

System-Level Program Comprehension: Query Language and Graph Transformations

Suraj C. Kothari
Electrical & Computer Engineering Department
Iowa State University
EnSoft Corporation
kothari@iastate.edu

The goal of system-level program comprehensions is to provide the big picture to manage the complexity of software by understanding how the software relates to domain-specific knowledge. The purpose of this talk is to demonstrate how to create the big picture and its use in working with real-world software. We will take operating systems as an example and use a program comprehension tool called Atlas.

The tool Atlas is based on a hybrid approach that creates a powerful combination of query language and graph transformations. The query language provides a mechanism to extract program artifacts and semantic relationships between them. These relationships are represented as graphs. For any real-world software, the resulting raw graphs are huge and not suitable for human comprehension. The next step is to provide a mechanism to process the raw graphs and create a meaningful big picture relevant to a particular goal of program comprehension. Atlas uses graph transformations to provide such a mechanism.

The key issues for creating a tool like Atlas are: (a) the design of the query language, (b) the speed and accuracy of program analysis to support the query language, (c) an easy-to-use integration of the query language and graph transformations. Along with the demonstration, we will briefly talk about these issues and the rationale for choices made in Atlas.