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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 Materials 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。

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NatureLatest Research(Materials)

来源：https://www.nature.com/nmat/

1. **标题：**Ideal maximum strengths and defect-induced softening in nanocrystalline-nanotwinned metals
作者：Xing Ke, Jianchao Ye, Zhiliang Pan, Jie Geng, Matt F. Besser, Dongxia Qu, Alfredo Caro, Jaime Marian, Ryan T. Ott, Y. Morris Wang & Frederic Sansoz
摘要：Strengthening of metals through nanoscale grain boundaries and coherent twin boundaries is manifested by a maximum strength—a phenomenon known as Hall–Petch breakdown. Different softening mechanisms are considered to occur for nanocrystalline and nanotwinned materials. Here, we report nanocrystalline-nanotwinned Ag materials that exhibit two strength transitions dissimilar from the above mechanisms. Atomistic simulations show three distinct strength regions as twin spacing decreases, delineated by positive Hall–Petch strengthening to grain-boundary-dictated (near-zero Hall–Petch slope) mechanisms and to softening (negative Hall–Petch slope) induced by twin-boundary defects. An ideal maximum strength is reached for a range of twin spacings below 7 nm. We synthesized nanocrystalline-nanotwinned Ag with hardness 3.05 GPa—42% higher than the current record, by segregating trace concentrations of Cu impurity (<1.0 weight (wt)%). The microalloy retains excellent electrical conductivity and remains stable up to 653 K; 215 K better than for pure nanotwinned Ag. This breaks the existing trade-off between strength and electrical conductivity, and demonstrates the potential for creating interface-dominated materials with unprecedented mechanical and physical properties.
链接：https://www.nature.com/articles/s41563-019-0484-3

2. **标题：**Ultralow-threshold, continuous-wave upconverting lasing from subwavelength plasmons
作者：Angel Fernandez-Bravo, Danqing Wang, Edward S. Barnard, Ayelet Teitelboim, Cheryl Tajon, Jun Guan, George C. Schatz, Bruce E. Cohen, Emory M. Chan, P. James Schuck & Teri W. Odom
摘要：Miniaturized lasers are an emerging platform for generating coherent light for quantum photonics, in vivo cellular imaging, solid-state lighting and fast three-dimensional sensing in smartphones1,2,3. Continuous-wave lasing at room temperature is critical for integration with opto-electronic devices and optimal modulation of optical interactions4,5. Plasmonic nanocavities integrated with gain can generate coherent light at subwavelength scales6,7,8,9, beyond the diffraction limit that constrains mode volumes in dielectric cavities such as semiconducting nanowires10,11. However, insufficient gain with respect to losses and thermal instabilities in nanocavities has limited all nanoscale lasers to pulsed pump sources and/or low-temperature operation6,7,8,9,12,13,14,15. Here, we show continuous-wave upconverting lasing at room temperature with record-low thresholds and high photostability from subwavelength plasmons. We achieve selective, single-mode lasing from Yb3+/Er3+-co-doped upconverting nanoparticles conformally coated on Ag nanopillar arrays that support a single, sharp lattice plasmon cavity mode

and greater than wavelength λ/20 field confinement in the vertical dimension. The intense electromagnetic near-fields localized in the vicinity of the nanopillars result in a threshold of 70 W cm−2, orders of magnitude lower than other small lasers. Our plasmon-nanoarray upconverting lasers provide directional, ultra-stable output at visible frequencies under near-infrared pumping, even after six hours of constant operation, which offers prospects in previously unrealizable applications of coherent nanoscale light.

链接：https://www.nature.com/articles/s41563-019-0482-5

3.**标题：**A window to trap-free charge transport in organic semiconducting thin films

作者：Naresh B. Kotadiya, Anirban Mondal, Paul W. M. Blom, Denis Andrienko & Gert-Jan A. H. Wetzelaer

摘要：Organic semiconductors, which serve as the active component in devices, such as solar cells, light-emitting diodes and field-effect transistors1, often exhibit highly unipolar charge transport, meaning that they predominantly conduct either electrons or holes. Here, we identify an energy window inside which organic semiconductors do not experience charge trapping for device-relevant thicknesses in the range of 100 to 300 nm, leading to trap-free charge transport of both carriers. When the ionization energy of a material surpasses 6 eV, hole trapping will limit the hole transport, whereas an electron affinity lower than 3.6 eV will give rise to trap-limited electron transport. When both energy levels are within this window, trap-free bipolar charge transport occurs. Based on simulations, water clusters are proposed to be the source of hole trapping. Organic semiconductors with energy levels situated within this energy window may lead to optoelectronic devices with enhanced performance. However, for blue-emitting light-emitting diodes, which require an energy gap of 3 eV, removing or disabling charge traps will remain a challenge.

链接：https://www.nature.com/articles/s41563-019-0473-6

4.**标题：**Robust zero-energy modes in an electronic higher-order topological insulator

作者：S. N. Kempkes, M. R. Slot, J. J. van den Broeke, P. Capiod, W. A. Benalcazar, D. Vanmaekelbergh, D. Bercioux, I. Swart & C. Morais Smith

摘要：Quantum simulators are essential tools for understanding complex quantum materials. Platforms based on ultracold atoms in optical lattices and photonic devices have led the field so far, but the basis for electronic quantum simulators is now being developed. Here, we experimentally realize an electronic higher-order topological insulator (HOTI). We create a breathing kagome lattice by manipulating carbon monoxide molecules on a Cu(111) surface using a scanning tunnelling microscope. We engineer alternating weak and strong bonds to show that a topological state emerges at the corner of the non-trivial configuration, but is absent in the trivial one. Different from conventional topological insulators, the topological state has two dimensions less than the bulk, denoting a HOTI. The corner mode is protected by a generalized chiral symmetry, which leads to a particular robustness against perturbations. Our versatile approach to designing artificial lattices holds promise for revealing unexpected quantum phases of matter.

链接：https://www.nature.com/articles/s41563-019-0483-4

5.标题：Towards understanding the doping mechanism of organic semiconductors by Lewis acids

作者：Brett Yurash, David Xi Cao, Viktor V. Brus, Dirk Leifert, Ming Wang, Alana Dixon, Martin Seifrid, Ahmed E. Mansour, Dominique Lungwitz, Tuo Liu, Peter J. Santiago, Kenneth R. Graham,

Norbert Koch, Guillermo C. Bazan & Thuc-Quyen Nguyen

摘要：Precise doping of organic semiconductors allows control over the conductivity of these materials, an essential parameter in electronic applications. Although Lewis acids have recently shown promise as dopants for solution-processed polymers, their doping mechanism is not yet fully understood. In this study, we found that B(C6F5)3 is a superior dopant to the other Lewis acids investigated (BF3, BBr3 and AlCl3). Experiments indicate that Lewis acid–base adduct formation with polymers inhibits the doping process. Electron–nuclear double-resonance and nuclear magnetic resonance experiments, together with density functional theory, show that p-type doping occurs by generation of a water–Lewis acid complex with substantial Brønsted acidity, followed by protonation of the polymer backbone and electron transfer from a neutral chain segment to a positively charged, protonated one. This study provides insight into a potential path for protonic acid doping and shows how trace levels of water can transform Lewis acids into powerful Brønsted acids.

链接：https://www.nature.com/articles/s41563-019-0479-0

6.**标题：**Reply to: On the ferroelectricity of CH3NH3PbI3 perovskites

作者：Yongtao Liu, Liam Collins, Roger Proksch, Songkil Kim, Brianna R. Watson, Benjamin Doughty, Tessa R. Calhoun, Mahshid Ahmadi, Anton V. Ievlev, Stephen Jesse, Scott T. Retterer, Alex Belianinov, Kai Xiao, Jingsong Huang, Bobby G. Sumpter, Sergei V. Kalinin, Bin Hu & Olga S. Ovchinnikova

摘要：First, we thank Schulz et al.1 for their response to our Article2. Schulz et al. raise a few concerns regarding the piezoresponse force microscopy (PFM) measurements and their interpretation, as well as the crystal orientation, which they claim brings into question our central conclusions. Accordingly, Schulz et al. conclude that ferroelectricity is responsible for the origin of the PFM signal. However, we do not agree with this conclusion as there is no measurable electromechanical contrast above 1 pm V−1 and there are strong mechanical and chemical variations inside the twin domains that, in our opinion, are behind the measured PFM signal.

链接：https://www.nature.com/articles/s41563-019-0481-6

7.**标题：**On the ferroelectricity of CH3NH3PbI3 perovskites

作者：Alexander D. Schulz, Holger Röhm, Tobias Leonhard, Susanne Wagner, Michael J. Hoffmann & Alexander Colsmann

摘要：A common method for mapping the local polarization in ferroelectric domains is piezoresponse force microscopy (PFM) where an a.c. voltage is applied between the bottom electrode of the sample and the cantilever tip of the atomic force microscope. The sample cantilever system can be considered as a driven damped harmonic oscillator with a resonance frequency f0. Liu et al. build their argument on the hypothesis that the amplitude and phase contrast of domains observed in single-frequency PFM (sf-PFM) originate from shifts in the contact resonance frequency due to different elastic moduli of neighbouring domains. To verify their hypothesis, they claim to observe a resonance frequency contrast between neighbouring domains in their Fig. 1b,c. Yet, a more detailed analysis of their measurement data questions this claim. First, the authors do not provide data on the crystal orientation of each grain’s surface, which is mandatory to discuss surface effects originating from ferroelastic twinning and ionic charging. Second, in contrast to the earlier reports on domains in CH3NH3PbI3 referenced in their paper, blurring and significant amounts of scanning artefacts do hamper the identification of domains. In particular, domains and domain walls on the grain that is

highlighted in their Fig. 1b are hardly distinguishable, which renders a reliable interpretation of the presented data very difficult. Third, they have disregarded important own data towards the interpretation of their measurements. In the very same image (their Fig. 1b,c), on the grain in the lower right corner, only contrast between domains and domain walls is visible, and there is clearly no contrast between the domains themselves. This missing resonance frequency contrast implies equal elastic moduli of neighbouring domains and therefore conflicts with their central claim.
链接：https://www.nature.com/articles/s41563-019-0480-7

8.**标题：**Nodal superconducting exchange coupling
作者：A. Di Bernardo, S. Komori, G. Livanas, G. Divitini, P. Gentile, M. Cuoco & J. W. A. Robinson
摘 要： A superconducting spin valve consists of a thin-film superconductor between two ferromagnetic layers. A change of magnetization alignment shifts the superconducting transition temperature (ΔTc) due to an interplay between the magnetic exchange energy and the superconducting condensate. The magnitude of ΔTc scales inversely with the superconductor thickness (dS) and is zero when dS exceeds the superconducting coherence length (ξ). Here, we report a superconducting spin-valve effect involving a different underlying mechanism in which magnetization alignment and ΔTc are determined by nodal quasiparticle excitation states on the Fermi surface of the d-wave superconductor YBa2Cu3O7–δ sandwiched between insulating layers of ferromagnetic Pr0.8Ca0.2MnO3. We observe ΔTc values that approach 2 K with the sign of ΔTc oscillating with dS over a length scale exceeding 100ξ and, for particular values of dS, the superconducting state reinforces an antiparallel magnetization alignment. These results pave the way to all-oxide superconducting memory in which superconductivity modulates the magnetic state.
链接：https://www.nature.com/articles/s41563-019-0476-3

9.**标题：**A multicolour bistable electronic shelf label based on intramolecular proton-coupled electron transfer
作者：Yuyang Wang, Shuo Wang, Xiaojun Wang, Weiran Zhang, Wenxuan Zheng, Yu-Mo Zhang & Sean Xiao-An Zhang
摘要：Bistable electrochromic materials have been explored as a viable alternative to reduce energy consumption in display applications. However, the development of ideal bistable electrochromic displays (especially multicolour displays) remains challenging due to the intrinsic limitations associated with existing electrochromic processes. Here, a bistable electrochromic device with good overall performance—including bistability (>52 h), reversibility (>12,000 cycles), colouration efficiency (⩾1,240 cm2 C−1) and transmittance change (70%) with fast switching (⩽1.5 s)—was designed and developed based on concerted intramolecular proton-coupled electron transfer. This approach was used to develop black, magenta, yellow and blue displays as well as a multicolour bistable electrochromic shelf label. The design principles derived from this unconventional exploration of concerted intramolecular proton-coupled electron transfer may also be useful in different optoelectronic applications.
链接：https://www.nature.com/articles/s41563-019-0471-8

10. **标 题：** Mapping spin–charge conversion to the band structure in a topological oxide two-dimensional electron gas
作者：Diogo C. Vaz, Paul Noël, Annika Johansson, Börge Göbel, Flavio Y. Bruno, Gyanendra Singh,

Siobhan McKeown-Walker, Felix Trier, Luis M. Vicente-Arche, Anke Sander, Sergio Valencia, Pierre Bruneel, Manali Vivek, Marc Gabay, Nicolas Bergeal, Felix Baumberger, Hanako Okuno, Agnès Barthélémy, Albert Fert, Laurent Vila, Ingrid Mertig, Jean-Philippe Attané & Manuel Bibes

摘要：While spintronics has traditionally relied on ferromagnetic metals as spin generators and detectors, spin–orbitronics exploits the efficient spin–charge interconversion enabled by spin–orbit coupling in non-magnetic systems. Although the Rashba picture of split parabolic bands is often used to interpret such experiments, it fails to explain the largest conversion effects and their relationship with the electronic structure. Here, we demonstrate a very large spin-to-charge conversion effect in an interface-engineered, high-carrier-density SrTiO3 two-dimensional electron gas and map its gate dependence on the band structure. We show that the conversion process is amplified by enhanced Rashba-like splitting due to orbital mixing and in the vicinity of avoided band crossings with topologically non-trivial order. Our results indicate that oxide two-dimensional electron gases are strong candidates for spin-based information readout in new memory and transistor designs. Our results also emphasize the promise of topology as a new ingredient to expand the scope of complex oxides for spintronics.

链接：https://www.nature.com/articles/s41563-019-0467-4

11.**标题：**Cycle stability of conversion-type iron fluoride lithium battery cathode at elevated temperatures in polymer electrolyte composites

作者：Qiao Huang, Kostiantyn Turcheniuk, Xiaolei Ren, Alexandre Magasinski, Ah-Young Song, Yiran Xiao, Doyoub Kim & Gleb Yushin

摘要：Metal fluoride conversion cathodes offer a pathway towards developing lower-cost Li-ion batteries. Unfortunately, such cathodes suffer from extremely poor performance at elevated temperatures, which may prevent their use in large-scale energy storage applications. Here we report that replacing commonly used organic electrolytes with solid polymer electrolytes may overcome this hurdle. We demonstrate long-cycle stability for over 300 cycles at 50 °C attained in high-capacity (>450 mAh g−1) FeF2 cathodes. The absence of liquid solvents reduced electrolyte decomposition, while mechanical properties of the solid polymer electrolyte enhanced cathode structural stability. Our findings suggest that the formation of an elastic, thin and homogeneous cathode electrolyte interphase layer on active particles is a key for stable performance. The successful operation of metal fluorides at elevated temperatures opens a new avenue for their practical applications and future successful commercialization.

链接：https://www.nature.com/articles/s41563-019-0472-7

12.**标题：**Titanium-carbide MXenes for work function and interface engineering in perovskite solar cells

作者：A. Agresti, A. Pazniak, S. Pescetelli, A. Di Vito, D. Rossi, A. Pecchia, M. Auf der Maur, A. Liedl, R. Larciprete, Denis V. Kuznetsov, D. Saranin & A. Di Carlo

摘要：To improve the efficiency of perovskite solar cells, careful device design and tailored interface engineering are needed to enhance optoelectronic properties and the charge extraction process at the selective electrodes. Here, we use two-dimensional transition metal carbides (MXene Ti3C2Tx) with various termination groups (Tx) to tune the work function (WF) of the perovskite absorber and the TiO2 electron transport layer (ETL), and to engineer the perovskite/ETL interface. Ultraviolet photoemission spectroscopy measurements and density functional theory calculations show that the

addition of Ti3C2Tx to halide perovskite and TiO2 layers permits the tuning of the materials' WFs without affecting other electronic properties. Moreover, the dipole induced by the Ti3C2Tx at the perovskite/ETL interface can be used to change the band alignment between these layers. The combined action of WF tuning and interface engineering can lead to substantial performance improvements in MXene-modified perovskite solar cells, as shown by the 26% increase of power conversion efficiency and hysteresis reduction with respect to reference cells without MXene.

链接：https://www.nature.com/articles/s41563-019-0478-1

13.**标题：**Critical role of intermediate electronic states for spin-flip processes in charge-transfer-type organic molecules with multiple donors and acceptors

作者：Hiroki Noda, Xian-Kai Chen, Hajime Nakanotani, Takuya Hosokai, Momoka Miyajima, Naoto Notsuka, Yuuki Kashima, Jean-Luc Brédas & Chihaya Adachi

摘要：Spin-flip in purely organic molecular systems is often described as a forbidden process; however, it is commonly observed and utilized to harvest triplet excitons in a wide variety of organic material-based applications. Although the initial and final electronic states of spin-flip between the lowest singlet and lowest triplet excited state are self-evident, the exact process and the role of intermediate states through which spin-flip occurs are still far from being comprehensively determined. Here, via experimental photo-physical investigations in solution combined with first-principles quantum-mechanical calculations, we show that efficient spin-flip in multiple donor–acceptor charge-transfer-type organic molecular systems involves the critical role of an intermediate triplet excited state that corresponds to a partial molecular structure of the system. Our proposed mechanism unifies the understanding of the intersystem crossing mechanism in a wide variety of charge-transfer-type molecular systems, opening the way to greater control over spin-flip rates.

