The First New Zealand Agent School (NZAS'13)
Dunedin, New Zealand

Location: Commerce Building, Room CO 2.04 and CO 2.07

1st December 2013

8.15-8.30 am

Welcome CO 2.07

Session 1

8.30-10.00am

Track A: Agent and services – Aditya Ghose (CO. 2.04)

Track B: Self-Organising Multi-Agent Systems – Jeremy Pitt (CO. 207)

Refreshment Break – 10.00-10.30am

Session 2

10.30am-12.00 noon

Track A: Game-theory -- Makoto Yokoo (CO. 2.04)

Track B: Computational Justice – Jeremy Pitt (CO. 207)

Lunch Break – 12:00-1:00pm

Session 3

1.00-3.00pm

Track A: Normative Systems -- Frank Dignum (CO. 2.04)

Track B: Automated Negotiation – Takayuki Ito (CO. 2.07)

Refreshment Break – 3.00-3.30pm

Session 4

3.30-5.30pm

Track A: Agent-based Social Simulation -- Virginia Dignum (CO. 204)

Self-organising multi-agent systems

This tutorial focuses on how multi-agent systems which are open (in the sense that there is no centralized authority, no inspection of internals, and no guarantee that components will operate correctly) can operate efficiently and effectively, by defining a set of mutually-agreed, conventional rules with the capability to change those rules themselves at run-time. This tutorial lecture is in three parts: a motivation for run-time self-organisation stemming from open systems; a review of different approaches with a focus on dynamic norm-governed systems; and a specific analysis of a voting protocol in an Action Language (the Event Calculus) which intelligent agents can use to re-define the specification of conventional rules at run-time. Tutorial attendees will gain an overview of the requirements, challenges and applications of self-organising multi-agent systems, understand how to use frameworks and languages for representing, reasoning about and proving properties of such systems, and get an insight into engineering self-* properties in dynamical systems.

Computational justice

Many open networks, distributed computing systems, and infrastructure management systems face a common problem: how to distribute a collectivised set of resources amongst a set of autonomous agents of heterogenous provenance. One approach is for the agents themselves to self-organise the allocation of resource with respect to a set of agreed conventional rules; but given an allocation scheme which maps resources to those agents, and a set of rules for determining that allocation scheme, some natural questions arise – Is this allocation fair? Is the allocation method effective? Is it efficient? Are the decision makers accountable? In this tutorial lecture, we discuss how some answers to these questions can be found in the formal characterisation of different aspects of 'justice', and that these different aspects need a principled operationalisation as policies for system management. An overview of different qualifiers of justice is given, and a detailed analysis of one qualifier (distributive justice) is used to illustrate the concept of 'fairness' in the distribution of resources. Tutorial attendees will gain an overview of the different aspects of computational justice, understand how to represent and reason about justice, and get an insight into the overall inter-disciplinary research programme.

Tutor: Dr Jeremy Pitt

Jeremy Pitt is Reader in Intelligent Systems in the Department of Electrical & Electronic Engineering at Imperial College London. His research interests focus on the foundations and applications of computational logic in multi-agent systems, in particular agent societies, agent communication languages, and self-organising electronic institutions. He has been an investigator on more than 30 national and European research projects and has published more than 150 articles in journals and conferences. He has taught at various summer schools and given tutorials at AAMAS and SASO. He is a Senior Member of the ACM, a Fellow of the BCS, and a Fellow of the IET, and an Associate Editor of ACM Transactions on Autonomous and Adaptive Systems and IEEE Technology & Society Magazine.

Game theory

Game-theory and economics, in particular, mechanism design theory, can provide a solid theoretical foundation of autonomous agents and multi-agent systems. Also, due to recent advances in Electronic Commerce, new application fields of autonomous agents and multi-agent technologies, including Internet auctions, have been growing very rapidly. However, some basic concepts of game-theory and economics, such as equilibrium, rationality, uncertainty, etc., are not easily accessible to students with computer science or engineering backgrounds. This lecture gives an introductory tutorial of these basic concepts and their applications from the viewpoint of computer science.

Tutor: Prof. Makoto Yokoo

Prof. Makoto Yokoo received the B.E. and M.E. degrees in electrical engineering, in 1984 and 1986, respectively, and the Ph.D. degree in information and communication engineering in 1995, from the University of Tokyo, Japan. From 1986 to 2004, he was a research scientist of Nippon Telegraph and Telephone Corporation (NTT). He is currently a Distinguished Professor of Information Science and Electrical Engineering, Kyushu University. His research interests include multi-agent systems, constraint satisfaction, and mechanism design among self-interested agents. He served as a general co-chair of International joint Conference on Autonomous Agents and Multi-Agent Systems in 2007 (AAMAS-2007), and as a program co-chair of AAMAS-2003. He received the ACM SIGART Autonomous Agents Research Award in 2004. He is the past president of International Foundation for Autonomous Agent and Multiagent Systems (IFAAMAS).

