AzTE
ASU® TECHNOLOGY TRANSFER

Integrated Framework for Fault Detection and Test Algebra for Combinatorial Testing

AzTE Case # M15-077P

Inventors

Dr. Wei-Tek Tsai

Professor Emeritus
School of Computing Informatics and Decision Systems Engineering

Background

Combinatorial testing (CT) is a process of testing every possible set of input parameters for a software program to determine if there are any unexpected issues that need to be fixed. Complex software uses multiple inputs, making the CT process slow and cumbersome. As the number of input parameters increases, there is an exponential increase in the complexity of testing each input. Typical CT techniques are unable to determine exactly which configuration fails and what interactions are faulty because they only test the interaction of input parameters with the software. Therefore, a more efficient method of testing input parameters and their interactions with the software.

Invention Description

Researchers at Arizona State University have invented a new approach to CT using adaptive reasoning and test algebra. Adaptive reasoning techniques are able to identify software faults more quickly than standard CT techniques. Once faults are identified, test algebra is used to eliminate related configurations of input parameters. Combining adaptive reasoning and test algebra techniques enables CPU-intensive CT applications which were previously infeasible due to size. This innovation is able to identify both faulty interactions between input parameters and software and faulty configurations of the input parameters themselves.

Intellectual Property Status:
Pending

Potential Applications

- Software-as-a-service (SaaS)
- Testing-as-a-service (TaaS)
- Cloud-based computing

Benefits and Advantages

- **Scalability** – Program can be adjusted to any number or combination of input parameters.
- **Speed** – CT process is sped up by eliminating duplicate tests of the same fault.
- **Specificity** – Find faulty configurations of input parameters and faulty interactions between input parameters and software.

Contact

Bill Loux

Director of Business Development, Physical Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1992

F: 480.884.1984

BLOUX@AZTE.COM

TECHNOLOGYVENTURES@AZTE.COM

www.AzTE.com