Research Bytes

Issue No.4, July 2001

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Director of Research

Welcome to this summer's edition of the Research Newsletter. This is the first electronic edition of the newsletter. We hope to keep up regular contact about what's happening in research and industrial liaison. Regular items will include new grants, a report on industrial liaison, research opportunities and profiles of key contacts. We also intend to spotlight new research. Read on, and let us know what you think.

The period since the last newsletter has been very busy; the Research Assessment Exercise (RAE) has come and gone, followed closely by the EPSRC International Review. Now we have time to sit back and take stock – and we hope to return to the regular publication schedule of this newsletter.

E-Science in the Department of Computing, by Dr Steven Newhouse, Research Director of The Imperial College Parallel Computing Centre

E-Science is the effective use of distributed high performance computing resources, instruments and data sources to meet the needs of the applied scientist. The current UK activities extend ongoing research in the US that has focussed on the development of Computational Grids – exploitation and access to the underlying networking and distributed hardware.

As part of the £120M E-Science Programme announced in the last budget, EPSRC is funding several multi-disciplinary research activities including several regional E-Science Centres and Applied E-Science Testbeds. The Parallel Software Group in the Department has recently been designated the London and South-East Regional E-Science Centre with an infrastructure funding of £0.5M and further funding of £1M for collaborative industrial projects. This funding will support the continued development of several middleware projects, broadening the existing EPSRC funded High Performance Software Components project, which will demonstrate E-Science activities within the College.

Underpinning the Centre's research activities is a £3M SRIF (Strategic Research Investment Fund) award for computing, storage and networking resources which will provide support applied E-Science research in High Energy Physics, Bioinformatics and Computational Engineering. This infrastructure will also benefit several funded Applied E-Science Testbeds involving the Centre in the Investigation of Condensed Matter and Materials and High Throughput Informatics.

By Jim Cunningham, Senior Lecturer
and European Studies Coordinator

Testbed for a Worldwide Agent Network: Research and Development

The Agentcities project is a 14 partner European Union project coordinated by Motorola Laboratories in Paris. The project will set up and demonstrate a worldwide network of platforms for mobile software agents. It is the first project of its kind. The network will be used as a testbed for validating interoperability standards of the Foundation for Intelligent Physical Agents (FIPA) and for the development of services based on these standards

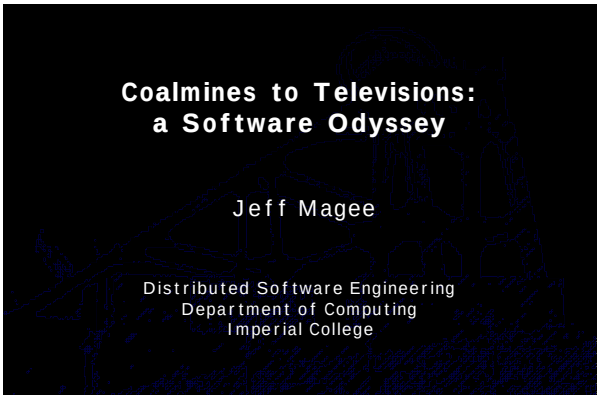
Agents on each Agentcities platform will provide services for the local real-world city or place, initially concentrating on information and transaction services for real-world entities such as bars, restaurants, hotels, travel infrastructure and theatres etc. Worldwide agent-based applications will be able to access these service agents using FIPA federated directory and communication facilities. The service agents deployed in the network can thus be used as building blocks to construct new services.

The Imperial College London platform will be realised using April technology, which was invented by Professor Keith Clark and Dr Frank McCabe in the Department of Computing and has been further developed by Fujitsu Laboratories in Japan and America. The Imperial College team will be led by Professor Clark, with support from Mr Jim Cunningham, leader of the Communicating agents group, Dr. Jeremy Pitt, a Senior Lecturer in the Department of Electrical and Electronic Engineering and from Abe Mamdani, Professor of Telecommunications Strategy and Services in the same department. Professor Mamdani is a founder of FIPA.

For more information: http://www.agentcities.org/EU

Professor Jeffrey N Magee, Distributed Software Engineering Inaugural Lecture, 19 June 2001

Coalmines to Televisions: A Software Odyssey



Abstract

The emerging discipline of Software Architecture is concerned with the high-level design of complex software systems. The foundations of this discipline have arisen from initially independent work at leading academic and industrial research institutions throughout the world. This lecture follows research on Software Architecture at Imperial College from its origins in a distributed software system developed in response to the control and monitoring requirements of coal mining to its current commercial application in the development of the next generation of consumer television products. This application represents the first large-scale industrial use of a software architecture description language.

