IEEE Future Directions Newsletter

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IEEE Experts Weigh Social Implications of Emerging Technologies in Future Pandemics

Emerging technologies can help societies during global pandemics, but deployment and implementation must be carefully guided. In this article, thought leaders from IEEE Future Directions initiatives on Blockchain, Brain, Digital Reality, and Future Networks explore the societal aspects of utilizing emerging technologies to secure health and economic systems against future pandemics. Topic areas including healthcare, supply chain, and connecting the unconnected are examined while taking into account citizens' privacy, security, and well-being.

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IEEE Future Directions Technical Communities - Renew Now for 2021

In IEEE Future Directions, we're committed to bringing you the best knowledge, resources, and opportunities in emerging technologies within IEEE. As we evolve and expand our offerings, subscription to our current Future Directions Technical Communities for IEEE Society members will be free as a Society member benefit. IEEE Members and Non-members

will pay a fee. These communities include: Blockchain, Brain, Digital Reality, Future Networks, and Rebooting Computing. Details of this change, including regular and student rates, can be reviewed as you renew your membership for 2021.

As a participant in our Technical Communities, you will receive access to our growing suite of content, including online courses, webinars, white papers, videos, and more at discounted rates.

Thank you for being a part of our Technical Communities. We value your involvement and look forward to your continued participation in IEEE Future Directions.

Renew for 2021

Technology Policy and Ethics

IEEE Future Directions Technology, Policy and Ethics publishes articles addressing issues in current and future technologies, including the social and ethical considerations. We are currently seeking submissions of original content, articles of 800-1200 words on the implications of technology, including but not limited to policy and ethics topics. If interested, please email FDPolicyEthics@ieee.org. Learn more about submitting an article through the author guidelines.

The Authenticity of Information on Social Media

Rajakumar Arul, Vishnu K, *Department of Computer Science and Engineering, Amrita School of Engineering, Bengaluru, Amrita Vishwa Vidyapeetham, India,* Amna Eleyan and Ali Kashif Bashir, *Department of Computing and Mathematics, Manchester Metropolitan University, UK*

The dawn of the electronic age has led to the rapid growth of social networking platforms, which have become an inevitable part of our lives by satisfying our ever-growing expectations. They yield a variety of services, such as a platform for interpersonal networking opportunities, data sharing, a resource for local and global news, and many more. The most important service is the ability to provide a replacement of traditional mass media (newspapers, televisions, etc.) for accessing and distributing news. This transition is caused by ease of access, low costs, and the capabilities of receiving the news/information in an instantaneous manner. During a 2020 survey, more than 70 percent of respondents from Kenya, South Africa, Chile, Bulgaria, Greece, and Argentina stated that they used social media as a source of news. Conversely, less than 40 percent of adults in France, the UK, Germany, and Japan reported the same. However, a large portion of social media users admit that although they do

not trust social networking sites as a media source, or as a source to get news, they continue to use it on a consistent basis.

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Implementation of 5G and Health Concerns

Donna Jiamjirarat and Corentin Rafflin, *Ball State University*

5G promises improved performance and efficiency at a lower cost than 4G, thus enabling the Internet of Things (IoT) to thrive. Implementing 5G requires adding base stations closer to the people because they will use higher frequencies, up to 300GHz, and will, therefore, have a shorter range. 5G will use frequencies from 600 MHz to 300 GHz, which include the millimeter-wave frequency bands – 30 GHz and 300 GHz – that were not used before. Despite the advantages of 5G, concerns are still to be addressed regarding the possible health impacts of this technology. Opinions and research outcomes on this topic diverge across the scientist community, government agencies, and organizations.

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Cyber Security in Operation Technologies

Dr. Junaid Chaudhry PhD, *Harvard Business School, University of Amsterdam, Edith Cowan University, and Kaspersky Research Laboratory*

Cybersecurity has been at the forefront of the digital revolution for almost a decade now, yet we have not seen, what some call, ground-breaking silver bullet solutions to the problems like phishing, digital fraud, distributed denial of service attacks etc. One of the biggest hurdles in creating the 'sense of self' among high-performance machines is the ability to classify what is normal operation and what is anomalous.

