Recovery from Cyber Attacks in Cyber-Physical Systems

Supervision team
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Research project
This PhD focuses on the recovery from cyber attacks in Cyber-Physical Systems (CPS). This research will delve into the unique challenges and open problems associated with this critical aspect of cybersecurity. Unlike traditional IT systems, CPS integrate computational and physical components, making them inherently more complex. This complexity, coupled with the real-world impact of these systems, makes recovery from cyber attacks a challenging task. The interconnected nature of CPS means that an attack on one component can have cascading effects, complicating the recovery process.
This studentship offers a unique opportunity to contribute to a cutting-edge field of study and make significant advancements in the security of Cyber-Physical Systems.

This PhD project is open to self-funded students. Successful candidates will gain access to the EPSRC National Edge Artificial Intelligence Hub, which "will deliver world-class fundamental research, co-created with stakeholders from other disciplines and regions, to protect the quality of data and quality of learning associated with Artificial Intelligence (AI) algorithms when they are subjected to cyber attacks in the Edge Computing (EC) environments." The Hub provides solutions and support for edge AI, "fostering engagement, education, collaboration, and innovation across industries." Candidates will also benefit from Hub resources and events through platforms such as Edge AI Engage and Edge AI Educate.

Applicant skills/background
This project requires applicants with a strong background in computer science, electrical engineering, or a related field, and a keen interest in cybersecurity.

References

Global Scale Digital Forensics for CyberPhysical Systems

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Research project
Forensics in cyber-physical systems (CPS) often takes place in a local context. However, detecting attacks, protecting systems, recovering operations, and identifying attackers requires cooperation across multiple defenders spanning both the CPS network and the core infrastructure.

Internet Service Provider (ISP) networks have visibility into 60–70% of network traffic, but lack the intelligence or local CPS context required to attribute attacks or detect stepping-stone behaviours. This project aims to develop methods and tools to address the critical challenges of visibility, scale, privacy, false positives, and cooperation in CPS forensics.

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Applicant skills/background
This project requires a strong background in computer science, cybersecurity, or a related field, with an interest in digital forensics, large-scale systems, and cyber-physical security.

References