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RESEARCH ARTICLE

Automated Model-Based Test Path Generation from UML Diagrams via Graph Coverage Techniques

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Abstract— UML State Chart Diagrams are the basic models used to derive test paths from intermediate graphs generated automatically using graph coverage techniques in addition to the tool support provided by MBT Tool TestOptimal's Basic as well as ProMBT version. The test Paths Generated covers Node Coverage, Edge Coverage, Edge Pair Coverage as well as most importantly Prime Path coverage which is till today not explored much. The algorithm employed is Prefix based combined with Chinese postman Problem Algorithm together. From State charts, first of all Model Coverage Graphs are constructed with help of TestOptimal and then Test Paths are generated one by one. Testing is often incomplete, i.e. cannot cover all possible system behaviours. There are several heuristic means to measure the quality of test suites, e.g. fault detection, mutation analysis, or coverage criteria. These means of quality measurement can also be used to decide when to stop testing. This paper is centred upon coverage criteria. There are many different kinds of coverage criteria, e.g. focused on data flow, control flow, transition sequences, or boundary values. In this paper, we will present new approaches, e.g. to combine coverage criteria and generation of test paths manually as well as automatically using tools based on Chinese postman and prefix based algorithms.

Key Terms: - SUT; TestOptimal; State charts; MECG; STG

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