The establishment of security operation centres and countless man-hours of security analysts have assisted in classifying known threats and attack patterns e.g. petya, wannacry etc. Along with assistance from data science marvels, we have come to a stage where we can confidently say that we have discovered a method through which human intelligence can be passed on to machines in the form of pattern. We are readily reaping the benefits of Artificial Narrow Intelligence by pattern matching the known threats. In a closed system as soon as all the threats are discovered and accounted for, that system will be considered as a "secure-system."

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Current Activities in our Technical Communities

The IEEE Healthcare: Blockchain & AI Virtual Event Series is leveraging the new digital world that the COVID-19 pandemic has necessitated to discuss Blockchain & AI enabled solutions and their impact on healthcare. This series aims to deliver actionable discussions from all aspects of the healthcare industry. Virtual Sessions are held monthly on the first Wednesday. Learn more and register for the Global Standards Collaboration Kickoff on 2 December.

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IEEE Brain and the International Neuroethics Society are holding a 1-hour panel discussion on the award-winning documentary, 'I Am Human' on 2 December. The film explores the co-evolution of humans and technology by following three subjects with implantable brain interfaces and discussing the ethical implications of this technology on society. Learn more and register now to stream the film for free and attend the online panel discussion.

On-demand recordings from internationally renowned experts at the 2020 IEEE Brain Workshop on Advanced NeuroTechnologies are now available for a limited time. Already registered? Access on-demand sessions from the Program Page using the meeting code from the live event. New registrants can sign up on the Registration Page.

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The IEEE Transactions on Cloud Computing is a scholarly journal dedicated to the multidisciplinary field of cloud computing. It publishes peer-reviewed articles that present innovative research ideas and application results of cloud

computing, focusing on key technical issues related to theory, algorithms, systems, applications, and performance.

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IEEE Security & Privacy Magazine aims to provide a unique combination of research articles, case studies, tutorials, and regular departments covering diverse aspects of security and dependability of computer-based systems, including legal and ethical issues, privacy concerns, tools to help secure information, methods for development and assessment of trustworthy systems, analysis of vulnerabilities and attacks, trends and new developments, security issues in wireless networks, design and test strategies for secure and survivable systems, and cryptology, and other topics of interest to a general, technically oriented readership.

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Register now for the next webinar, *Autonomous Things and GPUs*, to learn more about the rise of GPU computing and, in particular, GPU's role in XR and AI enabled Autonomous Things. Join our featured speaker Riccardo Mariani, VP of Industry Safety at NVIDIA, during the live presentation and Q&A session on 16 December 2020. Learn more about the IEEE Digital Reality webinar series and access previously recorded webinars on-demand.

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A new issue of Tech Focus is now available with articles on MIPI RF Front-End Control Interface, Rural Networks, 3D Printed Antennas for 5G Communications, and Cellular Progress and Challenges of 5G. A new Massive MIMO Podcast lays out the path ahead in that field. There is a

System Optimization Workshop on Imperatives, Techniques, and Opportunities for Future Networks. Two new White Papers - System Optimization and Connecting the Unconnected - are now available to view online. The IEEE Learning Network is hosting an online course on Bridging the 4G/5G Gap, presented by one of the Deployment Co-Chairs. US-based members, make sure to share this event with your local government officials if you want to see 5G deployed in your town or city!

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The IEEE World Forum on the Internet of Things 2021 (WF-IoT 2021) seeks submissions and proposals for original technical papers that address the Internet of Things (IoT), its theoretical and technological building blocks, the applications that drive the growth and evolution of IoT, operational considerations, experimentation, experiences from deployments, and the impacts of IoT on consumers, the public sector, and industrial verticals. In addition, the World Forum is also seeking proposals for: Special Sessions, Workshops, and Industry Panels aimed at research topics important to industrial IoT issues.

