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According to TrustRadius, women in tech are nearly twice as likely as men to have lost their jobs or been furloughed due to the pandemic.



LABZ

Network Connectivity Made Easy with the NetRecon Lab Lexington, Kentucky, USA

Within the College of Engineering, settled in the Department of Computer Science, is one of the University of Kentucky's leading labs. Unyielding to COVID-19, the Network Reconnaissance (NetRecon) Lab leads in innovation, research, and service, with lab members still creating, delivering, and publishing during the pandemic. Under the leadership of Dr. Corey Baker, the lab focuses on cyber-physical systems specializing in opportunistic wireless communication. Let's dive into NetRecon Lab's top projects.

We will first explore the pragmatic applications of delay-tolerant networks (DTNs), particularly focused on rural remote patient monitoring

of patients. Although many patients have benefited from mHealth solutions, and national efforts are underway to accelerate broadband deployment, rural patients may not benefit to the same extent as their non-rural counterparts due to geographical and financial barriers that result in limited or nonexistent access to broadband connectivity. Additionally, chronic disease is approximately 20 percent more prevalent in rural areas than other areas. NetRecon Lab investigates how to securely transmit data between medical experts and patients who may be out-of-range of one another. Discovering innovative solutions for patient monitoring is essential to closing the feedback loop between a

patient and doctor, allowing patients to better understand their respective health, improving patient-to-doctor interactions, and helping save lives independent of internet availability. NetRecon Lab also uses patient-centered design to improve UI/UX for patients and provide personalized care, encouraging patients to submit status updates often and accurately. To solve the ambitious task of delivering optimal patient care in rural environments, NetRecon Lab is part of an interdisciplinary team called, Linking and Amplifying User-centered Networks through Connected Health (LAUNCH). The LAUNCH team consists of leading experts from the UK Markey Cancer Center, the National Institute on Health (NIH), the National Cancer Institute, the Federal Commissions on Cancer (FCC), the University of California San Diego Design Lab, and Amgen.

Another exciting project is "Delay Tolerant Social Networks." In this project, researchers incorporate the concepts of DTNs and mobile ad-hoc networks into a real-world application to evaluate disseminating data in social networks when internet availability is sparse or nonexistent, such as emergency situations or natural disasters. This project began with investigating the performance of networks in simulation and in real-world environments. In a simulation, it can be found that the domain provides quick processing time and swift network interaction. However, in a real-time environment, a researcher could notice the possibility of performance lags. Simulation networks cannot capture the full range of attributes that real-time networks have in performance. With this in mind, NetRecon Lab created the AllyOop Social Research Platform, which provides a secure DTN for online social networks (OSNs). This platform was designed with a patented middleware scheme for Apple

Image courtesy of Dr. Corey Baker



Last year Dice reported on the gender pay gap in the U.S. tech industry, showing female technologist in New York State make almost \$9,000 less than male counterparts.

iOS devices to engage while on OSNs. This infrastructure does not require a cellular network or Wi-Fi connectivity for interacting on AlleyOop Social. From this platform, the researchers propose using AlleyOop Social with device-to-device connectivity. This connectivity can use peer-to-peer connections via Wi-Fi or Bluetooth structured with DTN routing protocols.

The final project of the lab is “Low-Cost Smart Cities.” Cities worldwide are taking strides to urbanize the existing infrastructure and create a technology-enhanced city for their citizens. This technology can include pedestrian counters, traffic signal priority, and kiosks that employ many IoT-connected devices. In some cities, we already see technological enhances being made, but they come at a cost. Besides the cost of buying products, installing technologies, and maintaining the infrastructure, a significant expense derives from providing these devices’ network connectivity. Typically, these systems depend heavily on high-cost methods of connectivity, such as 5G or Wi-Fi. In this project, researchers propose using DTNs and edge computing as a foundation to enhance the communication infrastructure for smart cities while reducing the cost. Furthermore, this work investigates the privacy of the smart city infrastructure. This work is an NSF award-winning project and exemplifies the broader impact through its application. Additionally, the Low-Cost Smart City project shows the Lab’s commitment to developing a low-cost smart city through a partnership with the city of Louisville.

With relevant and timely research, NetRecon Lab continuously demonstrates creativity, ingenuity, and broader impact at a larger scale.

—*Jasmine DeHart*

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BACK

The Gender Digital Divide



Although internet access has been widely acknowledged, women are not fully reaping its rewards. Women experience less access to information technology than men, which can be true of rich and poor countries alike. According to a recent report released by the Economist Intelligence Unit (EUI), men remain 21 percent more likely to be online than women, with that number rising to 52 percent in the world’s least developed countries.

The internet has demonstrated the power to drive economic growth, expand social opportunities, and promote online learning, especially during the current hard times due to COVID-19. To be offline today means to miss out on opportunities, such as social inclusion and political participation. The gender divide online could deepen existing gender inequalities, pushing women further to the margins of society. Establishing a deep and broad understanding of women’s participation in the web is an important step in bringing about change.

—*Kun Jin*

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