

Project Proposal

Group: Red Pandas

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## **RGL: 3D Visualization of Trails**

### **Project goal:**

The goal of this project is to create interactive 3D visualizations of hiking trails using the rgl package in R. By using geographical coordinates and attributes of the trails, we aim to map out hiking trails in a 3-dimensional space, allowing users to explore trail features such as elevation changes, terrain difficulty, and geographic location without the limitations of a simple 2D visualization.

### **Data sets:**

#### **Texas Housing Dataset**

We will be using the Texas housing dataset from the ggplot2 package to introduce some basic rgl functions. We will use the city variable as a classification variable in a basic 3d plot. We'll also use the sales, median, and listing variables to compare different houses and create graphics that make it easier to differentiate houses based on specific needs. This example will serve as an introduction to the abundant features of rgl.

#### **Great Smoky Mountains Trail Data**

We will be using the Great Smoky Mountain National Park open source dataset to showcase the persp3d function from the rgl package. With this function, it will allow us to visualize national park trails and create topographic maps. This function allows users to visualize the elevations of different mountains creating the possibility to map out climbing routes. Visitors can use this function to plan their hiking trip based on the difficulty of the trails. We will use the latitude, longitude, and elevation variables in the dataset to create our 3d visualizations.

#### **MPG Dataset**

We will be using the mpg dataset from the ggplot2 package to showcase the features of the rgl package. The features that we will be using include the par3d function, which allows us to manipulate various graph parameters for 3D visualization. For example, we could adjust the FOV (Field of View) parameter to control the perspective, zoom to magnify the scene, and more. Additionally, we can use functions like tetrahedron3d, cube3d, octahedron3d, and others to construct solid shapes within the 3D plot. By combining the features of rgl with the mpg dataset, we can create visually engaging and interactive 3D plots that offer insights into the relationships between different attributes of vehicle fuel efficiency.