

Infocomm written report

Category 9

Group 9-11

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Introduction

Project description: We are using Blender and Unity to make a 3D interactive map of the school using Unity's navmesh system and Blender to model the buildings in the school campus.

In the short time that we have been in this school, we have seen many of our fellow Secondary One classmates lose their way because of the large size of our school campus. Even we ourselves have gone through the experience of being lost in the school. Through surveys, we found out that many new students were indeed lost because of the school's large campus, and most respondents preferred making a map to solve the problem.

According to a short survey we had done previously, we conclude that most of the Secondary Ones had been lost before and had either been scolded, missed part of or most of an event, or end up late. We have discovered that many new students were lost mainly because of the school's large campus. After some study, we have decided that making a map would be the most efficient and easy method of solving this problem, as an app would be available for many students.

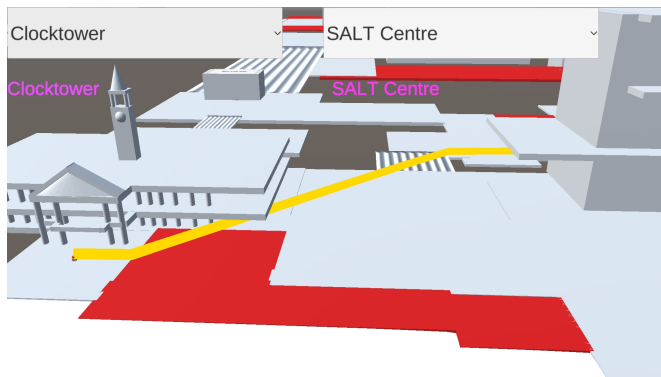
We came up with this project idea to help new batches of Secondary Ones become familiar with the school campus and to help visitors around the large campus. Our project is a simple and interactive map of the school as an app. The app is a Unity project and we are able to import it as a mobile app and it will work on both IOS and Android.

Our project work distribution is He Cheng, the leader as the map designer, Kenshin as our programmer, and Tian Jing as our writer.

The functions of our app include a Navigation system, drop-down boxes as part of the user interface and camera movement eg. zooming in and out. The way our app functions is simple. Select your start and end points through options provided, and follow the yellow line on the map around the school. The line will update when there is a change in the selected starting point or destination. To get a better view of the line, users can make use of simple camera

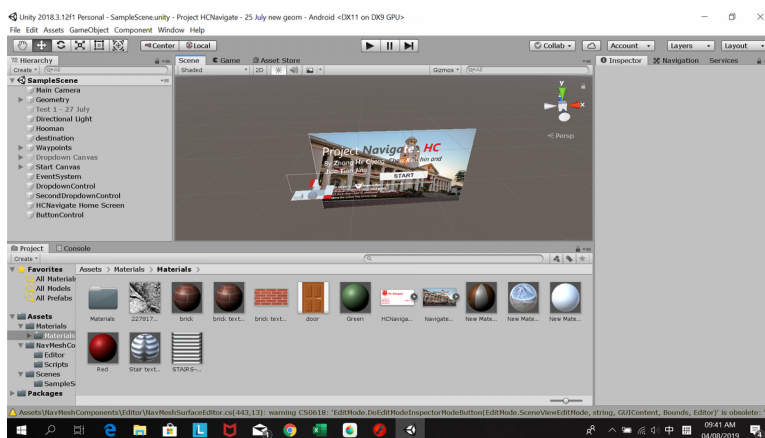
functions like zoom and rotating through finger movements.

Function 1:

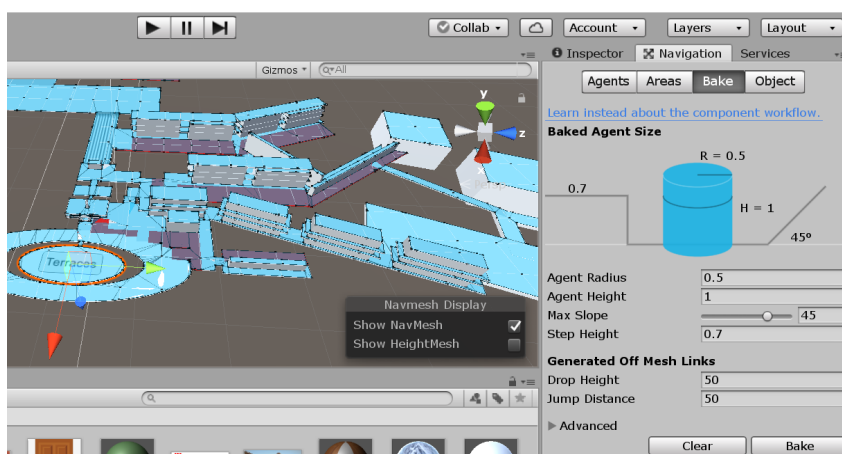


Drop-down boxes translating to line drawing

Function 2:



Start Menu in the Unity editor.



Literature Review

As stated in our introduction, many new batches of sec ones and visitors, are confused about the some whereabouts in the school as the campus is huge and sometimes, it takes up to 5

min just to reach a certain place.

Our previous survey result before proposal evaluation showed that 62.5% of our respondents were lost before and 25% of them are still lost. Thus supporting our motives.

