIL, LAB STRUCT & MAT AVANCES GENIE CIVIL & TRAVAUX PU, SIDI BEL ABBES, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, MAT & HYDROL LAB, FAC TECHNOL, CIVIL ENGN DEPT, SIDI BEL ABBES, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, LAB MODELISAT & SIMULAT MULTIECHELLE, DEPT PHYS, FAC SCI EXACTES, SIDI BEL ABBES, ALGERIA;UNIV MUSTAPHA STAMBOULI MASCARA, DEPT CIVIL ENGN, MASCARA, ALGERIA;KING ABDULAZIZ UNIV, DEPT MATH, FAC SCI, JEDDAH, SAUDI ARABIA;UNIV SOHAG, MATH DEPT, FAC SCI, SOHAG, EGYPT
电子邮件地址：tou_abdel@yahoo.com

24、被引频次：124

题目：A NEW NONLOCAL TRIGONOMETRIC SHEAR DEFORMATION THEORY FOR THERMAL BUCKLING ANALYSIS OF EMBEDDED NANOSIZE FG PLATES

作者：KHETIR, H;BOUIADJRA, MB;HOUARI, MSA;TOUNSI, A;MAHMOUD, SR

出处：STRUCTURAL ENGINEERING AND MECHANICS 64 (4): 391-402 NOV 25 2017

摘要：In this paper, a new nonlocal trigonometric shear deformation theory is proposed for thermal buckling response of nanosize functionally graded (FG) nano-plates resting on two-parameter elastic foundation under various types of thermal environments. This theory uses for the first time, undetermined integral variables and it contains only four unknowns, that is even less than the first shear deformation theory (FSDT). It is considered that the FG nano-plate is exposed to uniform, linear and sinusoidal temperature rises. Mori-Tanaka model is utilized to define the gradually variation of material properties along the plate thickness. Nonlocal elasticity theory of Eringen is employed to capture the size influences. Through the stationary potential energy the governing equations are derived for a refined nonlocal four-variable shear deformation plate theory and then solved analytically. A variety of examples is proposed to demonstrate the importance of elastic foundation parameters, various temperature fields, nonlocality, material composition, aspect and side-to-thickness ratios on critical stability temperatures of FG nano-plate.

地址：UNIV DJILLALI LIABES SIDI BEL ABBES, DEPT GENIE CIVIL, FAC TECHNOL, LAB STRUCT & MAT AVANCES GENIE CIVIL & TRAVAUX PU, SIDI BEL ABBES, ALGERIA;UNIV MUSTAPHA STAMBOULI MASCARA, DEPT CIVIL ENGN, MASCARA, ALGERIA;KING FAHD UNIV PETR & MINERALS, DEPT CIVIL & ENVIRONM ENGN, DHAHRAN 31261, EASTERN PROVINC, SAUDI ARABIA;UNIV DJILLALI LIABES SIDI BEL ABBES, CIVIL ENGN DEPT, FAC TECHNOL, MAT & HYDROL LAB, SIDI BEL ABBES, ALGERIA;KING ABDULAZIZ UNIV, DEPT MATH, FAC SCI, JEDDAH, SAUDI ARABIA;ALGERIAN NATL THEMAT AGCY RES SCI & TECHNOL ATRST, EL HARRACH,

ALGERIA
电子邮件地址：mohamedbachirbouiadjra@gmail.com

25、被引频次：118

题目：AN EFFICIENT HYPERBOLIC SHEAR DEFORMATION THEORY FOR BENDING, BUCKLING AND FREE VIBRATION OF FGM SANDWICH PLATES WITH VARIOUS BOUNDARY CONDITIONS

作 者 ： ABDELAZIZ, HH;MEZIANE, MAA;BOUSAHLA, AA;TOUNSI, A;MAHMOUD, SR;ALWABLI, AS

出处：STEEL AND COMPOSITE STRUCTURES 25 (6): 693-704 DEC 30 2017

摘要：In this research, a simple hyperbolic shear deformation theory is developed and applied for the bending, vibration and buckling of powerly graded material (PGM) sandwich plate with various bundary conditions. The displacement field of the present model is selected based on a hyperbolic variation in the in-plane displacements across the plate's thichness. By splitting the deflection into the bending and shear parts, the number of unknown and equation of motion of the present formulation is reduced and hence marks them simple to use. Equation of motion are obtained from Hamilton's principle. Numerical results for the natural frequencies, deflections and critical buckling loads of severs types of powerly graded sandwich plates under various boundary conditions are presented. The accuracy of the present formulation is demonstrated by comparing the computed results with those available in the literature. As conclusion, this theory is an accurate as other theories available in the literature and so it becomes more attractive due to smaller number of unknows.

地址：UNIV SIDIBEL ABBES, CIVIL ENGN DEPT, FAC TECHNOL, MAT & HYDROL LAB, SIDI BEL ABBES, ALGERIA;UNIV IBN KHALDOUN, BP 78 ZAAROURA, TIARET 14000, ALGERIA;UNIV DJILLALI LIABES SIDI BEL ABBES, LAB MODELISAT & SIMULAT MULTIECHELLE, SIDI BEL ABBES, ALGERIA;CTR UNIV RELIZANE, RELIZANE, ALGERIA;KING ABDULAZIZ UNIV, FAC SCI, DEPT MATH, JEDDAH, SAUDI ARABIA;KING ABDULAZIZ UNIV, FAC SCI, BIOL DEPT, JEDDAH, SAUDI ARABIA
电子邮件地址：tou_abdel@yahoo.com

ESI HIGHLY CITED PAPERS

(Engineering)

（来源：http://esi.incites.thomsonreuters.com）

1、被引频次：5557
题目：DEEP LEARNING
作者：LECUN, Y;BENGIO, Y;HINTON, G
出处：NATURE 521 (7553): 436-444 MAY 28 2015
摘要：Deep learning allows computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction. These methods have dramatically improved the state-of-the-art in speech recognition, visual object recognition, object detection and many other domains such as drug discovery and genomics. Deep learning discovers intricate structure in large data sets by using the backpropagation algorithm to indicate how a machine should change its internal parameters that are used to compute the representation in each layer from the representation in the previous layer. Deep convolutional nets have brought about breakthroughs in processing images, video, speech and audio, whereas recurrent nets have shone light on sequential data such as text and speech.
地址：FACEBOOK AL RES, NEW YORK, NY 10003 USA;NEW YORK UNIV, NEW YORK, NY 10003 USA;UNIV MONTREAL, DEPT COMP SCI & OPERAT RES, MONTREAL, PQ H3C 3J7, CANADA;GOOGLE, MOUNTAIN VIEW, CA 94043 USA;UNIV TORONTO, DEPT COMP SCI, TORONTO, ON M5S 3G4, CANADA
电子邮件地址：yann@cs.nyu.edu

2、被引频次：3123
题目：ROBUST FACE RECOGNITION VIA SPARSE REPRESENTATION
作者：WRIGHT, J;YANG, AY;GANESH, A;SASTRY, SS;MA, Y
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 31 (2): 210-227 FEB 2009
摘要：We consider the problem of automatically recognizing human faces from frontal views with varying expression and illumination, as well as occlusion and disguise. We cast the recognition problem as one of classifying among multiple linear regression models and argue that new theory from sparse signal representation offers the key to addressing this problem. Based on a sparse representation computed by l(1)-minimization, we propose a general classification algorithm for (image-based) object recognition. This new framework provides new insights into two crucial issues in face recognition: feature extraction and robustness to occlusion. For feature extraction, we show that if sparsity in the recognition problem is properly harnessed, the choice of features is no longer critical. What is critical, however, is whether the number of features is sufficiently large and whether the sparse representation is correctly computed. Unconventional features such as downsampled images and random projections perform just as well as conventional features such as Eigenfaces and

Laplacianfaces, as long as the dimension of the feature space surpasses certain threshold, predicted by the theory of sparse representation. This framework can handle errors due to occlusion and corruption uniformly by exploiting the fact that these errors are often sparse with respect to the standard (pixel) basis. The theory of sparse representation helps predict how much occlusion the recognition algorithm can handle and how to choose the training images to maximize robustness to occlusion. We conduct extensive experiments on publicly available databases to verify the efficacy of the proposed algorithm and corroborate the above claims.

