PRIORITIZING SOFTWARE REGRESSION TESTING USING REINFORCEMENT LEARNING AND HIDDEN MARKOV MODEL

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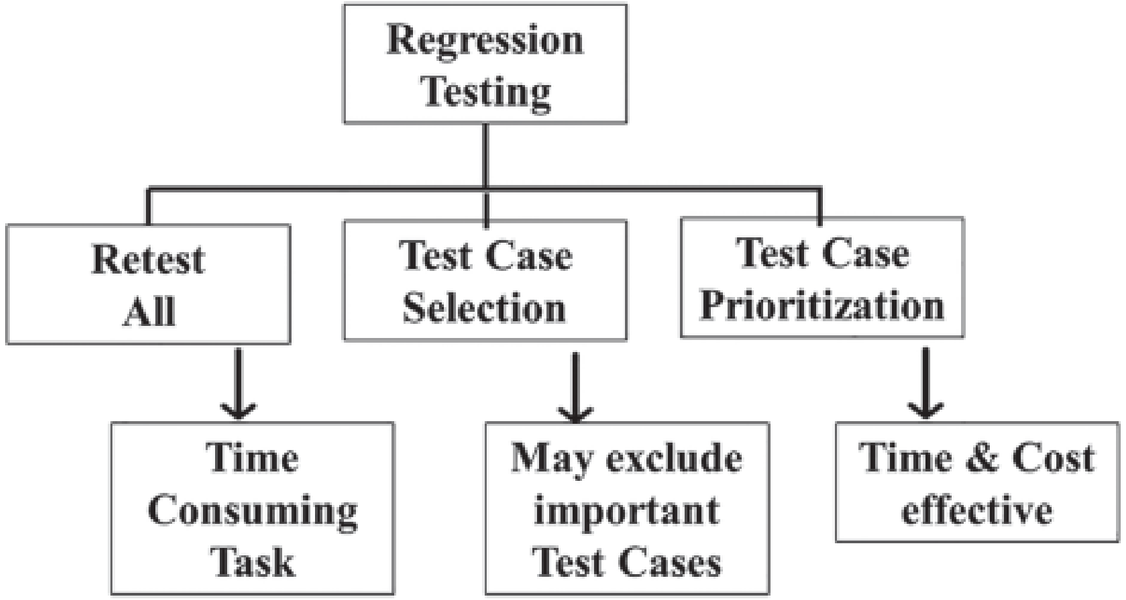
OVERVIEW

- Research Problems
- Data source and Type
- Methodology
- Result and Findings
- Future works

PROBLEM

The research study aims to minimize the quantity of software test cases while enhancing their quality within regression testing, using minimization and selection approaches.



DATA SOURCE AND TYPE

Experimental case study of 5 applications, the total test cases were 366, with fault seeding techniques

- introduced known faults (seeds)
- measured how well the test cases detect them

METHODOLOGY

The Hidden Markov Model (HMM) used historical data which included code coverage metrics and defect risk.

The Q-learning model generates Q-values from the previously executed test case sequences.

These Q-values are then used by the HMM to predict the likelihood of each test case leading to a positive or negative outcome.

RESULT AND FINDINGS

The performance of the approach was evaluated using metrics which are precision, recall, and F1-score, which were found to be 0.9, 0.804, and 0.849 respectively

The findings suggest that the HMM-based RL algorithm effectively prioritizes test cases.

FUTURE WORKS

its effectiveness depends on the availability of historical data, and it may face scalability issues in large systems.

Further validation on different systems and datasets to confirm the real-world applicability of HMM-based RL for TCP is required

scarcity of extensive historical data and the high computational requirements present significant obstacles in local software testing environments.

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THANK YOU

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