In following the sometimes tortuous route from coalmines to televisions and beyond, we identify the need for soundly based engineering models of software architecture and illustrate the use of these models in examples drawn from industrial collaborations along the way. We address the challenge of making modelling and analysis more gain than pain for practising software architects and suggest that the tools and techniques for architecture, analysis and animation developed at Imperial College show promise in this respect.

Coalmines and televisions are two of the application areas that I have studied in relation to my research on the software engineering of complex systems. Coalmines at the start of my career here at IC, televisions very recently. In the journey between these very different application areas, I hope to explain something of the architectural approach to engineering complex software systems that we have developed in the Distributed Software Engineering group here at Imperial College.

For more information, contact Professor Magee on: jnm@doc.ic.ac.uk

Recent Grant Announcements

- ✔ Morris Sloman, “PolyNet: Policy Based Management of Adaptive Networks” £342,971 for 3 years staring October 2001
- ✔ Berc Rustem, "Optimisation Models for Computing Economic Equilibria et al” (Marie Curie Fellowship)" (Mercedes Esteban-Bravo is the Fellow); £107,314 for 2 years starting May 2001
- ✔ Paul Kelly, "Delayed-evaluation Self-optimising Remote Method Invocation" £216,227 for 3 years staring July 2001
- ✔ Paul Kelly "Optimisation of Scientific Software at Run-time (OSCAR)" £209,666 for 3 years staring March 2001
- ✔ Berc Rustem "Parallel Algorithms for Worst-Case Modelling and Risk Management of Dynamic Systems" £208,063 for 3 years starting September 2001
- ✔ Y Xu "Combined Analysis of Patient-Specific Intra-ventricular Blood Flow Patterns Using Computational Fluid Dynamics and Magnetic Resonance Imaging" Fellowship application for Dr Quan Long; £126,632 for 3 years
- ✔ Daniel Rueckert "Building a patient-specific model of the heart for integrated diagnosis and treatment of tachyarrhythmias by RF ablation"£159,330 for 3 years starting October 2001
- ✔ Guang-Zhong Yang "2000 JREI: Ultrafast Cardiovascular Magnetic Resonance Imaging"; £566,021 for 3 years starting April 2001
- ✔ John Darlington "2000 JREI - An Informatics Grid for Imperial College"; £763,898 for 3 years starting May 2001
- ✔ Peter Harrison "MM CPP/GE/c/L G-queues and Networks (MEGAN)" -; £220,910 for 3 years starting January 2001
- ✔ Tony Field "EMU: The Mechanical Extraction of Performance Models from UML Specifications" £189,533 for 3 years
- ✔ Oscar Mencer "FAST STREAM - Data Types and Elementary Functions for Custom Computing" £60,000 for 3 years starting October 2001

Academic Promotions

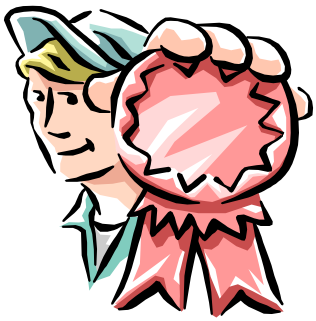
Warmest congratulations to the following members of staff, whose promotions take effect from October:

Naranker Dulay, Senior Lecturer

Paul Kelly, Reader

Wayne Luk, Reader

Jim Cunningham, Reader



New Members of Staff

The following new staff have joined the Department in July:

Dr Michael Huth

Dr Julie McCann

Professor Stephen Muggleton

Ms Jane Bright

New Doctors

J. Sutiwaraphun – May 2001

Supervisor: John Darlington

R.D Sandiford – February 2001

Supervisor: Wayne Luk

Olav Beckmann - February 2001

Supervisor: Paul Kelly

We invite your contributions to build Research Bytes into relevant and vibrant publication. If you have any contributions that you would like to make such as articles, events for the diary, new funding opportunities, examples of innovative research in practise or anything else that you think is relevant please contact me: robin@doc.ic.ac.uk, or 0207 594 8220