Automated Negotiation

This tutorial aims to give a broad overview of state of the art in automated negotiation among agents. The tutorial will be in 2 parts. The 1st part focuses on the foundations of electronic negotiations. We review the main concepts from both cooperative and competitive bargaining theory, such as Pareto optimality, the Pareto-efficient frontier as well as some solution concepts. A particular emphasis will be placed on multi-issue (or multi-attribute) negotiation - a research area that has received significant attention in recent years from the multi-agent community. The 2nd part introduces automated negotiating agent competition (ANAC) and how to build your own negotiating agent programs on the competition environment.

Tutor: A/Prof. Takayuki Ito

Dr. Takayuki ITO is an associate professor of Nagoya Institute of Technology. He received the B.E., M.E, and Doctor of Engineering from the Nagoya Institute of Technology in 1995, 1997, and 2000, respectively. From 1999 to 2001, he was a research fellow of the Japan Society for the Promotion of Science (JSPS). From 2000 to 2001, he was a visiting researcher at USC/ISI (University of Southern California/Information Sciences Institute). From April 2001 to March 2003, he was an associate professor of Japan Advanced Institute of Science and Technology (JAIST). From 2005 to 2006, he is a visiting researcher at Division of Engineering and Applied Science, Harvard University and a visiting researcher at the Center for Coordination Science, MIT Sloan School of Management. From 2008 to 2010, he was a visiting researcher at the Center for Collective Intelligence, MIT Sloan School of Management. He is a board member of IFAAMAS, the PC-chair of AAMAS2013, PRIMA2009,

and was a SPC/PC member in many top-level conferences (IJCAI, AAMAS, ECAI, AAAI, etc). He received the Prize for Science and Technology (Research Category), The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science, and Technology, 2013, the Young Scientists' Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science, and Technology, 2007, the Nagao Special Research Award of the Information Processing Society of Japan, 2007, the Best Paper Award of AAMAS2006, the 2005 Best Paper Award from Japan Society for Software Science and Technology, the Best Paper Award in the 66th annual conference of 66th Information Processing Society of Japan, and the Super Creator Award of 2004 IPA Exploratory Software Creation Projects. He is Principle Investigator of the Japan Cabinet Funding Program for Next Generation World-Leading Researchers (NEXT Program). Further, he has several companies, which are handling web-based systems and enterprise distributed systems. His main research interests include multi-agent systems, intelligent agents, group decision support systems, agent-mediated electronic commerce, and software engineering on offshoring.

Norms, agents and social structures

Norms play an important role in our every day life. In oreder to create systems that can participate better in our social environment or that can better simulate it they have to incorporate some model of norms.
In this tutorial we will discuss the nature of norms and their influence on the behavior of people and agents. Then we look at the consequences for the implementation of norms in agent based systems. Finally we will discuss the costs and benefits of incorporating norms in agent based systems.

Tutor: A/Prof. Frank Dignum

Frank Dignum got his PhD in 1989 at the Free University of Amsterdam. After setting up the CS department at the University of Swaziland and a year at the Technical University of Lisbon in Portugal, he worked at the Technical university of Eindhoven between 1993 and 2000 and moved to his current position at the Utrecht university. His research is mostly on social agents. Both formal theoretical work on norms, communication and agent architectures as well as applications in e-commerce, web services and serious games. He has organized many workshops and conferences, has been keynote speaker at many conferences and published more than 250 papers and books.

Agents for Social Simulation

Social simulation is a research field that applies agent-based computational models to the study of social phenomena, such as the emergence of social norms, the segregation of ethnic groups in urban cities and the formation of collective opinion. It aims to help (social) scientists to understand and explain complex social phenomena by looking at agent interaction in given social structures.

Traditionally, agent-based models for simulating important economic and sociological phenomena use very simple agents. Complex interactions result from how one perceives other people (social cognition) and how one forms own opinions and beliefs (individual cognition). In capturing such dynamics it is essential to formalize both how agents perceive, learn about and restructure their social environments, as well as how they adapt their own attitudes and opinions as resulting from these interactions. That is, in order to fully capture the complexity of social interaction, richer cognitive

behaviour is needed. In this way, social relations and individual differences can be understood in terms of the mental models and reasoning rules used by agents to form their decisions.

In this tutorial, we will introduce different approaches to agent reasoning in social simulation, present an extensible cognitive architecture that includes personality, normative, cultural and emotional aspects, and discuss the conditions under which increased cognitive expressiveness is necessary.

Tutor: A/Prof. Virginia Dignum

Virginia Dignum is an associate professor at the Faculty of Technology, Policy and Management, Delft University of Technology. She got her PhD in 2004 at Utrecht University. Her research focuses on agent based models of organizations, and the interaction between people and intelligent systems and teams. In 2006, she was awarded the prestigious Veni grant from NWO (Dutch Organization for Scientific Research). She has organized many international conferences and workshops, and has more than 120 peer-reviewed publications and books.

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