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ACADEMIC EXPERIENCE

Research Assistant, Queen Mary, University of London (2009–2012)

- Worked on the analysis of CCTV to detect abnormal behaviour.
- Most of the work was on creating new topic models for behavioural modelling. This included semi-supervised topic models so unsupervised mistakes could be corrected.
- Also worked on background subtraction and active learning. Of particular interest was the first active learning model to provide an elegant solution when both class discovery and class boundary refinement are required.
- Non-parametric Bayesian methods were used extensively, specifically Dirichlet processes.
- Both Gibbs sampling and variational methods were used.
- An extensive machine learning library was implemented in Python, available from my website, which contains some unusual algorithms in addition to many usual ones and those that I published.
- Have 3 conference papers and 3 journal papers awaiting publication.

PhD in Computer Vision, University of York (2005–2009)

- Worked on combining stereopsis and shape from shading to obtain a better shape estimate than either method alone.
- First work focused on the core problem, created a modular approach and concluding that the modules are the limiting factor.
- Second and third works therefore improved the modules, specifically shape from shading, and light source and albedo estimation.
- Belief propagation was used extensively, as was directional statistics, with a notable contribution from combining these two for solving the shape from shading problem.
- Such a system is dependent on many support algorithms. Consequently experience has been gained in many areas, such as segmentation and stereopsis.
- To assist a tool (Cyclops, see website) was created to assist - it includes the steps required to take a stereo pair to a 3D model.

PUBLICATIONS

T. S. F. Haines and T. Xiang, *Delta-Dual Hierarchical Dirichlet Processes: A pragmatic abnormal behaviour detector*, International Conference on Computer Vision, 2011.

T. S. F. Haines and T. Xiang, *Active Learning using Dirichlet Processes for Rare Class Discovery and Classification*, British Machine Vision Conference, 2011 (Oral, for which the acceptance rate was 11%).

T. S. F. Haines and T. Xiang, *Video Topic Modelling with Behavioural Segmentation*, ACM Multimedia Workshop on Multimodal Pervasive Video Analysis, 2010.

T. S. F. Haines and R. C. Wilson, *Belief Propagation with Directional Statistics for solving the Shape-from-Shading problem*, European Conference on Computer Vision, 2008 (Oral, for which the acceptance rate was 4.6%).

T. S. F. Haines and R. C. Wilson, *Combining Shape-From-Shading and Stereo Using Gaussian-Markov Random Fields*, International Conference on Pattern Recognition, 2008.

T. S. F. Haines and R. C. Wilson, *Integrating Stereo with Shape-from-Shading derived Orientation Information*, British Machine Vision Conference, 2007.

PROFESSIONAL
EXPERIENCE

I.B.M. Hursley, 2003–2004. Industrial Trainee, as part of undergraduate degree.

- Majority of time spent in four man development team working on middleware project *Business Integration for Games*.
- Responsibilities included building (Linux and Windows, Java and C), installation, Linux port and the demos. The demos consisted of two racing games (C++), one for windows and the other for Symbian.
- Additional responsibilities included technology demos to school children and executives. I developed one of these demos, a virtual version of the office constructed with Unreal Tournament 2004 and integrated with Websphere MQ. This allowed actions in reality and the game to affect each other, e.g. flipping the light switch in one would affect both.
- Other tasks included implementing a backend for an RFID vending machine, prototyping a brainstorming tool for Intech (An educational establishment) and reverse engineering a wayward fingerprint scanner.

EDUCATION

Bachelor of Engineering in Computer Science, University of York (2001–2005)

- Received a first class honours (75% weighted average, 83% for final year.)
- Final year project: *3D Reconstruction of Scenes from Multiple Photos*. Implemented all stages of constructing a 3D model from two photographs - camera calibration, sparse & dense correspondence, rectification and triangulation.
- Modules included Bayesian Networks (86%), Pattern Recognition and Neural Networks (90%), Computer Vision (85%), Formal Specification of Systems (91%), and Formal Program Development (85%).

SKILLS

Knowledgeable on many mathematical and related areas beyond those necessarily implied by the above. These include linear algebra; statistics - typical, robust and Bayesian, including non-parametric Bayesian methods; information theory; graphical models; neural networks; projective geometry; dynamic programming, belief propagation, Gibbs sampling, variational methods and various optimisation techniques.

Primary programming language choices are C++ and Python, but have experience with OpenCL, Java, Ada, Scheme, Pascal and PHP, plus passing knowledge of Prolog, Erlang, Cg and Javascript.

Have experience with many *systems*, such as Linux administration, Amazon web services, assorted databases, Blender, Joomla and \LaTeX . A.P.I. experience includes, among others, Gtk, OpenGL, DirectX, Websphere MQ and Panda 3D.

During college assisted other students in a lunchtime maths workshop, then during PhD demonstrated Formal Specification of Systems and Formal Program Development. These provided a strong reinforcement of knowledge in these areas, which for the latter includes the B-method and Alloy as well as formal methods in general.

REFERENCES

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