**MAZE GENERATION AND NAVIGATION**

Unity File Name: haptic-navigation

Available on Box and GitHub

1. Access to Box has been given to the researchers.
2. Link to GitHub: <https://github.com/virtual-embodiment-lab/haptic_navigation>

‘**haptic-navigation**’ is a Unity file created for developing experiment environments for navigation using haptics. The file has been adapted for the HMD platform and can be accessed using the VR headsets. It essentially has two components:

1. A maze generator: Generates mazes using user inputs.
2. A maze navigator: Helps navigate the maze, given there are starting and destination points.

**Maze Generator**  
This maze generator uses a back-tracking algorithm to randomly generate mazes.  
It has the prefabs wall and floor, and it duplicates/clones walls on the floor at relevant positions.  
It takes the following input from the user to generate the maze:

1. **Seed**: An integer number which determines what random maze design would be generated.
2. **Maze length**: An integer that determines the length of the entire maze.
3. **Maze width**: An integer that determines the width of the entire maze.
4. **Size**: An integer that determines the cell size within a maze. (Best to set it as 1.)

The scripts associated with maze generator are MazeGenerator and MazeRenderer.   
The **MazeGenerator** script contains the backtracking algorithm responsible for creating mazes. While the **MazeRenderer** script displays/renders the maze on the screen. It also includes scripts for the user interface for maze generator.  
  
**Accessing Maze Generator**Scenes > Sample Scene  
In the Scene window, Make Your Maze Object has the UI for generator a maze. (Details mentioned earlier.)  
  
**Maze Navigation**Navigation for the mesh is done using Navigation AI of Unity.   
Start and destination objects have been created within the maze, and a NavMeshAgent has been attached to the Start object which allows it to navigate through the maze. A script **Navigation Controller** has also been attached to the Start object to enable the navigation.  
  
For the current setup, suitable mazes are stored as prefabs: Prefabs > Maze > MazeName  
Note: Drag and drop the generated maze in the Maze prefab folder to store it.  
Naming the maze: Maze\_axb\_seed, here a is the length of the maze, b is the width of the maze, and seed is the seed used for generating this maze.

Visualizing the navigation path: Additionally, Navigation Path is script that helps in visualizing the calculated path in the scene window/tab using a thin white line.