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The Life Sciences Technical Community (LSTC) is pursuing activities in two unique areas of interest: Life Sciences for Extreme Environments; and Veterinary Medicine Engineering. Special sessions for both of these areas were held at the 42nd Annual Engineering in Medicine and Biology Conference (EMBC) 2020 and were in the Top 5% of both abstract reviews and content views during the virtually held meeting. Veterinary Medicine Engineering is going to explore technology used in Zoos and Aquariums for animal and marine life welfare. Extreme Environments considers the role of life sciences in areas such as Space Exploration, Underwater habitation, High altitude living, and situations such as fire rescues.

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The IEEE Quantum Podcast Series interviews top subject matter experts in the emerging field of quantum computing, covering topics from quantum engineering to benchmarking, standardization, industry trends, and more. In the latest episode, Candance Culhane, Co-Chair, IEEE Quantum Initiative; Los Alamos National Laboratory, discusses quantum technology, its current landscape, goals of the IEEE Quantum Initiative, and available quantum resources. Candace also explores how the advancement of quantum technologies compares to those of the past.

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Have you registered yet for the 5th IEEE International Conference on Rebooting Computing (ICRC)? This year, ICRC will be a fully virtual conference held on 1-3 December 2020. ICRC is the premier venue for forward-looking computing, with emphasis on all aspects of the computing stack. Learn more at the IEEE ICRC website.

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The recently re-launched webinar series provided by the IEEE Smart Cities program features events focusing on technical and professional development, as well as current issues/hot topics in the smart cities scope of interest. Learn more about the webinar series and register. Complete the IEEE Smart Cities Webinar Application if you are interested in presenting.

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IEEE Smart Grid hosts a series of webinars on varying aspects of global grid modernization. Visit the Live Webinar Events page on the IEEE Smart Grid web portal to see the latest offerings, or browse the Past Webinars page to access previously recorded webinars on demand.

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IEEE SDN now offers a collection of online courses in the field of Software Defined Networking, Network Function Virtualization, and related technologies. Learn from industry experts about topics that include the fundamentals of SDN and NFV, security and management challenges, the latest SDN open source platforms, and more. Participants also have the opportunity to earn Continuing Education Units (CEUs) and Professional Development Hours (PDHs) with each course. Access the courses.

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The IEEE Sustainable ICT Initiative's mission is to build a holistic approach to sustainability through ICT by incorporating green metrics through IEEE technical domains and seeks to foster the incorporation of green metrics and standards in design concepts for various technical domains. The initiative brings together expertise from different fields, in conferences and publications, with a view to foster holistic design and standardization approaches. Please join the IEEE Sustainable ICT Technical Community to help drive this very important topic.

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TEC will be hosting a joint webinar with IEEE Industrial Electronics Society entitled, A Holistic Approach to Battery

Modeling and State Estimation, on 9 December 2020. In this webinar, Bharat Balagopal and Mo-Yuen Chow, North Carolina State University, USA, will address the issues associated with current battery monitoring systems, their pros and cons, and provide insights into new technology that has been developed to not only model but also provide live status updates regarding the battery's SOC, SOH, and RUL when the battery is in use. Register now to participate in this virtual event, and view previous events on the TEC portal.

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IEEE Future Directions Events

2020 5th IEEE International Conference on Rebooting Computing (ICRC), 1-3 December 2020, Online

2020 IEEE Healthcare: Blockchain & AI Virtual Series - Global Standards Collaboration Kickoff, 2 December 2020, Online

IEEE Brain/International Neuroethics Society - 'I Am Human' Film Screening and Discussion, 2 December 2020, Online

2021 System Optimization Imperatives, Techniques, and Opportunities for Future Networks Workshop, 21,22,25 January 2021, Online

2021 IEEE International Forum on Smart Grids for Smart Cities (SG4SC), March 2021, Aachen Germany

2021 IEEE 7th World Forum on Internet of Things (WF-IoT), 20-24 June 2021, New Orleans, Louisiana, USA

2021 IEEE 7th International Conference on Network Softwarization (NetSoft), 28 June - 2 July 2021, Tokyo, Japan

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