Jonathon Ashley Gibbs

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Personal Profile

I am a results-driven, enthusiastic and hard-working individual with demonstrated research expertise. I have a strong academic background particularly in 3D reconstruction, with my PhD focusing on the reconstruction of 3D plant models from 2D images using an active vision system. Furthermore, my dissertation as an Undergraduate, in which I received the award for most outstanding project, primarily focused on machine learning and statistical analysis. My current position as Research Associate at The University of Nottingham allows me to pursue my interests in 3D modelling progressing to 4D representations capturing the time and space of complex objects. Access to a GPU would accelerate my work and produce more accurate models for plant phenotyping.

Education

The University of Nottingham
PhD in Computer Science, Computer Vision and Robotics - October 2014 - October 2017
I developed a novel algorithm to aid plant phenotyping methods. An active vision system comprised of a robot, turntable and camera were used to acquire 2D data. A novel 3D integration method was performed to increase accuracy and reduce computational requirements of 3D modelling. A clustering method based on PCA and 1D data to effectively cluster the 3D data. Finally, a novel surface reconstruction method was applied to the 3D data set.

The University of Nottingham
BSc(Hons) Software Systems (**First Class**) - October 2006 - July 2010
Key modules including: Programming, Database systems, Data structures and Algorithms, Large Scale Systems
Dissertation: The focus of my dissertation was on the performance of selection hyper-heuristics as a solution to the complex problem of scheduling football fixtures over the holiday periods. Hyper-heuristics aim to automate the process of selecting and combining simpler heuristics to solve computational search problems. The selection was based on machine learning using reinforcement learning and simulated annealing. The results, at the time of writing, improved the results of those previously published. The work produced during my undergraduate degree was published in PPSN (see publications section).

Research Interests

My research lies within the field of computer vision focusing on the reconstruction of plants from multiple 2D images to obtain 3D and 4D representations. I am particularly interested in 3D reconstruction, Computer Vision, Machine Learning and Deep Learning. The potential of deep learning has made this research grant of particular interest to me and I have recently purchased a robot model car and raspberry pi as a personal project into how environments can be manipulated in 3D using deep learning as a navigational method.

Publications

o **Gibbs, J. A.,** Pound, M., French, A. P., Wells, D. M., Murchie, E., & Pridmore, T. (2018). Active Vision and Surface Reconstruction for Crowded Scenes. IEEE/ACM Transactions on Computational Biology and Bioinformatics.

o **Gibbs, J. A.,** Pound, M., French, A. P., Wells, D. M., Murchie, E., & Pridmore, T. (2018). Plant Phenotyping: An Active Vision Cell for Three-Dimensional Plant Shoot Reconstruction. Plant Physiology

- **Gibbs, J. A.,** Pound, M., French, A. P., Wells, D. M., Murchie, E., & Pridmore, T. (2017). Approaches to three-dimensional reconstruction of plant shoot topology and geometry. *Functional Plant Biology*

- **Gibbs, J. A.,** The British Machine Vision Association and Society for Pattern Recognition: Plants in Computer Vision A Fully Automated Active Vision Cell for 3D Reconstruction of Plant Shoots

- **Gibbs, J. A.,** Pound, M., French, A. P., Wells, D. M., Murchie, E., & Pridmore, T. (2015). Three-dimensional reconstruction of plant shoots from multiple images using an active vision system." In Proceedings of the IROS workshop on agri-food robotics, Hamburg

- **Gibbs, J.A**, Kendall, G., & Özcan, E. (2010). Scheduling english football fixtures over the holiday period using hyper-heuristics. *Parallel Problem Solving from Nature, PPSN XI*,

Skills

Programming	Strong programming skills demonstrated both academically and professionally. Knowledge of a variety of languages including C#, C++, Java, PHP and SQL, Python, Lua.
3D Reconstruction	Extensive knowledge of 3D reconstruction, in particular plant modelling. The outcome of my PhD was to automatically produce 3D plant models from multiple 2D images. The results show that the method proposed was able to improve the current state of the art
Machine Learning	Undergraduate dissertation, in which I won the IBM award for most outstanding project, focused on solving NP hard problems with an emphasis on reinforcement learning, with simulated annealing and meta heuristics.
Deep Learning	Understand of deep learning; proficient in Lua and Pytorch and APIs such as Keras. I have developed numerous networks including linear models and stacked hourglass models for pollen, wheat and rice.

Awards, Achievements and Misc

- 2018 - PhD Demonstration at Digital Research Week
- 2018 - University Demonstration of PhD at Research Strategy: One Year On event
- 2011- 2013 - Development of data analysis and project management software for Lockwood Publishing LTD.
- 2010 - **Winner** of IBMs `*most outstanding project*` award for dissertation
- 2009 - University Award for `*best group project*`, in which I was the project leader.
- 2009 - '*Best newcomer*' award for Computer Science Society at University where I was the sports secretary.

Employment History

Research Associate – The University of Nottingham
October 2017 – Present

Prescribing Analyst – NHS – Greater East Midlands Commissioning Support Unit (GEM CSU)
February 2014 – September 2014

Senior Analyst / Manager of Finance - Lockwood Publishing Limited
February 2011 - January 2013