

MASTERS DEGREE DEFENSE

COMPUTER SCIENCE DEPARTMENT

**Evaluation and Implementation of Algorithms for DU Path Testing**

By

Lei Liu

Most data-flow strategies for testing sequential and parallel programs are based on modeling a program as a data-flow graph and finding the paths of the graph that link the definition and use of variables. Such paths are called DU-paths. A definition-clear DU-path (DCU-path) with respect to a specific variable is a DU-path, which includes only one definition and at least one use of that variable. A set of paths of a given data-flow graph is called a complete set of paths if each path is from the start node to the stop node and the set of paths cover all DCU-paths of the given graph. The DCU-paths can be used for determining the locations of breakpoints in the debugging process and the complete paths represent the paths that should be exercised by some test data.

In this thesis, some known algorithms for DCU-paths and complete paths have been evaluated, namely the algorithms of Rapps and Weyuker's Data Flow Criteria; James M. Bieman and Janet L. Schultz's algorithm; Girgis' ZOT algorithm and Paul C. Jorgensen's methodology. An innovative algorithm has been formulated and implemented, which consists of three steps. The first step is to find all DCU-paths based on the depth first search. The second step is to implement ZOT algorithm to obtain a set of complete paths. The last step is to determine a minimum set of complete paths by applying the well-known Petrick's method for Boolean function minimization.

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Time: 12:00 - 1:00 pm

Location: 8-48 Computer Science Conference Room

Advisor / Committee Chair: Dr. Salam Salloum  
Committee Members: Dr. Chung Lee, Dr. Lan Yang