链接：https://www.nature.com/articles/s41563-019-0465-6

14. **标 题 ：** Room-temperature stabilization of antiferromagnetic skyrmions in synthetic antiferromagnets

作者：William Legrand, Davide Maccariello, Fernando Ajejas, Sophie Collin, Aymeric Vecchiola, Karim Bouzehouane, Nicolas Reyren, Vincent Cros & Albert Fert

摘要：Room-temperature skyrmions in ferromagnetic films and multilayers show promise for encoding information bits in new computing technologies. Despite recent progress, ferromagnetic order generates dipolar fields that prevent ultrasmall skyrmion sizes, and allows a transverse deflection of moving skyrmions that hinders their efficient manipulation. Antiferromagnetic skyrmions shall lift these limitations. Here we demonstrate that room-temperature antiferromagnetic skyrmions can be stabilized in synthetic antiferromagnets (SAFs), in which perpendicular magnetic anisotropy, antiferromagnetic coupling and chiral order can be adjusted concurrently. Utilizing interlayer electronic coupling to an adjacent bias layer, we demonstrate that spin-spiral states obtained in a SAF with vanishing perpendicular magnetic anisotropy can be turned into isolated antiferromagnetic skyrmions. We also provide model-based estimates of skyrmion size and stability, showing that room-temperature antiferromagnetic skyrmions below 10 nm in radius can be anticipated in further optimized SAFs. Antiferromagnetic skyrmions in SAFs may thus solve major issues associated with ferromagnetic skyrmions for low-power spintronic devices.

链接：https://www.nature.com/articles/s41563-019-0468-3

15.**标题：**Integrin nanoclusters can bridge thin matrix fibres to form cell–matrix adhesions
作者：Rishita Changede, Haogang Cai, Shalom J. Wind & Michael P. Sheetz
摘要：Integrin-mediated cell–matrix adhesions are key to sensing the geometry and rigidity of extracellular environments and influence vital cellular processes. In vivo, the extracellular matrix is composed of fibrous arrays. To understand the fibre geometries that are required for adhesion formation, we patterned nanolines of various line widths and arrangements in single, crossing or paired arrays with the integrin-binding peptide Arg-Gly-Asp. Single thin lines (width ≤30 nm) did not support cell spreading or formation of focal adhesions, despite the presence of a high density of Arg-Gly-Asp, but wide lines (>40 nm) did. Using super-resolution microscopy, we observed stable, dense integrin clusters formed on parallel (within 110 nm) or crossing thin lines (mimicking a matrix mesh) similar to those on continuous substrates. These dense clusters bridged the line pairs by recruiting activated but unliganded integrins, as verified by integrin mutants unable to bind ligands that coclustered with ligand-bound integrins when present in an active extended conformation. Thus, in a fibrous extracellular matrix mesh, stable integrin nanoclusters bridge between thin (≤30 nm) matrix fibres and bring about downstream consequences of cell motility and growth.
链接：https://www.nature.com/articles/s41563-019-0460-y

16.**标题：**Actomyosin controls planarity and folding of epithelia in response to compression
作者：Tom P. J. Wyatt, Jonathan Fouchard, Ana Lisica, Nargess Khalilgharibi, Buzz Baum, Pierre Recho, Alexandre J. Kabla & Guillaume T. Charras
摘要：Throughout embryonic development and adult life, epithelia are subjected to compressive deformations. While these have been shown to trigger mechanosensitive responses such as cell extrusion and differentiation, which span tens of minutes, little is known about how epithelia adapt to compression over shorter timescales. Here, using suspended epithelia, we uncover the immediate response of epithelial tissues to the application of in-plane compressive strains (5–80%). We show that fast compression induces tissue buckling followed by actomyosin-dependent tissue flattening that erases the buckle within tens of seconds, in both mono- and multi-layered epithelia. Strikingly, we identify a well-defined limit to this response, so that stable folds form in the tissue when compressive strains exceed a ‘buckling threshold’ of ~35%. A combination of experiment and modelling shows that this behaviour is orchestrated by adaptation of the actomyosin cytoskeleton as it re-establishes tissue tension following compression. Thus, tissue pre-tension allows epithelia to both buffer against deformation and sets their ability to form and retain folds during morphogenesis.
链接：https://www.nature.com/articles/s41563-019-0461-x

17.**标题：**Spin current as a probe of quantum materials
作者：Wei Han, Sadamichi Maekawa & Xin-Cheng Xie
摘要：Spin current historically referred to the flow of electrons carrying spin information, in particular since the discovery of giant magnetoresistance in the 1980s. Recently, it has been found that spin current can also be mediated by spin-triplet supercurrent, superconducting quasiparticles, spinons, magnons, spin superfluidity and so on. Here, we review key progress concerning the developing research direction utilizing spin current as a probe of quantum materials. We focus on spin-triplet superconductivity and spin dynamics in the ferromagnet/superconductor heterostructures, quantum spin liquids, magnetic phase transitions, magnon-polarons, magnon-polaritons, magnon Bose–Einstein condensates and spin superfluidity. The unique characteristics of spin current as a

probe will be fruitful for future investigation of spin-dependent properties and the identification of new quantum materials.

链接：https://www.nature.com/articles/s41563-019-0456-7

18.**标题：**Ultrahigh-current-density niobium disulfide catalysts for hydrogen evolution

作者：Jieun Yang, Abdul Rahman Mohmad, Yan Wang, Raymond Fullon, Xiuju Song, Fang Zhao, Ibrahim Bozkurt, Mathias Augustin, Elton J. G. Santos, Hyeon Suk Shin, Wenjing Zhang, Damien Voiry, Hu Young Jeong & Manish Chhowalla

摘要：Metallic transition metal dichalcogenides (TMDs)1,2,3,4,5,6,7,8 are good catalysts for the hydrogen evolution reaction (HER). The overpotential and Tafel slope values of metallic phases and edges9 of two-dimensional (2D) TMDs approach those of Pt. However, the overall current density of 2D TMD catalysts remains orders of magnitude lower (~10–100 mA cm−2) than industrial Pt and Ir electrolysers (>1,000 mA cm−2)10,11. Here, we report the synthesis of the metallic 2H phase of niobium disulfide with additional niobium (2H Nb1+xS2, where x is ~0.35)12 as a HER catalyst with current densities of >5,000 mA cm−2 at ~420 mV versus a reversible hydrogen electrode. We find the exchange current density at 0 V for 2H Nb1.35S2 to be ~0.8 mA cm−2, corresponding to a turnover frequency of ~0.2 s−1. We demonstrate an electrolyser based on a 2H Nb1+xS2 cathode that can generate current densities of 1,000 mA cm−2. Our theoretical results reveal that 2H Nb1+xS2 with Nb-terminated surface has free energy for hydrogen adsorption that is close to thermoneutral, facilitating HER. Therefore, 2H Nb1+xS2 could be a viable catalyst for practical electrolysers.

链接：https://www.nature.com/articles/s41563-019-0463-8

19.**标题：**Enhanced sieving from exfoliated MoS2 membranes via covalent functionalization

作者：Lucie Ries, Eddy Petit, Thierry Michel, Cristina Coelho Diogo, Christel Gervais, Chrystelle Salameh, Mikhael Bechelany, Sébastien Balme, Philippe Miele, Nicolas Onofrio & Damien Voiry

摘要：Nanolaminate membranes made of two-dimensional materials such as graphene oxide are promising candidates for molecular sieving via size-limited diffusion in the two-dimensional capillaries, but high hydrophilicity makes these membranes unstable in water. Here, we report a nanolaminate membrane based on covalently functionalized molybdenum disulfide (MoS2) nanosheets. The functionalized MoS2 membranes demonstrate >90% and ~87% rejection for micropollutants and NaCl, respectively, when operating under reverse osmotic conditions. The sieving performance and water flux of the functionalized MoS2 membranes are attributed both to control of the capillary widths of the nanolaminates and to control of the surface chemistry of the nanosheets. We identify small hydrophobic functional groups, such as the methyl group, as the most promising for water purification. Methyl- functionalized nanosheets show high water permeation rates as confirmed by our molecular dynamic simulations, while maintaining high NaCl rejection. Control of the surface chemistry and the interlayer spacing therefore offers opportunities to tune the selectivity of the membranes while enhancing their stability.

链接：https://www.nature.com/articles/s41563-019-0464-7

20.**标题：**Organic mixed ionic–electronic conductors

作者：Bryan D. Paulsen, Klas Tybrandt, Eleni Stavrinidou & Jonathan Rivnay

摘要：Materials that efficiently transport and couple ionic and electronic charge are key to advancing a host of technological developments for next-generation bioelectronic, optoelectronic and energy

storage devices. Here we highlight key progress in the design and study of organic mixed ionic–electronic conductors (OMIECs), a diverse family of soft synthetically tunable mixed conductors. Across applications, the same interrelated fundamental physical processes dictate OMIEC properties and determine device performance. Owing to ionic and electronic interactions and coupled transport properties, OMIECs demand special understanding beyond knowledge derived from the study of organic thin films and membranes meant to support either electronic or ionic processes only. We address seemingly conflicting views and terminology regarding charging processes in these materials, and highlight recent approaches that extend fundamental understanding and contribute to the advancement of materials. Further progress is predicated on multimodal and multi-scale approaches to overcome lingering barriers to OMIEC design and implementation.
链接：https://www.nature.com/articles/s41563-019-0435-z

21. **标题：**Hyaluronic acid–bilirubin nanomedicine for targeted modulation of dysregulated intestinal barrier, microbiome and immune responses in colitis
作者：Yonghyun Lee, Kohei Sugihara, Merritt G. Gillilland III, Sangyong Jon, Nobuhiko Kamada & James J. Moon
摘要：While conventional approaches for inflammatory bowel diseases mainly focus on suppressing hyperactive immune responses, it remains unclear how to address disrupted intestinal barriers, dysbiosis of the gut commensal microbiota and dysregulated mucosal immune responses in inflammatory bowel diseases. Moreover, immunosuppressive agents can cause off-target systemic side effects and complications. Here, we report the development of hyaluronic acid–bilirubin nanomedicine (HABN) that accumulates in inflamed colonic epithelium and restores the epithelium barriers in a murine model of acute colitis. Surprisingly, HABN also modulates the gut microbiota, increasing the overall richness and diversity and markedly augmenting the abundance of Akkermansia muciniphila and Clostridium XIVα, which are microorganisms with crucial roles in gut homeostasis. Importantly, HABN associated with pro-inflammatory macrophages, regulated innate immune responses and exerted potent therapeutic efficacy against colitis. Our work sheds light on the impact of nanotherapeutics on gut homeostasis, microbiome and innate immune responses for the treatment of inflammatory diseases.
链接：https://www.nature.com/articles/s41563-019-0462-9

22. **标题：**Programming shape using kirigami tessellations
作者：Gary P. T. Choi, Levi H. Dudte & L. Mahadevan
摘要：Kirigami tessellations, regular planar patterns formed by partially cutting flat, thin sheets, allow compact shapes to morph into open structures with rich geometries and unusual material properties. However, geometric and topological constraints make the design of such structures challenging. Here we pose and solve the inverse problem of determining the number, size and orientation of cuts that enables the deployment of a closed, compact regular kirigami tessellation to conform approximately to any prescribed target shape in two or three dimensions. We first identify the constraints on the lengths and angles of generalized kirigami tessellations that guarantee that their reconfigured face geometries can be contracted from a non-trivial deployed shape to a compact, non-overlapping planar cut pattern. We then encode these conditions into a flexible constrained optimization framework to obtain generalized kirigami patterns derived from various periodic tesselations of the plane that can be deployed into a wide variety of prescribed shapes. A simple

mechanical analysis of the resulting structure allows us to determine and control the stability of the deployed state and control the deployment path. Finally, we fabricate physical models that deploy in two and three dimensions to validate this inverse design approach. Altogether, our approach, combining geometry, topology and optimization, highlights the potential for generalized kirigami tessellations as building blocks for shape-morphing mechanical metamaterials.
链接：https://www.nature.com/articles/s41563-019-0452-y

23. **标题：**Fundamentals of inorganic solid-state electrolytes for batteries
作者：Theodosios Famprikis, Pieremanuele Canepa, James A. Dawson, M. Saiful Islam & Christian Masquelier
摘要：In the critical area of sustainable energy storage, solid-state batteries have attracted considerable attention due to their potential safety, energy-density and cycle-life benefits. This Review describes recent progress in the fundamental understanding of inorganic solid electrolytes, which lie at the heart of the solid-state battery concept, by addressing key issues in the areas of multiscale ion transport, electrochemical and mechanical properties, and current processing routes. The main electrolyte-related challenges for practical solid-state devices include utilization of metal anodes, stabilization of interfaces and the maintenance of physical contact, the solutions to which hinge on gaining greater knowledge of the underlying properties of solid electrolyte materials.
链接：https://www.nature.com/articles/s41563-019-0431-3

24. **标题：**Synthetic spin–orbit interaction for Majorana devices
作者：M. M. Desjardins, L. C. Contamin, M. R. Delbecq, M. C. Dartiailh, L. E. Bruhat, T. Cubaynes, J. J. Viennot, F. Mallet, S. Rohart, A. Thiaville, A. Cottet & T. Kontos
摘要：The interplay of superconductivity with non-trivial spin textures is promising for the engineering of non-Abelian Majorana quasiparticles. Spin–orbit coupling is crucial for the topological protection of Majorana modes as it forbids other trivial excitations at low energy but is typically intrinsic to the material1,2,3,4,5,6,7. Here, we show that coupling to a magnetic texture can induce both a strong spin–orbit coupling of 1.1 meV and a Zeeman effect in a carbon nanotube. Both of these features are revealed through oscillations of superconductivity-induced subgap states under a change in the magnetic texture. Furthermore, we find a robust zero-energy state—the hallmark of devices hosting localized Majorana modes—at zero magnetic field. Our findings are generalizable to any low-dimensional conductor, and future work could include microwave spectroscopy and braiding operations, which are at the heart of modern schemes for topological quantum computation.
链接：https://www.nature.com/articles/s41563-019-0457-6

25. **标题：**Nanometre-thin indium tin oxide for advanced high-performance electronics
作者：Shengman Li, Mengchuan Tian, Qingguo Gao, Mengfei Wang, Tiaoyang Li, Qianlan Hu, Xuefei Li & Yanqing Wu
摘要：Although indium tin oxide (ITO) is widely used in optoelectronics due to its high optical transmittance and electrical conductivity, its degenerate doping limits exploitation as a semiconduction material. In this work, we created short-channel active transistors based on an ultra-thin (down to 4 nm) ITO channel and a high-quality, lanthanum-doped hafnium oxide dielectric of equivalent oxide thickness of 0.8 nm, with performance comparative to that of existing metal oxides and emerging two-dimensional materials. Short-channel immunity, with a subthreshold slope

of 66 mV per decade, off-state current <100 fA μm–1 and on/off ratio up to 5.5 × 109, was measured for a 40-nm transistor. Logic inverters working in the subthreshold regime exhibit a high gain of 178 at a low-supply voltage of 0.5 V. Moreover, radiofrequency transistors, with as-measured cut-off frequency fT and maximum oscillation frequency fmax both >10 GHz, have been demonstrated. The unique wide bandgap and low dielectric constant of ITO provide prospects for future scaling below the 5-nm regime for advanced low-power electronics.

链接：https://www.nature.com/articles/s41563-019-0455-8

IEL Top25

（来源：http://ieeexplore.ieee.org/）

1.标题：Deep Learning for Health Informatics

作者：Daniele Ravì ; Charence Wong ; Fani Deligianni ; Melissa Berthelot ; Javier Andreu-Perez ; Benny Lo ; Guang-Zhong Yang

出处：IEEE Journal of Biomedical and Health Informatics

Volume: 21 Issue: 1 Date : Jan. 2017

Page(s): 4 - 21

摘要：With a massive influx of multimodality data, the role of data analytics in health informatics has grown rapidly in the last decade. This has also prompted increasing interests in the generation of analytical, data driven models based on machine learning in health informatics. Deep learning, a technique with its foundation in artificial neural networks, is emerging in recent years as a powerful tool for machine learning, promising to reshape the future of artificial intelligence. Rapid improvements in computational power, fast data storage, and parallelization have also contributed to the rapid uptake of the technology in addition to its predictive power and ability to generate automatically optimized high-level features and semantic interpretation from the input data. This article presents a comprehensive up-to-date review of research employing deep learning in health informatics, providing a critical analysis of the relative merit, and potential pitfalls of the technique as well as its future outlook. The paper mainly focuses on key applications of deep learning in the fields of translational bioinformatics, medical imaging, pervasive sensing, medical informatics, and public health.

链接：https://ieeexplore.ieee.org/document/7801947

2.标题：Artificial Intelligence in the 21st Century

作者：Jiaying Liu ; Xiangjie Kong ; Feng Xia ; Xiaomei Bai ; Lei Wang ; Qing Qing ; Ivan Lee

出处：IEEE Access

Volume: 6 Date : 2018

Page(s): 34403 - 34421

摘要：The field of artificial intelligence (AI) has shown an upward trend of growth in the 21st century (from 2000 to 2015). The evolution in AI has advanced the development of human society in our own time, with dramatic revolutions shaped by both theories and techniques. However, the multidisciplinary and fast-growing features make AI a field in which it is difficult to be well understood. In this paper, we study the evolution of AI at the beginning of the 21st century using publication metadata extracted from 9 top-tier journals and 12 top-tier conferences of this discipline. We find that the area is in the sustainable development and its impact continues to grow. From the perspective of reference behavior, the decrease in self-references indicates that the AI is becoming more and more open-minded. The influential papers/researchers/institutions we identified outline landmarks in the development of this field. Last but not least, we explore the inner structure in terms of topics' evolution over time. We have quantified the temporal trends at the topic level and discovered the inner connection among these topics. These findings provide deep insights into the current scientific innovations, as well as shedding light on funding policies.
链接：https://ieeexplore.ieee.org/document/8325446/

3. 标题：Blockchain for AI: Review and Open Research Challenges
作者：Khaled Salah ; M. Habib Ur Rehman ; Nishara Nizamuddin ; Ala Al-Fuqaha
出处：IEEE Access
Volume: 7 Date : 2019
Page(s): 10127 - 10149
摘要：Recently, artificial intelligence (AI) and blockchain have become two of the most trending and disruptive technologies. Blockchain technology has the ability to automate payment in cryptocurrency and to provide access to a shared ledger of data, transactions, and logs in a decentralized, secure, and trusted manner. Also with smart contracts, blockchain has the ability to govern interactions among participants with no intermediary or a trusted third party. AI, on the other hand, offers intelligence and decision-making capabilities for machines similar to humans. In this paper, we present a detailed survey on blockchain applications for AI. We review the literature, tabulate, and summarize the emerging blockchain applications, platforms, and protocols specifically targeting AI area. We also identify and discuss open research challenges of utilizing blockchain technologies for AI.
链接：https://ieeexplore.ieee.org/document/8598784/

4. 标题：A Vision of IoT: Applications, Challenges, and Opportunities With China Perspective
作者：Shanzhi Chen ; Hui Xu ; Dake Liu ; Bo Hu ; Hucheng Wang
出处：IEEE Internet of Things Journal
Volume: 1 Issue: 4 Date : Aug. 2014
Page(s): 349 - 359
摘要：Internet of Things (IoT), which will create a huge network of billions or trillions of “Things” communicating with one another, are facing many technical and application challenges. This paper introduces the status of IoT development in China, including policies, R&D plans, applications, and standardization. With China's perspective, this paper depicts such challenges on technologies, applications, and standardization, and also proposes an open and general IoT architecture consisting of three platforms to meet the architecture challenge. Finally, this paper discusses the opportunity and prospect of IoT.

