

## **TRANSCENDING THE DESKTOP: BIG DATA VISUALIZATION IN XR**

### **Introduction:**

In this project, we decided to design and prototype an immersive analytics application that could be feasibly used in a software tools department.

### **Main Text:**

While extended reality technologies such as virtual reality and augmented reality have often been considered in the purview of games and entertainment, they can be applied in more serious applications. For our thesis, we explored the application of virtual reality in the setting of a software tooling department and compared it with their existing software applications. At the outset, we intended to make a hi-fi prototype that encompassed a wide variety of data analysis tasks, but in the end, the scope was limited to identifying extrema in a data set. For this narrow task, the application performed better than Graphite, a graph-based desktop application in terms of the speed in which users could accomplish this task. However, user performance was not significantly better in correctly identifying these extrema when comparing our VR application to Graphite.

In order to develop this application, we engaged in academic research as well as user research, lo-fi and hi-fi prototyping within the R&D Tools department at Axis. During the user research stage, we found that the engineers desired a data visualization tool that could help them better navigate their data in a faster manner especially when they are troubleshooting issues within the services that they manage as well as providing an overview of the overall system that they monitor. From this feedback, we generated a few different approaches ranging from smell notifications to a fully virtual environment. We also engaged with the team in further developing these ideas.

Ultimately, we chose to go with a VR application that could do a wide range of data analysis tasks including assisting with troubleshooting by identifying relevant data to data visualization and also data organization. A lo-fi prototype was created using the ShapesXR tool to further confirm that this was an application that could be useful to the engineers at R&D Tools. Once we validated the idea, we constructed a hi-fi prototype. Unfortunately due to setbacks and time constraints, we were not able to implement all of the ideas in our lo-fi prototype. Thus, we were only able to test our hi-fi in a very narrow task: extrema identification.

Thus, the question as to whether or not an immersive application could prove to be suitable for data analysis tasks and for the analysis of big data sets, remains open. While we did prove that it helped participants navigate the data faster, it only provided a relatively insignificant increase in the accuracy of their answers. We concluded that more research would be needed in this area, especially in the realm of complex real-world data analysis tasks to really test the feasibility of such a solution.