

## Gayathri Nadarajan

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### Oct 2005 – present

### Ph.D. Student in Artificial Intelligence

Institution	School of Informatics, University of Edinburgh, Scotland
Title	<b>Semantics-Based Workflow Composition for Video Processing in the Grid</b>
Supervisors	Dr. Jessica Chen-Burger and Prof. Bob Fisher
Summary	I am investigating methods to automate generic video processing tasks for information extraction. Video processing applications are developed from scratch and not reused for multiple tasks due to the difficulty in capturing user requirements and function parameters accurately. I propose a semantics-based method using ontologies coupled with a planning-enacted workflow engine to tackle this problem. The heuristics used by vision experts are incorporated in a planner that communicates with the ontologies that contain the goals, constraints and domain description via a meta level interpreter. The sequence of video processing toolset is then selected automatically based on performance level and executed by the workflow engine.

### Academic Qualifications & Awards

2004 – 2005	MSc. Artificial Intelligence, University of Edinburgh, Scotland
MSc. Dissertation	Mapping Fundamental Business Process Modelling Language to a Semantic Web-Based Language
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
2008, 2009	Google Europe Anita Borg Scholarship Finalist (Google Inc.)
1996	Victor Graham Prize for Mathematics (Trinity College Dublin)
1994 – 1999	Higher Level Education Scholarship (Malaysia)

### Research, Teaching & Academic duties

*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, Prof. A. Faro and Dr. D. Giordano in the provision of independent image processing modules for detection and classification tasks of ecological videos. My role is in finding a suitable level of granularity for image processing executables to be populated in the process library and invoked from the 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 Mentor & Teaching Assistant. School of Informatics, University of Edinburgh*  
System Design Project is a third year undergraduate group project involving construction of a robot under conditions designed to give insights into industrial teamwork (RoboCup). My role as a mentor and teaching assistant involved guiding students in a large group of 10 in the software development process and team management, scheduling demonstrations, marking, refereeing friendly matches, panelling and judging the final day tournament and presentations.

*Sept 2004–present Tutor, Lab Demonstrator. School of Informatics, University of Edinburgh*  
Informatics1A Functional Programming (Haskell), Computation and Logic (C, Prolog)  
Informatics1B Data and Analysis, Object Oriented Programming (Java)

*Sept 2006–2007 Teaching Assistant. School of Informatics, University of Edinburgh*  
Informatics1B Data and Analysis: Unstructured Data. Introduction to Human Computer Interaction including system design and evaluation methods. My duties included preparation of tutorials, lab exercises and assignments, responding to queries on newsgroup, preparing, delegating and conducting marking.

*Sept 2006–present Tutor. School of Informatics, University of Edinburgh*  
Software Engineering Introduction to the design and implementation of software systems using the Unified Modeling Language (UML) and Java.

*Sept 2006–2007 Teaching Assistant. School of Informatics, University of Edinburgh*  
Informatics1B Informatics Research Review. I conducted weekly meetings with a group of 3–5 students to explore their specific research interests in Knowledge Representation and Reasoning in order to help them prepare a literature review of their selected area.

*May 2005–present Paper Reviewer for Journals and Conferences*

I have reviewed for journals and conferences including Journal of Software Maintenance and Evolution (JSME), IEEE/ACM Conference on Intelligent Agent Technology (IAT), IEEE International Symposium on Cluster Computing and the Grid (CCGrid), 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.

## **Industry Experience**

*Sept 1999–Sept 2002 Software Engineer. Altion Limited, Dublin, Ireland*

Altion is a network management solutions provider for fixed-line telecommunications clients. I was involved in the development of various software applications. Contributions and skills acquired:

- Development
- 1) Data extraction from spreadsheet to Oracle importable format (Perl, shell scripting).
  - 2) Creating, routing and equipping VC-12 path trails for Data-Synchronisation Utility.
  - 3) Implementation of reporting application for Digital Distribution Frames (Java, C).
  - 4) Interfacing client and server database for querying fault correlation (C, SQL triggers).

- Maintenance    i) Work Order Provisioning between two databases using a standalone C application in Acceleration Service Provisioning (ASP).  
                       ii) 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.

*Nov 2002–May 2003    Trainee Executive, Tenaga Nasional Berhad, Malaysia*

As part of the largest utility company in Malaysia with 28,000 employees, I was exposed to three sub-units during the first 6 months of my employment. At the end of my training period I decided to work in their university, in which I was already tutoring at the same time.

Departments    Research, Telecommunications Protection Unit, Distribution Unit.

Skills acquired    Web Development using PHP, PC setup, Web portal analysis.

### **Technical Competencies**

Languages    C, C++, Java, Prolog, Perl, SQL, CORBA, HTML, PHP, Assembly Language.

Packages    Database (Oracle, Access), Java (Eclipse, BlueJ), Prolog (Sicstus, Amzi), Matlab, Graphics (OpenCV), Content Management System (Drupal), Office applications.

Platforms    Unix, Linux, Windows, Sun Solaris.

### **Languages**

English (fluent), Malay (native), German (beginner), Italian (beginner).

### **Technical Courses**

I attended various technical courses throughout my professional and academic experiences. These include Intermediate and Advanced C and Java Programming (Dublin, 2000 & 2001), Object-Oriented Analysis and Design with the Unified Modelling Language (Dublin, 2000), Macromedia Flash MX (Malaysia, 2004), Scientific Writing Skills, Effective Tutoring (Edinburgh, 2005), Effective Researching (Edinburgh, 2006), Advanced Unix (Edinburgh, 2007).

### **Personal Interests & Additional Information**

#### *Tae Kwon Do*

I have been practising this Korean martial art since 1989 and co-founded the Edinburgh University Tae Kwon Do Club in 2005. During my undergraduate days, I was actively involved in the running of the Trinity College Dublin's Club- club Captain, assistant coach, women's team captain, competitions & self-defense 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 relevant 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 for SANDS Lothian Bereavement Support Group, Scotland since 2005. I have also attended a part-time interest course in refugees, asylum seekers and displaced people (2002).

#### *Residents' Assistant, Accommodation Services, University of Edinburgh*

I assisted new students settle into university accommodation for 3 years. My main responsibilities include being on call to deal with urgent issues that students may have outside office hours and organising social events to help them meet and mingle with their fellow residents.

#### *Events Organiser for Informatics PhD Students and Staff, University of Edinburgh*

Since 2006, I volunteer to co-organise a trip for PhD students and staff to Firbush, an outdoor sports centre, situated by Loch Tay, Scotland. The event aims to bring together researchers from different institutes within the school to exchange ideas and share their work in a relaxed setting. My role includes recruiting participants, coordinating presentations, arranging transportation and liaising with Firbush centre. Since 2008 I have been officially appointed as the coordinator for such networking events.

## 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 *International Conference on Computer Vision Theory and Applications (VISAPP 08)*, 2008.
- Nadarajan, G. “Planning for Automatic Video Processing using Ontology-Based Workflow”. Doctoral Consortium at *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 (Formerly IEE Proceedings Software)*, Vol. 1, Issue 1, p.1-17, 2007.
- Nadarajan, G., Chen-Burger, Y.-H., Malone, J. “Semantic Grid Services for Video Analysis.” In *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 International Conference on 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 FBPML to the Web Services Ontology.” In *IEEE International Symposium on Cluster Computing and the Grid (CCGRID 06)*, 2006.

## References

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**More References Available Upon Request**