链接：https://ieeexplore.ieee.org/document/6851114

5. 标题：ORB-SLAM: A Versatile and Accurate Monocular SLAM System
作者：Raúl Mur-Artal ; J. M. M. Montiel ; Juan D. Tardós
IEEE Transactions on Robotics
Volume: 31 Issue: 5 Date : Oct. 2015
Page(s): 1147 - 1163
摘要：This paper presents ORB-SLAM, a feature-based monocular simultaneous localization and mapping (SLAM) system that operates in real time, in small and large indoor and outdoor environments. The system is robust to severe motion clutter, allows wide baseline loop closing and relocalization, and includes full automatic initialization. Building on excellent algorithms of recent years, we designed from scratch a novel system that uses the same features for all SLAM tasks: tracking, mapping, relocalization, and loop closing. A survival of the fittest strategy that selects the points and keyframes of the reconstruction leads to excellent robustness and generates a compact and trackable map that only grows if the scene content changes, allowing lifelong operation. We present an exhaustive evaluation in 27 sequences from the most popular datasets. ORB-SLAM achieves unprecedented performance with respect to other state-of-the-art monocular SLAM approaches. For the benefit of the community, we make the source code public.
链接：https://ieeexplore.ieee.org/document/7219438

6. 标题：Performance Evaluation of Multi-UAV System in Post-Disaster Application: Validated by HITL Simulator
作者：Maher Aljehani ; Masahiro Inoue
出处：IEEE Access
Volume: 7 Date : 2019
Page(s): 64386 - 64400
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/8715365

7. 标题：Color Balance and Fusion for Underwater Image Enhancement
作者：Codruta O. Ancuti ; Cosmin Ancuti ; Christophe De Vleeschouwer ; Philippe Bekaert
出处：IEEE Transactions on Image Processing

Volume: 27 Issue: 1 Date : Jan. 2018
Page(s): 379 - 393

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

8. 标题：Underwater Optical Wireless Communication
作者：Hemani Kaushal ; Georges Kaddoum
出处：IEEE Access
Volume: 4 Date : 2016
Page(s): 1518 - 1547
摘要：Underwater wireless information transfer is of great interest to the military, industry, and the scientific community, as it plays an important role in tactical surveillance, pollution monitoring, oil control and maintenance, offshore explorations, climate change monitoring, and oceanography research. In order to facilitate all these activities, there is an increase in the number of unmanned vehicles or devices deployed underwater, which require high bandwidth and high capacity for information transfer underwater. Although tremendous progress has been made in the field of acoustic communication underwater, however, it is limited by bandwidth. All this has led to the proliferation of underwater optical wireless communication (UOWC), as it provides higher data rates than the traditional acoustic communication systems with significantly lower power consumption and simpler computational complexities for short-range wireless links. UOWC has many potential applications ranging from deep oceans to coastal waters. However, the biggest challenge for underwater wireless communication originates from the fundamental characteristics of ocean or sea water; addressing these challenges requires a thorough understanding of complex physio-chemical biological systems. In this paper, the main focus is to understand the feasibility and the reliability of high data rate underwater optical links due to various propagation phenomena that impact the performance of the system. This paper provides an exhaustive overview of recent advances in UOWC. Channel characterization, modulation schemes, coding techniques, and various sources of noise which are specific to UOWC are discussed. This paper not only provides exhaustive research in underwater optical communication but also aims to provide the development of new ideas that would help in the growth of future underwater communication. A hybrid approach to an acousto-optic communication system is presented that complements the existing acoustic ...
链接：https://ieeexplore.ieee.org/document/7450595

9. 标题：Hawk: The Blockchain Model of Cryptography and Privacy-Preserving Smart Contracts
作者：Ahmed Kosba ; Andrew Miller ; Elaine Shi ; Zikai Wen ; Charalampos Papamanthou
出处：2016 IEEE Symposium on Security and Privacy (SP)
Date : 22-26 May 2016
Page(s): 839 - 858
摘要：Emerging smart contract systems over decentralized cryptocurrencies allow mutually distrustful parties to transact safely without trusted third parties. In the event of contractual breaches or aborts, the decentralized blockchain ensures that honest parties obtain commensurate compensation. Existing systems, however, lack transactional privacy. All transactions, including flow of money between pseudonyms and amount transacted, are exposed on the blockchain. We present Hawk, a decentralized smart contract system that does not store financial transactions in the clear on the blockchain, thus retaining transactional privacy from the public's view. A Hawk programmer can write a private smart contract in an intuitive manner without having to implement cryptography, and our compiler automatically generates an efficient cryptographic protocol where contractual parties interact with the blockchain, using cryptographic primitives such as zero-knowledge proofs. To formally define and reason about the security of our protocols, we are the first to formalize the blockchain model of cryptography. The formal modeling is of independent interest. We advocate the community to adopt such a formal model when designing applications atop decentralized blockchains.
链接：https://ieeexplore.ieee.org/document/7546538

10. 标题：Loihi: A Neuromorphic Manycore Processor with On-Chip Learning
作者：Mike Davies ; Narayan Srinivasa ; Tsung-Han Lin ; Gautham Chinya ; Yongqiang Cao ; Sri Harsha Choday ; Georgios Dimou ; Prasad Joshi ; Nabil Imam ; Shweta Jain ; Yuyun Liao ; Chit-Kwan Lin ; Andrew Lines ; Ruokun Liu ; Deepak Mathaikutty ; Steven McCoy ; Arnab Paul ; Jonathan Tse ; Guruguhanathan Venkataramanan ; Yi-Hsin Weng ; Andreas Wild ; Yoonseok Yang ; Hong Wang
出处：IEEE Micro
Volume: 38 Issue: 1 Date : January/February 2018
Page(s): 82 - 99
摘要：Loihi is a 60-mm2chip fabricated in Intels 14-nm process that advances the state-of-the-art modeling of spiking neural networks in silicon. It integrates a wide range of novel features for the field, such as hierarchical connectivity, dendritic compartments, synaptic delays, and, most importantly, programmable synaptic learning rules. Running a spiking convolutional form of the Locally Competitive Algorithm, Loihi can solve LASSO optimization problems with over three orders of magnitude superior energy-delay-product compared to conventional solvers running on a CPU iso-process/voltage/area. This provides an unambiguous example of spike-based computation, outperforming all known conventional solutions.
链接：https://ieeexplore.ieee.org/document/8259423/

11. 标题：Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks
作者：Shaoqing Ren ; Kaiming He ; Ross Girshick ; Jian Sun
出处：IEEE Transactions on Pattern Analysis and Machine Intelligence
Volume: 39 Issue: 6 Date : 1 June 2017

Page(s): 1137 - 1149

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.

链接：https://ieeexplore.ieee.org/document/7485869

12. 标题：A Survey of Clustering With Deep Learning: From the Perspective of Network Architecture

作者：Erxue Min ; Xifeng Guo ; Qiang Liu ; Gen Zhang ; Jianjing Cui ; Jun Long

出处：IEEE Access

Volume: 6 Date : 2018

Page(s): 39501 - 39514

摘要：Clustering is a fundamental problem in many data-driven application domains, and clustering performance highly depends on the quality of data representation. Hence, linear or non-linear feature transformations have been extensively used to learn a better data representation for clustering. In recent years, a lot of works focused on using deep neural networks to learn a clustering-friendly representation, resulting in a significant increase of clustering performance. In this paper, we give a systematic survey of clustering with deep learning in views of architecture. Specifically, we first introduce the preliminary knowledge for better understanding of this field. Then, a taxonomy of clustering with deep learning is proposed and some representative methods are introduced. Finally, we propose some interesting future opportunities of clustering with deep learning and give some conclusion remarks.

链接：https://ieeexplore.ieee.org/document/8412085/

13. 标题：Beyond a Gaussian Denoiser: Residual Learning of Deep CNN for Image Denoising

作者：Kai Zhang ; Wangmeng Zuo ; Yunjin Chen ; Deyu Meng ; Lei Zhang

出处：IEEE Transactions on Image Processing

Volume: 26 Issue: 7 Date : July 2017

Page(s): 3142 - 3155

摘要：The discriminative model learning for image denoising has been recently attracting considerable attentions due to its favorable denoising performance. In this paper, we take one step forward by investigating the construction of feed-forward denoising convolutional neural networks

(DnCNNs) to embrace the progress in very deep architecture, learning algorithm, and regularization method into image denoising. Specifically, residual learning and batch normalization are utilized to speed up the training process as well as boost the denoising performance. Different from the existing discriminative denoising models which usually train a specific model for additive white Gaussian noise at a certain noise level, our DnCNN model is able to handle Gaussian denoising with unknown noise level (i.e., blind Gaussian denoising). With the residual learning strategy, DnCNN implicitly removes the latent clean image in the hidden layers. This property motivates us to train a single DnCNN model to tackle with several general image denoising tasks, such as Gaussian denoising, single image super-resolution, and JPEG image deblocking. Our extensive experiments demonstrate that our DnCNN model can not only exhibit high effectiveness in several general image denoising tasks, but also be efficiently implemented by benefiting from GPU computing.
链接：https://ieeexplore.ieee.org/document/7839189

14. 标题：What Will 5G Be?
作者：Jeffrey G. Andrews ; Stefano Buzzi ; Wan Choi ; Stephen V. Hanly ; Angel Lozano ; Anthony C. K. Soong ; Jianzhong Charlie Zhang
出处：IEEE Journal on Selected Areas in Communications
Volume: 32 Issue: 6 Date : June 2014
Page(s): 1065 - 1082
摘要：What will 5G be? What it will not be is an incremental advance on 4G. The previous four generations of cellular technology have each been a major paradigm shift that has broken backward compatibility. Indeed, 5G will need to be a paradigm shift that includes very high carrier frequencies with massive bandwidths, extreme base station and device densities, and unprecedented numbers of antennas. However, unlike the previous four generations, it will also be highly integrative: tying any new 5G air interface and spectrum together with LTE and WiFi to provide universal high-rate coverage and a seamless user experience. To support this, the core network will also have to reach unprecedented levels of flexibility and intelligence, spectrum regulation will need to be rethought and improved, and energy and cost efficiencies will become even more critical considerations. This paper discusses all of these topics, identifying key challenges for future research and preliminary 5G standardization activities, while providing a comprehensive overview of the current literature, and in particular of the papers appearing in this special issue.
链接：https://ieeexplore.ieee.org/document/6824752/

15. 标题：Untangling Blockchain: A Data Processing View of Blockchain Systems
作者：Tien Tuan Anh Dinh ; Rui Liu ; Meihui Zhang ; Gang Chen ; Beng Chin Ooi ; Ji Wang
出处：IEEE Transactions on Knowledge and Data Engineering
Volume: 30 Issue: 7 Date : 1 July 2018
Page(s): 1366 - 1385
摘要：Blockchain technologies are gaining massive momentum in the last few years. Blockchains are distributed ledgers that enable parties who do not fully trust each other to maintain a set of global states. The parties agree on the existence, values, and histories of the states. As the technology landscape is expanding rapidly, it is both important and challenging to have a firm grasp of what the core technologies have to offer, especially with respect to their data processing capabilities. In this paper, we first survey the state of the art, focusing on private blockchains (in which parties are

authenticated). We analyze both in-production and research systems in four dimensions: distributed ledger, cryptography, consensus protocol, and smart contract. We then present BLOCKBENCH, a benchmarking framework for understanding performance of private blockchains against data processing workloads. We conduct a comprehensive evaluation of three major blockchain systems based on BLOCKBENCH, namely Ethereum, Parity, and Hyperledger Fabric. The results demonstrate several trade-offs in the design space, as well as big performance gaps between blockchain and database systems. Drawing from design principles of database systems, we discuss several research directions for bringing blockchain performance closer to the realm of databases.
链接：https://ieeexplore.ieee.org/document/8246573

16. 标题：3D Convolutional Neural Networks for Human Action Recognition
作者：Shuiwang Ji ; Wei Xu ; Ming Yang ; Kai Yu
出处：IEEE Transactions on Pattern Analysis and Machine Intelligence
Volume: 35 Issue: 1 Date : Jan. 2013
Page(s): 221 - 231
摘要：We consider the automated recognition of human actions in surveillance videos. Most current methods build classifiers based on complex handcrafted features computed from the raw inputs. Convolutional neural networks (CNNs) are a type of deep model that can act directly on the raw inputs. However, such models are currently limited to handling 2D inputs. In this paper, we develop a novel 3D CNN model for action recognition. This model extracts features from both the spatial and the temporal dimensions by performing 3D convolutions, thereby capturing the motion information encoded in multiple adjacent frames. The developed model generates multiple channels of information from the input frames, and the final feature representation combines information from all channels. To further boost the performance, we propose regularizing the outputs with high-level features and combining the predictions of a variety of different models. We apply the developed models to recognize human actions in the real-world environment of airport surveillance videos, and they achieve superior performance in comparison to baseline methods.
链接：https://ieeexplore.ieee.org/document/6165309/

17. 标题：A Review on the Use of Blockchain for the Internet of Things
作者：Tiago M. Fernández-Caramés ; Paula Fraga-Lamas
出处：IEEE Access
Volume: 6 Date : 2018
Page(s): 32979 - 33001
摘要：The paradigm of Internet of Things (IoT) is paving the way for a world, where many of our daily objects will be interconnected and will interact with their environment in order to collect information and automate certain tasks. Such a vision requires, among other things, seamless authentication, data privacy, security, robustness against attacks, easy deployment, and self-maintenance. Such features can be brought by blockchain, a technology born with a cryptocurrency called Bitcoin. In this paper, a thorough review on how to adapt blockchain to the specific needs of IoT in order to develop Blockchain-based IoT (BIoT) applications is presented. After describing the basics of blockchain, the most relevant BIoT applications are described with the objective of emphasizing how blockchain can impact traditional cloud-centered IoT applications. Then, the current challenges and possible optimizations are detailed regarding many aspects that

affect the design, development, and deployment of a BIoT application. Finally, some recommendations are enumerated with the aim of guiding future BIoT researchers and developers on some of the issues that will have to be tackled before deploying the next generation of BIoT applications.
链接：https://ieeexplore.ieee.org/document/8370027

18. 标题：Deep Learning Approach for Intelligent Intrusion Detection System
作者：R. Vinayakumar ; Mamoun Alazab ; K. P. Soman ; Prabaharan Poornachandran ; Ameer Al-Nemrat ; Sitalakshmi Venkatraman
出处：IEEE Access
Volume: 7 Date : 2019
Page(s): 41525 - 41550
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/

19. 标题：Deep Convolutional Neural Networks for Computer-Aided Detection: CNN Architectures, Dataset Characteristics and Transfer Learning
作者：Hoo-Chang Shin ; Holger R. Roth ; Mingchen Gao ; Le Lu ; Ziyue Xu ; Isabella Nogues ; Jianhua Yao ; Daniel Mollura ; Ronald M. Summers
出处：IEEE Transactions on Medical Imaging
Volume: 35 Issue: 5 Date : May 2016
Page(s): 1285 - 1298
摘要：Remarkable progress has been made in image recognition, primarily due to the availability of large-scale annotated datasets and deep convolutional neural networks (CNNs). CNNs enable

learning data-driven, highly representative, hierarchical image features from sufficient training data. However, obtaining datasets as comprehensively annotated as ImageNet in the medical imaging domain remains a challenge. There are currently three major techniques that successfully employ CNNs to medical image classification: training the CNN from scratch, using off-the-shelf pre-trained CNN features, and conducting unsupervised CNN pre-training with supervised fine-tuning. Another effective method is transfer learning, i.e., fine-tuning CNN models pre-trained from natural image dataset to medical image tasks. In this paper, we exploit three important, but previously understudied factors of employing deep convolutional neural networks to computer-aided detection problems. We first explore and evaluate different CNN architectures. The studied models contain 5 thousand to 160 million parameters, and vary in numbers of layers. We then evaluate the influence of dataset scale and spatial image context on performance. Finally, we examine when and why transfer learning from pre-trained ImageNet (via fine-tuning) can be useful. We study two specific computer-aided detection (CADe) problems, namely thoraco-abdominal lymph node (LN) detection and interstitial lung disease (ILD) classification. We achieve the state-of-the-art performance on the mediastinal LN detection, and report the first five-fold cross-validation classification results on predicting axial CT slices with ILD categories. Our extensive empirical evaluation, CNN model analysis and valuable insights can be extended to the design of high performance CAD systems for other medical imaging tasks.
链接：https://ieeexplore.ieee.org/document/7404017/

20. 标题：Internet of Things for Smart Healthcare: Technologies, Challenges, and Opportunities
作者：Stephanie B. Baker ; Wei Xiang ; Ian Atkinson
出处：IEEE Access
Volume: 5 Date : 2017
Page(s): 26521 - 26544
摘要：Internet of Things (IoT) technology has attracted much attention in recent years for its potential to alleviate the strain on healthcare systems caused by an aging population and a rise in chronic illness. Standardization is a key issue limiting progress in this area, and thus this paper proposes a standard model for application in future IoT healthcare systems. This survey paper then presents the state-of-the-art research relating to each area of the model, evaluating their strengths, weaknesses, and overall suitability for a wearable IoT healthcare system. Challenges that healthcare IoT faces including security, privacy, wearability, and low-power operation are presented, and recommendations are made for future research directions.
链接：https://ieeexplore.ieee.org/document/8124196/

21. 标题：A fast and elitist multiobjective genetic algorithm: NSGA-II
作者：K. Deb ; A. Pratap ; S. Agarwal ; T. Meyarivan
出处：IEEE Transactions on Evolutionary Computation
Volume: 6 Issue: 2 Date : April 2002
Page(s): 182 - 197
摘要：Multi-objective evolutionary algorithms (MOEAs) that use non-dominated sorting and sharing have been criticized mainly for: (1) their O(MN/sup 3/) computational complexity (where M is the number of objectives and N is the population size); (2) their non-elitism approach; and (3) the need to specify a sharing parameter. In this paper, we suggest a non-dominated sorting-based MOEA, called

NSGA-II (Non-dominated Sorting Genetic Algorithm II), which alleviates all of the above three difficulties. Specifically, a fast non-dominated sorting approach with O(MN/sup 2/) computational complexity is presented. Also, a selection operator is presented that creates a mating pool by combining the parent and offspring populations and selecting the best N solutions (with respect to fitness and spread). Simulation results on difficult test problems show that NSGA-II is able, for most problems, to find a much better spread of solutions and better convergence near the true Pareto-optimal front compared to the Pareto-archived evolution strategy and the strength-Pareto evolutionary algorithm - two other elitist MOEAs that pay special attention to creating a diverse Pareto-optimal front. Moreover, we modify the definition of dominance in order to solve constrained multi-objective problems efficiently. Simulation results of the constrained NSGA-II on a number of test problems, including a five-objective, seven-constraint nonlinear problem, are compared with another constrained multi-objective optimizer, and the much better performance of NSGA-II is observed.

