

Gayathri Nadarajan

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Education

Oct 2005 – Aug 2010

Ph.D. in Informatics

Institution School of Informatics, University of Edinburgh, Scotland
Title Semantics and Planning Based Workflow Composition for Video Processing
Supervisors Dr. Yun-Heh (Jessica) Chen-Burger and Prof. Bob Fisher

I have investigated methods to automate generic video processing tasks for information extraction. Video processing applications (programs) are developed from scratch and not reused for multiple tasks due to the difficulty in capturing user requirements and estimating function parameters accurately. I proposed and developed a hybrid workflow composition system that utilises hierarchical task network (HTN) planning and ontologies for performance-based selection of tools. This approach manipulates user-provided domain knowledge and image processing experts' heuristics. The system was tested on ecological videos of varying qualities, providing automatic support for naive users (*e.g.* marine biologists). In a wider context, the framework could be used in a distributed environment.

2004 – 2005 MSc. Informatics, University of Edinburgh, Scotland
MSc. Dissertation Mapping Fundamental Business Process Modelling Language to OWL-S

1995 – 1999 B.A. (Mod) Computer Science, Trinity College Dublin, Ireland
Final Year Project On-Line Handwriting Recognition Using Hidden Markov Models

1994 – 1995 Institute of Education, Lower Lesson St, Dublin, Ireland
Irish Leaving Certificate (pre-university/high school equivalent)

Awards

2008/09, 2009/10 Google Europe Anita Borg Scholarship Finalist (Google Inc.)
1996 Victor Graham Prize, top score in Mathematics (Computer Science Dept., Dublin)
1994 – 1999 Higher Education Scholarship (competitive scholarship at national level, Malaysia)

Work Experience

July 2009–July 2010 Image annotation, SynProc Project, University of Edinburgh
Segmenting and labelling images from a large database of photographs

June–Dec 2008 Website development, OpenKnowledge Project, University of Edinburgh

Nov 2002–May 2003 System Analyst, Tenaga Nasional Berhad, Malaysia
Departments: Research, Telecommunications Protection Unit, Distribution Unit
Skills: Web Development using PHP, PC setup, Web portal analysis

Sept 1999–Sept 2002 Software Engineer, Altion Limited, Dublin, Ireland
Network management solutions provider for telecommunications client

Projects – Data extraction from spreadsheet to Oracle importable format (Perl scripting)
– Creating, routing and equipping VC-12 path trails for Data-Synchronisation
– Reporting application for Digital Distribution Frames (Java, C)
– Interfacing client and server database for querying fault correlation (C, SQL)
– Interfacing Fujitsu-Fens system with local system using Remote Procedure
Calls (RPC) for alarm detection system

Others Team participation, training new staff, inter-personal communication skills

Research, Teaching & Academic

Sept–Dec 2008 Visiting Researcher, Dept. of Computer Engineering, University of Catania, Italy

The goal of my visit was to collaborate with Dr. C. Spampinato and Dr. D. Giordano in the provision of independent image processing modules for detection and classification tasks of ecological videos. The modules were populated in a process library and invoked from a planning-based workflow engine.

June–Dec 2008 Researcher, OpenKnowledge Project, University of Edinburgh

Funded by the European Framework Programme, OpenKnowledge is a system which allows peers on an arbitrarily large peer-to-peer network to interact productively with one another without any global agreements or pre-run-time knowledge of who to interact with or how interactions will proceed. The research highlights of OpenKnowledge include dynamic ontology matching, service discovery, trust, visualisation and multimedia. My primary role is in the enhancement of the project's website to provide better structuring of content, especially in the organisation for users of different levels of expertise.

Jan–Apr 2009, 2010 Mentor & Teaching Assistant. System Design Project (3rd year undergraduate)

This course is a large group project involving construction of a robot under conditions designed to give insights into industrial teamwork (RoboCup). My role involved guiding students in groups of 10 in the software development process and team management, scheduling demonstrations, marking coursework, refereeing matches and serving as a panel judge on the final day tournament and presentations.

Sept 2004–2009 Tutor & Lab Demonstrator. Informatics 1

Informatics1A Functional Programming (Haskell), Computation and Logic (C, Prolog)

Informatics1B Data and Analysis, Object Oriented Programming (Java)

Sept 2006–2007 Teaching Assistant. Informatics 1B, Data and Analysis: Unstructured Data

Introduction to Human Computer Interaction; system design and evaluation methods. I prepared tutorials, lab exercises and assignments, responded to newsgroup queries and delegated the marking.

Sept 2006–2007 Tutor. Software Engineering with Objects and Components (Undergraduate/MSc.)

Supervised group meetings that resembled software project meetings to expose students to the design and implementation of software systems using the Unified Modeling Language (UML) and Java.

Sept 2006–2007 Teaching Assistant. Informatics Research Review (MSc. Level)

I conducted weekly meetings with 3–5 students to explore their specific research interests in Knowledge Representation & Reasoning in order to help them prepare a literature review of their selected area.