地址：UNIV ILLINOIS, COORDINATED SCI LAB, URBANA, IL 61801 USA;UNIV CALIF BERKELEY, DEPT ELECT ENGN & COMP SCI, BERKELEY, CA 94720 USA

电子邮件地址：jnwright@uiuc.edu; yang@eecs.berkeley.edu; abalasu2@uiuc.edu; sastry@eecs.berkeley.edu; yima@uiuc.edu

3、被引频次：2323

题目：INSIGHTS INTO THE MODELING OF ADSORPTION ISOTHERM SYSTEMS

作者：FOO, KY;HAMEED, BH

出处：CHEMICAL ENGINEERING JOURNAL 156 (1): 2-10 JAN 1 2010

摘要：Concern about environmental protection has increased over the years from a global viewpoint. To date, the prevalence of adsorption separation in the environmental chemistry remains an aesthetic attention and consideration abroad the nations, owning to its low initial cost, simplicity of design, ease of operation, insensitivity to toxic substances and complete removal of pollutants even from dilute solutions. With the renaissance of isotherms modeling, there has been a steadily growing interest in this research field. Confirming the assertion, this paper presents a state of art review of adsorption isotherms modeling, its fundamental characteristics and mathematical derivations. Moreover, the key advance of the error functions, its utilization principles together with the comparisons of linearized and non-linearized isotherm models have been highlighted and discussed. Conclusively, the expanding of the nonlinear isotherms represents a potentially viable and powerful tool, leading to the superior improvement in the area of adsorption science.

地址：UNIV SAINS MALAYSIA, SCH CHEM ENGN, NIBONG TEBAL 14300, PENANG, MALAYSIA

电子邮件地址：chbassim@eng.usm.my

4、被引频次：2209

题目：OPPORTUNITIES AND CHALLENGES FOR A SUSTAINABLE ENERGY FUTURE

作者：CHU, S;MAJUMDAR, A

出处：NATURE 488 (7411): 294-303 AUG 16 2012

摘要：Access to clean, affordable and reliable energy has been a cornerstone of the world's increasing prosperity and economic growth since the beginning of the industrial revolution. Our use of energy in the twenty-first century must also be sustainable. Solar and water-based energy generation, and engineering of microbes to produce biofuels are a few examples of the alternatives. This Perspective puts these opportunities into a larger context by relating them to a number of aspects in the transportation and electricity generation sectors. It also provides a snapshot of the current energy landscape and discusses several research and development opportunities and pathways that could lead to a prosperous, sustainable and secure energy future for the world.

地址：US DOE, WASHINGTON, DC 20585 USA
电子邮件地址：the.secretary@hq.doe.gov; 4majumdar.pubs@gmail.com

5、被引频次：1887
题目：IMAGENET LARGE SCALE VISUAL RECOGNITION CHALLENGE
作 者 ： RUSSAKOVSKY, O;DENG, J;SU, H;KRAUSE, J;SATHEESH, S;MA, S;HUANG, ZH;KARPATHY, A;KHOSLA, A;BERNSTEIN, M;BERG, AC;FEI-FEI, L
出处：INTERNATIONAL JOURNAL OF COMPUTER VISION 115 (3): 211-252 DEC 2015
摘要：The ImageNet Large Scale Visual Recognition Challenge is a benchmark in object category classification and detection on hundreds of object categories and millions of images. The challenge has been run annually from 2010 to present, attracting participation from more than fifty institutions. This paper describes the creation of this benchmark dataset and the advances in object recognition that have been possible as a result. We discuss the challenges of collecting large-scale ground truth annotation, highlight key breakthroughs in categorical object recognition, provide a detailed analysis of the current state of the field of large-scale image classification and object detection, and compare the state-of-the-art computer vision accuracy with human accuracy. We conclude with lessons learned in the 5 years of the challenge, and propose future directions and improvements.
地址：STANFORD UNIV, STANFORD, CA 94305 USA;UNIV MICHIGAN, ANN ARBOR, MI 48109 USA;MIT, CAMBRIDGE, MA 02139 USA;UNIV N CAROLINA, CHAPEL HILL, NC USA
电子邮件地址：olga@cs.stanford.edu

6、被引频次：1809
题 目 ： FASTER R-CNN: TOWARDS REAL-TIME OBJECT DETECTION WITH REGION PROPOSAL NETWORKS
作者：REN, SQ;HE, KM;GIRSHICK, R;SUN, J
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 39 (6): 1137-1149 JUN 2017
摘要：State-of-the-art object detection networks depend on region proposal algorithms to hypothesize object locations. Advances like SPPnet [1] and Fast R-CNN [2] have reduced the running time of these detection networks, exposing region proposal computation as a bottleneck. In this work, we introduce a Region Proposal Network (RPN) that shares full-image convolutional features with the detection network, thus enabling nearly cost-free region proposals. An RPN is a fully convolutional network that simultaneously predicts object bounds and objectness scores at each position. The RPN is trained end-to-end to generate high-quality region proposals, which are used by Fast R-CNN for detection. We further merge RPN and Fast R-CNN into a single network by sharing their convolutional features-using the recently popular terminology of neural networks with 'attention' mechanisms, the RPN component tells the unified network where to look. For the very deep VGG-16 model [3], our detection system has a frame rate of 5 fps (including all steps) on a GPU, while achieving state-of-the-art object detection accuracy on PASCAL VOC 2007, 2012, and MS COCO datasets with only 300 proposals per image. In ILSVRC and COCO 2015 competitions, Faster R-CNN and RPN are the foundations of the 1st-place winning entries in several tracks. Code has been made publicly available.
地 址 ： UNIV SCI & TECHNOL CHINA, HEFEI 230026, ANHUI, PEOPLES R CHINA;MICROSOFT RES, VISUAL COMP GRP, BEIJING 100080, PEOPLES R

CHINA;FACEBOOK AI RES, SEATTLE, WA 98109 USA
电子邮件地址：sqren@mail.ustc.edu.cn; kahe@microsoft.com; rbg@fb.com; jiansun@microsoft.com

7、被引频次：1708
题目：OBJECT DETECTION WITH DISCRIMINATIVELY TRAINED PART-BASED MODELS
作者：FELZENSZWALB, PF;GIRSHICK, RB;MCALLESTER, D;RAMANAN, D
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 32 (9): 1627-1645 SEP 2010
摘要：We describe an object detection system based on mixtures of multiscale deformable part models. Our system is able to represent highly variable object classes and achieves state-of-the-art results in the PASCAL object detection challenges. While deformable part models have become quite popular, their value had not been demonstrated on difficult benchmarks such as the PASCAL data sets. Our system relies on new methods for discriminative training with partially labeled data. We combine a margin-sensitive approach for data-mining hard negative examples with a formalism we call latent SVM. A latent SVM is a reformulation of MI-SVM in terms of latent variables. A latent SVM is semiconvex, and the training problem becomes convex once latent information is specified for the positive examples. This leads to an iterative training algorithm that alternates between fixing latent values for positive examples and optimizing the latent SVM objective function.
地址：UNIV CHICAGO, DEPT COMP SCI, CHICAGO, IL 60637 USA;TOYOTA TECHNOL INST, CHICAGO, IL 60637 USA;UNIV CALIF IRVINE, DEPT COMP SCI, IRVINE, CA 92697 USA
电子邮件地址：pff@cs.uchicago.edu; rbg@cs.uchicago.edu; mcallester@tti-c.org; dramanan@ics.uci.edu

