IEEE Future Directions Newsletter

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This global health crisis is a unique challenge that has impacted many members of the IEEE family. These are difficult times, but we will get through them by working together. Thank you for your support of our shared mission to advance technology for humanity.

IEEE Tech Talks: Innovation at Work

IEEE Future Directions, in partnership with IEEE Educational Activities, has developed a series of complimentary virtual panel discussions on the latest developments in technology. This new series provides a chance to hear from industry experts and innovators regarding the latest advancements in technology, engineering, social implications, and more. The events are complimentary, but registration is required. Watch on-demand:

- Personal Digital Twins: The speakers address the potential usefulness of digital twins in the context of today's world - specifically related to epidemic alerts, monitoring and containment.
- Daily Challenges of 4G, 5G, and IoT: Expert panelists address how 4G and 5G network communications, as well as the Internet of Things, support our daily lives. They also discuss demand challenges that remote working and learning have placed on the existing infrastructure.
- Future Neural Therapeutics: Learn about key challenges and technological advances in neuroscience that can be used to treat movement and neurological disorders.
- Use of Gaming Devices to Stay Connected: A fun and unique conversation about the use of handheld gaming devices to stay connected in today's world. Our subject matter experts highlight gaming in the tech space utilizing many technologies and the overall social implications.

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.

COVID-19: The Threat and Impact Vectors

Fatima Hussain, *Royal Bank of Canada, Toronto, Canada,* and Rasheed Hussain, *Innopolis University, Innopolis, Russia*

At the time of writing this article, the novel Coronavirus (COVID-19) claimed 203,307 human lives and left 2,923,125 affected with the virus among which 837,323 recovered, around the globe. Although every sector of our life is badly affected by the COVID-19, the long-lasting effects of this pandemic will set new priorities for the nations' policy-makers. At this point, the contours of the pandemic are opaque but it is anticipated that it will take an unprecedented amount of time, effort, resources, compromises, trade-offs, and policies to set the path to the next normal. Among other walks of life, the world economy took a huge hit due to lockdowns imposed by the international communities. COVID-19 has badly affected our daily lives, shaken the healthcare systems, and above all, paralyzed the norms of work ethics due to both "work from home" and "no work." The way we are struggling to work remotely to keep our jobs, remote schooling, managing our personal and social lives, COVID-19 is no longer just a health or a well-being threat. It has a far bigger threat vector than we currently anticipate. Also, thanks to our globalized society and interdependent economy, this pandemic has no political, geographic and religious boundaries, and has caused a regional and global crisis (public health included). In this vein, this article is a minute attempt to shed light on the threat vector of the COVID-19 pandemic.

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A Low-cost Preventive Face Shield and Reusable N95 Compatible Mask for Preventing the Spread of COVID-19

Sunil Jacob, Saira Joseph, and Varun G Menon, *Center for Robotics, SCMS School of Engineering and Technology, India*

Recently, there has been a severe shortage in the global repository of personal protective equipment (PPE) stemming from the rising demand of gloves, face masks, and ventilators. This has left doctors, nurses, and other frontline health workers dangerously ill-equipped to care for COVID-19 patients. Most of the doctors and medical personnel are increasingly anxious, fearing they could expose not only themselves to the virus, but their families and others as well. Since the start of the COVID-19 outbreak, the price of N95 masks, gowns and other medical essentials has increased greatly. The research community is putting its best efforts to come up with novel solutions to tackle this problem.

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COVID-19 Disease Modelling and Its Impact on Public Health Policy

Muhammad Qasim, *University of Otago, New Zealand,* Waqas Ahmad, *University of Otago, New Zealand,* Muhammad Azhar, *Islamic International University Islamabad, Pakistan,* and Mohammad Azam Ali, *Islamic International University Islamabad, Pakistan*

In pandemics or outbreaks, mathematical models are one of the first tools to use for estimation, characterization, and planning of measures to mitigate the spread of disease. When a pandemic of influenza occurred in 2009, it was important to quickly analyze the potential of the virus to cause illness and death by comparing with already available data of 1918, 1957 and 1968 pandemics and characterizing it as mild or severe diseases. Exact forecasting of an epidemic or pandemic based on previous disease data is a major gold standard method of disease modelling. Additionally, modelling of real time data during an outbreak or pandemic is very helpful to pattern disease spread and identify the most

vulnerable regions to take appropriate actions. Similarly, it is important to estimate the number of infected cases in the near future, for quick resource mobilization and resource management.

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Indiana: How We Figured Out the Optimal Approach to Run Government from Our Couches and Kitchen Tables

Joe Cudby, *Indiana Office of Technology,* and Jared Linder, *Indiana Family and Social Services Administration*

As a rapid response to COVID-19, Indiana's governor mandated sheltering the entire state in-place except for essential service providers. Most of the state's agencies were required to leave their offices since they were deemed 'non-essential'. Historically state employees did not work remotely -- with no resources (e.g., computers, virtual private network access) ever being placed in their residences. The state's move to support the majority of workers with remote services was a huge undertaking that needed to be accomplished quickly and without too many fail points as the citizens of the State of Indiana still needed the critical services the state provides. This article is a brief case study of how this challenge was overcome. We will describe how Indiana—both at a state and an agency level—rapidly adapted to the operational challenges presented by the COVID-19 pandemic. By pivoting quickly to novel technology, Indiana enabled more than just the ability for remote work, but also empowered teams to respond with agility to the new environment wrought by the pandemic. This response was only made possible by a strong centralized information technology (IT) presence and a collaborative agency response. We also describe the specific response and outline a successful use case.

