Web Based Immersive Reality

Making Data Consumable for the General Public

PRIFYSGOL BANGOR UNIVERSITY

Project Goals

The aim of this project is to prototype and develop techniques to allow for rapid generation of 3D immersive models, for both augmented and virtual reality, web based environments

Utilising novel technology to create simple, easily navigable data worlds. Breaking down data to make it more consumable for the general public

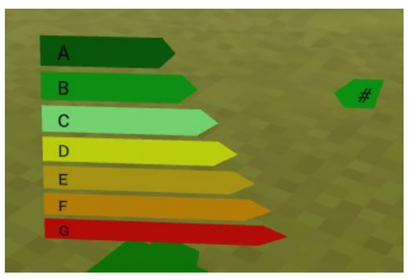
Technology

Three.js is a JavaScript library created to allow for animated 3D computer graphics within a web browser using webGL

A-Frame is an entity component system framework for Three.js allowing for simple creation of 3D and WebVR scenes

Prototype 1: Local Sustainability Data

This model aims create a 3D model of a campus, in this instance we use the university's Friddoedd Accommodation site. The user can then float manoeuvre through the site, selecting individual buildings to gain access to a variety of sustainability data, in this current example we building energy ratings, however this effect can be replicated using any building specific data set, creating an informative pop out that can be quickly and easily correlated between different buildings. Providing a novel alternative method to searching for data



Future Work

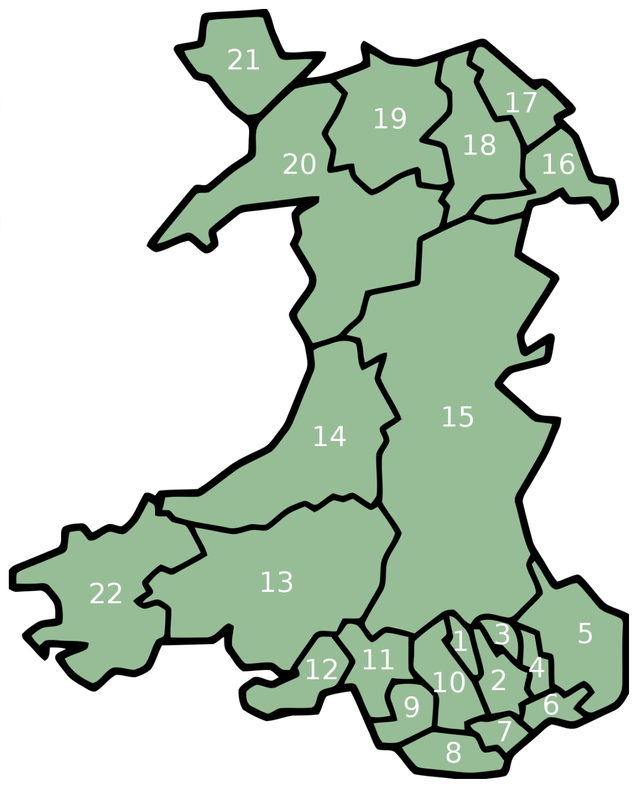
Moving forward it is the hope that the techniques used within this project can be combined with technologies such as the Google Maps API in the instance of prototype 1 and GeoJSONs for prototype 2. Creating a framework to allow for rapid creation of models and scenes. As opposed to the and crafted environments currently used.

This framework would allow people to simply define a location, select relevant models for the scene, import the desired data and have a fully functional data world ready for user consumption

Prototype 2: Covid Transmission Data

Covid-19 has been a huge source of data across the world. My aim is to be able to encapsulate that data within an environment that is friendly to the general public. Using similar techniques to Prototype 1, I can create a novel interesting data story, following the Virus' transmission through the country, with local authorities literally rising out of the map to demonstrate virus concentration similar to a choropleth map.

A host of additional data being available through various popups on selection. But maintain the simple overview to prevent Information overload



Related Work

R. Hackathorn and T. Margolis, "Immersive analytics: Building virtual data worlds for collaborative decision support," 2016 Workshop on Immersive Analytics (IA), Greenville, SC, USA, 2016, pp. 44-47, doi: 10.1109/IMMERSIVE.2016.7932382.

P. W. S. Butcher and P. D. Ritsos, "Building Immersive Data Visualizations for the Web," 2017 International Conference on Cyberworlds (CW), Chester, 2017, pp. 142-145, doi: 10.1109/CW.2017.11.

Y. Yang, T. Dwyer, K. Marriott, B. Jenny and S. Goodwin, "Tilt Map: Interactive Transitions Between Choropleth Map, Prism Map and Bar Chart in Immersive Environments," in IEEE Transactions on Visualization and Computer Graphics, doi: 10.1109/TVCG.2020.3004137.

A. Moran, V. Gadepally, M. Hubbell and J. Kepner, "Improving Big Data visual analytics with interactive virtual reality," 2015 IEEE High Performance Extreme Computing Conference (HPEC), Waltham, MA, USA, 2015, pp. 1-6, doi: 10.1109/HPEC.2015.7322473.

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