8、被引频次：1649
题目：DATA CLUSTERING: 50 YEARS BEYOND K-MEANS
作者：JAIN, AK
出处：PATTERN RECOGNITION LETTERS 31 (8): 651-666 SP. ISS. SI JUN 1 2010
摘要：Organizing data into sensible groupings is one of the most fundamental modes of understanding and learning. As an example, a common scheme of scientific classification puts organisms into a system of ranked taxa: domain, kingdom, phylum, class, etc. Cluster analysis is the formal study of methods and algorithms for grouping, or clustering, objects according to measured or perceived intrinsic characteristics or similarity. Cluster analysis does not use category labels that tag objects with prior identifiers, i.e., class labels. The absence of category information distinguishes data clustering (unsupervised learning) from classification or discriminant analysis (supervised learning). The aim of clustering is to find structure in data and is therefore exploratory in nature. Clustering has a long and rich history in a variety of scientific fields. One of the most popular and simple clustering algorithms, K-means, was first published in 1955. In spite of the fact that K-means was proposed over 50 years ago and thousands of clustering algorithms have been published since then, K-means is still widely used. This speaks to the difficulty in designing a general purpose clustering algorithm and the ill-posed problem of clustering. We provide a brief overview of clustering, summarize well known clustering methods, discuss the major challenges and key issues in designing clustering algorithms, and point out some of the emerging and useful research directions, including semi-supervised clustering, ensemble clustering, simultaneous feature selection during data

clustering, and large scale data clustering. (C) 2009 Elsevier B.V. All rights reserved.
地址：MICHIGAN STATE UNIV, DEPT COMP SCI & ENGN, E LANSING, MI 48824 USA;KOREA UNIV, DEPT BRAIN & COGNIT ENGN, SEOUL 136713, SOUTH KOREA
电子邮件地址：jain@cse.msu.edu

9、被引频次：1602
题目：A SURVEY ON TRANSFER LEARNING
作者：PAN, SJ;YANG, QA
出处：IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 22 (10): 1345-1359 OCT 2010
摘要：A major assumption in many machine learning and data mining algorithms is that the training and future data must be in the same feature space and have the same distribution. However, in many real-world applications, this assumption may not hold. For example, we sometimes have a classification task in one domain of interest, but we only have sufficient training data in another domain of interest, where the latter data may be in a different feature space or follow a different data distribution. In such cases, knowledge transfer, if done successfully, would greatly improve the performance of learning by avoiding much expensive data-labeling efforts. In recent years, transfer learning has emerged as a new learning framework to address this problem. This survey focuses on categorizing and reviewing the current progress on transfer learning for classification, regression, and clustering problems. In this survey, we discuss the relationship between transfer learning and other related machine learning techniques such as domain adaptation, multitask learning and sample selection bias, as well as covariate shift. We also explore some potential future issues in transfer learning research.
地址：HONG KONG UNIV SCI & TECHNOL, DEPT COMP SCI & ENGN, KOWLOON, HONG KONG, PEOPLES R CHINA
电子邮件地址：sinnopan@cse.ust.hk; qyang@cse.ust.hk

10、被引频次：1556
题目：EXTREME LEARNING MACHINE FOR REGRESSION AND MULTICLASS CLASSIFICATION
作者：HUANG, GB;ZHOU, HM;DING, XJ;ZHANG, R
出处：IEEE TRANSACTIONS ON SYSTEMS MAN AND CYBERNETICS PART B-CYBERNETICS 42 (2): 513-529 SP. ISS. SI APR 2012
摘要：Due to the simplicity of their implementations, least square support vector machine (LS-SVM) and proximal support vector machine (PSVM) have been widely used in binary classification applications. The conventional LS-SVM and PSVM cannot be used in regression and multiclass classification applications directly, although variants of LS-SVM and PSVM have been proposed to handle such cases. This paper shows that both LS-SVM and PSVM can be simplified further and a unified learning framework of LS-SVM, PSVM, and other regularization algorithms referred to extreme learning machine (ELM) can be built. ELM works for the "generalized" single-hidden-layer feedforward networks (SLFNs), but the hidden layer (or called feature mapping) in ELM need not be tuned. Such SLFNs include but are not limited to SVM, polynomial network, and the conventional feedforward neural networks. This paper shows the following: 1) ELM provides a unified learning platform with a widespread type of feature mappings and can be applied in regression and multiclass

classification applications directly; 2) from the optimization method point of view, ELM has milder optimization constraints compared to LS-SVM and PSVM; 3) in theory, compared to ELM, LS-SVM and PSVM achieve suboptimal solutions and require higher computational complexity; and 4) in theory, ELM can approximate any target continuous function and classify any disjoint regions. As verified by the simulation results, ELM tends to have better scalability and achieve similar (for regression and binary class cases) or much better (for multiclass cases) generalization performance at much faster learning speed (up to thousands times) than traditional SVM and LS-SVM.

地址：NANYANG TECHNOL UNIV, SCH ELECT & ELECT ENGN, SINGAPORE 639798, SINGAPORE;NANYANG TECHNOL UNIV, SCH ELECT & ELECT ENGN, SINGAPORE 639798, SINGAPORE;NW UNIV XIAN, DEPT MATH, XIAN 710069, PEOPLES R CHINA;XI AN JIAO TONG UNIV, SCH ELECT & INFORMAT ENGN, XIAN 710049, PEOPLES R CHINA
电子邮件地址：egbhuang@ntu.edu.sg; hmzhou@ntu.edu.sg; xjding@xjtu.edu.cn; zh0010ui@ntu.edu.sg

11、被引频次：1539

题目：GMSH: A 3-D FINITE ELEMENT MESH GENERATOR WITH BUILT-IN PRE- AND POST-PROCESSING FACILITIES

作者：GEUZAINE, C;REMACLE, JF

出处：INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING 79 (11): 1309-1331 SEP 10 2009

摘要：Gmsh is an open-source 3-D finite element grid generator with a build-in CAD engine and post-processor. Its design goal is to provide a fast, light and user-friendly meshing tool with parametric input and advanced visualization capabilities. This paper presents the overall philosophy, the main design choices and some of the original algorithms implemented in Gmsh. Copyright (C) 2009 John Wiley & Sons, Ltd.

地址：UNIV CATHOLIQUE LOUVAIN, INST MECH MAT & CIVIL ENGN, B-1348 LOUVAIN, BELGIUM;UNIV LIEGE, INST MONTEFIORE, DEPT ELECT ENGN & COMP SCI, B-4000 LIEGE, BELGIUM
电子邮件地址：jean-francois.remacle@uclouvain.be

12、被引频次：1539

题目：SLIC SUPERPIXELS COMPARED TO STATE-OF-THE-ART SUPERPIXEL METHODS

作者：ACHANTA, R;SHAJI, A;SMITH, K;LUCCHI, A;FUA, P;SUSSTRUNK, S

出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 34 (11): 2274-2281 NOV 2012

摘要：Computer vision applications have come to rely increasingly on superpixels in recent years, but it is not always clear what constitutes a good superpixel algorithm. In an effort to understand the benefits and drawbacks of existing methods, we empirically compare five state-of-the-art superpixel algorithms for their ability to adhere to image boundaries, speed, memory efficiency, and their impact on segmentation performance. We then introduce a new superpixel algorithm, simple linear iterative clustering (SLIC), which adapts a k-means clustering approach to efficiently generate superpixels. Despite its simplicity, SLIC adheres to boundaries as well as or better than previous methods. At the same time, it is faster and more memory efficient, improves segmentation performance, and is straightforward to extend to supervoxel generation.

