

## **Automated Steering of Model-Based Test Oracles to Admit Real Program Behaviors**

**Krishna Sindhuja Kalusani**

**USC ID: T25568677**

Software testing needs two important concepts to test a software

- the test data - inputs given to the system under test (SUT)
- the oracle - which judges the correctness of the resulting execution

The systems in which small changes causing large behavioural differences, the oracle test cases are highly important such as in real time embedded systems. These systems are mainly used for analysis purposes before the final system is built but they represent an idealized system, abstracting away certain considerations such as non-deterministic timing behaviour and sensor noise. Thus, even with the same test data, the model's behaviour may fail to match an acceptable behaviour of the SUT, leading to many false positives reported by the oracle. The proposed framework provides solution to adjust the behaviour of the model to match the behaviour of SUT in order to reduce rate of false positives.

Models require abstraction which is useful for requirement analysis but may not reflect operating conditions. Similar to the program steering, oracle steering is done by adjusting the execution of the oracle. But how a process chooses an efficient steering action. The Steering action that is chosen should give a solution that:

- Satisfies all tolerance constraints
- Meets additional steering policies
- Minimizes dissimilarity function

A system should consider these points in order to satisfy the above problem.