Internship Proposal: Modelling Software Runtime using Temporal Domain Knowledge Graphs.

In the context of AI for software engineering, the objective of this internship is to address below fundamental research areas:

* 1. Formalize Techniques to effectively augment temporal dependencies to the structural dependencies of a Knowledge Graph
  2. What are the knowledge graph representations that can dynamically evolve and depict software behavior over time by capturing rich domain specific knowledge in terms of state changes, signal values etc.?
  3. Define and formalize knowledge representation to discover & establish relations that occur, re-occur or evolve over consecutive and non-consecutive time points.
  4. How do we validate and evaluate the completeness and correctness of the temporal knowledge graphs for interdependent state transitions?

# Domain for Illustration – Automotive Domain Software Development

These techniques developed to model the software runtime behavior can be leveraged to dynamically enrich and evolve the knowledge graphs. Such temporal knowledge graphs would be a true representation depicting variability and state transitions for analysis and usage in further tasks such as software simulation and validation.

# Deliverables

The internship is expected to result in following deliverables

1. Tool for generating temporal knowledge graphs.
2. List of formalized algorithms and representation techniques towards modelling of intertwined evolution of entity embedding over time. The techniques should translate domain specific software model information into external influences that trigger entity-relation drifts and non-linear dynamics of entities within relation space.
3. The reasoning algorithms should be demonstrated with proof-of-scale and proof-of-variability validations, and cater to software validation and change impact analysis.
4. Develop graph theoretic measures to validate entity-relation drifts and entity associations.

# Internship Request Details:

1. Number of Interns : 2
2. Preferred Educational Qualifications : Final year Masters Students or Early PhD Students
3. Expected Skills : AI/ML, Knowledge Graphs, Software Engineering, Graph Theory, Python