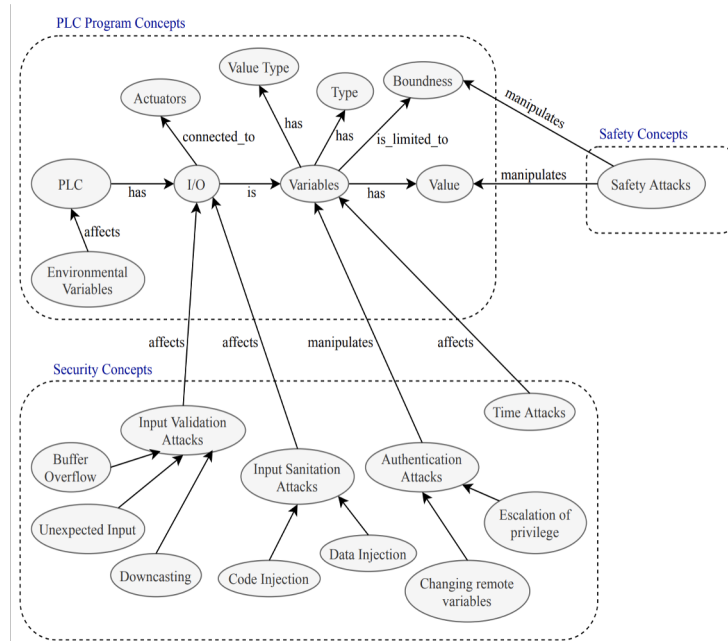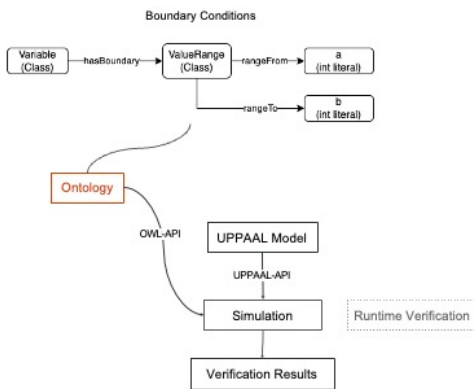# CAREER: Formal TOols foR SafEty aNd Security of Industrial Control Systems (FORENSICS)

Challenge:

- Formal Verification and Validation of Safety and Security Requirements of Industrial Control Software
- Detecting Process Anomalies: Security and Failure Models, Algorithms, and Tools

Solution:

- Requirements are expressed in an ontology as DL and SWRL rules
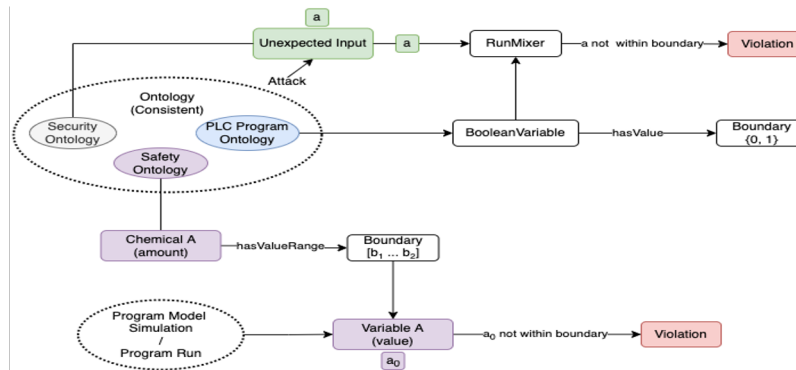- Transformation: SWRL to Timed Computational Tree Logic (TCTL)

Graphical representation Description Logics (DL) [Knowledge Base (KB) = TBoxes + ABoxes] + Semantic Web Rule Language (SWRL) -> A formal representation of knowledge

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COLLEGE OF ENGINEERING
Department of Computer Science

Scientific Impact:

- Developing formal models, algorithms, tools, and libraries to provide control technicians with a practical toolkit to integrate security into the control software without any expertise in cybersecurity

Broader Impact and Broader Participation:

- Provide knowledge base and tools for understanding how safety and security could be integrate into industrial processes and critical infrastructures.
- Laying a foundation for future development of algorithms and user experiences around controller systems
- Education and Outreach through Teaching and Course Development