College of Engineering
Department of Civil Engineering

Gutierrez Soto
Smart Structures Lab
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Seminar Series

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Multi-Modal Inference: How to Add Value to Infrastructure Monitoring

The growing popularity of concepts like Smart Cities, Internet-of-things, and Digital Twins means we are collecting more sensor data on infrastructure than ever before. However, raw data alone has little value, what is more important is the information it provides and the decisions that it enables. Certain types of sensing modalities (e.g. accelerometers, cameras, and LIDAR) collect high resolution data that can yield a variety of rich, and sometimes unexpected, information. Through targeted signal processing and analysis, it is possible to infer high-level information for a variety of civil infrastructure applications. "Inference" is the key word, since much of the information contained in physical data is not readily obvious from observation alone. Our lab is multi-modal inference techniques which produce high-level, actionable data, including: 1) Using LIDAR point clouds to infer a building's structural design, 2) Using traffic cameras to infer structural damage in traffic light masts, 3) Using vibrations to infer building occupancy patterns for operation management. Each of these examples demonstrate one of three main advantages of multi-modal inference techniques. Firstly, they value to certain data acquisition techniques by making them more versatile. Secondly, they are useful for "recycling" existing infrastructure data for a new purpose. Finally, they can be used to design infrastructure hardware which adapts to future needs.

Monday July 27, 2020
10:30am
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Dr. Rodrigo Sarlo received his B.S. in Mechanical Engineering from the University of Virginia and his Ph.D. in Mechanical Engineering from Virginia Tech. He is currently entering his third year as an Assistant Professor in Civil and Environmental Engineering. He is director of the VIBEs Lab (www.vibeslab.cee.vt.edu) and associate director of the Virginia Tech Smart Infrastructure Laboratory (http://vtsil.weebly.com/), which includes Goodwin Hall, a highly-instrumented "smart" building and experimental platform. His research encompasses signal processing and experimental testing in a variety of domains, including micron-scale bio-sensors, musical instruments and full-scale buildings. He is interested in the use of physical sensors as an interface between humans and the built environment.