# METHOD FOR CONSENSUS PRIORITIZATION OF REGRESSION TEST- CASES SUPPORTED BY PARALLEL EXECUTION WINDOWS

## IITM Technology Available for Licensing

## Problem Statement

- Presently, software regression testing techniques employ **single heuristic factor** for testing purposes. This may not be desirable as diversity and sophistication varies in different software.
- The current software testing techniques **lack efficiency and delay in testing** which may lead to **non-compliance** in software release timelines.
- Existing technology fail to account for resources expended in technique and there is a need **to provide test cases** according to business and resource requirements.
- The present invention use two approaches: **Hybrid (priority-aware / on-the-fly),** and **Consensus (priority blind / post-individual)** regression test prioritization.

## Technology Category/ Market

**Category -** Computer Science & IT, Software Testing
**Applications** - Software testing solutions in enterprise setting, BFSI, IT, Govt. & Public sector

**Market** – Software testing market is valued at USD 40 B in 2021 and is anticipated to record a **CAGR of more than 6%** between 2022 - 2030.

## Technology

Testing initiated; Heuristics employed to **compute individual scores** based on software tested

Individual heuristics compute & generate individual priority scores from which a **weighted score is assigned**; test case prioritization performed in accordance

A **cost cognizant metric EPL** is used to quantify the effectiveness of the prioritization, when execution is driven by size-varying test parallelization windows of **unequal load distribution**

**Distance** between two prioritizations (with and without ties) to measure the quality of the final consensus prioritization.

**Hybrid**

- Weighted - sum-hybridization
- For any given instance of hybridization, exactly two individual heuristics are used.
- Test-cases are sorted only after the weighted score is computed.

**Consensus**

- Individual permutations are first computed (offline phase)
- Followed by computation of a consensus permutation respecting preference lists of individual prioritization approaches, to the extant possible

**Fig 1.** further outlines the claimed method graphically. (Page 2)

## Intellectual Property

- IN 386511
- PCT/IN2022/050354
- IITM IDF Ref. **2106**

## Key Features / Value Proposition

- The **weighted score assignment and hybridization function** is not performed by other software testing technique.
- The **employment of parallelization windows** help in division of labor and efficient utilization of computer resources.
- The present prioritization method outperformed existing techniques by showcasing an **effectiveness of 55.22%.** (Fig. 2)

## TRL (Technology Readiness Level)

**TRL 3/4 ,** Early stage validation has been carried.

The method is evaluated on **20 open-source subjects** including source code, **69,305 test-cases**, and with parallelization support of up to **40 logical CPUs**.

## Research Lab

**Prof. Rupesh Nasre**
Dept. of Computer Science & Engg. , IIT Madras

**CONTACT US**
**Dr. Dara Ajay,** Senior Manager
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

**IITM TTO Website**:
https://ipm.icsr.in/ipm/

**Email**: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
**Phone**: +91-44-2257 9756/ 9719

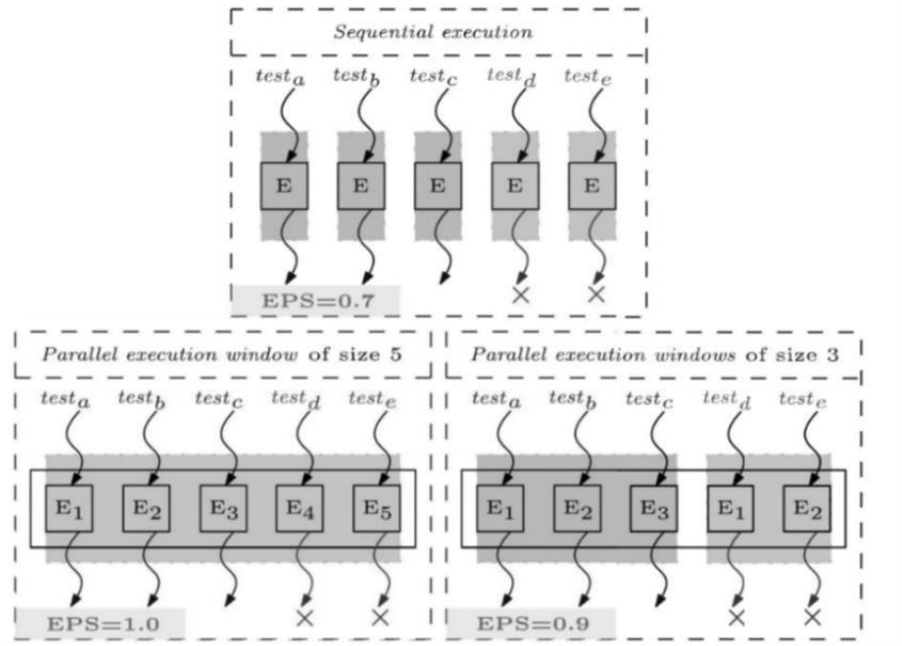


**Fig. 1.** Graphical representation of claimed method

**EPS** - Cost Cognizant metric

| Company | Testing Technique Employed | Effectiveness % |
|---|---|---|
| JIANGSU SUCE SOFTWARE DETECTION TECHNOLOGY CO., LTD | Regression test case selection method based on cluster analysis | 50.41% |
| SAP SE | Automated, Self-Adaptive Test Case Prioritizer (ATCP) | 38.81% |
| Current Invention | Consensus Prioritization supported by parallel execution windows | **55.22%** |

**Fig. 2.** Comparative effectiveness of software testing strategies

**CONTACT US**
**Dr. Dara Ajay,** Senior Manager
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

**IITM TTO Website**:
https://ipm.icsr.in/ipm/

**Email**: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
**Phone**: +91-44-2257 9756/ 9719