



Medical Image Annotation in Virtual Environment

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Introduction

There is the need for medical image annotation systems that are accurate as manual annotation is impractical, time-consuming and prone to errors. The objective of this research is to generate and visualize a 3dimensional model in a virtual environment from good annotated Magnetic Resonance Imaging (MRI) dataset. Assisting physicians with a 3-dimensional model, will help to diagnose the patient in a timely and accurate manner.

It will be used to avoid complications during surgery and plan out how to approach a tumor and avoid critical areas like the motor cortex or the sensory areas. Many computational models to support human life will be proposed from the strong annotated dataset.

Approach

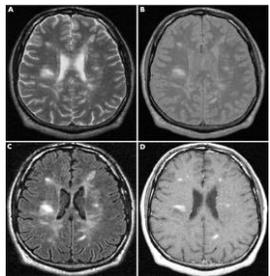


Figure 1. MRI data

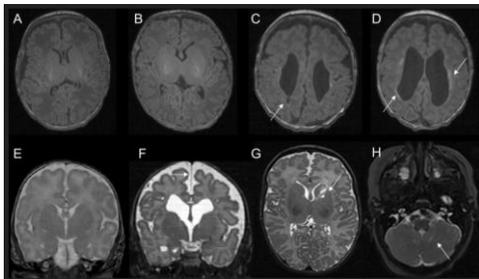


Figure 2. MRI image slices

The MRI visualizing tools show images in three planes that do not give a detailed view of the organ, and the surgeon has to imagine a 3-dimensional object using these planes. Visualizing the model in virtual space will extract more features and information. Using the MRI Dataset for building a 3D model. Then Segmenting the 3D model into voxels and using Unity 3D and the Oculus Rift for visualizing in virtual environment.

Proposed

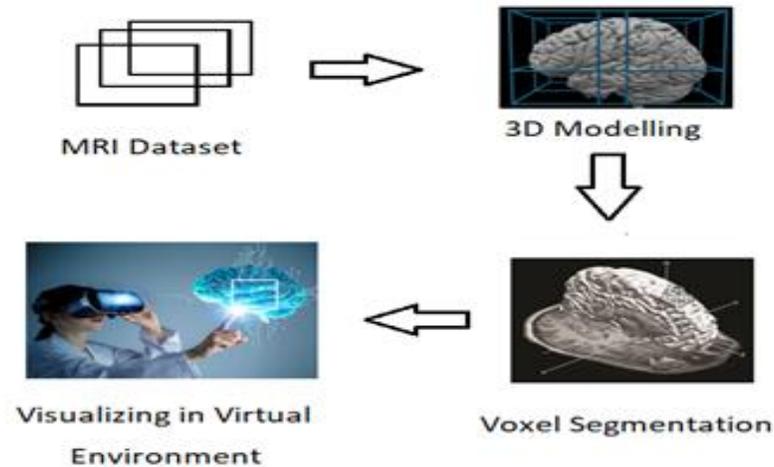


Figure 3. Proposed Framework



Figure 4. The illustration of visualizing the 3D model into virtual environment using head mounted display and VR controller.

The ultimate goal of this project is to visualize a particular model in virtual environment and control the virtual object using the VR controller. To achieve this, we have to first construct a 3D model using the MRI images. Secondly, to visualize the synthesized 3D model in virtual environment, we have to segment the 3D model into voxels and then map it to VR. After visualizing the model, perform annotation by grouping the voxels in different modalities.

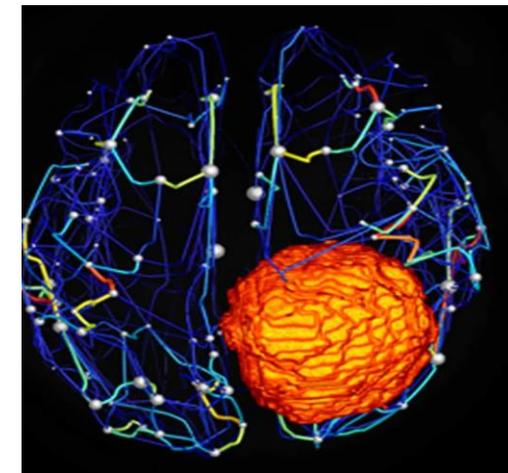


Figure 5. Visualizing a brain tumor in 3D model