

Kanokwan Kaewthong 2012: Avoiding Fault using Rule Extraction from Bayesian Network and Automatic Checking with Aspect Oriented Programming. Master of Science (Computer Science), Major Field: Computer Science, Department of Computer Science. Thesis Advisor: Miss Usa Sammapun, Ph.D. 73 pages.

In software development, we want to build software which can work correctly and efficiently. Therefore, we need a technique to detect errors in the software. To be able to detect errors, one can define rules specifying possible patterns of errors. However, in defining such rules, developers need to investigate and understand the software comprehensively, which can take a long time. Thus, using a learning technique to learn and extract rules can save developers' time. In addition, once errors are found, they should be managed by, for example, avoiding errors before occurring. Therefore, this research builds a failure-avoidance system to learn rules from application-level data derived from the running software. The learning technique finds the relationships between failures and behaviors that lead to failures and transform into rules. The rules are used to detect possible failures while the software is running. Then, Aspect Oriented Programming (AOP) is applied to avoid such failures.

Experiments in this work are divided into 2 parts which are (1) a rule extraction process and (2) a failure-avoidance process. A racing game case study is used in the experiments. The rule extraction process uses Bayesian Network in the WEKA tool to learn relationships between failures and behaviors that lead to failures. Then, the relationships are transformed into rules. The resulting rules are evaluated using performance measures and execution time. Finally, the extracted rules are used to monitor software runtime behaviors to detect possible failures, which are then avoided using Aspect Oriented Programming.

From the experimental results, we can accurately catch behaviors that lead to failure and avoid them.

---

Student's signature

---

Thesis Advisor's signature