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Optimizing Safety Certification of Cyber-Physical Systems

-Background Safety certification of cyber-physical systems (CPS) such as autonomous vehicles or medical control systems is a complex process that often contends with a lack of transparency between the manufacturer and the certifying authority. The manufacturer may be reluctant to freely share knowledge with the certification authority, with trade secrets being one of many possible reasons. Furthermore, time constraints may not permit the certification authority to examine internal details of the CPS. Hence, a process that optimally accounts for these realities may help promote timely and effective safety review. Invention Description Researchers at Arizona State University have developed a novel certification process for evaluation of cyber-physical systems (CPS). The process is modeled as an agile iterative game, where the manufacturer aims to find the optimal set of information required to share with the certification agent for accurate safety assessment. The certification agent, using a model extraction and reachability analysis tool, aims to accurately assess safety of the CPS system from the shared information. Potential Applications Safety analysis for: •   Cyber-physical systems •   Safety-critical systems •   Medical device control •   Autonomous vehicles Benefits and Advantages •   Facilitates CPS development by balancing interests between the manufacturer and certification agent •   Preserves a CPS manufacturer's competitive edge by maintaining confidentiality of internal system parameters •   Minimizes cost and time required for safety certification Related Publication: Certification Game for the Safety Analysis of AI-Based CPSResearch Homepage of Professors Sandeep Gupta and Ayan Banerjee