SPEAKER: Ana Cavalcanti

WEBPAGE: https://www-users.york.ac.uk/~alcc500/

TITLE: Systematic testing of a drone for emergency relief

ABSTRACT: Recent surveys suggest that, within the field of robotics, there is a prevailing tendency to employ a manual ad hoc testing approach, heavily reliant on the expertise of developers. However, this method proves to be costly and comes with various drawbacks, including the inability to assess the fault-detection capabilities of the test set, potential errors in test specification and execution, and the possibility of expert disagreement on test outcomes. In this presentation, we share our experience with the adoption of the innovative RoboStar systematic testing approach for a firefighting UAV, developed using the widely adopted ROS middleware. The RoboStar framework advocates a model-based approach in control software development for robotics, offering domain-specific tool-independent notations for modeling and simulation, along with techniques for the automatic generation of artifacts. Our focus in this talk, centers on the RoboStar techniques for automated test generation. Through our approach, we effectively reduce testing expenses and can provide guarantees regarding the absence of faults within specified classes.

BIOGRAPHY: Ana Cavalcanti is a Professor at the University of York, UK, and holds a Royal Academy of Engineering Chair in Emerging Technologies. In that role, she is Director of the RoboStar centre on Software Engineering for Robotics. She previously held a Royal Society Industry Fellowship, which provided her with the ideal opportunity to understand and contribute to the practice of formal methods working with QinetiQ. Her main scientific achievements have been on the design and justification of sound refinement-based program development and verification techniques. She has covered theoretical and practical integration with industry-strength technology: concurrency, object-orientation, and testing, dealing now with mobile and autonomous robots. She has led the development and justification of refinement theories, notations, and techniques, and tools to cope with control systems. Her work provides support for graphical notations popular with engineers, and for main-stream programming languages. It is distinctive in that it has comprehensive coverage of practical languages, rather than idealised notations. It also supports high degrees of automation to enable usability and scalability. She has chaired the Programme Committee of leading conferences, and been a member of numerous Programme Committees. Currently, she is the Chair of the Formal Methods Europe Board.