Efficiency of Adaptive Random Testing

Mr Chow Kwong Pok Cliff

Abstract:

Test case selection is a prime process in the engineering of test harnesses. In particular, test case diversity is an important concept. In order to achieve an even spread of test cases across the input domain, Adaptive Random Testing (ART) was proposed such that the history of previously executed test cases are taken into consideration when selecting the next test case. Empirical studies showed that ART algorithms make good use of the concept of even spreading and achieve 40 to 50% improvement in test effectiveness over random testing in revealing the first failure, which is close to the theoretical limit. However, the computational complexity of ART algorithms may be quadratic or higher, and hence efficiency is an issue when a large number of previously executed test cases are involved. This talk introduces a proposed approach, namely divide-and-conquer, to improve the efficiency of ART algorithms while maintaining their performance in effectiveness. Experimental results show that the divide-and-conquer technique can provide much better efficiency while maintaining similar, or even better, effectiveness.

About the Speaker:

Cliff Chow is a part-time PhD Student in the Department of Computer Science, The University of Hong Kong. His Supervisor is Prof. T.H. Tse. His research interests are software testing, software engineering, and data mining.