Speaker: Dr. Polina Kurtser, Umeå University

Title: Automating thermal leaks detection in building envelopes

Abstract:

Current automation efforts in monitoring and inspecting early signs of infrastructure degradation in outdoor environments (urban, industrial, agricultural, or forestry) using unmanned ground and aerial robots face a common challenge: supervised perception models, commonly trained for detection of such degradation, require a substantial amount of representative data of anomalies under varying conditions to detect them robustly and reliably. Unfortunately, acquiring such data at scale is often labor-intensive, generalizes poorly, is prone to biases, and frequently requires trained personnel. Traditionally though, methods for outlier or out-of-distribution detection have relied mostly on the representation and modeling of normality to identify anomalies through detection of significant deviation from that norm. In this talk, I will present our ongoing study on merging these two traditions by employing and developing one-class or weakly supervised methods for anomaly detection in visual data, which partially alleviates the data labeling challenge. I will focus specifically on my personal interest in this field—multi-sensory based anomaly detection where the detection tasks require sensor fusion. I will share our ongoing efforts and lessons learned in applying these methods to the use case of automating thermal leak detection in building envelopes using ground vehicles.

Bio:

Dr. Polina Kurtser is an Associate Professor in the Department of Computing Science at Umeå University, Sweden. Her research focuses on robotic perception in uncontrolled environments, sensor fusion, and image reconstruction in both industrial applications and medical imaging. Previously, Polina was a postdoctoral fellow in the Radiation Physics group led by Prof. Tufve Nyholm in the Department of Diagnostics and Interventions at Umeå University, and a postdoctoral fellow in the Robot Navigation and Perception group led by Prof. Achim Lilienthal at the Centre for Applied Autonomous Sensor Systems (AASS) at Örebro University in Sweden. Polina holds a Ph.D. from the Department of Industrial Engineering and Management at Ben-Gurion University under the supervision of Prof. Yael Edan, where her work focused on perception and task planning in autonomous robotic harvesting in greenhouses. She also holds a master’s degree in industrial engineering and a bachelor's degree in Biomedical Engineering from Ben-Gurion University.