地址：ECOLE POLYTECH FED LAUSANNE, SCH COMP & COMMUN SCI, IMAGES & VISUAL REPRESENTAT GRP, CH-1015 LAUSANNE, SWITZERLAND;ETH SWISS FED INST TECHNOL, ZURICH LIGHT MICROSCOPY CTR, INST BIOCHEM, CH-4093 ZURICH, SWITZERLAND;ECOLE POLYTECH FED LAUSANNE, COMP VIS LAB, SCH COMP & COMMUN SCI, CH-1015 LAUSANNE, SWITZERLAND
电子邮件地址：radhakrishna.achanta@epfl.ch; appu.shaji@epfl.ch; kevin.smith@lmc.biol.ethz.ch; aureline.lucchi@epfl.ch; pascal.fua@epfl.ch; sabine.susstrunk@epfl.ch

13、被引频次：1374
题目：NEW WORLD RECORD EFFICIENCY FOR CU(IN,GA)SE-2 THIN-FILM SOLAR CELLS BEYOND 20%
作者：JACKSON, P;HARISKOS, D;LOTTER, E;PAETEL, S;WUERZ, R;MENNER, R;WISCHMANN, W;POWALLA, M
出处：PROGRESS IN PHOTOVOLTAICS 19 (7): 894-897 SP. ISS. SI NOV 2011
摘要：In this contribution, we present a new certified world record efficiency of 20.1 and 20.3% for Cu(In,Ga)Se-2 thin-film solar cells. We analyse the characteristics of solar cells on such a performance level and demonstrate a high degree of reproducibility. Copyright (C) 2011 John Wiley & Sons, Ltd.
地址：ZENTRUM SONNENENERGIE & WASSERSTOFF FORSCH, BADEN WUERTTEMBERG ZSW, GERMANY
电子邮件地址：philip.jackson@zsw-bw.de

14、被引频次：1353
题目：THE PASCAL VISUAL OBJECT CLASSES (VOC) CHALLENGE
作者：EVERINGHAM, M;VAN GOOL, L;WILLIAMS, CKI;WINN, J;ZISSERMAN, A
出处：INTERNATIONAL JOURNAL OF COMPUTER VISION 88 (2): 303-338 SP. ISS. SI JUN 10 2010
摘要：The Pascal Visual Object Classes (VOC) challenge is a benchmark in visual object category recognition and detection, providing the vision and machine learning communities with a standard dataset of images and annotation, and standard evaluation procedures. Organised annually from 2005 to present, the challenge and its associated dataset has become accepted as the benchmark for object detection. This paper describes the dataset and evaluation procedure. We review the state-of-the-art in evaluated methods for both classification and detection, analyse whether the methods are statistically different, what they are learning from the images (e.g. the object or its context), and what the methods find easy or confuse. The paper concludes with lessons learnt in the three year history of the challenge, and proposes directions for future improvement and extension.
地址：UNIV LEEDS, LEEDS, W YORKSHIRE, ENGLAND;KATHOLIEKE UNIV LEUVEN, LOUVAIN, BELGIUM;UNIV EDINBURGH, EDINBURGH, MIDLOTHIAN, SCOTLAND;MICROSOFT RES, CAMBRIDGE, ENGLAND;UNIV OXFORD, OXFORD, ENGLAND
电子邮件地址：m.everingham@leeds.ac.uk

15、被引频次：1338
题目：SCALING UP MIMO
作 者 ： RUSEK, F;PERSSON, D;LAU, BK;LARSSON, EG;MARZETTA, TL;EDFORS, O;TUFVESSON, F
出处：IEEE SIGNAL PROCESSING MAGAZINE 30 (1): 40-60 JAN 2013
摘要：
地 址 ： LUND INST TECHNOL, DEPT ELECT & INFORMAT TECHNOL, LUND, SWEDEN;LUND UNIV, DEPT ELECT & INFORMAT TECHNOL, S-22100 LUND, SWEDEN;SUBWORKING GRP 2 2 COMPACT ANTENNA SYST TERMINALS, LUND, SWEDEN;SUBWORKING GRP 1 1 COMPACT ANTENNA SYST ASPECTS C, LUND, SWEDEN;LINKOPING UNIV, DEPT ELECT ENGN, DIV COMMUN SYST, S-58183 LINKOPING, SWEDEN;BELL LABS, MURRAY HILL, NJ USA;IEEE, NEW YORK, NY USA;LULEA UNIV TECHNOL, DIV SIGNAL PROC, LULEA, SWEDEN
电 子 邮 件 地 址 ： fredrik.rusek@eit.lth.se; daniel.persson@isy.liu.se; bkl@eit.lth.se; erik.larsson@isy.liu.se; tlm@research.bell-labs.com; ove.edfors@eit.lth.se; ftn@eit.lth.se

16、被引频次：1294
题目：REPRESENTATION LEARNING: A REVIEW AND NEW PERSPECTIVES
作者：BENGIO, Y;COURVILLE, A;VINCENT, P
出处：IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 35 (8): 1798-1828 AUG 2013
摘要：The success of machine learning algorithms generally depends on data representation, and we hypothesize that this is because different representations can entangle and hide more or less the different explanatory factors of variation behind the data. Although specific domain knowledge can be used to help design representations, learning with generic priors can also be used, and the quest for AI is motivating the design of more powerful representation-learning algorithms implementing such priors. This paper reviews recent work in the area of unsupervised feature learning and deep learning, covering advances in probabilistic models, autoencoders, manifold learning, and deep networks. This motivates longer term unanswered questions about the appropriate objectives for learning good representations, for computing representations (i.e., inference), and the geometrical connections between representation learning, density estimation, and manifold learning.
地址：UNIV MONTREAL, DEPT COMP SCI & OPERAT RES, MONTREAL, PQ H3C 3J7, CANADA
电子邮件地址：

17、被引频次：1288
题目：DEEP NEURAL NETWORKS FOR ACOUSTIC MODELING IN SPEECH RECOGNITION
作 者 ： HINTON, G;DENG, L;YU, D;DAHL, GE;MOHAMED, AR;JAITLY, N;SENIOR, A;VANHOUCKE, V;NGUYEN, P;SAINATH, TN;KINGSBURY, B
出处：IEEE SIGNAL PROCESSING MAGAZINE 29 (6): 82-97 NOV 2012
摘要：
地址：UNIV WATERLOO, DEPT ELECT & COMP ENGN, WATERLOO, ON N2L 3G1, CANADA;MSR, REDMOND, WA USA;MIT, ATR INTERPRETING TELECOMMUN RES LABS, KYOTO, JAPAN;HONG KONG UNIV SCI & TECHNOL, HONG KONG, HONG KONG,

PEOPLES R CHINA;KATHOLIEKE UNIV LEUVEN, ESAT PSI SPEECH GRP, LOUVAIN, BELGIUM;SPEECH R&D TEAM ,NUANCE, MENLO PK, CA USA;PANASON SPEECH TECHNOL LAB, SANTA BARBARA, CA USA;CAPR PHARMACEUT, MONTREAL, PQ, CANADA

电子邮件地址：geoffrey.hinton@gmail.com; deng@microsoft.com; dongyu@ieee.org; george.dahl@gmail.com; asamir@cs.toronto.edu; ndjaitly@yahoo.com; andrewsenior@google.com; vanhoucke@google.com; drpng@google.com; tsainath@us.ibm.com; bedk@us.ibm.com

18、被引频次：1285

题目：MILLIMETER WAVE MOBILE COMMUNICATIONS FOR 5G CELLULAR: IT WILL WORK!

作者：RAPPAPORT, TS;SUN, S;MAYZUS, R;ZHAO, H;AZAR, Y;WANG, K;WONG, GN;SCHULZ, JK;SAMIMI, M;GUTIERREZ, F

出处：IEEE ACCESS 1: 335-349 2013

摘要：The global bandwidth shortage facing wireless carriers has motivated the exploration of the underutilized millimeter wave (mm-wave) frequency spectrum for future broadband cellular communication networks. There is, however, little knowledge about cellular mm-wave propagation in densely populated indoor and outdoor environments. Obtaining this information is vital for the design and operation of future fifth generation cellular networks that use the mm-wave spectrum. In this paper, we present the motivation for new mm-wave cellular systems, methodology, and hardware for measurements and offer a variety of measurement results that show 28 and 38 GHz frequencies can be used when employing steerable directional antennas at base stations and mobile devices.

