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Toby Best

Portfolio: https://l0rdr0b.github.io/

Education:

PhD Research:

- 3rd Year PGR Student at Queen Mary University of London / University of York (September 2022 - ongoing).
- EPSRC Centre for Doctoral Training in Intelligent Games and Game Intelligence (iGGi) EP/S022325/1.
- Research Project: *"Game Master AI for Tabletop Games"*.
- Learning how to make an AI Agent that can learn to play TTRPGs such as Dungeons & Dragons in the role of Game Master, and act as co-GM assistant for human players.
- Two research papers accepted, published and presented at conferences thus far:
  - "'Journeys in the Dark' - Towards Game Master AI in Complex Board Games." *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. Vol. 20. No. 1. 2024.
  - "Why Choose You? - Exploring Attitudes Towards Starter Pokémon." *IFIP Conference on Human-Computer Interaction*. Cham: Springer Nature Switzerland, 2023.

Degree:

- *MEng Mathematical Computation*, University College London (UCL) (2016-2020).
- **Graduated with 2:1 grade**, August 2020.
- Modules include: Principles of Programming (*C & Haskell*), Object-Oriented Programming (*Java*), Mathematical Methods 2 (*Python*), Artificial Intelligence and Neural Computing, Computer Graphics, Virtual Environments (*C# & Unity*), Machine Vision (*Python*), Introduction to Deep Learning (*Julia & TensorFlow*), Multi-Agent Artificial Intelligence.
- Final Year Individual Project and Dissertation: Developed a virtual guitar tutor software in Unity, using motion-captured 3D hand animations, that can take an input song and its respective musical score and MIDI file, and outputs a series of animations in 3D space in accordance with the song being played.

A Levels and GCSEs:

- The Skinners' School, Tunbridge Wells (2009-2016), Sixth Form (2014-2016).
- 5 A-Levels; **A*** Mathematics, **A*** Product Design (Design and Technology), **A** Further Maths, **A** Physics, **B** Computing.
- 12 GCSEs; **A*** Maths, **A*** English Literature, **A*** English Language, **A*** Religious Studies, **A*** Biology, **A*** Chemistry, **A*** Physics, **A*** French, **A*** German, **A*A** Computing, **B** Design & Technology, as well as an **A** in FSMQ Additional Maths (highest grade).

Work Experience and Relevant Opportunities:

Student Representative – iGGi (October 2022 – ongoing)

- Volunteered as representative for iGGi PGRs, attending various important meetings with admins, supervisors and organisers across the calendar years.
- Held important role of responsibility in ensuring any matters raised by peers were acknowledged by the staff team, and to pass on information between both groups.

Lab Demonstrator – QMUL (October 2023 – January 2024):

- Assisted and supervised postgraduate students to develop basic games in Unity during their lab classes as part of their Multi-Platform Game Development module.
- Involved directly and indirectly with the class, discussing ideas with students,

playtesting their prototypes, providing feedback and grading coursework.

International Summer School on AI and Games – Microsoft, Cambridge (June 2023)

- Week-long opportunity to meet and converse with like-minded individuals within the field of Computer Science (education, research, industry, etc.).
- Made good connections and networked with people from around the world attending.

UCL Open Day Assistant (June 2018, September 2018, September 2019):

- Manned the Computer Science stall in the Engineering department, informing potential prospective students about the Computer Science and Mathematical Computation degrees.
- Improved my socialisation skills as I answered questions and explained to attendees about the courses.

Coding Club Assistant – The Skinners' School (January 2016 – June 2016)

- Helped run a weekly coding club for younger pupils at school, helping them to understand the basics of programming through bite-sized games in Scratch.

Villiers Park Mathematics Residential Course - Cambridge (September 2015):

- Worked alongside other students in various teambuilding exercises, including being given a problem to solve and then present our findings to the cohort (of which my group was voted the best presentation).
- Gave me insight into working as a team to solve difficult challenges together.

'Concepts in Game Development' Open2Study MOOC (January 2015):

- Participated in a four-week long online course on how video games are created, as well as how to program various AI behaviours to add extra levels of complexity.
- Effectively what kickstarted my interest in AI development, as I have always enjoyed playing video games and would like to learn how to build one myself.

Skills:

- Languages: Confident in *C#, Java, Python*; also have experience with C, *Haskell, Julia, LaTeX, CSS, HTML, PHP.*
- Have worked with *Unity, SciPy, Numpy, TensorFlow* and *Source SDK (Hammer Editor)* for both university projects and personal projects.
- Willing and enthusiastic to learn any programming languages or software necessary for the task at hand.
- Have a working understanding of French (A* GCSE), German (A* GCSE) and Japanese (2 years of study at university, chosen as an optional module).

Other Interests and Hobbies:

Acted as Dungeon Master for 7 years with both online and university friend groups for weekly Dungeons & Dragons sessions:

- Improved my problem-solving skills by having to engineer interesting challenges for my players to overcome, helping me to resolve issues whilst under pressure.
- Enhanced my planning and preparation skills, as I would have to prepare the games' content (environments, NPCs, plot hooks, etc.) in advance, as well as back-up plans for unforeseen problems (e.g. plot derailment, character deaths, etc.).
- Gained good improvisation and experimentation skills, and a willingness to try new ideas and think outside the box to see what can be done to improve our experience.
- The reason why my research is about studying AI agents as TTRPG Game Masters.

UCL Society Committee member (Harry Potter) for 3 years, Treasurer for 1 year:

- Gave me good communication and organisation skills as we worked together to plan various events for our society members throughout the year.
- Willingness to work hard for what I am passionate about.

References:

Doctor Raluca Gaina, Primary Supervisor at iGGi

- r.d.gaina@qmul.ac.uk
- Lecturer in Games and AI, School of Electronic Engineering and Computer Science, Queen Mary University of London
- Game AI Group, Empire House, Queen Mary University of London, 67-75 New Road, London E1 1HH

Professor Simon Lucas, Secondary Supervisor at iGGi

- simon.lucas@qmul.ac.uk
- Professor of Artificial Intelligence, School of Electronic Engineering and Computer Science, Queen Mary University of London
- Game AI Group, Empire House, Queen Mary University of London, 67-75 New Road, London E1 1HH

Professor Robin Hirsch, UCL Principal Supervisor and Degree Personal Tutor

- r.hirsch@ucl.ac.uk
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