

INTERNET-BASED MEDICAL DATA RENDERING AND IMAGE ENHANCEMENT USING WEBGL AND APACHE SERVER

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INTRODUCTION

- We implement internet-based medical data rendering and image enhancement using the volume rendering technique implemented in Web GL.
- Volume Rendering is used to visualize data in 3D form. A 3D dataset is a collection of multiple slices of 2D image data. The Web Graphics Library (WebGL) is used with JavaScript for rendering 3D graphics in a web browser.
- WebGL supports GPU based volume rendering which is an efficient tool for visual analysis of medical data, which involves vertex shaders and fragment shaders. The vertex shader provides space coordinates, and the fragment shader provides color.

OBJECTIVES

- The main goal behind developing image enhancements and property control methods can improve medical data visualization on web browsers, which will be helpful for internet-based medical data analysis and exploration, and medical diagnosis and treatment.
- Any underlying condition can be studied through these techniques and will greatly contribute to the technological advancements in the medicine industry.

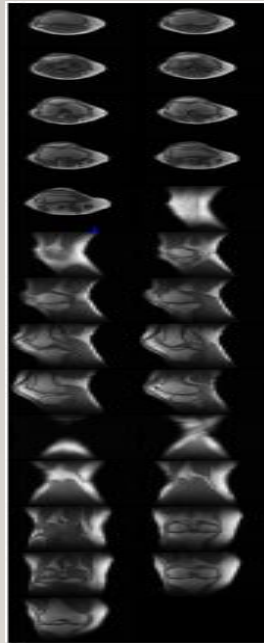
METHOD

- *Image processing method:* ImageJ tool is utilized to convert the new medical 3D dataset into multiple slices of 2D image data i.e. a “.png file” to fit the web-based rendering environment.
- *Rendering method:* Volume raycasting algorithm in WebGL is employed to render 3D medical data in web browsers.
- *Process:* After executing the Image processing method, the “.png file” is loaded in the software that implements the rendering method. The software/code is updated to include new control points for optical mapping.
- *Software platform:* Apache Web Server is used for network-based data visualization.

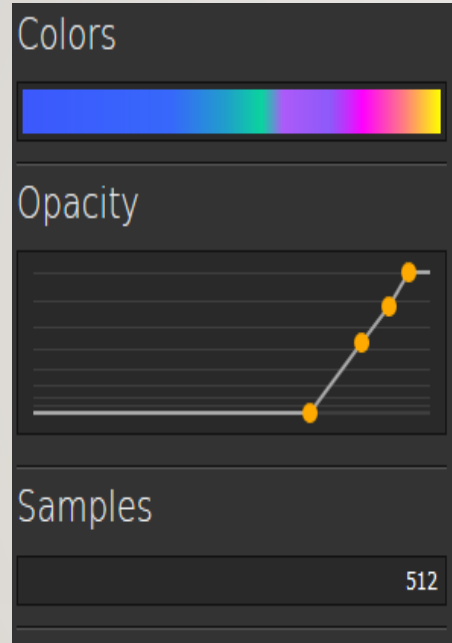
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Loading .png files

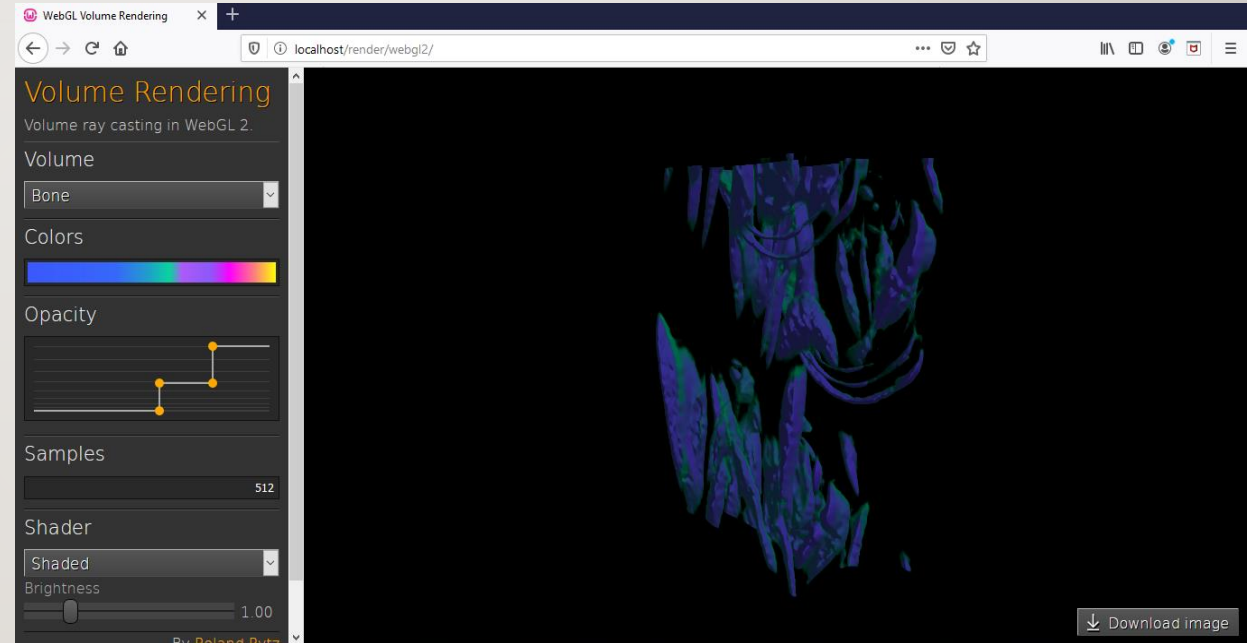
RESULTS



Processed
Bone.png



Opacity Control
Points



Bone data rendered on the web browser

CONCLUSION

- Volume Rendering techniques are helpful for a number of research projects especially for the contribution to medical field like early diagnosis of any condition which can help in providing treatment to patients well in advance.
- In addition to the properties already existing in the project, more enhancements and more properties that can generate high quality volume rendering can be used for better visualization and experience with volume rendering.