

Abstract

Volume rendering is a challenging problem due to the difficulty of rendering such complex information in a manner which is easy for a user to understand. Focus and context volume visualisation attempts to solve this issue by allowing the user to specify a focus area in the data which is displayed with a high level of detail while the surrounding data is sufficiently abstracted to retain context.

Non-photorealistic rendering techniques are regarded as powerful tools in manipulating view perception. These techniques are often used to abstract a scene by removing unnecessary detail, while highlighting important information. In fields such as medicine and science, NPR has been used by artists in the production of technical illustrations. For this reason, the field of volume rendering (VR) is heavily invested in NPR techniques, especially for visualisation of medical data sets.

This dissertation explores the use of NPR techniques in focus and context volume rendering. It describes the implementation of a volume rendering framework which renders compelling focus and context images with the use of colour abstraction, texture abstraction and silhouette extraction. Two focus and context interfaces are implemented, which combine focus and context regions. An effective style for focus and context rendering is identified and evaluated visually and with the use of an automatic salience metric.