链接：https://ieeexplore.ieee.org/document/996017/

22. 标题：Next Generation 5G Wireless Networks: A Comprehensive Survey

作者：Mamta Agiwal ; Abhishek Roy ; Navrati Saxena

出处：IEEE Communications Surveys & Tutorials

Volume: 18 Issue: 3 Date : thirdquarter 2016

Page(s): 1617 - 1655

摘要：The vision of next generation 5G wireless communications lies in providing very high data rates (typically of Gbps order), extremely low latency, manifold increase in base station capacity, and significant improvement in users' perceived quality of service (QoS), compared to current 4G LTE networks. Ever increasing proliferation of smart devices, introduction of new emerging multimedia applications, together with an exponential rise in wireless data (multimedia) demand and usage is already creating a significant burden on existing cellular networks. 5G wireless systems, with improved data rates, capacity, latency, and QoS are expected to be the panacea of most of the current cellular networks' problems. In this survey, we make an exhaustive review of wireless evolution toward 5G networks. We first discuss the new architectural changes associated with the radio access network (RAN) design, including air interfaces, smart antennas, cloud and heterogeneous RAN. Subsequently, we make an in-depth survey of underlying novel mm-wave physical layer technologies, encompassing new channel model estimation, directional antenna design, beamforming algorithms, and massive MIMO technologies. Next, the details of MAC layer protocols and multiplexing schemes needed to efficiently support this new physical layer are discussed. We also look into the killer applications, considered as the major driving force behind 5G. In order to understand the improved user experience, we provide highlights of new QoS, QoE, and SON features associated with the 5G evolution. For alleviating the increased network energy consumption and operating expenditure, we make a detail review on energy awareness and cost efficiency. As understanding the current status of 5G implementation is important for its eventual commercialization, we also discuss relevant field trials, drive tests, and simulation experiments. Finally, we point out major existing research issues and identify possible future research directi...

链接：https://ieeexplore.ieee.org/document/7414384

23. 标题：Wheel Defect Detection With Machine Learning
作者：Gabriel Krummenacher ; Cheng Soon Ong ; Stefan Koller ; Seijin Kobayashi ; Joachim M. Buhmann
出处：IEEE Transactions on Intelligent Transportation Systems
Volume: 19 Issue: 4 Date : April 2018
Page(s): 1176 - 1187
摘要：Wheel defects on railway wagons have been identified as an important source of damage to the railway infrastructure and rolling stock. They also cause noise and vibration emissions that are costly to mitigate. We propose two machine learning methods to automatically detect these wheel defects, based on the wheel vertical force measured by a permanently installed sensor system on the railway network. Our methods automatically learn different types of wheel defects and predict during normal operation if a wheel has a defect or not. The first method is based on novel features for classifying time series data and it is used for classification with a support vector machine. To evaluate the performance of our method we construct multiple data sets for the following defect types: flat spot, shelling, and non-roundness. We outperform classical defect detection methods for flat spots and demonstrate prediction for the other two defect types for the first time. Motivated by the recent success of artificial neural networks for image classification, we train custom artificial neural networks with convolutional layers on 2-D representations of the measurement time series. The neural network approach improves the performance on wheels with flat spots and non-roundness by explicitly modeling the multi sensor structure of the measurement system through multiple instance learning and shift invariant networks.
链接：https://ieeexplore.ieee.org/document/8006280/

24. 标题：Hybrid LSTM and Encoder–Decoder Architecture for Detection of Image Forgeries
作者：Jawadul H. Bappy ; Cody Simons ; Lakshmanan Nataraj ; B. S. Manjunath ; Amit K. Roy-Chowdhury
出处：IEEE Transactions on Image Processing
Volume: 28 Issue: 7 Date : July 2019
Page(s): 3286 - 3300
摘要：With advanced image journaling tools, one can easily alter the semantic meaning of an image by exploiting certain manipulation techniques such as copy clone, object splicing, and removal, which mislead the viewers. In contrast, the identification of these manipulations becomes a very challenging task as manipulated regions are not visually apparent. This paper proposes a high-confidence manipulation localization architecture that utilizes resampling features, long short-term memory (LSTM) cells, and an encoder-decoder network to segment out manipulated regions from non-manipulated ones. Resampling features are used to capture artifacts, such as JPEG quality loss, upsampling, downsampling, rotation, and shearing. The proposed network exploits larger receptive fields (spatial maps) and frequency-domain correlation to analyze the discriminative characteristics between the manipulated and non-manipulated regions by incorporating the encoder and LSTM network. Finally, the decoder network learns the mapping from low-resolution feature maps to pixel-wise predictions for image tamper localization. With the predicted mask provided by the final layer (softmax) of the proposed architecture, end-to-end training is performed to learn the network parameters through back-propagation using the ground-truth masks. Furthermore, a large image splicing dataset is introduced to guide the training process. The proposed method is capable of

localizing image manipulations at the pixel level with high precision, which is demonstrated through rigorous experimentation on three diverse datasets.
链接：https://ieeexplore.ieee.org/document/8626149/

25. 标题：Representation Learning: A Review and New Perspectives
作者：Yoshua Bengio ; Aaron Courville ; Pascal Vincent
出处：IEEE Transactions on Pattern Analysis and Machine Intelligence
Volume: 35 Issue: 8 Date : Aug. 2013
Page(s): 1798 - 1828
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.
链接：https://ieeexplore.ieee.org/document/6472238

ESI HOT PAPERS

(Physics)

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

1、被引频次：319
题目：LMERTEST PACKAGE: TESTS IN LINEAR MIXED EFFECTS MODELS
作者：KUZNETSOVA, A;BROCKHOFF, PB;CHRISTENSEN, RHB
出处：J STAT SOFTW 82 (13): 1-26 DEC 2017
地址：TECH UNIV DENMARK, LYNGBY, DENMARK;TECH UNIV DENMARK, CHRISTENSEN STAT, LYNGBY, DENMARK;DTU COMPUTE, STAT & DATA ANAL SECT, DEPT APPL MATH & COMP SCI, RICHARD PETERSENS PLADS,BLDG 324, DK-2800 LYNGBY, DENMARK
摘要：One of the frequent questions by users of the mixed model function lmer of the lme4 package

has been: How can I get p values for the F and t tests for objects returned by lmer? The ImerTest package extends the 'lmerMod' class of the lme4 package, by overloading the anova and summary functions by providing p values for tests for fixed effects. We have implemented the Satterthwaite's method for approximating degrees of freedom for the t and F tests. We have also implemented the construction of Type I-II ANOVA tables. Furthermore, one may also obtain the summary as well as the anova table using the Kenward-Roger approximation for denominator degrees of freedom (based on the KRmodcomp function from the pbkrtest package). Some other convenient mixed model analysis tools such as a step method, that performs backward elimination of nonsignificant effects both random and fixed, calculation of population means and multiple comparison tests together with plot facilities are provided by the package as well.
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2、被引频次：242
题目：A SURVEY ON DEEP LEARNING IN MEDICAL IMAGE ANALYSIS
作者：LITJENS, G;KOOI, T;BEJNORDI, BE;SETIO, AAA;CIOMPI, F;GHAFOORIAN, M;VAN DER LAAK, JAWM;VAN GINNEKEN, B;SANCHEZ, CI
出处：MED IMAGE ANAL 42: 60-88 DEC 2017
地址：RADBOUD UNIV NIJMEGEN, MED CTR, DIAGNOST IMAGE ANAL GRP, NIJMEGEN, NETHERLANDS
摘要：Deep learning algorithms, in particular convolutional networks, have rapidly become a methodology of choice for analyzing medical images. This paper reviews the major deep learning concepts pertinent to medical image analysis and summarizes over 300 contributions to the field, most of which appeared in the last year. We survey the use of deep learning for image classification, object detection, segmentation, registration, and other tasks. Concise overviews are provided of studies per application area: neuro, retinal, pulmonary, digital pathology, breast, cardiac, abdominal, musculoskeletal. We end with a summary of the current state-of-the-art, a critical discussion of open challenges and directions for future research. (C) 2017 Elsevier B.V. All rights reserved.
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3、被引频次：194
题目：IMAGEJ2: IMAGEJ FOR THE NEXT GENERATION OF SCIENTIFIC IMAGE DATA
作者：RUEDEN, CT;SCHINDELIN, J;HINER, MC;DEZONIA, BE;WALTER, AE;ARENA, ET;ELICEIRI, KW
出处：BMC BIOINFORMATICS 18: - NOV 29 2017
地址：UNIV WISCONSIN, LAB OPT & COMPUTAT INSTRUMENTAT, MADISON, WI 53706 USA;MORGRIDGE INST RES, MADISON, WI 53715 USA
摘要：Background: ImageJ is an image analysis program extensively used in the biological sciences and beyond. Due to its ease of use, recordable macro language, and extensible plug-in architecture, ImageJ enjoys contributions from non-programmers, amateur programmers, and professional developers alike. Enabling such a diversity of contributors has resulted in a large community that spans the biological and physical sciences. However, a rapidly growing user base, diverging plugin suites, and technical limitations have revealed a clear need for a concerted software engineering effort to support emerging imaging paradigms, to ensure the software's ability to handle the requirements of modern science. Results: We rewrote the entire ImageJ codebase, engineering a

redesigned plugin mechanism intended to facilitate extensibility at every level, with the goal of creating a more powerful tool that continues to serve the existing community while addressing a wider range of scientific requirements. This next-generation ImageJ, called "ImageJ2" in places where the distinction matters, provides a host of new functionality. It separates concerns, fully decoupling the data model from the user interface. It emphasizes integration with external applications to maximize interoperability. Its robust new plugin framework allows everything from image formats, to scripting languages, to visualization to be extended by the community. The redesigned data model supports arbitrarily large, N-dimensional datasets, which are increasingly common in modern image acquisition. Despite the scope of these changes, backwards compatibility is maintained such that this new functionality can be seamlessly integrated with the classic ImageJ interface, allowing users and developers to migrate to these new methods at their own pace. Conclusions: Scientific imaging benefits from open-source programs that advance new method development and deployment to a diverse audience. ImageJ has continuously evolved with this idea in mind; however, new and emerging scientific requirements have posed corresponding challenges for ImageJ's development. The described improvements provide a framework engineered for flexibility, intended to support these requirements as well as accommodate future needs. Future efforts will focus on implementing new algorithms in this framework and expanding collaborations with other popular scientific software suites.
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4、被引频次：180
题目：MASTERING THE GAME OF GO WITHOUT HUMAN KNOWLEDGE
作者：SILVER, D;SCHRITTWIESER, J;SIMONYAN, K;ANTONOGLOU, I;HUANG, A;GUEZ, A;HUBERT, T;BAKER, L;LAI, M;BOLTON, A;CHEN, YT;LILLICRAP, T;HUI, F;SIFRE, L;VAN DEN DRIESSCHE, G;GRAEPEL, T;HASSABIS, D
出处：NATURE 550 (7676): 354-+ OCT 19 2017
地址：DEEPMIND, 5 NEW ST SQ, LONDON EC4A 3TW, ENGLAND
摘要：A long-standing goal of artificial intelligence is an algorithm that learns, tabula rasa, superhuman proficiency in challenging domains. Recently, AlphaGo became the first program to defeat a world champion in the game of Go. The tree search in AlphaGo evaluated positions and selected moves using deep neural networks. These neural networks were trained by supervised learning from human expert moves, and by reinforcement learning from self-play. Here we introduce an algorithm based solely on reinforcement learning, without human data, guidance or domain knowledge beyond game rules. AlphaGo becomes its own teacher: a neural network is trained to predict AlphaGo's own move selections and also the winner of AlphaGo's games. This neural network improves the strength of the tree search, resulting in higher quality move selection and stronger self-play in the next iteration. Starting tabula rasa, our new program AlphaGo Zero achieved superhuman performance, winning 100-0 against the previously published, champion-defeating AlphaGo.
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5、被引频次：141
题目：PRACTICAL BAYESIAN MODEL EVALUATION USING LEAVE-ONE-OUT CROSS-VALIDATION AND WAIC

作者：VEHTARI, A;GELMAN, A;GABRY, J
出处：STAT COMPUT 27 (5): 1413-1432 SEP 2017
地址：AALTO UNIV, DEPT COMP SCI, HIIT, ESPOO, FINLAND;COLUMBIA UNIV, DEPT STAT, NEW YORK, NY USA
摘要：Leave-one-out cross-validation (LOO) and the widely applicable information criterion (WAIC) are methods for estimating pointwise out-of-sample prediction accuracy from a fitted Bayesian model using the log-likelihood evaluated at the posterior simulations of the parameter values. LOO and WAIC have various advantages over simpler estimates of predictive error such as AIC and DIC but are less used in practice because they involve additional computational steps. Here we lay out fast and stable computations for LOO and WAIC that can be performed using existing simulation draws. We introduce an efficient computation of LOO using Pareto-smoothed importance sampling (PSIS), a new procedure for regularizing importance weights. Although WAIC is asymptotically equal to LOO, we demonstrate that PSIS-LOO is more robust in the finite case with weak priors or influential observations. As a byproduct of our calculations, we also obtain approximate standard errors for estimated predictive errors and for comparison of predictive errors between two models. We implement the computations in an R package called loo and demonstrate using models fit with the Bayesian inference package Stan.
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6、被引频次：138
题目：IMAGENET CLASSIFICATION WITH DEEP CONVOLUTIONAL NEURAL NETWORKS
作者：KRIZHEVSKY, A;SUTSKEVER, I;HINTON, GE
出处：COMMUN ACM 60 (6): 84-90 JUN 2017
地址：GOOGLE INC, MOUNTAIN VIEW, CA 94043 USA;OPENAI, SAN FRANCISCO, CA USA
摘要：We trained a large, deep convolutional neural network to classify the 1.2 million high-resolution images in the ImageNet LSVRC-2010 contest into the 1000 different classes. On the test data, we achieved top-1 and top-5 error rates of 37.5% and 17.0%, respectively, which is considerably better than the previous state-of-the-art. The neural network, which has 60 million parameters and 650,000 neurons, consists of five convolutional layers, some of which are followed by max-pooling layers, and three fully connected layers with a final 1000-way softmax. To make training faster, we used non-saturating neurons and a very efficient GPU implementation of the convolution operation. To reduce overfitting in the fully connected layers we employed a recently developed regularization method called "dropout" that proved to be very effective. We also entered a variant of this model in the ILSVRC-2012 competition and achieved a winning top-5 test error rate of 15.3%, compared to 26.2% achieved by the second-best entry.
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7、被引频次：132
题目：A SURVEY OF DEEP NEURAL NETWORK ARCHITECTURES AND THEIR APPLICATIONS
作者：LIU, WB;WANG, ZD;LIU, XH;ZENGB, NY;LIU, YR;ALSAADI, FE
出处：NEUROCOMPUTING 234: 11-26 APR 19 2017
地址：BRUNEL UNIV LONDON, DEPT COMP SCI, UXBRIDGE U138 3PH, MIDDX, ENGLAND;XIAMEN UNIV, DEPT INSTRUMENTAL & ELECT ENGN, XIAMEN 361005,

FUJIAN, PEOPLES R CHINA;YANGZHOU UNIV, DEPT MATH, YANGZHOU 225002, JIANGSU, PEOPLES R CHINA;KING ABDULAZIZ UNIV, CSN RES GRP, FAC ENGN, JEDDAH 21589, SAUDI ARABIA

摘要：Since the proposal of a fast learning algorithm for deep belief networks in 2006, the deep learning techniques have drawn ever-increasing research interests because of their inherent capability of overcoming the drawback of traditional algorithms dependent on hand-designed features. Deep learning approaches have also been found to be suitable for big data analysis with successful applications to computer vision, pattern recognition, speech recognition, natural language processing, and recommendation systems. In this paper, we discuss some widely used deep learning architectures and their practical applications. An up-to-date overview is provided on four deep learning architectures, namely, autoencoder, convolutional neural network, deep belief network, and restricted Boltzmann machine. Different types of deep neural networks are surveyed and recent progresses are summarized. Applications of deep learning techniques on some selected areas (speech recognition, pattern recognition and computer vision) are highlighted. A list of future research topics are finally given with clear justifications.

