ICIRA 2023 Special Session Proposal

Title of the Proposal: Intelligent Inspection Robotics

Technical Outline of the Session and Topics:

Outline of the Session:

Intelligent inspection is of great significance for the maintenance and safety insurance of mechanical equipments in the field of aero-engine, aircraft, and nuclear power. However, the harsh inspection environment, long-narrow space, and scarce label data make it very challenging for the intelligent, efficient, and accurate inspection of these equipments. Under this context, the concept of "robotics + autonomous intelligence" emerges in the field of inspection and maintenance for mechanical equipment, and attracts extensive attention from OEMs, end-users, and academics. The new paradigm of inspection and maintenance will promote the robotics, sensors, and detection technology to an upper level due to the high demand on reachability in crammed space, multi-mode environment sensing, pattern identification, and classification accuracy. This topic mainly addresses the emerging theory and technology in the field of intelligent robotics-based in-situ inspection for high-end mechanical equipments, and focuses on intelligent robotics, multi-mode sensing, and explainable machine learning, which is intended for intelligent, efficient, and accurate inspection.

Topics of the Session:

- *Latest progress of state-of-the-art technologies in the field of robotics, sensing, and pattern identification for intelligent inspection*
- *Emerging robotics technologies such as soft robotics, micro-crawling robotics, and bio-inspired robotics for intelligent inspection*
- *Kinematics, intelligent control, and path planning for in-situ inspection robotics*
- *Intelligent sensing technologies such as flexible sensing, multi-mode sensing integration, and damage imaging method*
- *Deep learning methods in vision-based damage detection*
- *Explainable machine learning in the field of intelligent structure design, control, and detection*

Contact details of the Session Organizers

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