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Current Activities in our Technical Communities

IEEE BigData

Last chance to enter the IEEE DataPort™ Spring 2020 Upload Contest. This competition is designed to encourage authors, researchers, and engineers to bring their research to the forefront of the global technical community. Prizes will be awarded to the top 3 datasets that receive the most views. The submission deadline is 31 May. Visit IEEE DataPort™ for official contest rules, and submit your dataset today for free.

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IEEE BLOCKCHAIN™

Stay current in the field of blockchain with the online IEEE Blockchain eLearning modules. Courses range from an introduction to blockchain that lays the groundwork for understanding the technology to insightful case studies and applications to the potential impact of blockchain on the human rights of nationality and privacy. Gain an in-depth understanding of blockchain and its social and ethical

impacts, and meet your CEU and PDH requirements with each course.

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BrainInsight is the quarterly eNewsletter of the IEEE Brain Initiative, featuring practical and timely information and forward-looking commentary on neurotechnologies. Click here to read the latest issue.

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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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The IEEE Secure Development Conference (SecDev) is planned for September 2020 in Atlanta, GA. The goal of SecDev is to encourage and disseminate ideas for secure system development among academia, industry, and government. Click here for the most up-to-date news on SecDev 2020.

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The IEEE Digital Reality Webinar series has officially launched. The second webinar in the series presents a new type of Cyber-Physical-Social Eco-Society (CPSeS) system that implements the idea of “technological fusion” by bringing together Mixed Realities, Robots and Social Networking to provide engaging and interactive new “realities.” Register.

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The Future Networks Initiative released two new white papers to accompany the International Network Generations Roadmap, a 5G and beyond technology roadmap. The **Energy Efficiency** white paper explores the "5G Energy Gap," or the significant disparity between

currently available energy versus the demand expected from the many edge devices for proposed 5G use cases, in addition to other technological challenges associated with powering the network. The **Deployment** white paper's goal is to help inform the wireless industry about the tactical challenges of deployment in and around public right-of-way and to highlight the particular needs and perspectives of local governments and municipal agencies where applications for deployment of new 5G wireless communications facilities will be reviewed and permitted. Read the white papers.

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The *IEEE Internet of Things Magazine* (IEEE IoTM) publishes high-quality articles on IoT technology and end-to-end IoT solutions. IoTM articles are written by and for practitioners and researchers interested in practice and applications, and selected to represent the depth and breadth of the state of the art. Visit the IoTM website to learn more, subscribe, and view upcoming calls for papers.

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In the midst of this current pandemic situation, the Life Sciences Technical Committee is committed to keeping you informed about research developments in the scope of COVID-19, in collaboration with our sponsoring societies. We also want to call your attention to our special LSTC Newsletter issue on Consumer Technology Meets Healthcare. Furthermore, planning continues on the upcoming Life Sciences Conference in early 2021.

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Registration is now open for IEEE Quantum Week, to be held 12-16 October 2020 in Denver, Colorado, USA. This event will showcase the latest in quantum research, technologies, practice, applications, education, and training. Reserve your seat now for an early bird discount. Visit the conference website for details.

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The 2020 Low-Power Computer Vision Challenge (LPCVC), previously planned for 15 June 2020 in Seattle, Washington, USA together with the 2020 IEEE Computer Vision and Pattern Recognition Conference (CVPR), will now be held

as a virtual workshop on the same date. LPCVC is a continuation of the Low-Power Image Recognition Challenge (LPIRC). For details, visit the LPCVC website.

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The IEEE International Smart Cities Virtual Conference, 28 September to 1 October, is currently accepting paper and tutorial proposals. The theme of the event is "Smart Cities Solutions to New Challenges." Visit the conference website for more information.

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IEEE Smart Grid offers a full schedule of on-line tutorials including Professional Development Hours (PDH) and Continuing Education Units (CEU). Click here to register for upcoming tutorials.

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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 initatitive's mission is to build a holistic approach to sustainability through ICT by incorporating green metrics through IEEE technical domains and 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 our Technical Community to help drive this very important topic.

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Upcoming Webinars - TEC has two webinars on the schedule for June:

- Smart Battery Energy Management and Health Conscious Fast Charging for Future Transport, Tuesday, 2 June 2020, 10am EDT. Register.
- Wireless Charging for Autonomous Electrified Micro-mobility Devices: A Real-world Solution for Smart Cities to be Pandemic-ready, Tuesday, 30 June 2020, 10am EDT. Register.

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IEEE Future Directions Events

2020 Augmented World Expo (AWE-USA), 26-29 May 2020, Now Online

2020 IEEE Low Power Computer Vision Challenge (LPCVC), 15 June 2020, Online

2020 6th IEEE International Conference on Network Softwarization (NetSoft), 29 June - 3 July 2020, Online

2020 IEEE 44th Annual Computers, Software, an Applications Conference (COMPSAC), 13-17 July 2020, Online

2020 IEEE 5G World Forum (5GWF), 10-12 September 2020, Online

2020 IEEE International Forum on Smart Grids for Smart Cities (SG4SC), 9-11 September 2020, Aachen, Germany

2020 IEEE Secure Development Conference (SecDev), 28-30 September 2020, Atlanta, Georgia, USA

2020 IEEE International Smart Cities Conference (ISC2), 28 September - 1 October 2020, Online

2020 IEEE Quantum Week, 12-16 October 2020, Denver, Colorado, USA

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