地址：NYU, POLYTECH INST, NYU WIRELESS, NEW YORK, NY 11201 USA

电子邮件地址：tsr@nyu.edu

19、被引频次：1242

题目：LEARNING FROM IMBALANCED DATA

作者：HE, HB;GARCIA, EA

出处：IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 21 (9): 1263-1284 SEP 2009

摘要：With the continuous expansion of data availability in many large-scale, complex, and networked systems, such as surveillance, security, Internet, and finance, it becomes critical to advance the fundamental understanding of knowledge discovery and analysis from raw data to support decision-making processes. Although existing knowledge discovery and data engineering techniques have shown great success in many real-world applications, the problem of learning from imbalanced data (the imbalanced learning problem) is a relatively new challenge that has attracted growing attention from both academia and industry. The imbalanced learning problem is concerned with the performance of learning algorithms in the presence of underrepresented data and severe class distribution skews. Due to the inherent complex characteristics of imbalanced data sets, learning from such data requires new understandings, principles, algorithms, and tools to transform vast amounts of raw data efficiently into information and knowledge representation. In this paper, we provide a comprehensive review of the development of research in learning from imbalanced data. Our focus is to provide a critical review of the nature of the problem, the state-of-the-art technologies, and the current assessment metrics used to evaluate learning performance under the imbalanced

learning scenario. Furthermore, in order to stimulate future research in this field, we also highlight the major opportunities and challenges, as well as potential important research directions for learning from imbalanced data.

地址：STEVENS INST TECHNOL, DEPT ELECT & COMP ENGN, HOBOKEN, NJ 07030 USA
电子邮件地址：hhe@stevens.edu; edwardo.garcia@nyu.edu

20、被引频次：1214

题目：A REVIEW OF POLYMER ELECTROLYTE MEMBRANE FUEL CELLS: TECHNOLOGY, APPLICATIONS, AND NEEDS ON FUNDAMENTAL RESEARCH

作者：WANG, Y;CHEN, KS;MISHLER, J;CHO, SC;ADROHER, XC

出处：APPLIED ENERGY 88 (4): 981-1007 APR 2011

摘要：Polymer electrolyte membrane (PEM) fuel cells, which convert the chemical energy stored in hydrogen fuel directly and efficiently to electrical energy with water as the only byproduct, have the potential to reduce our energy use, pollutant emissions, and dependence on fossil fuels. Great deal of efforts has been made in the past, particularly during the last couple of decades or so, to advance the PEM fuel cell technology and fundamental research. Factors such as durability and cost still remain as the major barriers to fuel cell commercialization. In the past two years, more than 35% cost reduction has been achieved in fuel cell fabrication, the current status of $61/kW (2009) for transportation fuel cell is still over 50% higher than the target of the US Department of Energy (DOE), i.e. $30/kW by 2015, in order to compete with the conventional technology of internal-combustion engines. In addition, a lifetime of similar to 2500 h (for transportation PEM fuel cells) was achieved in 2009, yet still needs to be doubled to meet the DOE's target, i.e. 5000 h. Breakthroughs are urgently needed to overcome these barriers. In this regard, fundamental studies play an important and indeed critical role. Issues such as water and heat management, and new material development remain the focus of fuel-cell performance improvement and cost reduction. Previous reviews mostly focus on one aspect, either a specific fuel cell application or a particular area of fuel cell research. The objective of this review is three folds: (1) to present the latest status of PEM fuel cell technology development and applications in the transportation, stationary, and portable/micro power generation sectors through an overview of the state-of-the-art and most recent technical progress; (2) to describe the need for fundamental research in this field and fill the gap of addressing the role of fundamental research in fuel cell technology; and (3) to outline major challenges in fuel cell technology development and the needs for fundamental research for the near future and prior to fuel cell commercialization. (C) 2010 Elsevier Ltd. All rights reserved.

地址：UNIV CALIF IRVINE, RERL, IRVINE, CA 92697 USA;UNIV CALIF IRVINE, NATL FUEL CELL RES CTR, DEPT MECH & AEROSP ENGN, IRVINE, CA 92697 USA;SANDIA NATL LABS, ENGN SCI CTR, ALBUQUERQUE, NM 87185 USA
电子邮件地址：yunw@uci.edu

21、被引频次：1198

题目：IMAGE SUPER-RESOLUTION VIA SPARSE REPRESENTATION

作者：YANG, JC;WRIGHT, J;HUANG, TS;MA, Y

出处：IEEE TRANSACTIONS ON IMAGE PROCESSING 19 (11): 2861-2873 NOV 2010

摘要：This paper presents a new approach to single-image superresolution, based upon sparse signal representation. Research on image statistics suggests that image patches can be well-represented as a

sparse linear combination of elements from an appropriately chosen over-complete dictionary. Inspired by this observation, we seek a sparse representation for each patch of the low-resolution input, and then use the coefficients of this representation to generate the high-resolution output. Theoretical results from compressed sensing suggest that under mild conditions, the sparse representation can be correctly recovered from the downsampled signals. By jointly training two dictionaries for the low-and high-resolution image patches, we can enforce the similarity of sparse representations between the low-resolution and high-resolution image patch pair with respect to their own dictionaries. Therefore, the sparse representation of a low-resolution image patch can be applied with the high-resolution image patch dictionary to generate a high-resolution image patch. The learned dictionary pair is a more compact representation of the patch pairs, compared to previous approaches, which simply sample a large amount of image patch pairs [1], reducing the computational cost substantially. The effectiveness of such a sparsity prior is demonstrated for both general image super-resolution (SR) and the special case of face hallucination. In both cases, our algorithm generates high-resolution images that are competitive or even superior in quality to images produced by other similar SR methods. In addition, the local sparse modeling of our approach is naturally robust to noise, and therefore the proposed algorithm can handle SR with noisy inputs in a more unified framework.

地址：UNIV ILLINOIS, BECKMAN INST, URBANA, IL 61801 USA;MICROSOFT RES ASIA, VISUAL COMP GRP, BEIJING 100190, PEOPLES R CHINA;UNIV ILLINOIS, COORDINATED SCI LAB, URBANA, IL 61801 USA

电子邮件地址：jyang29@ifp.uiuc.edu; jowright@microsft.com; huang@ifp.uiuc.edu; yima@uiuc.edu

22、被引频次：1194

题目：OVERVIEW OF THE HIGH EFFICIENCY VIDEO CODING (HEVC) STANDARD

作者：SULLIVAN, GJ;OHM, JR;HAN, WJ;WIEGAND, T

出处：IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY 22 (12): 1649-1668 DEC 2012

摘要：High Efficiency Video Coding (HEVC) is currently being prepared as the newest video coding standard of the ITU-T Video Coding Experts Group and the ISO/IEC Moving Picture Experts Group. The main goal of the HEVC standardization effort is to enable significantly improved compression performance relative to existing standards-in the range of 50% bit-rate reduction for equal perceptual video quality. This paper provides an overview of the technical features and characteristics of the HEVC standard.

地址：MICROSOFT CORP, REDMOND, WA 98052 USA;RHEIN WESTFAL TH AACHEN, INST COMMUN ENGN, D-52056 AACHEN, GERMANY;GACHON UNIV, DEPT SOFTWARE DESIGN & MANAGEMENT, SONGNAM 461701, SOUTH KOREA;HEINRICH HERTZ INST NACHRICHTENTECH BERLIN GMBH, FRAUNHOFER INST TELECOMMUN, D-10587 BERLIN, GERMANY;BERLIN INST TECHNOL, D-10587 BERLIN, GERMANY

电子邮件地址：garysull@microsoft.com; ohm@ient.rwth-aachen.de; hurumi@gmail.com; twiegand@ieee.org

23、被引频次：1181
题目：SOLAR CELL EFFICIENCY TABLES (VERSION 45)
作者：GREEN, MA;EMERY, K;HISHIKAWA, Y;WARTA, W;DUNLOP, ED
出处：PROGRESS IN PHOTOVOLTAICS 23 (1): 1-9 JAN 2015
摘要：Consolidated tables showing an extensive listing of the highest independently confirmed efficiencies for solar cells and modules are presented. Guidelines for inclusion of results into these tables are outlined and new entries since July 2014 are reviewed. Copyright (c) 2014 John Wiley & Sons, Ltd.
地址：UNIV NEW S WALES, AUSTRALIAN CTR ADV PHOTOVOLTA, SYDNEY, NSW 2052, AUSTRALIA;NATL RENEWABLE ENERGY LAB, GOLDEN, CO 80401 USA;NATL INST ADV IND SCI & TECHNOL, RES CTR PHOTOVOLTA TECHNOL RCPVT, TSUKUBA, IBARAKI 3058568, JAPAN;FRAUNHOFER INST SOLAR ENERGY SYST, DEPT SOLAR CELLS MAT & TECHNOL, D-79110 FREIBURG, GERMANY;COMMISS EUROPEAN COMMUNITIES, JOINT RES CTR, RENEWABLE ENERGY UNIT, INST ENERGY, IT-21027 ISPRA, ITALY
电子邮件地址：m.green@unsw.edu.au