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8、被引频次：118

题目：LONG NON-CODING RNAS AND COMPLEX DISEASES: FROM EXPERIMENTAL RESULTS TO COMPUTATIONAL MODELS

作者：CHEN, X;YAN, CC;ZHANG, X;YOU, ZH

出处：BRIEF BIOINFORM 18 (4): 558-576 JUL 2017

地址：CHINA UNIV MIN & TECHNOL, SCH INFORMAT & ELECT ENGN, XUZHOU 221116, PEOPLES R CHINA;CHINA UNIV MIN & TECHNOL, SCH COMP SCI & TECHNOL, XUZHOU 221116, PEOPLES R CHINA;HANGZHOU DIANZI UNIV, INST INFORMAT & CONTROL, HANGZHOU, ZHEJIANG, PEOPLES R CHINA;SHANDONG UNIV, SCH MECH ELECT & INFORMAT ENGN, JINAN, PEOPLES R CHINA

摘要：LncRNAs have attracted lots of attentions from researchers worldwide in recent decades. With the rapid advances in both experimental technology and computational prediction algorithm, thousands of lncRNA have been identified in eukaryotic organisms ranging from nematodes to humans in the past few years. More and more research evidences have indicated that lncRNAs are involved in almost the whole life cycle of cells through different mechanisms and play important roles in many critical biological processes. Therefore, it is not surprising that the mutations and dysregulations of lncRNAs would contribute to the development of various human complex diseases. In this review, we first made a brief introduction about the functions of lncRNAs, five important lncRNA-related diseases, five critical disease-related lncRNAs and some important publicly available lncRNA-related databases about sequence, expression, function, etc. Nowadays, only a limited number of lncRNAs have been experimentally reported to be related to human diseases. Therefore, analyzing available lncRNA-disease associations and predicting potential human lncRNA-disease associations have become important tasks of bioinformatics, which would benefit human complex diseases mechanism understanding at lncRNA level, disease biomarker detection and disease diagnosis, treatment, prognosis and prevention. Furthermore, we introduced some state-of-the-art computational models, which could be effectively used to identify disease-related lncRNAs on a large scale and select the most promising disease-related lncRNAs for experimental

validation. We also analyzed the limitations of these models and discussed the future directions of developing computational models for lncRNA research.
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9、被引频次：113
题目：BRMS: AN R PACKAGE FOR BAYESIAN MULTILEVEL MODELS USING STAN
作者：BURKNER, PC
出处：J STAT SOFTW 80 (1): 1-28 AUG 2017
地址：UNIV MUNSTER, FAC PSYCHOL, D-48149 MUNSTER, GERMANY
摘要：The brms package implements Bayesian multilevel models in R using the probabilistic programming language Stan. A wide range of distributions and link functions are supported, allowing users to fit - among others - linear, robust linear, binomial, Poisson, survival, ordinal, zero-inflated, hurdle, and even non-linear models all in a multilevel context. Further modeling options include autocorrelation of the response variable, user defined covariance structures, censored data, as well as meta-analytic standard errors. Prior specifications are flexible and explicitly encourage users to apply prior distributions that actually reflect their beliefs. In addition, model fit can easily be assessed and compared with the Watanabe-Akaike information criterion and leave-one-out cross-validation.
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10、被引频次：107
题目：MULTI-SENSOR FUSION IN BODY SENSOR NETWORKS: STATE-OF-THE-ART AND RESEARCH CHALLENGES
作者：GRAVINA, R;ALINIA, P;GHASEMZADEH, H;FORTINO, G
出处：INF FUSION 35: 68-80 MAY 2017
地址：UNIV CALABRIA, DEPT INFORMAT MODELING ELECT & SYST, VIA P BUCCI, I-87036 ARCAVACATA DI RENDE, CS, ITALY;WASHINGTON STATE UNIV, SCH ELECT ENGN & COMP SCI, PULLMAN, WA 99164 USA
摘要：Body Sensor Networks (BSNs) have emerged as a revolutionary technology in many application domains in health-care, fitness, smart cities, and many other compelling Internet of Things (loT) applications. Most commercially available systems assume that a single device monitors a plethora of user information. In reality, BSN technology is transitioning to multi-device synchronous measurement environments; fusion of the data from multiple, potentially heterogeneous, sensor sources is therefore becoming a fundamental yet non-trivial task that directly impacts application performance. Nevertheless, only recently researchers have started developing technical solutions for effective fusion of BSN data. To the best of our knowledge, the community is currently lacking a comprehensive review of the state-of-the-art techniques on multi-sensor fusion in the area of BSN. This survey discusses clear motivations and advantages of multi-sensor data fusion and particularly focuses on physical activity recognition, aiming at providing a systematic categorization and common comparison framework of the literature, by identifying distinctive properties and parameters affecting data fusion design choices at different levels (data, feature, and decision). The survey also covers data fusion in the domains of emotion recognition and general-health and introduce relevant directions and challenges of future research on multi-sensor fusion in the BSN domain. (C) 2016 Elsevier B.V. All rights reserved.
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11、被引频次：105

题目：BASICS OF META-ANALYSIS: I-2 IS NOT AN ABSOLUTE MEASURE OF HETEROGENEITY

作者：BORENSTEIN, M;HIGGINS, JPT;HEDGES, LV;ROTHSTEIN, HR

出处：RES SYNTH METHODS 8 (1): 5-18 MAR 2017

地址：BIOSTAT INC, ENGLEWOOD, NJ 07631 USA;UNIV BRISTOL, SCH SOCIAL & COMMUNITY MED, BRISTOL, AVON, ENGLAND;NORTHWESTERN UNIV, DEPT STAT, EVANSTON, IL 60208 USA;CUNY, BARUCH COLL, DEPT MANAGEMENT, NEW YORK, NY 10021 USA

摘要：When we speak about heterogeneity in a meta-analysis, our intent is usually to understand the substantive implications of the heterogeneity. If an intervention yields a mean effect size of 50 points, we want to know if the effect size in different populations varies from 40 to 60, or from 10 to 90, because this speaks to the potential utility of the intervention. While there is a common belief that the I-2 statistic provides this information, it actually does not. In this example, if we are told that I-2 is 50%, we have no way of knowing if the effects range from 40 to 60, or from 10 to 90, or across some other range. Rather, if we want to communicate the predicted range of effects, then we should simply report this range. This gives readers the information they think is being captured by I-2 and does so in a way that is concise and unambiguous. Copyright (C) 2017 John Wiley & Sons, Ltd.

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12、被引频次：103

题目：SECURE ATTRIBUTE-BASED DATA SHARING FOR RESOURCE-LIMITED USERS IN CLOUD COMPUTING

作者：LI, J;ZHANG, YH;CHEN, XF;XIANG, Y

出处：COMPUT SECURITY 72: 1-12 JAN 2018

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摘要：Data sharing becomes an exceptionally attractive service supplied by cloud computing platforms because of its convenience and economy. As a potential technique for realizing finegrained data sharing, attribute-based encryption (ABE) has drawn wide attentions. However, most of the existing ABE solutions suffer from the disadvantages of high computation overhead and weak data security, which has severely impeded resource-constrained mobile devices to customize the service. The problem of simultaneously achieving fine-grainedness, high efficiency on the data owner's side, and standard data confidentiality of cloud data sharing actually still remains unresolved. This paper addresses this challenging issue by proposing a new attribute-based data sharing, scheme suitable for resource-limited mobile users in cloud computing. The proposed scheme eliminates a majority of the computation task by adding system public parameters besides moving partial encryption computation

offline. In addition, a public ciphertext test phase is performed before the decryption phase, which eliminates most of computation overhead due to illegitimate ciphertexts. For the sake of data security, a Chameleon hash function is used to generate an immediate ciphertext, which will be blinded by the offline ciphertexts to obtain the final online ciphertexts. The proposed scheme is proven secure against adaptively chosen-ciphertext attacks, which is widely recognized as a standard security notion. Extensive performance analysis indicates that the proposed scheme is secure and efficient. (C) 2017 Elsevier Ltd. All rights reserved.

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13、被引频次：91

题目：A SURVEY ON INTERNET OF THINGS: ARCHITECTURE, ENABLING TECHNOLOGIES, SECURITY AND PRIVACY, AND APPLICATIONS

作者：LIN, J;YU, W;ZHANG, N;YANG, XY;ZHANG, HL;ZHAO, W

出处：IEEE INTERNET THINGS J 4 (5): 1125-1142 SP. ISS. SI OCT 2017

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摘要：Fog/edge computing has been proposed to be integrated with Internet of Things (IoT) to enable computing services devices deployed at network edge, aiming to improve the user's experience and resilience of the services in case of failures. With the advantage of distributed architecture and close to end-users, fog/edge computing can provide faster response and greater quality of service for IoT applications. Thus, fog/edge computing-based IoT becomes future infrastructure on IoT development. To develop fog/edge computing-based IoT infrastructure, the architecture, enabling techniques, and issues related to IoT should be investigated first, and then the integration of fog/edge computing and IoT should be explored. To this end, this paper conducts a comprehensive overview of IoT with respect to system architecture, enabling technologies, security and privacy issues, and present the integration of fog/edge computing and IoT, and applications. Particularly, this paper first explores the relationship between cyber-physical systems and IoT, both of which play important roles in realizing an intelligent cyber-physical world. Then, existing architectures, enabling technologies, and security and privacy issues in IoT are presented to enhance the understanding of the state of the art IoT development. To investigate the fog/edge computing-based IoT, this paper also investigate the relationship between IoT and fog/edge computing, and discuss issues in fog/edge computing-based IoT. Finally, several applications, including the smart grid, smart transportation, and smart cities, are presented to demonstrate how fog/edge computing-based IoT to be implemented in real-world applications.

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14、被引频次：87

题目：ENERGY-EFFICIENT UAV COMMUNICATION WITH TRAJECTORY OPTIMIZATION

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出处：IEEE TRANS WIREL COMMUN 16 (6): 3747-3760 JUN 2017

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摘要：Wireless communication with unmanned aerial vehicles (UAVs) is a promising technology for future communication systems. In this paper, assuming that the UAV flies horizontally with a fixed altitude, we study energy-efficient UAV communication with a ground terminal via optimizing the UAV's trajectory, a new design paradigm that jointly considers both the communication throughput and the UAV's energy consumption. To this end, we first derive a theoretical model on the propulsion energy consumption of fixed-wing UAVs as a function of the UAV's flying speed, direction, and acceleration. Based on the derived model and by ignoring the radiation and signal processing energy consumption, the energy efficiency of UAV communication is defined as the total information bits communicated normalized by the UAV propulsion energy consumed for a finite time horizon. For the case of unconstrained trajectory optimization, we show that both the rate-maximization and energy-minimization designs lead to vanishing energy efficiency and thus are energy-inefficient in general. Next, we introduce a simple circular UAV trajectory, under which the UAV's flight radius and speed are jointly optimized to maximize the energy efficiency. Furthermore, an efficient design is proposed for maximizing the UAV's energy efficiency with general constraints on the trajectory, including its initial/final locations and velocities, as well as minimum/maximum speed and acceleration. Numerical results show that the proposed designs achieve significantly higher energy efficiency for UAV communication as compared with other benchmark schemes.

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15、被引频次：85

题目：5G: A TUTORIAL OVERVIEW OF STANDARDS, TRIALS, CHALLENGES, DEPLOYMENT, AND PRACTICE

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摘要：There is considerable pressure to define the key requirements of 5G, develop 5G standards, and perform technology trials as quickly as possible. Normally, these activities are best done in series but there is a desire to complete these tasks in parallel so that commercial deployments of 5G can begin by 2020. 5G will not be an incremental improvement over its predecessors; it aims to be a revolutionary leap forward in terms of data rates, latency, massive connectivity, network reliability, and energy efficiency. These capabilities are targeted at realizing highspeed connectivity, the Internet of Things, augmented virtual reality, the tactile internet, and so on. The requirements of 5G are expected to be met by new spectrum in the microwave bands (3.3-4.2 GHz), and utilizing large

bandwidths available in mm-wave bands, increasing spatial degrees of freedom via large antenna arrays and 3-D MIMO, network densification, and new waveforms that provide scalability and flexibility to meet the varying demands of 5G services. Unlike the one size fits all 4G core networks, the 5G core network must be flexible and adaptable and is expected to simultaneously provide optimized support for the diverse 5G use case categories. In this paper, we provide an overview of 5G research, standardization trials, and deployment challenges. Due to the enormous scope of 5G systems, it is necessary to provide some direction in a tutorial article, and in this overview, the focus is largely user centric, rather than device centric. In addition to surveying the state of play in the area, we identify leading technologies, evaluating their strengths and weaknesses, and outline the key challenges ahead, with research test beds delivering promising performance but pre-commercial trials lagging behind the desired 5G targets.

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16、被引频次：75

题目：COMMUNICATIONS AND SIGNALS DESIGN FOR WIRELESS POWER TRANSMISSION

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摘要：Radiative wireless power transfer (WPT) is a promising technology to provide cost-effective and real-time power supplies to wireless devices. Although radiative WPT shares many similar characteristics with the extensively studied wireless information transfer or communication, they also differ significantly in terms of design objectives, transmitter/receiver architectures and hardware constraints, and so on. In this paper, we first give an overview on the various WPT technologies, the historical development of the radiative WPT technology and the main challenges in designing contemporary radiative WPT systems. Then, we focus on the state-of-the-art communication and signal processing techniques that can be applied to tackle these challenges. Topics discussed include energy harvester modeling, energy beamforming for WPT, channel acquisition, power region characterization in multi-user WPT, waveform design with linear and non-linear energy receiver model, safety and health issues of WPT, massive multiple-input multiple-output and millimeter wave enabled WPT, wireless charging control, and wireless power and communication systems co-design. We also point out directions that are promising for future research.

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17、被引频次：71

题目：LSTM: A SEARCH SPACE ODYSSEY

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摘要：Several variants of the long short-term memory (LSTM) architecture for recurrent neural networks have been proposed since its inception in 1995. In recent years, these networks have become the state-of-the-art models for a variety of machine learning problems. This has led to a renewed interest in understanding the role and utility of various computational components of typical LSTM variants. In this paper, we present the first large-scale analysis of eight LSTM variants on three representative tasks: speech recognition, handwriting recognition, and polyphonic music modeling. The hyperparameters of all LSTM variants for each task were optimized separately using random search, and their importance was assessed using the powerful functional ANalysis Of VAriance framework. In total, we summarize the results of 5400 experimental runs (approximate to 15 years of CPU time), which makes our study the largest of its kind on LSTM networks. Our results show that none of the variants can improve upon the standard LSTM architecture significantly, and demonstrate the forget gate and the output activation function to be its most critical components. We further observe that the studied hyperparameters are virtually independent and derive guidelines for their efficient adjustment.

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18、被引频次：70

题 目：STACKED CONVOLUTIONAL DENOISING AUTO-ENCODERS FOR FEATURE REPRESENTATION

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出处：IEE TRANS CYBERN 47 (4): 1017-1027 APR 2017

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摘要：Deep networks have achieved excellent performance in learning representation from visual data. However, the supervised deep models like convolutional neural network require large quantities of labeled data, which are very expensive to obtain. To solve this problem, this paper proposes an unsupervised deep network, called the stacked convolutional denoising auto-encoders, which can map images to hierarchical representations without any label information. The network, optimized by layer-wise training, is constructed by stacking layers of denoising autoencoders in a convolutional way. In each layer, high dimensional feature maps are generated by convolving features of the lower layer with kernels learned by a denoising auto-encoder. The autoencoder is trained on patches extracted from feature maps in the lower layer to learn robust feature detectors. To better train the large network, a layer-wise whitening technique is introduced into the model. Before each convolutional layer, a whitening layer is embedded to sphere the input data. By layers of mapping, raw images are transformed into high-level feature representations which would boost the performance of the subsequent support vector machine classifier. The proposed algorithm is evaluated by extensive experimentations and demonstrates superior classification performance to

state-of-the-art unsupervised networks.
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19、被引频次：70
题目：AUTOMATED DETECTION OF ARRHYTHMIAS USING DIFFERENT INTERVALS OF TACHYCARDIA ECG SEGMENTS WITH CONVOLUTIONAL NEURAL NETWORK
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摘要：Our cardiovascular system weakens and is more prone to arrhythmia as we age. An arrhythmia is an abnormal heartbeat rhythm which can be life-threatening. Atrial fibrillation (A(fib)), atrial flutter (A(fl)), and ventricular fibrillation (V-fib) are the recurring life-threatening arrhythmias that affect the elderly population. An electrocardiogram (ECG) is the principal diagnostic tool employed to record and interpret ECG signals. These signals contain information about the different types of arrhythmias. However, due to the complexity and non-linearity of ECG signals, it is difficult to manually analyze these signals. Moreover, the interpretation of ECG signals is subjective and might vary between the experts. Hence, a computer-aided diagnosis (CAD) system is proposed. The CAD system will ensure that the assessment of ECG signals is objective and accurate. In this work, we present a convolutional neural network (CNN) technique to automatically detect the different ECG segments. Our algorithm consists of an eleven-layer deep CNN with the output layer of four neurons, each representing the normal (N-sr), A(fib), A(fl), and V-fib ECG class. In this work, we have used ECG signals of two seconds and five seconds' durations without QRS detection. We achieved an accuracy, sensitivity, and specificity of 92.50%, 98.09%, and 93.13% respectively for two seconds of ECG segments. We obtained an accuracy of 94.90%, the sensitivity of 99.13%, and specificity of 81.44% for five seconds of ECG duration. This proposed algorithm can serve as an adjunct tool to assist clinicians in confirming their diagnosis. (C) 2017 Elsevier Inc. All rights reserved.
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20、被引频次：65
题目：A PRIMER ON 3GPP NARROWBAND INTERNET OF THINGS
作者：WAN, YPE;LIN, XQ;ADHIKARY, A;GROVLEN, A;SUI, YT;BLANKENSHIP, Y;BERGMAN, J;RAZAGHI, HS
出处：IEEE COMMUN MAG 55 (3): 117-123 MAR 2017
地址：ERICSSON RES, SANTA CLARA, CA USA;ERICSSON RES, RADIO ACCESS TECHNOL, SANTA CLARA, CA USA;ERICSSON AB, STOCKHOLM, SWEDEN
摘要：Narrowband Internet of Things (NB-IoT) is a new cellular technology introduced in 3GPP Release 13 for providing wide-area coverage for IoT. This article provides an overview of the air interface of NB-IoT. We describe how NB-IoT addresses key IoT requirements such as deployment flexibility, low device complexity, long battery lifetime, support of massive numbers of devices in a

cell, and significant coverage extension beyond existing cellular technologies. We also share the various design rationales during the standardization of NB-IoT in Release 13 and point out several open areas for future evolution of NB-IoT.

