Allan Mark Bruce

PhD, Computing Science - Artificial Intelligence
MEng, Electronic/Computing Engineering

Summary
I have eighteen years' experience as a C++ programmer in the games industry, working with several high-profile companies. My background includes developing multiple AI systems for games, AI simulation methods, AI learning and implementing bot AI. Alongside my AI experience I have experience in integrating middleware solutions, developing core technical features, core gameplay systems and integrating VOIP into multiple projects. In addition to this I have experience in networking, profiling, and optimisation. I am an advocate of modern C++ language features and I promote and teach others in using these. I have recently become an author of several articles within the recent Game AI Uncovered series of books.

Career History

Mar 2022 – Current: **Principal AI Engineer, Sumo Digital**
Aug 2009 – Mar 2022: **Senior/Lead AI Engineer, CCP Games/Sumo Digital**
This position involved learning several new technologies within the Unreal engine and leading an AI team during development of several titles. Key points include writing a 3D path finder, a bespoke AI system to run efficiently on Unreal servers with hundreds of AI, implementing an instanced foliage system to populate very large-scale worlds with plants and rocks, and implementing a UI designed to be used in VR from the ground up. During usage of Havok AI, I contributed to their navmesh generation system to run multi-threaded. I gained experience with ECS systems, bot AI, iOS development and working with teams globally. I have also presented work internally and written articles for a published book series.

Sep 2006 – Jun 2009: **Intermediate/Senior Software Engineer, Midway Games Newcastle**
In this position I implemented a general AI system which was used for enemy driving, traffic driving and on-foot behaviours. I also helped implement a bespoke debugger to record and re-run the AI systems.

Mar 2006 – Sep 2006: **Research Associate, University of Aberdeen**
I was tutoring 4th year AI courses and writing scientific papers based on my PhD work. I also furthered research in methods of multiple diagnoses carrying on from my PhD work.

Oct 2001 – Dec 2005: **Tutorial Demonstrator, University of Aberdeen**
In this position, I was responsible for demonstrating tutorials and labs for students in all years studying engineering and computing science.

Jun 2001 - Sep 2001: **Research Assistant, Electronics Research Group, University of Aberdeen**
For this short project I researched areas of the TCP Protocol and its use in the communication between host and server using the HTTP/1.1 protocol.

May 1994 – Sep 2001: **Various Sales and mechanic positions throughout school and university.**

Titles worked on (including upcoming releases)

Vampire: The Masquerade - Bloodlines 2
FBC: Firebreak
Call of Duty: Vanguard
Hood: Outlaws and Legends
SPARC
Eve Valkyrie
Dust 514
Necessary Force (PoC)
Wheelman

Extensive Knowledge and Experience of

C++, C, C#, Rust, Java, Python, DirectX and OpenGL
Unreal engine 5 (and previous versions) including Mass Entity and many AI features
Unity, Northlight and other bespoke engines
Havok AI
Perforce, Araxis Merge, Swarm, TeamCity
Console development including PIX and SN Tuner profiling tools
Entity Component Systems
Agile and Scrum methods
Windows development (x86, x64, mobile) and Mac development (iOS, OS X)
HMD development (Oculus and others)
Visual Studio, XCode, Mono Develop, NetBeans
Multi-threaded environments and SSI
Network programming

Transferable skills

Excellent written and verbal communication including across time zones with international studios
Working collaboratively with middleware partners
Delivery of oral presentations of work
Leading teams and managing individuals
Peer code reviews and development
Training and mentoring colleagues

Academic Qualifications

University of Aberdeen (Jun 2002 – Mar 2006): PhD in Artificial Intelligence. "JMorven: A Framework for Parallel Non-Constructive Qualitative Reasoning and Fuzzy Interval Simulation." During which, I tutored 1st-4th year undergraduate, and master's students in Java, Artificial Intelligence and Bioinformatics.

University of Aberdeen (Sep 1996 – Jun 2002): Master of Engineering (MEng) in Electronic/Computing Engineering, involving courses in: Software Engineering; VHDL and hardware design; Computer engineering; Digital communications; Network administration; Embedded C programming; Microprocessor design; MATLAB programming; Artificial Intelligence; Logic design and optimisation; Mathematical optimisation & Project Management.

Interests

In my spare time, I enjoy keeping fit by running, rock climbing, playing squash, mountain biking, skiing and hill walking. I'm a bit of a gamer, both electronic and board games. My favourite board game is Lords of Waterdeep and my favourite genre of computer games is racing but I do also like anything Mario or Pokémon related. I'm a keen photographer and have sold several of my photos globally.

I have a few home development projects and have my own Perforce server. With a friend, I have created a space shooter and an IM client/server. I have also solely developed several windows-based utilities including an efficient Multi-Threaded Fractal Generator with support for AVX instructions, a utility to show where disk space is being used, a Neural Network implementation using genetic algorithms, a minesweeper clone using hexagonal cells and a utility similar to tail on Unix.

Other achievements

Published author of several articles in Game AI Uncovered series
Morale Team Representative for CCP Games
Fun Club Committee at CCP Games
Awarded 'Best Student Presentation' at RASC2004 international conference
Postgraduate representative at Aberdeen University
Team member in a national Maths Competition at secondary school
Organised a regional maths competition for Moray, Scotland
Six gold medals in Maths competitions and a bronze for a Maths Olympiad
Played for North of Scotland Rugby Under-15s

References available upon request