24、被引频次：1181
题目：EFFICIENT ORGANIC SOLAR CELLS PROCESSED FROM HYDROCARBON SOLVENTS
作者：ZHAO, JB;LI, YK;YANG, GF;JIANG, K;LIN, HR;ADE, H;MA, W;YAN, H
出处：NATURE ENERGY 1: - JAN 25 2016
摘要：Organic solar cells have desirable properties, including low cost of materials, high-throughput roll-to-roll production, mechanical flexibility and light weight. However, all top-performance devices are at present processed using halogenated solvents, which are environmentally hazardous and would thus require expensive mitigation to contain the hazards. Attempts to process organic solar cells from non-halogenated solvents lead to inferior performance. Overcoming this hurdle, here we present a hydrocarbon-based processing system that is not only more environmentally friendly but also yields cells with power conversion efficiencies of up to 11.7%. Our processing system incorporates the synergistic effects of a hydrocarbon solvent, a novel additive, a suitable choice of polymer side chain, and strong temperature-dependent aggregation of the donor polymer. Our results not only demonstrate a method of producing active layers of organic solar cells in an environmentally friendly way, but also provide important scientific insights that will facilitate further improvement of the morphology and performance of organic solar cells.
地址：HONG KONG UNIV SCI & TECHNOL, DEPT CHEM, KOWLOON, HONG KONG, PEOPLES R CHINA;HONG KONG UNIV SCI & TECHNOL, ENERGY INST, KOWLOON, HONG KONG, PEOPLES R CHINA;XI AN JIAO TONG UNIV, STATE KEY LAB MECH BEHAV MAT, XIAN 710049, PEOPLES R CHINA;HKUST SHENZHEN RES INST, 9 YUEXING 1ST RD,HITECH PK, SHENZHEN 518057, PEOPLES R CHINA;NORTH CAROLINA STATE UNIV, DEPT PHYS, RALEIGH, NC 27695 USA
电子邮件地址：msewma@mail.xjtu.edu.cn; hyan@ust.hk

25、被引频次：1158
题目：MATPOWER: STEADY-STATE OPERATIONS, PLANNING, AND ANALYSIS TOOLS FOR POWER SYSTEMS RESEARCH AND EDUCATION

作者：ZIMMERMAN, RD;MURILLO-SANCHEZ, CE;THOMAS, RJ

出处：IEEE TRANSACTIONS ON POWER SYSTEMS 26 (1): 12-19 FEB 2011

摘要：MATPOWER is an open-source Matlab-based power system simulation package that provides a high-level set of power flow, optimal power flow (OPF), and other tools targeted toward researchers, educators, and students. The OPF architecture is designed to be extensible, making it easy to add user-defined variables, costs, and constraints to the standard OPF problem. This paper presents the details of the network modeling and problem formulations used by MATPOWER, including its extensible OPF architecture. This structure is used internally to implement several extensions to the standard OPF problem, including piece-wise linear cost functions, dispatchable loads, generator capability curves, and branch angle difference limits. Simulation results are presented for a number of test cases comparing the performance of several available OPF solvers and demonstrating MATPOWER's ability to solve large-scale AC and DC OPF problems.

地址：CORNELL UNIV, DEPT APPL ECON & MANAGEMENT, ITHACA, NY 14853 USA;CORNELL UNIV, SCH ELECT & COMP ENGN, ITHACA, NY 14853 USA;UNIV AUTONOMA MANIZALES, MANIZALES, COLOMBIA;UNIV NACL COLOMBIA, MANIZALES, COLOMBIA

电子邮件地址：rz10@cornell.edu; carlos_murillo@ieee.org; rjt1@cornell.edu

AIAA、AAS、IAF 最新会议

AIAA

（AIAA 来源：http://www.aiaa.org/）

1.**会议名称：**2020 AIAA Aviation and Aeronautics Forum and Exposition (2020 AIAA AVIATION Forum)

会议时间：15 June - 19 June 2020

会议地点：Reno, Nevada, USA

会议简介：The AIAA AVIATION Forum is the only aviation event that covers the entire integrated spectrum of aviation business, research, development, and technology. The 2020 forum will bring together experts to share ideas on aeroacoustics; applied aerodynamics; fluid dynamics; multidisciplinary design optimization; air traffic operations, management, and systems; and much more.

链接：

https://www.aiaa.org/events-learning/event/2020/06/15/default-calendar/2020-aiaa-aviation-and-aeronautics-forum-and-exposition-(2020-aiaa-aviation-forum)

2.会议名称：Spaceport America Cup
会议时间：16 June - 20 June 2020
会议地点：New Mexico
会议简介：In partnership with the Experimental Sounding Rocket Association and Spaceport America, AIAA is proud to be a sponsor on this university competition as more than 1500 university students participate in launching solid, liquid, and hybrid rockets to target altitudes of 10,000 and 30,000 feet.
链接：https://www.aiaa.org/events-learning/event/2020/06/16/default-calendar/spaceport-america-cup

3.会议名称：2020 AAS/AIAA Astrodynamics Specialist Conference
会议时间：9 August - 13 August 2020
会议地点：Lake Tahoe Resort Hotel , South Lake Tahoe, California
会议简介：The 2020 AAS/AIAA Astrodynamics Specialist Conference will be held August 9-13, 2020 at the Lake Tahoe Resort Hotel in South Lake Tahoe, CA. The conference is organized by the American Astronautical Society (AAS) Space Flight Mechanics Committee and co-sponsored by the American Institute of Aeronautics and Astronautics (AIAA) Astrodynamics Technical Committee.
链接：
https://www.aiaa.org/events-learning/event/2020/08/09/default-calendar/2020-aas-aiaa-astrodynamics-specialist-conference

4.会议名称：32nd Congress of the International Council of the Aeronautical Sciences (ICAS)
会议时间：14 September - 18 September 2020
会议地点：Shanghai, China
会议简介：ICAS is an international, non-government, non-profit scientific organization with the mission to advance knowledge and facilitate collaboration in aeronautics. ICAS is the only international support organization to representative aeronautical engineering professional societies and their members in 30 countries. ICAS organizes every two years an International Congress covering all aspects of aeronautical science and technology and their application to both military and civil aviation.
链接：
https://www.aiaa.org/events-learning/event/2020/09/14/default-calendar/32nd-congress-of-the-international-council-of-the-aeronautical-sciences-(icas)

AAS

（AAS 来源：http://astronautical.org/）

1.会议名称：John Glenn Memorial Symposium
会议时间：July 14-16, 2020
会议地点：Cleveland, Ohio
会议简介：The 2nd Annual John Glenn Memorial Symposium will take place at Case Western

Reserve University. The symposium will focus on advancements in aerospace technology including power and propulsion, autonomy and communications, low boom supersonics, hypersonics, and more. Discussion will also encompass humans returning to the moon, including challenges associated with the 2024 mission.

链接：https://astronautical.org/events/john-glenn-memorial-symposium/

IAF

（IAF 来源：http://www.iafastro.org/）

1.**会议名称：**GLOBAL SPACE EXPLORATION CONFERENCE

会议时间：9 – 11 JUNE 2020

会议地点：ST. PETERSBURG, RUSSIA

会议简介：The International Astronautical Federation (IAF) is pleased to invite you to the Global Space Exploration Conference (GLEX) 2020 to take place in St. Petersburg, Russian Federation from 9 – 11 June 2020.