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21、被引频次：62

题目：CLOUD-AIDED LIGHTWEIGHT CERTIFICATELESS AUTHENTICATION PROTOCOL WITH ANONYMITY FOR WIRELESS BODY AREA NETWORKS

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出处：J NETW COMPUT APPL 106: 117-123 MAR 15 2018

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摘要：With the development of cloud computing and wireless body area networks (WBANs), wearable equipments are able to become new intelligent terminals to provide services for users, which plays an important role to improve the human health-care service. However, The traditional WBANs devices have limited computing and storage capabilities. These restrictions limit the services that WBANs can provide to users. Thus the concept of Cloud-aided WBANs has been proposed to enhance the capabilities of WBANs. In addition, due to the openness of the cloud computing environment, the protection of the user's physiological information and privacy remains a major concern. In previous authentication protocols, few of them can protect the user's private information in insecure channel. In this paper, we propose a cloud-aided lightweight certificateless authentication protocol with anonymity for wireless body area networks. Our protocol ensures that no one can obtain user's real identity except for the network manager in the registration phase. Moreover, in the authentication phase, the network manager cannot know the user's real identity. Note that, through the security analysis, we can conclude that our protocol can provide stronger security protection of private information than most of existing schemes in insecure channel.

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22、被引频次：59

题目：GRASSHOPPER OPTIMISATION ALGORITHM: THEORY AND APPLICATION

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出处：ADV ENG SOFTW 105: 30-47 MAR 2017

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摘要：This paper proposes an optimisation algorithm called Grasshopper Optimisation Algorithm (GOA) and applies it to challenging problems in structural optimisation. The proposed algorithm mathematically models and mimics the behaviour of grasshopper swarms in nature for solving

optimisation problems. The GOA algorithm is first benchmarked on a set of test problems including CEC2005 to test and verify its performance qualitatively and quantitatively. It is then employed to find the optimal shape for a 52-bar truss, 3-bar truss, and cantilever beam to demonstrate its applicability. The results show that the proposed algorithm is able to provide superior results compared to well-knowri and recent algorithms in the literature. The results of the real applications also prove the merits of GOA in solving real problems with unknown search spaces. (C) 2017 Elsevier Ltd. All rights reserved.

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23、被引频次：59

题目：MILLIMETER WAVE COMMUNICATIONS FOR FUTURE MOBILE NETWORKS

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摘要：Millimeter wave (mmWave) communications have recently attracted large research interest, since the huge available bandwidth can potentially lead to the rates of multiple gigabit per second per user. Though mmWave can be readily used in stationary scenarios, such as indoor hotspots or backhaul, it is challenging to use mmWave in mobile networks, where the transmitting/receiving nodes may be moving, channels may have a complicated structure, and the coordination among multiple nodes is difficult. To fully exploit the high potential rates of mmWave in mobile networks, lots of technical problems must be addressed. This paper presents a comprehensive survey of mmWave communications for future mobile networks (5G and beyond). We first summarize the recent channel measurement campaigns and modeling results. Then, we discuss in detail recent progresses in multiple input multiple output transceiver design for mmWave communications. After that, we provide an overview of the solution for multiple access and backhauling, followed by the analysis of coverage and connectivity. Finally, the progresses in the standardization and deployment of mmWave for mobile networks are discussed.

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24、被引频次：58

题目：APPLICATION OF DEEP CONVOLUTIONAL NEURAL NETWORK FOR AUTOMATED DETECTION OF MYOCARDIAL INFARCTION USING ECG SIGNALS

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摘要：The electrocardiogram (ECG) is a useful diagnostic tool to diagnose various cardiovascular diseases (CVDs) such as myocardial infarction (MI). The ECG records the heart's electrical activity and these signals are able to reflect the abnormal activity of the heart. However, it is challenging to visually interpret the ECG signals due to its small amplitude and duration. Therefore, we propose a novel approach to automatically detect the MI using ECG signals. In this study, we implemented a convolutional neural network (CNN) algorithm for the automated detection of a normal and MI ECG beats (with noise and without noise). We achieved an average accuracy of 93.53% and 95.22% using ECG beats with noise and without noise removal respectively. Further, no feature extraction or selection is performed in this work. Hence, our proposed algorithm can accurately detect the unknown ECG signals even with noise. So, this system can be introduced in clinical settings to aid the clinicians in the diagnosis of MI.

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25、被引频次：52

题目：SALP SWARM ALGORITHM: A BIO-INSPIRED OPTIMIZER FOR ENGINEERING DESIGN PROBLEMS

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摘要：This work proposes two novel optimization algorithms called Salp Swarm Algorithm (SSA) and Multiobjective Salp Swarm Algorithm (MSSA) for solving optimization problems with single and multiple objectives. The main inspiration of SSA and MSSA is the swarming behaviour of salps when navigating and foraging in oceans. These two algorithms are tested on several mathematical optimization functions to observe and confirm their effective behaviours in finding the optimal solutions for optimization problems. The results on the mathematical functions show that the SSA algorithm is able to improve the initial random solutions effectively and converge towards the optimum. The results of MSSA show that this algorithm can approximate Pareto optimal solutions with high convergence and coverage. The paper also considers solving several challenging and

computationally expensive engineering design problems (e.g. airfoil design and marine propeller design) using SSA and MSSA. The results of the real case studies demonstrate the merits of the algorithms proposed in solving real-world problems with difficult and unknown search spaces.
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ESI HIGHLY CITED PAPERS

(Physics)

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

1、被引频次：13947
题目：LIBSVM: A Library for Support Vector Machines
作者：CHANG, CC;LIN, CJ
出处：ACM TRANS INTELL SYST TECHNOL 2 (3): - SP. ISS. SI 2011
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摘要：LIBSVM is a library for Support Vector Machines (SVMs). We have been actively developing this package since the year 2000. The goal is to help users to easily apply SVM to their applications. LIBSVM has gained wide popularity in machine learning and many other areas. In this article, we present all implementation details of LIBSVM. Issues such as solving SVM optimization problems theoretical convergence multiclass classification probability estimates and parameter selection are discussed in detail.
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2、被引频次：10542
题目：Fitting Linear Mixed-Effects Models Using lme4
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出处：J STAT SOFTW 67 (1): 1-48 OCT 2015
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摘要：Maximum likelihood or restricted maximum likelihood (REML) estimates of the parameters in linear mixed-effects models can be determined using the lmer function in the lme4 package for R. As for most model-fitting functions in R, the model is described in an lmer call by a formula, in this case including both fixed- and random-effects terms. The formula and data together determine a numerical

representation of the model from which the profiled deviance or the profiled REML criterion can be evaluated as a function of some of the model parameters. The appropriate criterion is optimized, using one of the constrained optimization functions in R, to provide the parameter estimates. We describe the structure of the model, the steps in evaluating the profiled deviance or REML criterion, and the structure of classes or types that represents such a model. Sufficient detail is included to allow specialization of these structures by users who wish to write functions to fit specialized linear mixed models, such as models incorporating pedigrees or smoothing splines, that are not easily expressible in the formula language used by lmer.

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3、被引频次：7442

题目：Research electronic data capture (REDCap)-A metadata-driven methodology and workflow process for providing translational research informatics support

作者：HARRIS, PA;TAYLOR, R;THIELKE, R;PAYNE, J;GONZALEZ, N;CONDE, JG

出处：J BIOMED INFORM 42 (2): 377-381 APR 2009

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摘要：Research electronic data capture (REDCap) is a novel workflow methodology and software solution designed for rapid development and deployment of electronic data capture tools to support clinical and translational research. We present: (1) a brief description of the REDCap metadata-driven software toolset; (2) detail concerning the capture and use of study-related metadata from scientific research teams; (3) measures of impact for REDCap; (4) details concerning a consortium network of domestic and international institutions collaborating on. the project; and (5) strengths and limitations of the REDCap system. REDCap is currently supporting 286 translational research projects in a growing collaborative network including 27 active partner institutions. (C) 2008 Elsevier Inc. All rights reserved.

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4、被引频次：7025

题目：Scikit-learn: Machine Learning in Python

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出处：J MACH LEARN RES 12: 2825-2830 OCT 2011

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摘要：Scikit-learn is a Python module integrating a wide range of state-of-the-art machine learning algorithms for medium-scale supervised and unsupervised problems. This package focuses on bringing machine learning to non-specialists using a general-purpose high-level language. Emphasis is put on ease of use, performance, documentation, and API consistency. It has minimal dependencies and is distributed under the simplified BSD license, encouraging its use in both academic and commercial settings. Source code, binaries, and documentation can be downloaded from http://scikit-learn.sourceforge.net.

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5、被引频次：4386

题目：The Internet of Things: A survey

作者：ATZORI, L;IERA, A;MORABITO, G

出处：COMPUT NETW 54 (15): 2787-2805 OCT 28 2010

地址：UNIV CATANIA, I-95124 CATANIA, ITALY;UNIV CAGLIARI, DIEE, I-09124 CAGLIARI, ITALY;UNIV MEDITERRANEA REGGIO CALABRIA, REGGIO DI CALABRIA, ITALY

摘要：This paper addresses the Internet of Things. Main enabling factor of this promising paradigm is the integration of several technologies and communications solutions. Identification and tracking technologies, wired and wireless sensor and actuator networks, enhanced communication protocols (shared with the Next Generation Internet), and distributed intelligence for smart objects are just the most relevant. As one can easily imagine. any serious contribution to the advance of the Internet of Things must necessarily be the result of synergetic activities conducted in different fields of knowledge, such as telecommunications, informatics, electronics and social science. In such a complex scenario, this survey is directed to those who want to approach this complex discipline and contribute to its development. Different visions of this Internet of Things paradigm are reported and enabling technologies reviewed. What emerges is that still major issues shall be faced by the research community. The most relevant among them are addressed in details. (C) 2010 Elsevier B.V. All rights reserved.

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6、被引频次：4314

题目：Dropout: A Simple Way to Prevent Neural Networks from Overfitting

作者：SRIVASTAVA, N;HINTON, G;KRIZHEVSKY, A;SUTSKEVER, I;SALAKHUTDINOV, R

出处：J MACH LEARN RES 15: 1929-1958 JUN 2014

地址：UNIV TORONTO, DEPT COMP SCI, TORONTO, ON M5G 3G4, CANADA

摘要：Deep neural nets with a large number of parameters are very powerful machine learning

systems. However, overfitting is a serious problem in such networks. Large networks are also slow to use, making it difficult to deal with overfitting by combining the predictions of many different large neural nets at test time. Dropout is a technique for addressing this problem. The key idea is to randomly drop units (along with their connections) from the neural network during training. This prevents units from co-adapting too much. During training, dropout samples from an exponential number of different "thinned" networks. At test time, it is easy to approximate the effect of averaging the predictions of all these thinned networks by simply using a single unthinned network that has smaller weights. This significantly reduces overfitting and gives major improvements over other regularization methods. We show that dropout improves the performance of neural networks on supervised learning tasks in vision, speech recognition, document classification and computational biology, obtaining state-of-the-art results on many benchmark data sets.

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7、被引频次：3927

题目：RSEM: accurate transcript quantification from RNA-Seq data with or without a reference genome

作者：LI, B;DEWEY, CN

出处：BMC BIOINFORMATICS 12: - AUG 4 2011

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摘要：Background: RNA-Seq is revolutionizing the way transcript abundances are measured. A key challenge in transcript quantification from RNA-Seq data is the handling of reads that map to multiple genes or isoforms. This issue is particularly important for quantification with de novo transcriptome assemblies in the absence of sequenced genomes, as it is difficult to determine which transcripts are isoforms of the same gene. A second significant issue is the design of RNA-Seq experiments, in terms of the number of reads, read length, and whether reads come from one or both ends of cDNA fragments. Results: We present RSEM, an user-friendly software package for quantifying gene and isoform abundances from single-end or paired-end RNA-Seq data. RSEM outputs abundance estimates, 95% credibility intervals, and visualization files and can also simulate RNA-Seq data. In contrast to other existing tools, the software does not require a reference genome. Thus, in combination with a de novo transcriptome assembler, RSEM enables accurate transcript quantification for species without sequenced genomes. On simulated and real data sets, RSEM has superior or comparable performance to quantification methods that rely on a reference genome. Taking advantage of RSEM's ability to effectively use ambiguously-mapping reads, we show that accurate gene-level abundance estimates are best obtained with large numbers of short single-end reads. On the other hand, estimates of the relative frequencies of isoforms within single genes may be improved through the use of paired-end reads, depending on the number of possible splice forms for each gene. Conclusions: RSEM is an accurate and user-friendly software tool for quantifying transcript abundances from RNA-Seq data. As it does not rely on the existence of a reference genome, it is particularly useful for quantification with de novo transcriptome assemblies. In addition, RSEM has enabled valuable guidance for cost-efficient design of quantification experiments with RNA-Seq, which is currently relatively expensive.

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8、被引频次：3690

题目：BLAST plus : architecture and applications

作者：CAMACHO, C;COULOURIS, G;AVAGYAN, V;MA, N;PAPADOPOULOS, J;BEALER, K;MADDEN, TL

出处：BMC BIOINFORMATICS 10: - DEC 15 2009

地址：NATL LIB MED, NATL CTR BIOTECHNOL INFORMAT, NIH, BETHESDA, MD 20894 USA

摘要：Background: Sequence similarity searching is a very important bioinformatics task. While Basic Local Alignment Search Tool (BLAST) outperforms exact methods through its use of heuristics, the speed of the current BLAST software is suboptimal for very long queries or database sequences. There are also some shortcomings in the user-interface of the current command-line applications. Results: We describe features and improvements of rewritten BLAST software and introduce new command-line applications. Long query sequences are broken into chunks for processing, in some cases leading to dramatically shorter run times. For long database sequences, it is possible to retrieve only the relevant parts of the sequence, reducing CPU time and memory usage for searches of short queries against databases of contigs or chromosomes. The program can now retrieve masking information for database sequences from the BLAST databases. A new modular software library can now access subject sequence data from arbitrary data sources. We introduce several new features, including strategy files that allow a user to save and reuse their favorite set of options. The strategy files can be uploaded to and downloaded from the NCBI BLAST web site. Conclusion: The new BLAST command-line applications, compared to the current BLAST tools, demonstrate substantial speed improvements for long queries as well as chromosome length database sequences. We have also improved the user interface of the command-line applications.

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9、被引频次：3662

题目：A Fast Iterative Shrinkage-Thresholding Algorithm for Linear Inverse Problems

作者：BECK, A;TEBOULLE, M

出处：SIAM J IMAGING SCI 2 (1): 183-202 2009

地址：TECHNION ISRAEL INST TECHNOL, DEPT IND ENGN & MANAGEMENT, IL-32000 HAIFA, ISRAEL;TEL AVIV UNIV, SCH MATH SCI, IL-69978 TEL AVIV, ISRAEL

摘要：We consider the class of iterative shrinkage-thresholding algorithms (ISTA) for solving linear inverse problems arising in signal/image processing. This class of methods, which can be viewed as an extension of the classical gradient algorithm, is attractive due to its simplicity and thus is adequate for solving large-scale problems even with dense matrix data. However, such methods are also known to converge quite slowly. In this paper we present a new fast iterative shrinkage-thresholding algorithm (FISTA) which preserves the computational simplicity of ISTA but with a global rate of convergence which is proven to be significantly better, both theoretically and practically. Initial promising numerical results for wavelet-based image deblurring demonstrate the capabilities of FISTA which is shown to be faster than ISTA by several orders of magnitude.

