**INTRODUCTION**

With the increase in the amount of data produced, data visualization is becoming increasingly valuable and interactive data visualization that allows users to update and adjust parameters can be even more engaging.

To help make these kinds of data visualizations more accessible we have developed a mobile app that is capable of displaying 3D visualizations using augmented reality. This allows users to view data in the context of the real world and understand the data in an intuitive way.

Using 3D computer graphics techniques, we have created a variety of features that will assist in generating and displaying visualizations from different sources of data.

**METHODS**

We developed a mobile app, Wikar, using the Unity game engine. Unity works as a framework for 3D graphics applications and allows porting applications to a wide array of different platforms. The augmented reality aspects of the app were developed using Unity’s ARFoundation package.

We used GPU processing to generate and update 3D visualizations in real-time. Specialized fragment shaders and compute shaders were developed to process large amounts of data in parallel.

The data used to generate the visualizations is stored on Clowder, NCSA’s cloud data management tool.

**RESULTS**

- 3D models can be loaded dynamically from the cloud and displayed in augmented reality.
- Images and videos can be used to generate 3D real-time augmented reality data visualizations.
- Raw data files, like CSV, can be used to generate dynamic heightmap or volumetric visualizations.
- Visualizations are generated in real-time, so they can be manipulated and adjusted interactively.
- The Wikar iOS and Android apps are available on the App Store and the Google Play Store.

**CONCLUSIONS**

Using this framework it is easy to design and visualize data and view it in augmented reality. Many different kinds of data can be processed, including 3D models, images, audio files, videos, and text files.

The app can utilized in a wide variety of scenarios where data visualization is necessary. The system is easy to use, and all that is required is to upload data to Clowder. Having a generalized augmented reality platform for data visualization could be beneficial to many groups.

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