The Study and Methodology

The Unity NavMesh system involves at least one objects with the 'NavMesh Agent' component attached to it, and surfaces that are individually labelled as 'Walkable' surfaces. "The NavMesh Agent component handles both the pathfinding and the movement control of a character." (Unity Manual 2019.2, Navigation and Pathfinding, Navigation Overview, Creating a NavMesh Agent). This makes the NavMesh system easier to use as we just have to adjust the dimensions of our NavMesh Agent to suit the school map. When 'Baking' these NavMesh surfaces, "the process collects the Render Meshes and Terrains of all Game Objects which are marked as Navigation Static, and then processes them to create a navigation mesh that approximates the walkable surfaces of the level." (Unity User Manual 2019.2, Navigation and Pathfinding, Navigation Overview, Building a NavMesh)

Normally, the pre-planned path by the NavMesh Agent is not shown, though provided the NavMesh Agent is given speed in the component, it will move along the path, and data can be collected about the path through functions like SetDestination. Therefore, we coupled the NavMesh Agent with a LineRenderer function, which renders a line according to set lengths, vertices, thickness and colours. So, putting information about the path into vertices of the line rendered, we effectively visualize the path taken.

Our planned timeline was to finish the basic navigation mechanic by May, since we are fairly new to these programmes. We would then incorporate the user interface and models by early July, do bug fixes and a final survey on a test application to clean up the project. However, we went through a major set-back as there were numerous bugs in the rendering of the lines, even after fixing gaps in the model, and we were stuck as even the Unity programme does not provide much support to the LineRenderer function due to lack of use from other users.

We conducted a survey on 9 students and 3 adults for suggestions of final changes to the app and most respondents found the fonts and the buttons too small, the start page too bland, and our camera movement functions being too slow. The pictures of the test app are shown below

Outcomes, analysis and discussion

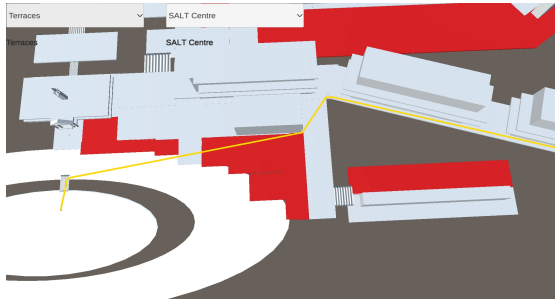
These were the different features of the app and includes screenshots while the app is in action



Press left box to
select start point,
Press right box to
select destination

START

White background looks very blank

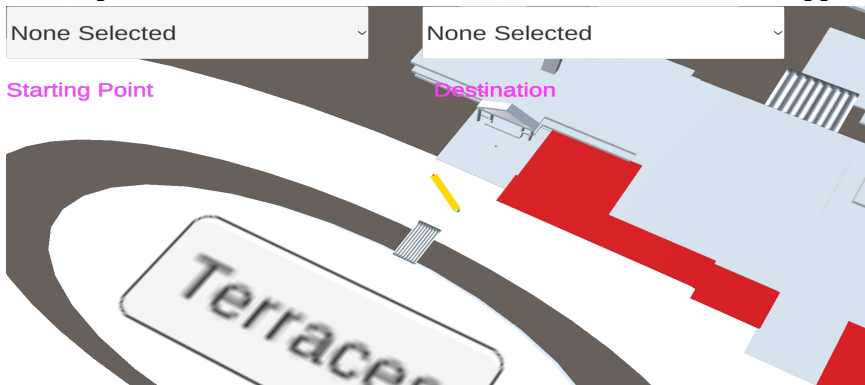


Words are not clearly seen

After our survey, we implemented the feedback to improve the user interface.



Revamp of the start menu and instructions on how to use the app



Bigger drop-down boxes

The yellow line is more visible so it is easier to locate.

Implications and Recommendations

Possible future extensions of the app can be firstly, an extension of the map, with more detailed locations, such as the OTH and respective entrance gates; or covering a wider range, like the International School and Junior College Section. A number of flaws may include a lack of a tutorial sequence, with just a set of instructions at the front page; as well as an inability to have different levels as there are limited tutorials on how to do so.

After this project, we have learnt more about working as a group, and have gained basic knowledge of these new platforms. We have also experienced first-hand how to develop a good user interface by conducting surveys and experienced the effort put in by service developers from the developers' perspective.

Bibliography

Cited text

(Unity User Manual 2019.2, Navigation and Pathfinding, Navigation Overview, Creating a NavMesh Agent) <https://docs.unity3d.com/Manual/nav-CreateNavMeshAgent.html>

(Unity User Manual 2019.2, Navigation and Pathfinding, Navigation Overview, Building a NavMesh) <https://docs.unity3d.com/Manual/nav-BuildingNavMesh.html>

Project references

(Sloan Kelly, August 30 2016, Unity 5 UI Tutorial - Dropdown List)

<https://www.youtube.com/watch?v=Q4NYCSIOamY>

(Brackeys, March 14 2018, Unity NavMesh Tutorial - Basics) <https://www.youtube.com/watch?v=CHV1ymlw-P8>