OOPSLA'95 Doctoral Symposium

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For the second year, OOPSLA sponsored a Doctoral Symposium in which advanced Ph.D. students presented their dissertation projects to one another and a group of four mentors. This year 10 students were selected from a set of 21 applicants; selection was based on the mentors' ratings of the relevance and soundness of the dissertation projects as well as judgments of the likely benefit of the presentation and critique to the student. The four mentors included Mary Loomis from Hewlett-Packard Laboratories, John McGregor from Clemson University, Eliot Moss from the University of Massachusetts, and Satoshi Matsuoka from the University of Tokyo.

Each student was given a 45-minute slot, with 20 minutes allotted to presentation of the dissertation project, and the remainder to questions and critique. The mentors were assigned to individual students, and served as discussants, initiating the post-presentation comments. The critique addressed technical aspects of the research as well as the style and organization of the presentation itself.

The Symposium included the following students:

Harumi Anne Kuno, University of Michigan

"View Management Issues in Object-oriented Databases"

Views are an established technique for restructuring and repartitioning the format of data, classes, and schemata so that applications can customize shared data, even adding new extrinsic properties, without affecting the shared data. MultiView is one of the first OODB systems to support dynamic and updatable materialized object-oriented database views.

Discussant: Mary Loomis

Michael VanHilst , University of Washington

"A Factor-based Approach to Extensible Object-oriented Development"

We propose an approach to object-oriented development for producing more easily extensible code, while using only existing language mechanisms. The key to this approach is the use of generic factors which are composed in a separate specification to form the structure and concrete classes of the implementation.

Discussant: Eliot Moss

Letha Hughes Etzkorn, University of Alabama

"A Metrics-based Approach to the Automated Identification of Object-oriented Reusable Components"

The identification of reusable code within legacy code traditionally has focused on functionally-decomposed code. Though object-oriented code is inherently more reusable, often reuse was not considered during development. A knowledge-based approach that makes preparing existing object-oriented code for reuse significantly easier and more quantifiable is described.

Discussant: John McGregor

Linda Keszenheimer, Northeastern University

"Testing Adaptive Object-oriented Software"

Class evolution has significant impact on the testing and maintenance of object-oriented programs. A framework is presented for testing and maintaining software during structurally-motivated and behaviorally-motivated transformations. The approach reduces the effort for testing pattern-oriented components as they are reused with many different class structures.

Discussant: John McGregor

Jamshed N. Patel, Purdue University

"Library-based Algorithm Prototyping Environment for Computer Vision and Image Processing on Parallel Computers"

We propose Cloner, an object-oriented environment for prototyping computer vision and image processing (CVIP) tasks on parallel computers. It is being designed to allow users to take advantage of the computing power provided by parallel processing systems without requiring an extensive understanding of the underlying architecture. Cloner is a software reuse tool that helps a user design parallel algorithms by building on and modifying algorithms that already exist in an overall system library.

Discussant: Satoshi Matsuoka

Charles D. Norton, Rensselaer Polytechnic Institute

"Object-oriented Runtime Support for Dynamically Irregular Parallel Computation in Plasma Modeling"

We introduce an Object Oriented Programming Paradigm to dynamically improve the efficiency of irregular parallel computations. The framework integrates application performance monitoring with dynamic load balancing techniques implicitly into the programming process. Our research is applied to scientific computations, such as problems in computational plasma physics, as part of the NASA/JPL HPCC Earth and Space Sciences Project

Discussant: Satoshi Matsuoka

Wayne J. Staats, North Carolina State University

"WOOD - A C++ Parallelizer"

We present WOOD, a C++ parallelizer, which extends the parallelizing transformation introduced by Yin, Bin, and Ungerer [20] to extract more inter and intra object parallelism and overcomes implementation difficulties with their proposal. We also present a mathematical model based on Milner's SCCS [16] which will be used to extend our parallelizing compiler by simulating certain aspects of the object oriented program as its being parallelized. The information gained from the simulation will be used by WOOD to make partitioning decision to help produce fewer and faster parallel processes.

Discussant: John McGregor

Adriana Lopes Diaz, Carleton University

"An Object-oriented Reflective Simulation Environment for Distributed Algorithms"

This thesis is an attempt to find applications for object-oriented reflection in providing a new approach to the simulation of distributed algorithms. The object-oriented concurrent reflective language ABCL/R2 is used to illustrate the simulation of some distributed algorithms.

Discussant: Eliot Moss

Siva Challa, Virginia Tech

"A Framework Using Reflection for Interoperability of Statically Typed Object-oriented Languages"

The major goal of this dissertation is to design and implement an Interoperable Common Object Model (ICOM) that facilitates interoperability among statically typed object-oriented languages (in a distributed, heterogeneous environment). The model will be realized by an implementation framework developed in C++, Modula-3, and Eiffel. A new reflection technique has been developed for uniform mapping of the features of the common object model on to the selected languages.

Discussant: Mary Loomis

K. Kishore Dhara, Iowa State University

"Behavioral Subtyping in Object-oriented Languages"

Behavioral subtyping is studied as a tool for modular verification of OO programs. We propose two notions of behavioral subtyping in the context of mutation and aliasing. The weaker form of behavioral subtyping allows more subtypes while limiting certain kinds of aliasing. These alias restrictions can be checked statically. Both behavioral subtype notions are adequate for sound and modular verification.

Discussant: Eliot Moss