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10、被引频次：3447
题目：A View of Cloud Computing
作者：ARMBRUST, M;FOX, A;GRIFFITH, R;JOSEPH, AD;KATZ, R;KONWINSKI, A;LEE, G;PATTERSON, D;RABKIN, A;STOICA, I;ZAHARIA, M
出处：COMMUN ACM 53 (4): 50-58 APR 2010
地址：UNIV CALIF BERKELEY, RELIABLE ADAPT DISTRIBUTED SYST LAB RAD LAB, BERKELEY, CA 94720 USA

11、被引频次：3194
题目：Regularization Paths for Generalized Linear Models via Coordinate Descent
作者：FRIEDMAN, J;HASTIE, T;TIBSHIRANI, R
出处：J STAT SOFTW 33 (1): 1-22 FEB 2010
地址：STANFORD UNIV, STANFORD, CA 94305 USA
摘要：We develop fast algorithms for estimation of generalized linear models with convex penalties. The models include linear regression, two-class logistic regression, and multinomial regression problems while the penalties include l(1) (the lasso), l(2) (ridge regression) and mixtures of the two (the elastic net). The algorithms use cyclical coordinate descent, computed along a regularization path. The methods can handle large problems and can also deal efficiently with sparse features. In comparative timings we find that the new algorithms are considerably faster than competing methods.
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12、被引频次：3112
题目：Conducting Meta-Analyses in R with the metafor Package
作者：VIECHTBAUER, W
出处：J STAT SOFTW 36 (3): 1-48 AUG 2010
地址：MAASTRICHT UNIV, SCH PUBL HLTH & PRIMARY CARE, DEPT METHODOL & STAT, NL-6200 MD MAASTRICHT, NETHERLANDS
摘要：The metafor package provides functions for conducting meta-analyses in R. The package includes functions for fitting the meta-analytic fixed- and random-effects models and allows for the inclusion of moderators variables (study-level covariates) in these models. Meta-regression analyses with continuous and categorical moderators can be conducted in this way. Functions for the Mantel-Haenszel and Peto's one-step method for meta-analyses of 2 x 2 table data are also available. Finally, the package provides various plot functions (for example, for forest, funnel, and radial plots) and functions for assessing the model fit, for obtaining case diagnostics, and for tests of publication bias.
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13、被引频次：2869
题目：lavaan: An R Package for Structural Equation Modeling
作者：ROSSEEL, Y
出处：J STAT SOFTW 48 (2): 1-36 MAY 2012
地址：UNIV GHENT, DEPT DATA ANAL, B-9000 GHENT, BELGIUM
摘要：Structural equation modeling (SEM) is a vast field and widely used by many applied

researchers in the social and behavioral sciences. Over the years, many software packages for structural equation modeling have been developed, both free and commercial. However, perhaps the best state-of-the-art software packages in this field are still closed-source and/or commercial. The R package lavaan has been developed to provide applied researchers, teachers, and statisticians, a free, fully open-source, but commercial-quality package for latent variable modeling. This paper explains the aims behind the development of the package, gives an overview of its most important features, and provides some examples to illustrate how lavaan works in practice.
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14、被引频次：2843
题目：What Will 5G Be?
作者：ANDREWS, JG;BUZZI, S;CHOI, W;HANLY, SV;LOZANO, A;SOONG, ACK;ZHANG, JC
出处：IEEE J SEL AREA COMMUN 32 (6): 1065-1082 JUN 2014
地址：UNIV TEXAS AUSTIN, AUSTIN, TX 78712 USA;UNIV CASSINO & SOUTHERN LATIUM, I-03043 CASSINO, FR, ITALY;CONSORZIO NAZL INTERUNIV TELECOMUNICAZ, I-03043 CASSINO FROSIONE, ITALY;KOREA ADV INST SCI & TECHNOL, DEPT ELECT ENGN, TAEJON 305701, SOUTH KOREA;MACQUARIE UNIV, N RYDE, NSW 2109, AUSTRALIA;UNIV POMPEU FABRA, BARCELONA 08002, SPAIN;HUAWEI TECHNOL, PLANO, TX 75024 USA;SAMSUNG ELECT, RICHARDSON, TX 75082 USA
摘要：What will 5G be? What it will not be is an incremental advance on 4G. The previous four generations of cellular technology have each been a major paradigm shift that has broken backward compatibility. Indeed, 5G will need to be a paradigm shift that includes very high carrier frequencies with massive bandwidths, extreme base station and device densities, and unprecedented numbers of antennas. However, unlike the previous four generations, it will also be highly integrative: tying any new 5G air interface and spectrum together with LTE and WiFi to provide universal high-rate coverage and a seamless user experience. To support this, the core network will also have to reach unprecedented levels of flexibility and intelligence, spectrum regulation will need to be rethought and improved, and energy and cost efficiencies will become even more critical considerations. This paper discusses all of these topics, identifying key challenges for future research and preliminary 5G standardization activities, while providing a comprehensive overview of the current literature, and in particular of the papers appearing in this special issue.
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15、被引频次：2712
题目：Noncooperative Cellular Wireless with Unlimited Numbers of Base Station Antennas
作者：MARZETTA, TL
出处：IEEE TRANS WIREL COMMUN 9 (11): 3590-3600 NOV 2010
地址：ALCATEL LUCENT, BELL LABS, MURRAY HILL, NJ 07974 USA
摘要：A cellular base station serves a multiplicity of single-antenna terminals over the same time-frequency interval. Time-division duplex operation combined with reverse-link pilots enables the base station to estimate the reciprocal forward-and reverse-link channels. The conjugate-transpose of the channel estimates are used as a linear precoder and combiner respectively

on the forward and reverse links. Propagation, unknown to both terminals and base station, comprises fast fading, log-normal shadow fading, and geometric attenuation. In the limit of an infinite number of antennas a complete multi-cellular analysis, which accounts for inter-cellular interference and the overhead and errors associated with channel-state information, yields a number of mathematically exact conclusions and points to a desirable direction towards which cellular wireless could evolve. In particular the effects of uncorrelated noise and fast fading vanish, throughput and the number of terminals are independent of the size of the cells, spectral efficiency is independent of bandwidth, and the required transmitted energy per bit vanishes. The only remaining impairment is inter-cellular interference caused by re-use of the pilot sequences in other cells (pilot contamination) which does not vanish with unlimited number of antennas.
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16、被引频次：2421
题目：Integrative Genomics Viewer (IGV): high-performance genomics data visualization and exploration
作者：THORVALDSDOTTIR, H;ROBINSON, JT;MESIROV, JP
出处：BRIEF BIOINFORM 14 (2): 178-192 SP. ISS. SI MAR 2013
地址：0
摘要：Data visualization is an essential component of genomic data analysis. However, the size and diversity of the data sets produced by today's sequencing and array-based profiling methods present major challenges to visualization tools. The Integrative Genomics Viewer (IGV) is a high-performance viewer that efficiently handles large heterogeneous data sets, while providing a smooth and intuitive user experience at all levels of genome resolution. A key characteristic of IGV is its focus on the integrative nature of genomic studies, with support for both array-based and next-generation sequencing data, and the integration of clinical and phenotypic data. Although IGV is often used to view genomic data from public sources, its primary emphasis is to support researchers who wish to visualize and explore their own data sets or those from colleagues. To that end, IGV supports flexible loading of local and remote data sets, and is optimized to provide high-performance data visualization and exploration on standard desktop systems. IGV is freely available for download from http://www.broadinstitute.org/igv, under a GNU LGPL open-source license.
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17、被引频次：2267
题目：pROC: an open-source package for R and S plus to analyze and compare ROC curves
作者：ROBIN, X;TURCK, N;HAINARD, A;TIBERTI, N;LISACEK, F;SANCHEZ, JC;MULLER, M
出处：BMC BIOINFORMATICS 12: - MAR 17 2011
地址：MED UNIV CTR, DEPT STRUCT BIOL & BIOINFORMAT, BIOMED PROTE RES GRP, GENEVA, SWITZERLAND;MED UNIV CTR, SWISS INST BIOINFORMAT, GENEVA, SWITZERLAND
摘要：Background: Receiver operating characteristic (ROC) curves are useful tools to evaluate classifiers in biomedical and bioinformatics applications. However, conclusions are often reached through inconsistent use or insufficient statistical analysis. To support researchers in their ROC curves analysis we developed pROC, a package for R and S+ that contains a set of tools displaying,

analyzing, smoothing and comparing ROC curves in a user-friendly, object-oriented and flexible interface. Results: With data previously imported into the R or S+ environment, the pROC package builds ROC curves and includes functions for computing confidence intervals, statistical tests for comparing total or partial area under the curve or the operating points of different classifiers, and methods for smoothing ROC curves. Intermediary and final results are visualised in user-friendly interfaces. A case study based on published clinical and biomarker data shows how to perform a typical ROC analysis with pROC. Conclusions: pROC is a package for R and S+ specifically dedicated to ROC analysis. It proposes multiple statistical tests to compare ROC curves, and in particular partial areas under the curve, allowing proper ROC interpretation. pROC is available in two versions: in the R programming language or with a graphical user interface in the S+ statistical software. It is accessible at http://expasy.org/tools/pROC/under the GNU General Public License. It is also distributed through the CRAN and CSAN public repositories, facilitating its installation.
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18、被引频次：2190
题目：Prodigal: prokaryotic gene recognition and translation initiation site identification
作者：HYATT, D;CHEN, GL;LOCASCIO, PF;LAND, ML;LARIMER, FW;HAUSER, LJ
出处：BMC BIOINFORMATICS 11: - MAR 8 2010
地址：OAK RIDGE NATL LAB, COMPUTAT BIOL & BIOINFORMAT GRP, OAK RIDGE, TN 37831 USA;UNIV TENNESSEE, GENOME SCI & TECHNOL GRAD SCH, KNOXVILLE, TN 37996 USA;OAK RIDGE NATL LAB, DOE JOINT GENOME INST, OAK RIDGE, TN 37831 USA
摘要：Background: The quality of automated gene prediction in microbial organisms has improved steadily over the past decade, but there is still room for improvement. Increasing the number of correct identifications, both of genes and of the translation initiation sites for each gene, and reducing the overall number of false positives, are all desirable goals. Results: With our years of experience in manually curating genomes for the Joint Genome Institute, we developed a new gene prediction algorithm called Prodigal (PROkaryotic DYnamic programming Gene-finding ALgorithm). With Prodigal, we focused specifically on the three goals of improved gene structure prediction, improved translation initiation site recognition, and reduced false positives. We compared the results of Prodigal to existing gene-finding methods to demonstrate that it met each of these objectives. Conclusion: We built a fast, lightweight, open source gene prediction program called Prodigal http://compbio.ornl.gov/prodigal/. Prodigal achieved good results compared to existing methods, and we believe it will be a valuable asset to automated microbial annotation pipelines.
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19、被引频次：2129
题目：The Split Bregman Method for L1-Regularized Problems
作者：GOLDSTEIN, T;OSHER, S
出处：SIAM J IMAGING SCI 2 (2): 323-343 2009
地址：UNIV CALIF LOS ANGELES, DEPT MATH, LOS ANGELES, CA 90095 USA
摘要：The class of L1-regularized optimization problems has received much attention recently because of the introduction of "compressed sensing," which allows images and signals to be reconstructed from small amounts of data. Despite this recent attention, many L1-regularized

problems still remain difficult to solve, or require techniques that are very problem-specific. In this paper, we show that Bregman iteration can be used to solve a wide variety of constrained optimization problems. Using this technique, we propose a "split Bregman" method, which can solve a very broad class of L1-regularized problems. We apply this technique to the Rudin-Osher-Fatemi functional for image denoising and to a compressed sensing problem that arises in magnetic resonance imaging.
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20、被引频次：1989
题目：The NumPy Array: A Structure for Efficient Numerical Computation
作者：VAN DER WALT, S;COLBERT, SC;VAROQUAUX, G
出处：COMPUT SCI ENG 13 (2): 22-30 MAR-APR 2011
地址：UNIV STELLENBOSCH, ZA-7600 STELLENBOSCH, SOUTH AFRICA;ENTHOUGHT INC, AUSTIN, TX USA;INRIA, LE CHESNAY, FRANCE
摘要：In the Python world, NumPy arrays are the standard representation for numerical data and enable efficient implementation of numerical computations in a high-level language. As this effort shows, NumPy performance can be improved through three techniques: vectorizing calculations, avoiding copying data in memory, and minimizing operation counts.
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21、被引频次：1788
题目：mice: Multivariate Imputation by Chained Equations in R
作者：VAN BUUREN, S;GROOTHUIS-OUDSHOORN, K
出处：J STAT SOFTW 45 (3): 1-67 DEC 2011
地址：TNO, NL-2301 CE LEIDEN, NETHERLANDS;FSS UNIV UTRECHT, DEPT METHODOL & STAT, UTRECHT, NETHERLANDS;UNIV TWENTE, MB HTSR, NL-7500 AE ENSCHEDE, NETHERLANDS
摘要：The R package mice imputes incomplete multivariate data by chained equations. The software mice 1.0 appeared in the year 2000 as an S-PLUS library, and in 2001 as an R package. mice 1.0 introduced predictor selection, passive imputation and automatic pooling. This article documents mice 2.9, which extends the functionality of mice 1.0 in several ways. In mice 2.9, the analysis of imputed data is made completely general, whereas the range of models under which pooling works is substantially extended. mice 2.9 adds new functionality for imputing multilevel data, automatic predictor selection, data handling, post-processing imputed values, specialized pooling routines, model selection tools, and diagnostic graphs. Imputation of categorical data is improved in order to bypass problems caused by perfect prediction. Special attention is paid to transformations, sum scores, indices and interactions using passive imputation, and to the proper setup of the predictor matrix. mice 2.9 can be downloaded from the Comprehensive R Archive Network. This article provides a hands-on, stepwise approach to solve applied incomplete data problems.
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22、被引频次：1773
题目：MCMC Methods for Multi-Response Generalized Linear Mixed Models: The MCMCglmm R Package

作者：HADFIELD, JD

出处：J STAT SOFTW 33 (2): 1-22 FEB 2010

地 址 ： UNIV EDINBURGH, INST EVOLUTIONARY BIOL, EDINBURGH EH9 3JT, MIDLOTHIAN, SCOTLAND

摘要：Generalized linear mixed models provide a flexible framework for modeling a range of data, although with non-Gaussian response variables the likelihood cannot be obtained in closed form. Markov chain Monte Carlo methods solve this problem by sampling from a series of simpler conditional distributions that can be evaluated. The R package M C M C g l m m implements such an algorithm for a range of model fitting problems. More than one response variable can be analyzed simultaneously, and these variables are allowed to follow Gaussian, Poisson, multi(bi) nominal, exponential, zero-inflated and censored distributions. A range of variance structures are permitted for the random effects, including interactions with categorical or continuous variables (i.e., random regression), and more complicated variance structures that arise through shared ancestry, either through a pedigree or through a phylogeny. Missing values are permitted in the response variable(s) and data can be known up to some level of measurement error as in meta-analysis. All simulation is done in C/C++ using the CSparse library for sparse linear systems.

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23、被引频次：1698

题目：Avogadro: an advanced semantic chemical editor, visualization, and analysis platform

作 者 ： HANWELL, MD;CURTIS, DE;LONIE, DC;VANDERMEERSCH, T;ZUREK, E;HUTCHISON, GR

出处：J CHEMINFORMATICS 4: - AUG 13 2012

地址：UNIV PITTSBURGH, DEPT CHEM, PITTSBURGH, PA 15260 USA;KITWARE INC, DEPT COMP SCI, CLIFTON PK, NY 12065 USA;COE COLL, DEPT COMP SCI, CEDAR RAPIDS, IA 52402 USA;SUNY BUFFALO, DEPT CHEM, BUFFALO, NY 14260 USA

摘要：Background: The Avogadro project has developed an advanced molecule editor and visualizer designed for cross-platform use in computational chemistry, molecular modeling, bioinformatics, materials science, and related areas. It offers flexible, high quality rendering, and a powerful plugin architecture. Typical uses include building molecular structures, formatting input files, and analyzing output of a wide variety of computational chemistry packages. By using the CML file format as its native document type, Avogadro seeks to enhance the semantic accessibility of chemical data types. Results: The work presented here details the Avogadro library, which is a framework providing a code library and application programming interface (API) with three-dimensional visualization capabilities; and has direct applications to research and education in the fields of chemistry, physics, materials science, and biology. The Avogadro application provides a rich graphical interface using dynamically loaded plugins through the library itself. The application and library can each be extended by implementing a plugin module in C++ or Python to explore different visualization techniques, build/manipulate molecular structures, and interact with other programs. We describe some example extensions, one which uses a genetic algorithm to find stable crystal structures, and one which interfaces with the PackMol program to create packed, solvated structures for molecular dynamics simulations. The 1.0 release series of Avogadro is the main focus of the results discussed here. Conclusions: Avogadro offers a semantic chemical builder and platform for visualization and analysis. For users, it offers an easy-to-use builder, integrated support for downloading from common

databases such as PubChem and the Protein Data Bank, extracting chemical data from a wide variety of formats, including computational chemistry output, and native, semantic support for the CML file format. For developers, it can be easily extended via a powerful plugin mechanism to support new features in organic chemistry, inorganic complexes, drug design, materials, biomolecules, and simulations. Avogadro is freely available under an open-source license from http://avogadro.openmolecules.net.
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24、被引频次：1626
题目：Open Babel: An open chemical toolbox
作者：OBOYLE, NM;BANCK, M;JAMES, CA;MORLEY, C;VANDERMEERSCH, T;HUTCHISON, GR
出处：J CHEMINFORMATICS 3: - OCT 7 2011
地址：UNIV PITTSBURGH, DEPT CHEM, PITTSBURGH, PA 15217 USA;UNIV COLL CORK, ANALYT & BIOL CHEM RES FACIL, CORK, IRELAND;TECH UNIV MUNICH, DEPT CHEM, D-85747 GARCHING, GERMANY;EMOLECULES INC, SOLANA BEACH, CA 92075 USA
摘要：Background: A frequent problem in computational modeling is the interconversion of chemical structures between different formats. While standard interchange formats exist (for example, Chemical Markup Language) and de facto standards have arisen (for example, SMILES format), the need to interconvert formats is a continuing problem due to the multitude of different application areas for chemistry data, differences in the data stored by different formats (0D versus 3D, for example), and competition between software along with a lack of vendor-neutral formats. Results: We discuss, for the first time, Open Babel, an open-source chemical toolbox that speaks the many languages of chemical data. Open Babel version 2.3 interconverts over 110 formats. The need to represent such a wide variety of chemical and molecular data requires a library that implements a wide range of cheminformatics algorithms, from partial charge assignment and aromaticity detection, to bond order perception and canonicalization. We detail the implementation of Open Babel, describe key advances in the 2.3 release, and outline a variety of uses both in terms of software products and scientific research, including applications far beyond simple format interconversion. Conclusions: Open Babel presents a solution to the proliferation of multiple chemical file formats. In addition, it provides a variety of useful utilities from conformer searching and 2D depiction, to filtering, batch conversion, and substructure and similarity searching. For developers, it can be used as a programming library to handle chemical data in areas such as organic chemistry, drug design, materials science, and computational chemistry. It is freely available under an open-source license from http://openbabel.org.
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25、被引频次：1468
题目：Primer-BLAST: A tool to design target-specific primers for polymerase chain reaction
作者：YE, J;COULOURIS, G;ZARETSKAYA, I;CUTCUTACHE, I;ROZEN, S;MADDEN, TL
出处：BMC BIOINFORMATICS 13: - JUN 18 2012
地址：NIH, NATL CTR BIOTECHNOL INFORMAT, NATL LIB MED, BETHESDA, MD 20894 USA;DUKE NUS GRAD MED SCH, NEUROSCI & BEHAV DISORDERS PROGRAM, SINGAPORE 169857, SINGAPORE

