

A Multidimensional Visualisation System for a Relational Database of Students in a University

Ferdia Soper Mac Cafraidh

The visualisation of information aims to aid the user in gaining an insight from data through a visual transformation. This process of visualisation is extremely important in the modern day setting where larger data sets are more prevalent, and analysts need an effective way to explore and understand the data.

The research performed was an investigation into the techniques that can be used to visually transform data and provide an interactive visualisation, in order to aid the exploration and analysis of data. A visualisation system was designed as a means of exploring the effectiveness of different data representations, and intuitive methods of user interaction with the visualisation, and also the feasibility of implementing a visualisation system using modern graphics libraries.

The result of the research was a browser-based graphics application implemented using WebGL and Three.js, which is a JavaScript library for WebGL. The application visualised a group of students that form a class by transforming the data into retinal properties, which take advantage of human perception and cognition to allow for the rapid and straightforward analysis of the students. The application also allowed for interaction through the use of the keyboard and mouse to allow the user to zoom, rotate, and highlight the information in the view.

The conclusion of the research was that a visualisation could be utilised in a university setting to complement existing non-graphics based applications used for finding student information. The visualisation could allow lecturers or instructors to easily explore their class, and identify striking information on individual students. The research also found that the occlusion of information is one of the major problems that face the designing of a visualisation system in three-dimensional space.