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CMSC 436: Data Visualization  
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## **Hierarchical File Structure (HFS) Proposal**

### **DESCRIPTION:**

We propose an immersive spatial representation of a file system in Virtual Reality (VR). In this representation, we will be treating a file system as a tree-like data structure made up of directories, files, and metadata. The design of this representation is not yet finalized.

We view file structures every day through file managers, but we rarely see them as anything more than icons and tables. File systems, even in VR, are typically flat floating screens: A GUI within a virtual environment. We hope to capitalize on the immersive and spatial nature of VR to better visualize a file system in a way that is intuitive to the human spatial and visual abilities, as an alternative to traditional two-dimensional GUIs.

### **APPROACH:**

Our approach is to map files, directories, and their metadata into a spatial VR environment. We will do so by translating the number of items in a directory to physical size, arranging items spatially by metadata, and providing a minimap denoting the user position within the hierarchical structure. The user will begin in a designated root directory, and be able to navigate the dataset from that starting point, interacting with the environment through hardware controllers. We plan on developing this project in Unity, using Unity virtual reality development tools and C#.

There are several metrics which we can use to evaluate the usefulness of our project. Quantitatively, we can measure navigation time. We can gain qualitative insights by surveying our test users for their response to our application: can a user recognize the attributes they are being shown, does it feel/look good, et cetera? We can draw conclusions about our project's strengths and weaknesses by comparing the results of our tests to those of existing file managers.

The final result will be not necessarily a file manager, but a visualization approximating one that could be extended into a file manager to be used within other VR applications.

If time permits, we plan to develop these additional features in the following order:

1. Improve object and environment aesthetics.
2. Additional heads-up display (HUD) detailing the data and player's location similar to a more traditional file explorer. I.e. "D:\Users\Documents\" at the top of the page. And/or similar to how registry lists things as cascading folders and files.
3. Display specific file types in unique ways.

## **DELIVERABLES:**

**Alpha:** A 3-dimensional representation of a file system in a VR environment.

**Beta:** A 3-dimensional representation of a file system in a VR environment with the capability to interact with the system.

**Final:** An effective and intuitive 3-dimensional representation of a file system in a VR environment.

We currently do not have a client for this project proposal.

## **PROSPECTIVE ROLES AND RESPONSIBILITIES:**

Undecided design elements will be agreed upon at future meetings by all team members. Each team member will be expected to provide some input to all work done as a reviewer or developer.

Pierce Jackson: Metadata representation, directory design, ambient environment design

Connor Markwell: VR testing, path design, user-environment scaling

John Reed: VR testing, file design, controller interface