摘要：Background: Choosing appropriate primers is probably the single most important factor affecting the polymerase chain reaction (PCR). Specific amplification of the intended target requires that primers do not have matches to other targets in certain orientations and within certain distances that allow undesired amplification. The process of designing specific primers typically involves two stages. First, the primers flanking regions of interest are generated either manually or using software tools; then they are searched against an appropriate nucleotide sequence database using tools such as BLAST to examine the potential targets. However, the latter is not an easy process as one needs to examine many details between primers and targets, such as the number and the positions of matched bases, the primer orientations and distance between forward and reverse primers. The complexity of such analysis usually makes this a time-consuming and very difficult task for users, especially when the primers have a large number of hits. Furthermore, although the BLAST program has been widely used for primer target detection, it is in fact not an ideal tool for this purpose as BLAST is a local alignment algorithm and does not necessarily return complete match information over the entire primer range. Results: We present a new software tool called Primer-BLAST to alleviate the difficulty in designing target-specific primers. This tool combines BLAST with a global alignment algorithm to ensure a full primer-target alignment and is sensitive enough to detect targets that have a significant number of mismatches to primers. Primer-BLAST allows users to design new target-specific primers in one step as well as to check the specificity of pre-existing primers. Primer-BLAST also supports placing primers based on exon/intron locations and excluding single nucleotide polymorphism (SNP) sites in primers. Conclusions: We describe a robust and fully implemented general purpose primer design tool that designs target-specific PCR primers. Primer-BLAST offers flexible options to adjust the specificity threshold and other primer properties. This tool is publicly available at http://www.ncbi.nlm.nih.gov/tools/primer-blast.
电子邮箱地址：jianye@ncbi.nlm.nih.gov

AIAA、AAS、IAF 最新会议

AIAA

（AIAA 来源：http://www.aiaa.org/）

1.**会议名称：**8th Aircraft Noise and Emissions Reduction Symposium (ANERS)
会议时间：25 FEBRUARY - 28 FEBRUARY 2020
会议地点：Bordeaux, France
会议简介：This conference will be offering scientists and engineers from industry, government, and academia an exceptional opportunity to exchange knowledge and results of current studies and to discuss directions for future research in the fields of aeronautics and space.
链接：https://www.aiaa.org/home/events-learning/event/2020/02/25/default-calendar/8th-aners

2.**会议名称：**55th 3AF International Conference on Applied Aerodynamics
会议时间：23 MARCH - 25 MARCH 2020
会议地点：Poitiers, France (ISAE-ENSMA)
会议简介：The 3AF International Conference on Applied Aerodynamics is an annual event organised by the French Aeronautics and Aerospace Society (3AF) at French venues known for their activity in the field of aeronautics and/or aerospace technology.
The conference is an excellent opportunity for scientific exchange between scientists from industry, research institutions and academia. Scientists and engineers from other fluid mechanics fields are also welcome.
链接：
https://www.aiaa.org/home/events-learning/event/2020/03/23/default-calendar/55th-3af-international-conference-on-applied-aerodynamics-turbulent-flows-in-aerodynamic-applications

3.**会议名称：**27th Saint Petersburg International Conference on Integrated Navigation System
会议时间：25 MAY - 27 MAY 2020
会议地点：Saint Petersburg, Russia
会议简介：The 27th Saint Petersburg International Conference on Integrated Navigation Systems will be held by the State Research Center of the Russian Federation - Concern Central Scientific and Research Institute Elektropribor, JSC.
链接：
https://www.aiaa.org/home/events-learning/event/2020/05/25/default-calendar/27th-saint-petersburg-international-conference-on-integrated-navigation-system

AAS

（AAS 来源：http://astronautical.org/）

1.**会议名称：**Robert H. Goddard Memorial Symposium
会议时间：March 17-19, 2020
会议地点：Silver Spring, Maryland
会议简介：In recognition of several milestones in space exploration, the 2019 Goddard Symposium will examine the history and future of the science and technology of exploring our home planet, our solar system, and beyond. Join us at our new venue in Silver Spring, Maryland, for the 57th annual Goddard Symposium!
链接：https://astronautical.org/events/goddard/

IAF

（IAF 来源：http://www.iafastro.org/）

1.**会议名称：**AEC2020
会议时间：25 - 28 February 2020

会议地点：Bordeaux, France

会议简介：To pave the way for a single European aerospace conference, 3AF and CEAS have decided to join forces to launch the very first edition of the Aerospace Europe Conference (AEC2020).

Aerospace Europe Conference 2020, will feature 3AF 3rd Greener Aviation, CEAS 7th Air & Space Conference and the 8th edition of Aircraft Noise and Emissions Reduction Symposium (ANERS).

This conference will be offering scientists and engineers from industry, government, and academia an exceptional opportunity to exchange knowledge and results of current studies and to discuss directions for future research in the fields of aeronautics and space. Individually, each of the three conferences has proven to be very successful. In joining the three we expect to be even more attractive, offering additional transversal topics and synergies between aeronautics and space towards a greener and cleaner environment.

By welcoming worldwide contributions, this new conference will give attendees a unique overview of the global research efforts aimed at reducing the environmental impact of aviation and space activities.

链接：http://www.iafastro.org/evenements/aec2020-conference/

2.**会议名称：**IAF Spring Meetings 2020

会议时间：24 - 26 March 2020

会议地点：Paris, France

会议简介：More information will be available soon.

链接：http://www.iafastro.org/evenements/iaf-spring-meetings-2020/

ACM 最新会议

来源：http://www.acm.org/

1. **会议名称：**2020 The 4th International Conference on Compute and Data Analysis

会议时间：March 9-12, 2020

会议地点：Silicon Valley,San Jose, United States

会议简介：The International Conference on Compute and Data Analysis (ICCDA), is an annual conference hold each year in United States. It is an international forum for academia and industries to exchange visions and ideas in the state of the art and practice of compute and data analysis.

The previous edition of ICCDA was held in Florida Polytechnic University, Lakeland, Northern Illinois University (NIU) DeKalb and University of Hawaii Maui College, Kahului. ICCDA 2020 conference will be located in International Technological University, USA, in Silicon Valley, San Jose.

We believe the final program will be the result of a highly selective review process designed to

include the best work of its kind in every category.You are cordially invited to submit your recent research work to the ICCDA 2020.
链接：http://www.iccda.org/

2.**会议名称：**SIGCSE 2020
会议时间：March 11 - March 14, 2020
会议地点：Portland, Oregon, USA
会议简介：The SIGCSE Technical Symposium is the largest computing education conference worldwide organized by ACM Special Interest Group on Computer Science Education (SIGCSE). It attracts nearly 2000 researchers, educators, and practitioners interested in improving computing education in K-12 and higher education.
链接：https://sigcse2020.sigcse.org/

3.**会议名称：**CHIIR 2020
会议时间：14–18 March, 2020
会议地点：Vancouver, British Columbia, Canada
会议简介：Digital information permeates all aspects of our lives, and information systems strive to cater to our needs and anticipate our desires in both physical and virtual environments. The demand for effective, responsible, and human-centred information systems design has never been greater, as the range of applications continues to grow and underlying technologies are increasingly shaped by AI methods. The CHIIR conference, with its cross-cutting commitments to information retrieval, human information interaction, and design is a premier venue for research in these areas.
ACM CHIIR 2020 invites submissions focused on user-centred approaches to the design and evaluation of systems for information access, retrieval, and use. Papers may explore improvements to existing systems and interfaces, propose novel theories, models, and systems, or focus on understanding individual and group interactions with information and information systems. As a multi-disciplinary research meeting, we welcome submissions using a wide range of quantitative and qualitative research methods.
链接：http://sigir.org/chiir2020/

4.**会议名称：**ACM IUI 2020
会议时间：March 17 - 20，2020
会议地点：Cagliari, Italy
会议简介：ACM IUI 2020 is the 25th annual meeting of the intelligent interfaces community and serves as a premier international forum for reporting outstanding research and development on intelligent user interfaces. ACM IUI is where the Human-Computer Interaction (HCI) community meets the Artificial Intelligence (AI) community. We are also very interested in contributions from related fields, such as psychology, behavioral science, cognitive science, computer graphics, design, the arts, etc.
链接：https://iui.acm.org/2020/

5.**会议名称：**ICISS 2020
会议时间：March 19-22, 2020
会议地点：Cambridge University, UK

会议简介：The 3rd International Conference on Information Science and System (ICISS 2020) will be held in Cambridge University, UK during March 19-22, 2020. It is organized by International Association of Computer Science and Information Technology with an objective to serve as a platform for scientists, researchers, engineers and developers from a wide range of information science and system areas to exchange ideas and applications.

Information science and system is mainly concerned with the analysis, collection, classification, manipulation, storage, retrieval, movement, dissemination, and protection of information. Practitioners within and outside the field study application and usage of knowledge in organizations along with the interaction between people, organizations, and any existing information systems with the aim of creating, replacing, improving, or understanding information systems. Information science and system incorporates aspects of diverse fields such as computer science, library science, telecommunications, archival science, cognitive science, management, mathematics, etc. This conference cordially invites submission of researches concerning any branch of Information Science and System and the participation of anyone who are interested in the related fields.

链接：http://www.iciss.org/

6.**会议名称：**‹ Programming› 2020

会议时间：Mon 23 - Thu 26 March, 2020

会议地点：Porto,Portugal

会议简介：The International Conference on the Art, Science, and Engineering of Programming is a new conference focused on programming topics including the experience of programming. We have named it ‹Programming› for short. ‹Programming› seeks for papers that advance knowledge of programming on any relevant topic, including programming practice and experience.

After Brussels, Nice, and Genova, this fourth edition will take place in Porto, Portugal, Mon 23 - Thu 26 March, 2020, a charming city that will embrace you as soon as you arrive!

The main venue will be the Faculty of Engineering of University of Porto (FEUP, which has been promoting informatics engineering both in academia and industry.

The program will provide an opportunity to sample some of Porto’s attractions, as well as local academy and industry, to promote informal and playful conversations about programming, and to make sure that your conference experience will be me-mo-ra-ble!

链接：https://2020.programming-conference.org/

7.**会议名称：**ACM SOSR 2020

会议时间：March 3, 2020

会议地点：San Jose, CA

会议简介：The ACM SIGCOMM Symposium on SDN Research (SOSR) is the premiere venue for research publications on SDN, building on past years' successful SOSR and HotSDN (Hot Topics in Software Defined Networking) workshops. New to this year, SOSR will be co--located with the Open Compute Project (OCP) Global Summit on March 3, 2020 in San Jose, CA to foster interaction between academic and industrial attendees.

We are also pleased to announce that we will again be giving out the SOSR Software Systems Award at this year's SOSR, which recognizes software that has significantly impacted SDN.

链接：https://conferences.sigcomm.org/sosr/2020/

8.会议名称：NICE 2020
会议时间：March 24- 27，2020
会议地点：Heidelberg, GERMANY
会议简介：Conventional, stored program architecture systems are designed for algorithmic and exact calculations.
However, problems with highest impact involve large, noisy and incomplete data sets that do not lend themselves to convenient solutions by current systems.
Our task is to build upon the convergence among neuroscience, microelectronics and computational systems to develop new architectures and approaches designed to handle the hardest challenges.
链接：https://niceworkshop.org/

9.会议名称：MSIE 2020
会议时间：April 7-9, 2020
会议地点：Osaka, Japan
会议简介：MSIE 2019 was successfully held in Phuket, Thailand and experts from all over the world attended the conference to share their reports. 2020 2nd International Conference on Management Science and Industrial Engineering will be held in Osaka, Japan during April 7-9, 2020. MSIE 2020 is one of the principal events for experts from academia, industry, utilities, researchers and scientists across the globe to exchange ideas and experiences on Management Science and Industrial Engineering. The primary goal of the conference is to exchange, share and distribute the latest research and theories from our international community. Prospective authors are invited to submit original research papers which have not been submitted or published by other conferences or journals.
链接：http://www.msie.org/

10.会议名称：EuroSys 2020
会议时间：April 27-30, 2020
会议地点：Heraklion, Crete, Greece
会议简介：The EuroSys conference series brings together professionals from academia and industry. It has a strong focus on systems research and development: operating systems, database systems, real-time systems, network middleware, distributed, parallel, or embedded computing systems. EuroSys has become a premier forum for discussing various issues of systems software research and development, including implications related to hardware and applications.
The 15th edition of EuroSys will follow the pattern established by the previous EuroSys conferences, by seeking papers on all aspects of computer systems. EuroSys 2020 will also include a number of workshops to allow junior and senior members of the systems community to explore leading-edge topics and ideas before they are presented at a conference.
链接：https://www.eurosys2020.org/

IQPC 最新国防会议(Defence)

IQPC 来源：http://www.iqpc.com/

1. **会议名称：**Combat Support Week
会议时间：25 - 27 February, 2020
会议地点：Copthorne Tara Hotel London Kensington, London, United Kingdom
会议简介：The return to preparations for a peer threat engagement has placed a new emphasis on the military support structure. There is now a greater emphasis on maintaining mobility and operational freedom whilst denying the enemy their own, placing new pressures on the combat support commander.
Combat Support Week will address these new challenges for Military Engineers and Logisticians to ensure that mobility is maintained and capabilities are able to be effectively deployed by the combat force. Assessing the critical requirements for the deployment and maintenance of a combat force in theatre will feature throughout the programme this year along with a clear focus on enabling mobility, momentum and capability by identifying innovative, cost-efficient solutions to modernise operational capabilities.
Recognising the emerging technical requirements within Combat Support the conference will enable attendees to revolutionise their capabilities in line with modern operating conditions by stimulating discussion and building concensus between military experts and industry partners on the future of Combat Support.
链接：
https://www.defenceiq.com/events-combatsupportweek?utm_medium=portal&mac=IQPCCORP

2.**会议名称：**Additive Manufacturing for Aerospace & Space
会议时间：25 - 27 February, 2020
会议地点：Birmingham, UK
会议简介：Now entering its 5th year, IQPC's Additive Manufacturing for Aerospace & Space conference has fast established itself as the premium forum for AM users, R&D experts and industry partners within the aerospace and space industry. Returning to London after hosting the forum in Munich earlier this year, and following a valuable visit to the EOS facilities, we are delighted to announce AM for Aerospace & Space will return home. This year, Airbus will take the lead from an AM user perspective and will kindly host a visit to their world renowned Space Systems facility just north of London.
Not just academic in focus and not solution provider heavy, the event has achieved its reputation by providing content that can tangibly help the AM user exploit the performance gains and economic returns that AM offers – this is achieved through predominantly case study led presentations from both users and solution providers.
Aligned to support the UK's national AM strategy, the conference is a platform to tackle the roadblocks of industrial digitisation and ensure opportunities in high value manufacturing are not squandered – both internationally and in the UK.
链接：

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

3.**会议名称：**Support Ships
会议时间：25 - 27 February, 2020
会议地点：London, UK
会议简介：The 2020 Support Ships conference brings together members of the naval and joint force logistics community at a time when NATO's leading fleets are working to retain - or attain - blue water naval capability.
With the UK gearing up for the first operational carrier deployment in 2021, there has been a lot of new capability coming on tap for the Royal Fleet Auxiliary, in order to support blue water naval capability. Other nations are also moving to modernise their capability as changes to the overall threat context demand readiness for extended, high-tempo maritime operations. This conference provides an opportunity to determine what the support ship should look like if it is to adequately support the future surface fleet. Perhaps as importantly, however, it also looks at the overall supply chain, logistics and maintenance architecture that these vessels help to deliver.
链接：https://www.defenceiq.com/events-supportships?utm_medium=portal&mac=IQPCCORP

4.**会议名称：**International Military Helicopter
会议时间：25 - 27 February, 2020
会议地点：LONDON, UNITED KINGDOM
会议简介：In the United States and around the world, emerging concepts for future vertical lift are advancing our understanding of how next-generation rotorcraft should be designed, deployed and sustained to meet the demands of a complex, contested and multi-domain operating environment. Even as requirements continue to be shaped, we are beginning to see a vision for the future helicopter force which will rely on increased range, speed, survivability and payload, open architectures, connectivity and unmanned systems integration – to name a few. Given the scope of our ambition, it is imperative that we meet to align these future platforms with the threats they will face, and to ensure – as we prepare for new aircraft – that we manage the capability gap to sustain the highest possible standards of readiness, both for today and for tomorrow.
International Military Helicopter unites more than 200 military and industry leaders, at a strategic forum designed to assure the role of the military helicopter by supporting the delivery of capability in practice. Organised in 2020 across three specifically themed days – Vision 2030, War Fighter Readiness/Current Operations and Platform Sustainment – it provides a unique opportunity to look across the life-cycle of the platform, offering a world-class program led by operators, capability leaders and technical specialists alike. Though future capability-focused, the forum does not ignore the challenges of the present, and it remains the opportunity to prepare for the full-spectrum of operations, from combat to search and rescue, logistics to humanitarian support. Covering everything from manned-unmanned teaming to training and predictive maintenance, it offers an unparalleled chance to ensure our forces are ready to fight and win, whenever they might be called upon to do so.
链接：https://www.defenceiq.com/events-militaryhelicopter?utm_medium=portal&mac=IQPCCORP

5.**会议名称：**Airborne ISR & C2 Battle Management
会议时间：10 - 12 March, 2020
会议地点：The Hurlingham Club, London, United Kingdom

会议简介：Now in its seventh year, the international Airborne C2ISR conference has built a strong reputation among leaders from the Air and Intelligence communities who recognize the need to strengthen partnerships, share strategic objectives and build trust and understanding in an effort to enhance global intelligence and command and control infrastructures across the air, space and cyber domains.

Building on the success of our 2019 event, which brought together over 200 delegates to discuss the concepts of global reach and deterrence, next year's conference will be themed around decision advantage for the full spectrum of conflict, with emphasis on the changing nature of the 'OODA Loop' in a time of emerging disruptive technologies and the adoption of multi-domain concepts of operation. This theme has the potential to address some significant gaps in understanding between government and industry and across global alliances about the future of C2ISR as we plan for the full spectrum of operational environments and high-end, peer conflict.

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

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