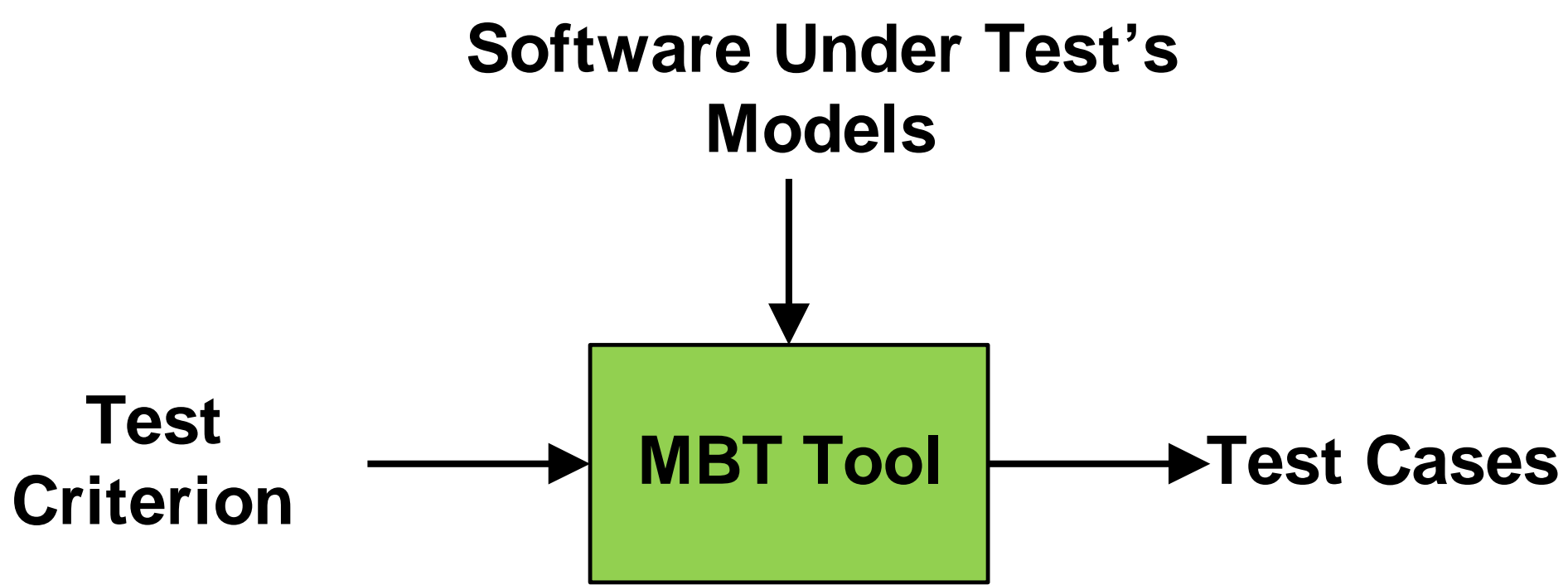


# TOWARD SCALABLE AND PRACTICAL MODEL-BASED TESTING

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## Model-based Testing (MBT)

One of the best practices in software testing



## Advantages

- Automated → Reducing test generation cost
- Systematic → Effective in detecting faults

## Problems

- Execution cost → Too many test cases to run
- Lack of models → No model exists in industry

## Motivation

MBT can not scale up if test case execution is expensive, which is the case for most system level testing of industrial systems

## Challenge

Given a limited testing budget, (number of test cases to execute), maximize the fault detection rate of the selected test cases

## Solution

Existing selection techniques:

- 1) Random
- 2) Coverage-based

My proposal:

## Similarity-based Test Case Selection (SBST)

Industrial case studies and simulations showed

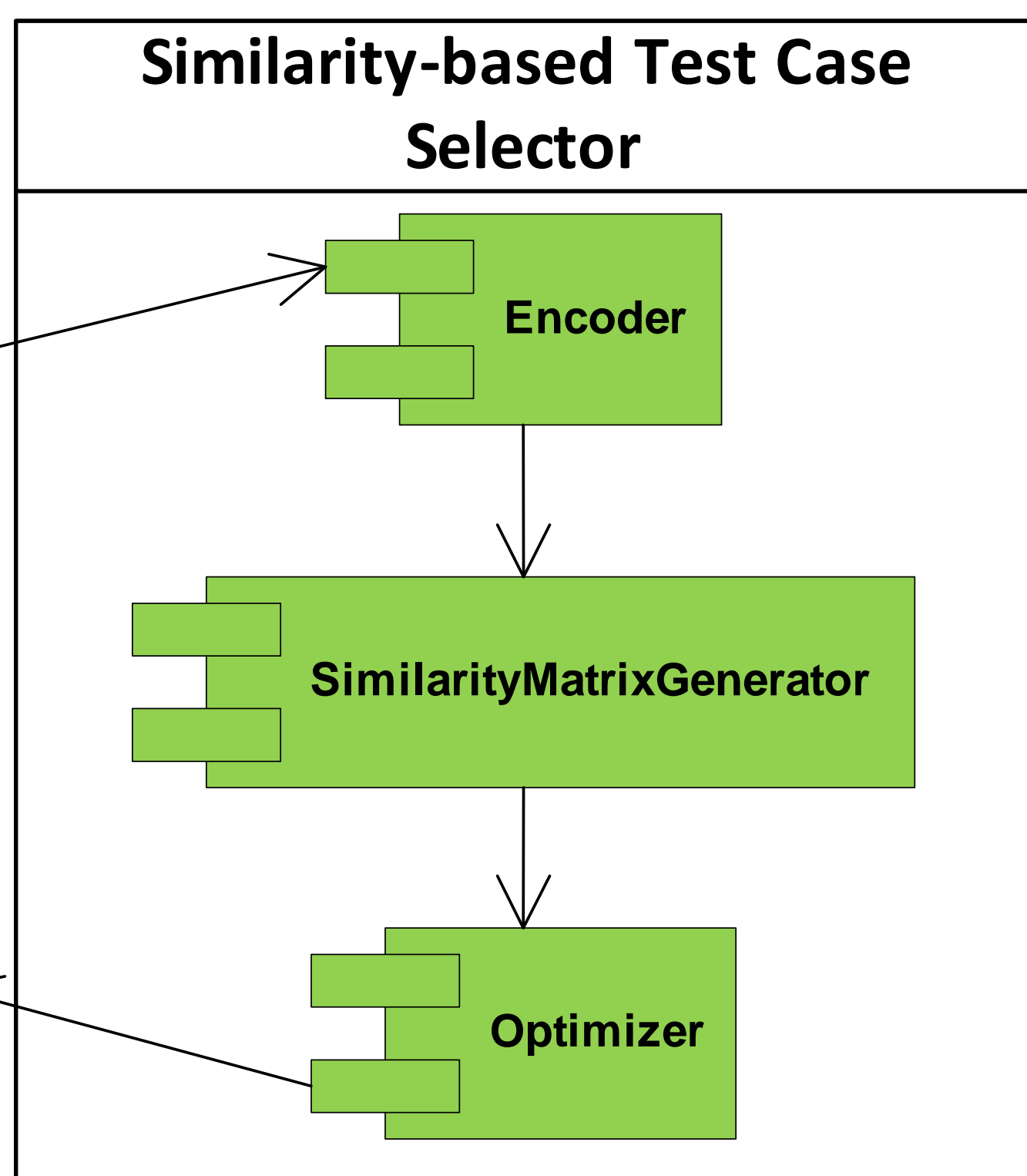
## Assumption:

The more diverse the test cases, the higher their fault detection rate

Test cases finding common fault → similar  
distinct faults → dissimilar

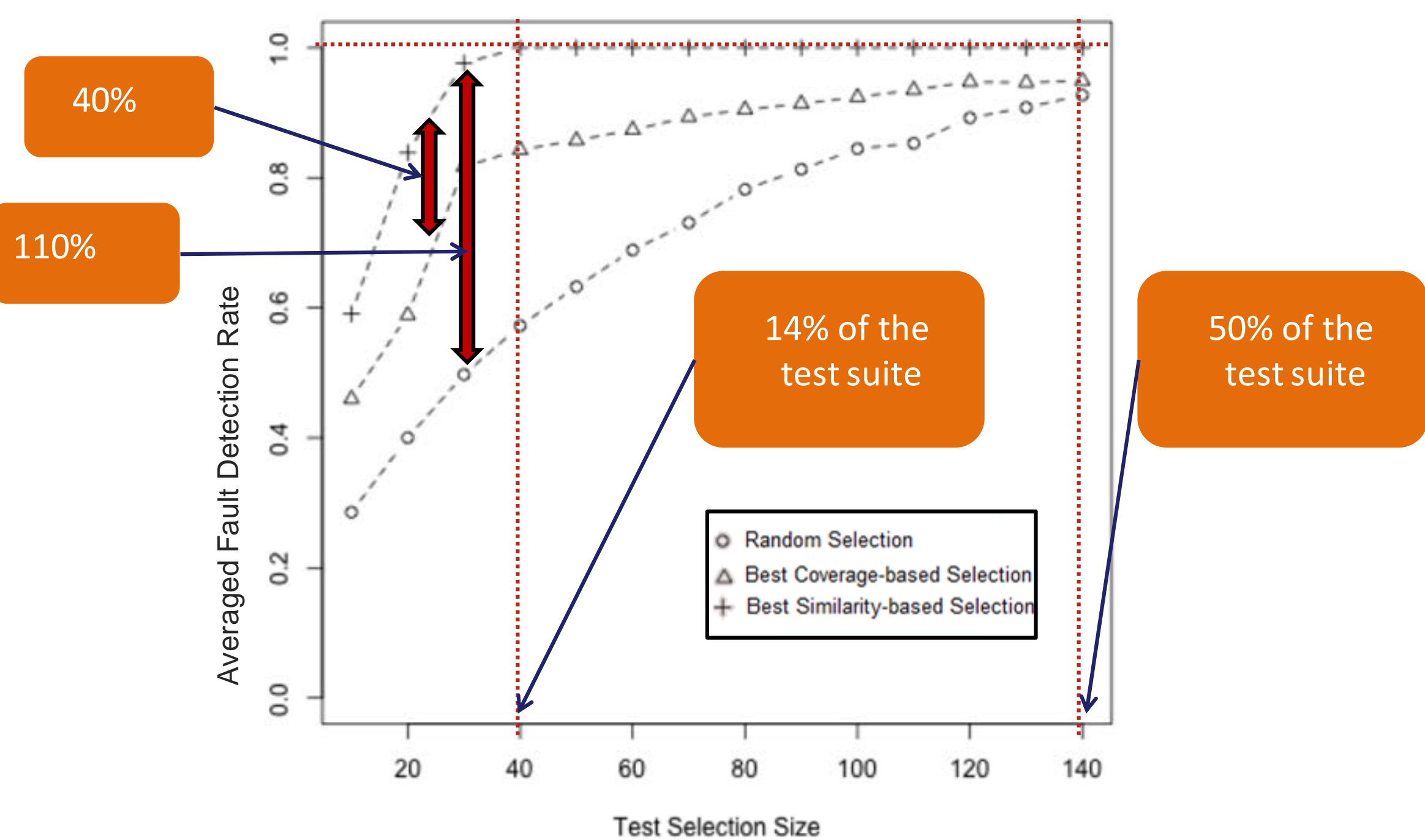
**Tool Support:** 320 STCS variants are implemented using different algorithms for encoding, similarity function, and optimization

My PhD Study at Simula Research Lab, Norway  
Working on the Problem of Execution Cost of MBT



## SBST vs. Coverage based and Random Selection

### Empirical Study on Two Industrial Systems



## Future Work (My PostDoc at Queen's)

Working on the second problem: Lack of models in industry and combining it with SBST

**Reference:** H. Hemmati. *Similarity-Based Test Case Selection: Toward Scalable and Practical Model-Based Testing*, PhD thesis, Simula Research Laboratory and Informatic Department, University of Oslo, May 2011.

