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International Doctoral Program in Civil and Environmental Engineering

SEMINAR

Artificial Intelligence-enabled Smart Structural Health Monitoring and Maintenance of Civil Infrastructure

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Location:
UNIPG Campus of Engineering
Via G. Duranti, 93, Perugia
Room 13
Timetable:
September 14th, 2023 - 3 p.m. (CET)

Abstract
Structural Health Monitoring (SHM) has tremendous potential to detect incipient failures of structures, e.g., the onset of damage and unexpected behaviour during extreme climatic events or operational conditions so that corrective actions can be employed in a timely manner. In the era of climate change and progressively aging infrastructure, the importance of monitoring the health of civil infrastructure and its continual maintenance has gained considerable attention. A parallel development in smart sensors, Artificial Intelligence (AI), data mining and computing technologies has opened up several possibilities to undertake damage assessment with rapidity and ease. My current multidisciplinary research aims to develop various cutting-edge SHM methods to detect damage or anomalies in infrastructure automatically through the use of smart sensors (e.g., wireless sensors, cameras, drones, unmanned robots, and immersive glasses) and AI under a variety of challenging practical situations. These algorithms have been successfully implemented for various civil infrastructures, including pedestrian and highway bridges, high-rise buildings, towers, dams and mining industries located in North America and Europe. The proposed vibration- and vision-based SHM methods have firmly headed as invaluable tools to inspect, renew, and control large-scale infrastructure under in-service conditions with reduced maintenance cost and improved public safety. This research has also made the structural inspections rapid, remote, real-time and robust, making them suitable for maintaining sustainable and resilient infrastructure in smart cities. This talk will present an overview of these powerful and cutting-edge SHM technologies and articulate their broader impacts on our society.

Prof. Ayan Sadhu is Canada Research Chair Associate Professor, Director of Smart Cities and Communities Laboratory at the Department of Civil and Environmental Engineering at the Western University, Canada.
Dr. Ayan Sadhu received his Master Degree at the Indian Institute of Technology (IIT) Kanpur, India and herned a Ph.D. at the University of Waterloo. Dr. Sadhu's research is focused on addressing the practical challenges of structural health monitoring while harnessing the capability of modern sensing technology. His current projects involve both theoretical as well as experimental research in areas including structural condition assessment, damage detection, pattern recognition, vibration control, Artificial Intelligence, and information modeling techniques of large-scale structures. This research resulted in numerous research articles, and the pr
located in North America and Europe. In 2021, Dr. Sadhu received the prestigious Early Researcher Award from the Ministry of Ontario. In 2022, Dr. Sadhu was the recipient of the Junior Faculty Award for Excellence in Research at Western Engineering.