The Conference, co-organized by the International Astronautical Federation (IAF) and ROSCOSMOS, will bring together leaders and decision-makers within the science and human exploration community – engineers, scientists, entrepreneurs, educators, agency representatives and policy makers. The leaders in the field will converge in St. Petersburg to discuss recent results, current challenges and innovative solutions and it will contain several opportunities to learn about how space exploration investments provide benefits as well as discuss how those benefits can be increased through thoughtful planning and cooperation.

ROSCOSMOS and IAF are both committed to supporting the international relationships that enable exploration of outer space and are very enthusiastic to organize GLEX 2020.

The conference will feature an Opening Event; several Plenary Events and Keynote Lectures; a Technical Programme with Sessions in several parallel technical streams; a Global Networking Forum (GNF) Programme and an attractive social and networking programme including a Welcome Reception and a Gala Dinner.

链接：http://www.iafastro.org/events/global-series-conferences/glex-2020/

2. COSPAR 2020

会议时间：15 - 22 August 2020

会议地点：Sydney, Australia

会议简介：Topics:

146 meetings covering the fields of COSPAR Scientific Commissions (SC) and Panels (full list available at http://www.cospar-assembly.org):

- SC A: The Earth’s Surface, Meteorology and Climate
- SC B: The Earth-Moon System, Planets, and Small Bodies of the Solar System
- SC C: The Upper Atmospheres of the Earth and Planets Including Reference Atmospheres
- SC D: Space Plasmas in the Solar System, Including Planetary Magnetospheres

- SC E: Research in Astrophysics from Space
- SC F: Life Sciences as Related to Space
- SC G: Materials Sciences in Space
- SC H: Fundamental Physics in Space
- Panel on Satellite Dynamics (PSD)
- Panel on Scientific Ballooning (PSB)
- Panel on Potentially Environmentally Detrimental Activities in Space (PEDAS)
- Panel on Radiation Belt Environment Modelling (PRBEM)
- Panel on Space Weather (PSW)
- Panel on Planetary Protection (PPP)
- Panel on Capacity Building (PCB)
- Panel on Education (PE)
- Panel on Exploration (PEX)
- Panel on Interstellar Research (PIR)
- Special events: Interdisciplinary lectures, space agency round table, etc.

Selected papers published in Advances in Space Research and Life Sciences in Space Research, fully refereed journals with no deadlines open to all submissions in relevant fields.

链接：http://www.iafastro.org/evenements/cospar-2020/

ACM 最新会议

来源：http://www.acm.org/

1. **会议名称：**ICSE

会议时间：May 23-29 2020

会议地点：Seoul, Korea

会议简介：ICSE, the International Conference on Software Engineering,® is the premier software engineering conference, providing a forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, experiences and concerns in the field of software engineering. Note that ICSE: International Conference on Software Engineering® is a registered trademark.

On this web site you can find information about the ICSE conference series as well as useful information for organizing a future ICSE conference.

链接：http://www.icse-conferences.org/

2.**会议名称：**BDE 2020

会议时间：May 29-31, 2020

会议地点：Shanghai, China

会议简介：he 2020 2nd International Conference on Big Data Engineering (BDE 2020) will be held during May 29-31, 2020 in Shanghai, China. It is supporte by ACM Singapore Chapter. BDE 2020 is an international forum for sharing knowledge and results in theory, methodology and new advances and research results in the fields of Big Data Engineering. The conference will bring together researchers and practitioners from both academia as well as industry to meet and share cutting-edge development in the field. The Conference welcomes significant contributions in all major fields of the Big Data Engineering in theoretical and practical aspects. It will put special emphasis on the participations of PhD students, Postdoctoral fellows and other young researchers from all over the world. It would be beneficial to bring together a group of experts from diverse fields to discuss recent progress and to share ideas on open questions. The conference will feature world-class keynote speakers in the main areas.

Big data is an emerging paradigm applied to datasets whose size is beyond the ability of commonly used software tools to capture, manage, and process the data within a tolerable elapsed time. Such datasets are often from various sources (Variety) yet unstructured such as social media, sensors, scientific applications, surveillance, video and image archives, Internet texts and documents, Internet search indexing, medical records, business transactions and web logs; and are of large size (Volume) with fast data in/out (Velocity). More importantly, big data has to be of high value (Value) and establish trust in it for business decision making (Veracity). Various technologies are being discussed to support the handling of big data such as massively parallel processing databases, scalable storage systems, cloud computing platforms, and MapReduce.

链接：http://www.bde.net/

3.**会议名称：**ISCA 2020

会议时间：May 30 – June 3, 2020

会议地点：Valencia, Spain

会议简介：The International Symposium on Computer Architecture (ISCA) is the premier forum for new ideas and research results in computer architecture. In 2020, the 47th edition of ISCA will be held in Valencia, Spain.

链接：https://iscaconf.org/isca2020/

4.**会议名称：**SYSTOR 2020

会议时间：June 2 - 4，2020

会议地点：Haifa,Israel

会议简介：The ACM International Systems and Storage Conference (SYSTOR) is an excellent international forum for interaction across the systems research community. The program includes both innovative, peer-reviewed research papers in the broad area of systems and storage, as well as distinguished keynote lecturers, a poster session, and social events. ACM SYSTOR is designed to appeal to academic and industrial researchers and practitioners, welcoming both students and seasoned professionals.

链接：https://www.systor.org/2020/

5.**会议名称：**ETRA2020

会议时间：June 2 - 5, 2020

会议地点：Stuttgart, GERMANY

会议简介：The 12th ACM Symposium on Eye Tracking Research and Applications (ETRA2020) aims to bring together eye tracking researchers from Computer Science and Psychology/Cognitive Science under the motto Bridging Communities.ETRA 2020 welcomes scientists and practitioners of all disciplines in support of a common vision of moving eye tracking research and its application forward. We hope to see you in Stuttgart!

链接：https://etra.acm.org/2020/

6.**会议名称：**ACM WiSec 2020

会议时间：July 8 to July 10, 2020

会议地点：Linz, Austria

会议简介：The 13th ACM Conference on Security and Privacy in Wireless and Mobile Networks (ACM WiSec 2020) will be held in Linz, Austria from July 8 to July 10, 2020. The event will be hosted by the Institute of Networks and Security at Johannes Kepler University Linz.

ACM is the world's largest educational and scientific computing society. ACM WiSec is the leading ACM and SIGSAC conference dedicated to all aspects of security and privacy in wireless and mobile networks and their applications, mobile software platforms, Internet of Things, cyber-physical systems, usable security and privacy, biometrics, and cryptography. ACM WiSec is a very competitive, high quality conference, and is very-well attended by industry, government, and academia to share information, network, explore ideas, and learn about emerging trends and today's hottest and most provocative cybersecurity topics.

So, this event is a great opportunity for like-minded colleagues, students to attend and learn from the pioneers in the security and privacy field and connect with program managers.

链接：https://wisec2020.ins.jku.at/

7.**会议名称：**WebSci'20

会议时间：JULY 7TH - JULY 10TH, 2020

会议地点：Southampton, UK

会议简介：Thirty years have passed since Tim Berners-Lee's inception of the World Wide Web. Today, an increasing range of voices are calling for reflection on how well the Web is serving society. As Berners-Lee put it in his 2019 open letter on the future of the Web, while the Web has created some wonderful opportunities, giving marginalised groups a voice and making our daily lives easier, it has also created opportunities for the spreading of misinformation, hate and crime, and the construction of systems which are more about process than people. It is time to ask: can the Web be reimagined for the public good? Can it be made more human-centric, and if so, how?

The 12th International ACM Conference on Web Science in 2020 (WebSci'20) is a unique interdisciplinary conference facilitating creative and critical dialogue with the aim of understanding the Web and its impacts and reflecting on the most pressing questions facing the Web. WebSci'20 welcomes participation from diverse fields including (but not limited to) art, anthropology, computer and information sciences, communication, criminology, economics, geography, health sciences, humanities, informatics, international relations, law, linguistics, philosophy, political science, psychology, and sociology. Following the tradition of earlier conferences, we encourage contributions to WebSci'20 that cross traditional disciplinary boundaries. The community engages with novel and thought-provoking ideas and discusses original research, work in progress, analysis, and practice in the fields of Web Science. This year we also particularly encourage contributions on

the interrelationships between the Web, AI and other new digital technologies, exploring current theoretical, methodological, and epistemological challenges as well as the practices of individuals, collectives, institutions, and platforms.