May 2005–present Paper Reviewer for Journals and Conferences

Reviewed for Journal of Software Maintenance and Evolution, IEEE Conference on Intelligent Agent Technology, IEEE Symposium on Cluster Computing and the Grid, Euro-Par Conference.

Nov 2002–Sept 2004 Teaching Executive, College of IT, University Tenaga Nasional, Malaysia

Lecturing Software Engineering (diploma level), Computer Literacy (foundation level)

Lab C, Software Engineering, Operating Systems, Prolog for Artificial Intelligence

Others Diploma level project supervision, Industrial training supervision, Panel evaluator for final project and industrial training presentations, member of Examination Committee

Professional Memberships: AAAI, IEEE, AISB

Languages: English (fluent), Malay (native), German (beginner), Italian (beginner)

Technical Courses Attended

Intermediate and Advanced Java (2000 & 2001), Intermediate and Advanced C (2000 & 2001), Object-Oriented Analysis and Design with UML (2000), Macromedia Flash MX (2004), Scientific Writing Skills, Effective Tutoring (2005), Effective Researching (2006), Advanced Unix (2007).

Personal Interests & Additional Information

Educational and Social Events Convenor for Graduate Students and Staff in Informatics

I organise networking events that bring together young researchers within the School of Informatics at Edinburgh University, a run-by-students-for-students effort. These include social events, team-building activities, and educational ones such as poster competitions and invited talks. Some highlights include the biannual Furbush trip (outdoor sports centre), hillwalking day trip and paintball.

Tae Kwon Do (TKD) – Korean martial art

I am a practitioner for 20 years and co-founded the Edinburgh University TKD Club in 2005. In my undergraduate days, my contributions include club captain, assistant coach, women's team captain, competitions & workshops organiser, participant and winner of inter-varsity level tournaments. I was elected as a Herean in 1999, awarded to female athletes with significant contributions to their clubs.

Voluntary Work

I take special interest in social issues and have taught basic IT skills to refugees and asylum seekers through Spirasi, Ireland (2002), helped facilitate a Youth Motivation Camp in Malaysia (2003) and volunteer in a charity shop for SANDS Lothian Bereavement Support Group, Scotland since 2005.

Others: MSc. Class Representative, Residents' Assistant & Warden at University Halls.

List of Publications to Date

- Nadarajan, G., Chen-Burger, Y.-H., Fisher, R. B. "A Knowledge-Based Planner for Processing Unconstrained Underwater Videos". In *IJCAI-09 Workshop on Learning Structural Knowledge From Observations (STRUCK 09)*, 2009.
- Nadarajan, G., Manataki, A., Chen-Burger, Y.-H. "Semantics-Based Process Support for Grid Applications". Book Chapter in *Grid Technology for Maximizing Collaborative Decision Management and Support: Advancing Effective Virtual Organizations*, IGI Global, 2009.
- Spampinato, C., Chen-Burger, Y.-H., Nadarajan, G., Fisher, R. B. "Detecting, Tracking and Counting Fish in Low Quality Unconstrained Underwater Videos". In *VISAPP 08*, 2008.
- Nadarajan, G. "Planning for Automatic Video Processing using Ontology-Based Workflow". In *International Conference on Automated Planning & Scheduling (ICAPS 07)*, 2007.
- Nadarajan, G., Renouf, A. "A Modular Approach for Automating Video Analysis". In *International Conference on Computer Analysis of Images and Patterns (CAIP 07)*, 2007.
- Nadarajan, G., Chen-Burger, Y.-H. "Translating a Typical Business Process Modelling Language to a Web Services Ontology through Lightweight Mapping". *IET Software*, 2007.
- Nadarajan, G., Chen-Burger, Y.-H., Malone, J. "Semantic Grid Services for Video Analysis." In *IEEE International Workshop on Service Composition (SERCOMP 06)*, 2006.
- Nadarajan, G., Chen-Burger, Y.-H., Malone, J. "Semantic-Based Workflow Composition for Video Processing in the Grid". In *IEEE/WIC/ACM Conf. Web Intelligence (WI 06)*, 2006.
- Nadarajan, G., Chen-Burger, Y.-H. "Mapping Fundamental Business Process Modelling Language to OWL-S." In *Hellenic Conference on Artificial Intelligence (SETN 06)*, 2006.
- Nadarajan, G., Chen-Burger, Y.-H. "An Ontology-Based Conceptual Mapping Framework for Translating FBPM to the Web Services Ontology." In *IEEE Symposium CCGRID 06*, 2006.

References

- Dr. Yun-Heh (Jessica) Chen-Burger – AIAI, University of Edinburgh, U.K. (jessicac@inf.ed.ac.uk)
- Prof. Robert B. Fisher – IPAB, University of Edinburgh, U.K. (rbf@inf.ed.ac.uk)
- Prof. Pádraig Cunningham – School of Computer Science & Informatics, University College Dublin, Ireland (padraig.cunningham@ucd.ie)
- Prof. Phillip Wadler – LFCS, University of Edinburgh, U.K. (wadler@inf.ed.ac.uk)