Inferring Behavioral Specifications from Large-scale Repositories by Leveraging Collective Intellligence

Hridesh Rajan: hridesh@iastate.edu
Gary T. Leavens: leavens@eecs.ucf.edu
Tien N. Nguyen: tien@iastate.edu
Robert Dyer: rdyer@bgsu.edu

Problem: Insufficient Code Specification and Cost Effectiveness of Specifying Applications

Behavioral Interface Specifications:
writing non-trivial specification requires significant time and expertise.

Problem 1, Insufficient Specification of Core Libraries:
Frequently used existing libraries lack formal specifications.

Problem 2, Cost of Applications:
Specification of Applications depending on those libraries become highly expensive.

Solution: A vision for Inference of Behavioral Interface Specifications

The overall problem of inferring specifications needs a three pronged approach by identifying widely used codes, similar rare codes and non-similar rare codes.

Consensus-based Inference:
most clients for widely used code in big code work, broken client tend to get fixed eventually.

Similarity and Differential-based Inference:
Programmers reuse and clone good patterns of program design; similar code should have similar specifications.

Decomposition-based Inference:
function signatures in widely used codes can help quickly to separate (code, specification) pairs.

Publications


The research and educational activities described on this poster has been supported in part by the US National Science Foundation (NSF) under grants 1513263, 1512947, 1423370, 1349153, 1117937, 1017334 and 0846059.

Boa Inference

IDE

SourceForge

GitHub

Boa’s Spec Inference Engine

Code

Spec

Consensus-based Spec Inference

Differential-based Spec Inference

Decomposition-based Spec Inference

The research and educational activities described on this poster has been supported in part by the US National Science Foundation (NSF) under grants 1513263, 1512947, 1423370, 1349153, 1117937, 1017334 and 0846059.

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY
Bowling Green State University

University of Central Florida

Laboratory of Software Design
http://boa.cs.iastate.edu