SPECIAL TRACK ON COORDINATION MODELS, LANGUAGES AND APPLICATIONS

George A. Papadopoulos
(Track Chairman)
Department of Computer Science
University of Cyprus
75 Kallipoleos Street, POB 537, CY-1678, Nicosia
CYPRUS

E-mail: george@cs.ucy.ac.cy

INTRODUCTION

A new class of models, formalisms and mechanisms has recently evolved for describing concurrent and distributed computations based on the concept of "coordination". The purpose of a coordination model and associated language is to provide a means of integrating a number of possibly heterogeneous components together, by interfacing with each component in such a way that the collective set forms a single application that can execute on and take advantage of parallel and distributed systems.

The Special Track on Coordination Models, Languages and Applications took deliberately a broad view of what is coordination, thus inviting contributions to a number of areas where the concept of coordination is used in one way or another, such as software architectures, middleware platforms, groupware and workflow management, etc., in addition to the traditional areas covering data-driven (such as Linda) and control-driven (such as Manifold) models and languages.

In response to the call for papers for this track, 22 papers were submitted; 6 of them were forwarded to more appropriate tracks for review while the rest 16 were fed into the review process. There were altogether about 40 reviewers and a total of 78 reviews were produced, an average of about 5 reviews per paper. Based on these reviews 7 submissions were accepted as regular papers ([1-7]) and 2 more as short papers ([8-9]).

THE CONTRIBUTED PAPERS

The paper by Ciampolini *et al.* ([1]) presents the design and initial implementation of an abductive multi-agent system based on Prolog and Java, and where the abductive space is realised by means of using and accessing a Linda tuple space. A coordination protocol is developed and used by the agents in their reasoning process. Puntigam and Peter ([2]) propose an extension of process types based on promised messages to ensure that servers return always appropriate answers to clients and thus related problems of livelock and deadlock get minimised. This work is applicable to middleware platforms such as CORBA. Rauber and Runger ([3]) propose a model for deriving parallel implementations, containing both task and data parallelism, from an initial specification via a coordination program. The model includes a specification and implementation language and is suitable for scientific computing types of applications such as the solving of differential equations. Bonsangue *et al.* ([4]) present a number of models for coordination models of the Linda family, based on issues of distribution and preservation of data production. It then goes on to study the relationships between these models with respect to a number of factors such as linearity and

ordering of data production, and proves equivalences between different models. Sample *et al.* ([5]) introduce the system MARS, an environment based on heterogeneous execution for building multidisciplinary applications comprising collection of pre-existing modules containing legacy code. The system includes a scripting language for specifying module actions. The paper by Omicini ([6]) proposes a conceptual framework to define the semantics of coordination models and uses it to characterise operationally tuple-based coordination models. Zambonelli and Omicini ([7]) introduce TuCSoN, a coordination framework for Internet-based applications, where coordination rules are separated from "algorithmic parts" inside Internet agents. The model is based on independently programmable communication abstractions local to each node ("tuple centers"). Dumitrescu and ELederer ([8]) present the SCCM system, an environment supporting a mixed combination of imperative and functional programming and illustrate its applicability in the scientific computing field, and more to the point in matrix multiplications. Finally, Mott and Roberts ([9]) introduce a particular notion of mediator (a broker) and use it to derive relevant properties of multi-broker systems.

BIOGRAPHY

George A. Papadopoulos holds a B.Sc. in Computer Science and Mathematics (1982) and an M.Sc. in Computer Science with Applications (1983), both from the University of Aston in Birmingham, UK, and a Ph.D. in Computer Science (1989) from the University of East Anglia, Norwich, UK. He has participated and he is still actively involved in a number of national and international research programs (Alvey's Flagship, ESPRIT II's EDS and PCA, MED-CAMPUS, INCO-DC, etc.). He is currently an Associate Professor in the Department of Computer Science at the University of Cyprus in Nicosia, Cyprus. His research interests include parallel programming, concurrent object-oriented programming techniques, design and implementation of declarative (concurrent constraint and functional) programming languages, coordination models and languages, and multimedia systems. Professor Papadopoulos is a recipient of an ERCIM Fellowship Award for 1994-95 supported financially by EU's Human Capital and Mobility programme.

REFERENCES

[1] A. Ciampolini, E. Lamma, P. Mello and C. Stefanelli, 'Abductive Coordination of Logic Agents', these proceedings.

[2] F. Puntigam and C. Peter, 'Changeable Interfaces and Promised Messages for Concurrent Components', these proceedings.

[3] T. Rauber and G. Runger, 'A Coordination Language for Mixed Task and Data Parallel Programs', these proceedings.

[4] M. M. Bonsangue, J. N. Kok and G. Zavattaro, 'Sharing Distributed Replicated Data', these proceedings.

[5] N. Sample, C. Bartlett and M. Haines, 'MARS: Runtime Support for Coordinated Applications', these proceedings.

[6] A. Omicini, 'On the Semantics of Tuple-based Coordination Models', these proceedings.

[7] F. Zambonelli and A. Omicini, 'Tuple Centers for the Coordination of Internet Agents', these proceedings.

[8] R. A. Dumitrescu and E. F. A. Lederer, 'Reliable and Efficient Matrix Processing with the Specification-Consistent Coordination Model', these proceedings.

[9] P. Mott and S. Roberts, 'A Multi-Broker Architecture for Sharing Information Amongst Diverse User Communities', these proceedings.