Agreed Project Brief

Student Name	Joshua England	je7g08@soton.ac.uk
Supervisor Name	John Carter	

3D Graphical Output of

Voxel Data from Gait Experiments

Researchers at Southampton University have been analysing the biometric information about how people walk to see if it is possible to identify a person by their Gait. By triangulating data from 12 cameras they are able to produce voxel data to describe in 3D how a person is walking. The aim of this project is to use this data to produce a graphical output as part of the analysis pipeline. This must be done in real time to allow for visual analysis of the data and demonstrations.

The technical challenges of this project with involve translating the 3D voxel data into a 2D graphical display in real time. To help with graphics processing, dedicated hardware will be used. This may require any algorithms used to be adapted as graphics hardware is quite different from a traditional CPU.

The most likely technique for producing the image will be a simplified ray tracing algorithm, however, this has traditionally been unsuited to graphics hardware. Some optimisations and efficiencies may have to be incorporated into the program to allow for an acceptable image to be generated in an acceptable time. For example an Octree could be used to organise the voxel data in a more structured way.

This project is an extension to an existing research so no data collection will be needed. The process of generating the voxel data has already been established. Instead this project will produce a 3D graphical output near the end of the pipeline. Because of the existing system, nVidia graphics cards and CUDA technology will be used to produce the image on linux operated computers.

Depending on time constraints possible extensions would allow the user to view the voxel data at any angle via a 'floating camera', produce better quality images or to provide optimisations in other parts of the pipeline.