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ABSTRACT

Assurance for Autonomous AI/ML Enabled Systems

There's no substitute for applying sound engineering principles for the design and implementation of mission- and safety-critical systems. By definition, problems tackled by systems based on AI/ML are ill-posed and not precisely specified. Sound engineering requires a full understanding of the complexity of applied tasks and human cultural contexts in addition to the complexities of AI/ML technologies themselves. We need assurance objectives which encompass safety, reliability and trustworthiness.

However, it is unclear how these objectives will be achieved in practice within the design space of Autonomous Avionics Systems. Formal methods are the gold standard for assurance and certification; however, they currently cannot provide the needed assurance for autonomous systems, clearly a topic of much needed research. Therefore, for the interim, we pursue a process-based verification and certification approach.

We conclude with an outline of work being done in the SAE G-34/ EUROCAE WG-114 Joint International Technical Standards Committee on "Artificial Intelligence in Aviation," whose charter is to prepare technical standards required to support development and certification of aeronautical systems implementing AI-technologies.