

BALRAJ JOHAL

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I am a dedicated and creative Full-Stack Developer with two years of industry experience in roles as a full-time employee and in a freelance capacity. I pride myself on my versatility as a developer and in building strong interpersonal relationships with clients and colleagues alike. I graduated from the University of Sheffield with a BSc Honours in Artificial Intelligence and Computer Science, and am particularly passionate about creative applications of technology.

My technical skills include:

- Full Stack Web Development primarily working in *JavaScript* with *React.js* (*react-redux*, *tailwindCSS*, *AWS S3*), *Node.js* and *MongoDB*
- AI & Machine Learning, including cloud AI services
- Agile Development Methodologies & GitHub project management skills
- WebGL libraries such as *Three.js*, *React-Three-Fiber*
- Web and Mobile XR/Augmented Reality
- Unity (inc. VR Toolkit) and Unreal Engine
- 3D modelling and an understanding of the web graphics pipeline

Employment/Work Experience

Freelance Full Stack Developer

February 2021 - Current

University of Sheffield – 3D rendering of medical MRI scan data for public installation

Working with real medical scans, I used Three.js to render a 3D visualisation of a human brain in various states of health, which will be used in a public installation to promote preventative health measures.

Coney – Audience Participation System for event at COP26 Global Climate Summit

Using the MERN stack (MongoDB, Express, React and Node.js) and Three.js I built an audience participation visualisation system, which also had a generative audio soundscape built with the Web Audio API. Due to the live nature of the usage of this system it was vital that the code written was fully tested, robust and reliable.

Megaverse (Digital Creative Agency) – Routes & As The Crow Files

Using the MERN stack I developed a web application/immersive theatre experience emulating the look and behaviour of a 90's PC Operating System.

React, redux and Sass CSS pre-processing were used for client-side development, with a focus on smooth UX design and satisfying interaction feel. Particular focus was put on application accessibility. Server side development used bcrypt and JSON Web Tokens for authentication and used RESTful API design for client communication.

Throughout development I got the chance to test and refine my knowledge of Full Stack Development on a robust production ready application. I also improved my project management skills, working with product stakeholders to determine product requirements and to establish milestones and reasonable project scoping.

I was also again contracted to build upon my previous project with Megaverse to create a new immersive web experience, this time emulating a modern desktop system, and developing immersive choice-based live action video, in the vein of Black Mirror: Bandersnatch.

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Throughout this project I learned more about working with a legacy codebase and building on the framework built in the last project. This opportunity to continue work allowed me to refactor the codebase to create a much more reliable foundation.

Studio Polpo – Treo

I developed a VR experience developed in Unreal Engine 4, liaising between multiple interdisciplinary partners. The project incorporated generative audio/data sonification elements that were developed in conjunction with PHD researchers from the University of Sheffield, as well as implementing a simulation of tree growth adapted from research papers.

The finished project is an interactive VR experience in which the user can watch and hear the way that a group of randomly generated according to biomechanical models trees grow, especially the way that they are influenced by user determined sunlight and water level influences.

Full Stack Software Developer / Research Assistant at the University of Sheffield

**February – August 2020
June – July 2019**

Collaborated on a project exploring the use of AI and robotics in theatre experiences through the continued development of a visual programming toolset (built with JavaScript and Node.js). A particular focus was placed on an intuitive and smooth end user development experience, allowing people with no programming experience to develop interactions with complex and emerging technologies (AR, Artificial Intelligence – Computer Vision, Sentiment Analysis, Speech to Text and Chatbot services) that they would otherwise have no access to.

Throughout this project I gained experience of a codesign paradigm, working face to face with cross-disciplinary partners to create a flexible and robust system with a focus on usability. I also gained skills in managing client expectations and prioritising requirements to deliver a solution in the required timeframe. I put my knowledge of correct software development workflows into practice, using Git version control to collaborate efficiently and iterating through the cycle of identifying requirements, designing features, implementation and testing.

As the project progressed I also took on more creative/production responsibilities, including set creation, filming, writing and voice acting roles.

Web Developer at the University of Sheffield

Sept 2019 - February 2020

I was the sole developer of a website for the Institute of Coding built on the Drupal 8 Content Management System, intended to be a network for facilitating the creation of Student Enterprises by providing resources and connecting Industry and Higher Education organisations.

I communicated with stakeholders to gather and define site specifications and created then iterated on wireframe designs – considering modern UI/UX principles and patterns - supported by User journey models and diagrams. I created interactive prototypes for final design feedback, then developed and deployed the site to a live server, creating an elegant and intuitive front-end using twig (PHP & HTML templating) CSS and JS, while matching the Institute of Coding brand identity. I also extended the Drupal 8 framework developing a custom module using PHP 7 to meet site requirements.

Education

2016 - 2019: BSc AI & Computer Science – Class 2.1

Dissertation: Extending a Visual-Toolset for the Creation of AI-Enhanced AR Games by Non-Programmers