链接：https://websci20.webscience.org/

8.**会议名称：**ANRW 2020

会议时间：July 27, 2020

会议地点：Madrid, Spain

会议简介：The ACM/IRTF Applied Networking Research Workshop 2020 (ANRW'20) is an academic workshop that provides a forum for researchers, vendors, network operators, and the Internet standards community to present and discuss emerging results in applied networking research, and to find inspiration from topics and open problems discussed at the IETF. The workshop will consist of a mix of invited talks, submitted talks, and submitted short papers.

ANRW '20 particularly encourages the submission of results that could form the basis for future engineering work in the IETF, that could help better specify Internet protocols, that could change operational Internet practices, or that could influence further research and experimentation in the IRTF. ANRW '20 is sponsored by ACM SIGCOMM, and the Internet Research Task Force (IRTF).

链接：https://irtf.org/anrw/2020/

9.**会议名称：**PODC 2020

会议时间：August 3-7, 2020

会议地点：Salerno, Italy

会议简介：The ACM Symposium on Principles of Distributed Computing, is an international forum on the theory, design, analysis, implementation and application of distributed systems and networks. We solicit papers in all areas of distributed computing. Papers from all viewpoints, including theory, practice, and experimentation, are welcome. The common goal of the conference is to improve understanding of the principles underlying distributed computing. Topics of interest include, but are not limited to, the following:

biological distributed algorithms
blockchain protocols
coding and reliable communication
communication networks: algorithms, protocols, applications
complexity and impossibility results for distributed computing
concurrency, synchronization, and persistence
design and analysis of distributed algorithms
distributed and cloud storage
distributed data structures
distributed graph algorithms
distributed machine learning algorithms
distributed operating systems, middleware, databases
distributed resource management and scheduling
fault-tolerance, reliability, self-organization, self-stabilization
game-theoretic approaches to distributed computing
high-performance, cluster, cloud and grid computing

internet applications, social networks, recommendation systems
languages, verification, formal methods for distributed systems
multiprocessor and multi-core architectures and algorithms
peer-to-peer systems, overlay networks
population protocols
quantum and optics based distributed algorithms
replication and consistency
security in distributed computing, cryptographic protocols
sensor, mesh, and ad hoc networks
specifications and semantics
system-on-chip and network-on-chip architectures
transactional memory
wireless networks, mobile computing, autonomous agents
链接：http://www.podc.org/

10.**会议名称：**ICER 2020
会议时间：10-12 August, 2020
会议地点：Dunedin, New Zealand
会议简介：You are warmly invited to the sixteenth annual ACM International Computing Education Research (ICER) conference, which will be held in Dunedin, New Zealand, 10-12 August, 2020. ICER provides a forum for presenting and publishing high-quality research in computing education. At ICER 2020 we will continue the traditional ICER single-track format, which is designed to encourage authors and audience to engage in lively discussion about each work presented.
You can find the Call for Papers online as well as other guidelines and reference material in the sidebar to the right.
链接：https://icer.acm.org/

IQPC 最新国防会议(Defence)

IQPC 来源：http://www.iqpc.com/

1. **会议名称：**Military Flight Training 2020
会议时间：31 March - 02 April, 2020
会议地点：Hilton London Syon Park, Middlesex, United Kingdom
会议简介：Concurrent with today's operational context, Military Flight Training 2020 will discuss key challenge areas such as: training for contested and degraded environments, delivering LVC in mixed inventories of new and legacy platforms, solving red air deficiency, LVC interoperability,

rotary-wing training, recruitment & retention, operational conversion training and crew resource management, integrated synthetic/virtual training capabilities, and effective threat emulations.

Attracting over 250 military and industry attendees from over 40 nations, Military Flight Training 2020 arrives at a time where guaranteeing air superiority and strike capability has never been tougher.

链接：

https://www.defenceiq.com/events-militaryflighttraining?utm_medium=portal&mac=IQPCCORP

2.**会议名称：**Future Amphibious Forces

会议时间：31 March - 02 April, 2020

会议地点：London, UK

会议简介：Hosted with the official support of the Royal Marines, the inaugural Future Amphibious Force conference will being together senior military and industry personnel to contribute and share knowledge on the future nature of amphibious operations, and the utility of amphibiosity. Our speakers will share their assessments of the changing threats faced by navies and amphibious forces (including A2/AD); priority capability areas for development, and how Marine forces are adapting to this new world through the use of new disruptive technologies.

The conference will take place at an exciting time for UK Amphibious capability, as the Royal Marines embark on a major transformation programme to develop the Future Commando Force.

FAF20 will feature keynote presentations from the Commandant General Royal Marines, as well as the heads of navies and marine corps from around the World, and we invite you to join us in discussing priority capability development areas, as well as new approaches and technologies for advancing amphibiosity.

链接：

https://www.defenceiq.com/events-future-amphibious-force?utm_medium=portal&mac=IQPCCORP

3.**会议名称：**ICS Cyber Security Conference

会议时间：28 - 30 April, 2020

会议地点：London, UK

会议简介：As the most established Industrial Control Systems Cyber Security Event in Europe, the ICS cyber security conference brings together leading practitioners, operators and decision makers form across Europe to share a wealth of practical experience in implementing cyber security in organisations, and best practice on defending against cyber security risk to Industrial Control Systems.

Attend the event to understand how leading organisations are operating in the post-NIS implementation phase, assessing new threats to IP and data theft, and maintaining an effective secure network against cyber threats. Use the event to understand how industries are engaging with cyber risk internally and externally, and expanding their cyber security capabilities against the total cyber threatscape.

链接：https://www.defenceiq.com/events-icscybersecurity?utm_medium=portal&mac=IQPCCORP

4.**会议名称：**Future Artillery 2020

会议时间：11 - 13 May, 2020

会议地点：Stamford Bridge, London

会议简介：Welcome to the 2020 Future Artillery Forum, the world's longest-running and most

prestigious conference on indirect fires.

It is no coincidence that the fielding of a long-range precision fires capability tops the US Army's list of modernisation priorities. The importance of artillery as a joint enabler has been consistently underlined by concepts of operation that describe a contested future battlespace – where the predominance of A2/AD technologies deny the air superiority on which NATO has come to rely.

The Future Artillery conference remains the premier platform for discussing those next-generation systems that will provide a decisive long-range fires capability for future multi-domain operations. New in 2020, the conference will look not just at the systems themselves, but at the network and ISTAR enterprise that will be integral to applying fires in the future land and joint environment. It provides an opportunity for 200 defence and industry leaders from more than 20 countries to gather and overcome shared challenges relating to future force design, training, capability and – perhaps most importantly – interoperability.

Join the artillery community in London next May as they seek to deliver a digitized, networked and agile precision fires capability today, in readiness for operations tomorrow.

链接：https://www.defenceiq.com/events-futureartillery?utm_medium=portal&mac=IQPCCORP

5.**会议名称：**Maritime Security and OPV

会议时间：15 - 17 June, 2020

会议地点：TBC

会议简介：For the second consecutive year, IQPC is honoured to announce that the Maritime Security Week will be held in Dubai, UAE, actively working with navies and coast guards across the region to increase maritime capabilities and security levels. Key focus areas will include:

Securing national waters to protect critical infrastructure and valuable trade routes by enhancing navies and coast guards in the region to build a strong shield system through cooperation

New naval technologies and tactics based on future requirements for the field of operations

The latest updates from modernisation, upgrade and refurbishment project of Navies and Coast Guards to tackle current and future threats tackling a complex multi-faced environment

链接：

https://www.defenceiq.com/events-maritimesecurityweek?utm_medium=portal&mac=IQPCCORP