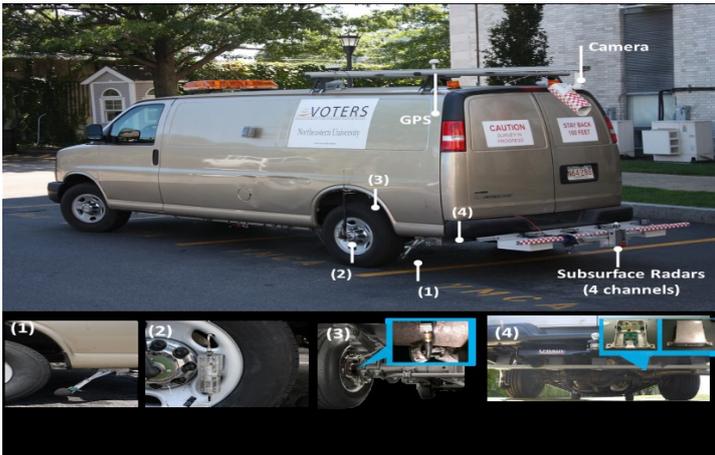THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
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National Rail Transit Electrification and Automation Engineering Technology Research Center (Hong Kong Branch)
國家軌道交通電氣化與自動化工程技術研究中心
(香港分中心)

Smart Infrastructure Systems – A Practical Platform for Continuous Network-Wide Health Monitoring of Transportation Infrastructures

Prof. Ming L. WANG

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Director, VOTERS Sensors Systems, Northeastern University in Boston, USA

Abstract

The VOTERS project at Northeastern University was funded in 2009 by the National Institute for Standards and Technology (NIST) Technology Innovation Program, which was established to support innovative and high-risk, high-reward research in areas of societal critical need. The VOTERS project succeeded in providing not only the framework, but also demonstrated a working prototype and created a blueprint for a service to shift from periodical localized inspections to continuous network-wide health monitoring of roadways. VOTERS created a simple, inexpensive way to detect surface and subsurface trouble spots without stopping traffic. This innovative multi-modal multi-sensor approach centers upon infrastructure inspection and cyber monitoring through the use of city or fleet vehicles already on city roads and interstate highways, such as post office or sanitation trucks, police or other city vehicles, taxis, or delivery trucks. Traveling in traffic, multiple sensor subsystems will obtain measurements and data using a variety of innovative sensing methods: acoustic waves generated by tires and high frequency impulse radar to detect surface defects, subsurface delamination, corrosion, layer thickness and properties, millimeter-wave radar to determine near-surface properties of pavement, complemented by optical systems. Through data fusion VOTERS can provide accurate, up-to-date condition information without setting up hazardous and expensive work zones. VOTERS data-driven approach to assessing the pavement conditions allows decision makers to conduct the right repairs at the right time and right place for safety and long term financial benefit. Our goal is to control the diagnostics of the world's transportation infrastructures. We will talk about conceptual vision and the initiation of the project as well as the solutions to account for practical applications.

Date: 27 May 2019 (Monday)
Time: 17:00 – 18:00
Venue: Room Z406, 4/F, Block Z, The Hong Kong Polytechnic University, 181 Chatham Road South, Hunghom, Kowloon, Hong Kong

Speaker's Biography

Prof. Ming L. Wang is a Distinguished Professor and was the PI and Director for VOTERS Sensor Systems at Northeastern University in Boston. VOTERS (Versatile Onboard Traffic-Embedded Roaming Sensors) aims to provide a continuous stream of accurate, up-to-date information about the state of roadways and bridge decks gathered by sensor systems mounted on vehicles of opportunity, while also eliminating the hazardous, congestion-prone work zones that are often set up to gather this critical data. The VOTERS project is funded under the Technology Innovation Program (TIP) of NIST and will run for five years at a total cost of $18.8 million, including cost-sharing by the project participants. The VOTERS team includes more than 40 members including faculty, research scientists, administrative staff, and graduate students from three universities as well as research engineers and consultants from several industrial partners. It emphasizes interdisciplinary research at system level. Since May 2015, a spinoff company (StreesScan, Inc) using VOTERS technology has attracted a lot of attention from magazines and TV Medias. More than 60 cities and roadway maintenance officials are adopting the technology as part of their maintenance strategy to confront our worsen street and roadways. His recent work includes the development of DNA and RNA decorated Nano-sensors to detect airborne chemicals, toxics, and harmful agents. He was also awarded patents on noninvasive "Saliva Glucose Sensing System" for diabetes. He is focusing on multidisciplinary research agenda.

*** All Interested Are Welcome ***
For further information, please contact Prof. William H.K. Lam at Tel. 2766-6045.
Free Admission. Please reserve your seat with Ms Autumn Lin by email: autumn.lin@polyu.edu.hk.
Certificates of attendance will be provided to participants who attend the whole seminar.