EECS 581/582 Final Project

Team 18

Project Artifacts

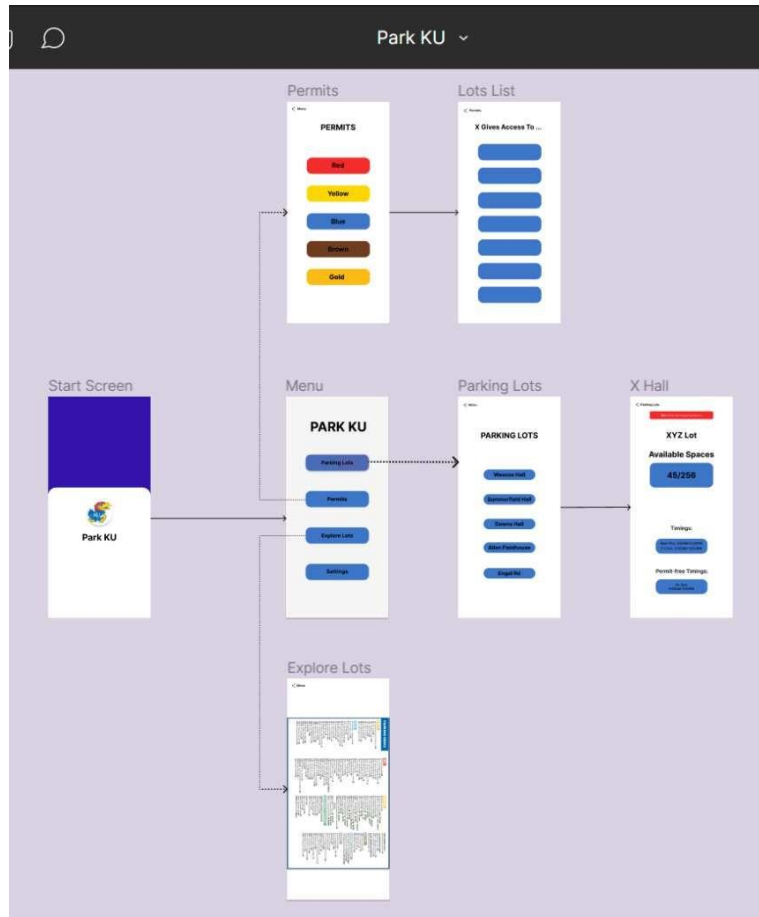The following diagram shows what the flow of our project would look like:

Fig5: The flow of our project; ParkKU

The tentative flow of our app can be viewed on the following link:

https://github.com/hzahid99/EECS-Final-Project/blob/main/Demo%20of%20the%20app.mp4

 The following GitHub repository holds our progress so far:

https://github.com/hzahid99/EECS-Final-Project

Below are some of the figures that show how we are training our machine learning component of the app to detect cars. This will enable us to increment/decrement the cars as they enter/leave the lot.
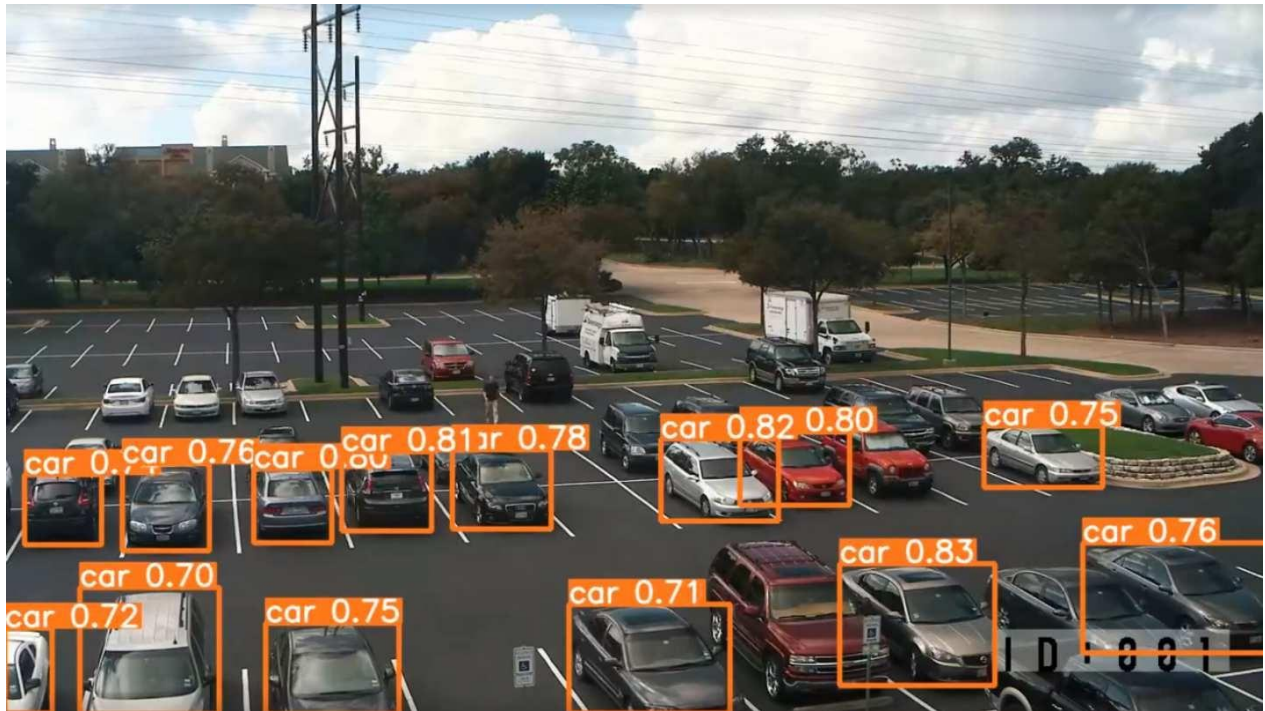

Fig1: Detection of cars

```
%cd /content/yolov5

from roboflow import Roboflow

rf = Roboflow(api_key="iq9O2jVL4DCXGhvxCASc")
project = rf.workspace("new-workspace-29pun").project("parking-occupancy-dataset-al6")
dataset = project.version(5).download("yolov5")
```

```
/content/yolov5
loading Roboflow workspace...
loading Roboflow project...
Downloading Dataset Version Zip in Parking-Occupancy-Dataset-Al6-5 to yolov5pytorch: 100% [24322382 / 24322382] bytes

Extracting Dataset Version Zip to Parking-Occupancy-Dataset-Al6-5 in yolov5pytorch:: 100%|██████████| 462/462 [00:00<00:00, 636.60it/s]
```

```
    # this is the YAML file Roboflow wrote for us that we're loading into this notebook with our data
    %cat {dataset.location}/data.yaml
```

```
names:
- free
- occupied
nc: 2
train: Parking-Occupancy-Dataset-Al6-5/train/images
val: Parking-Occupancy-Dataset-Al6-5/valid/images
```

Fig2: Loading dataset and checking the classes

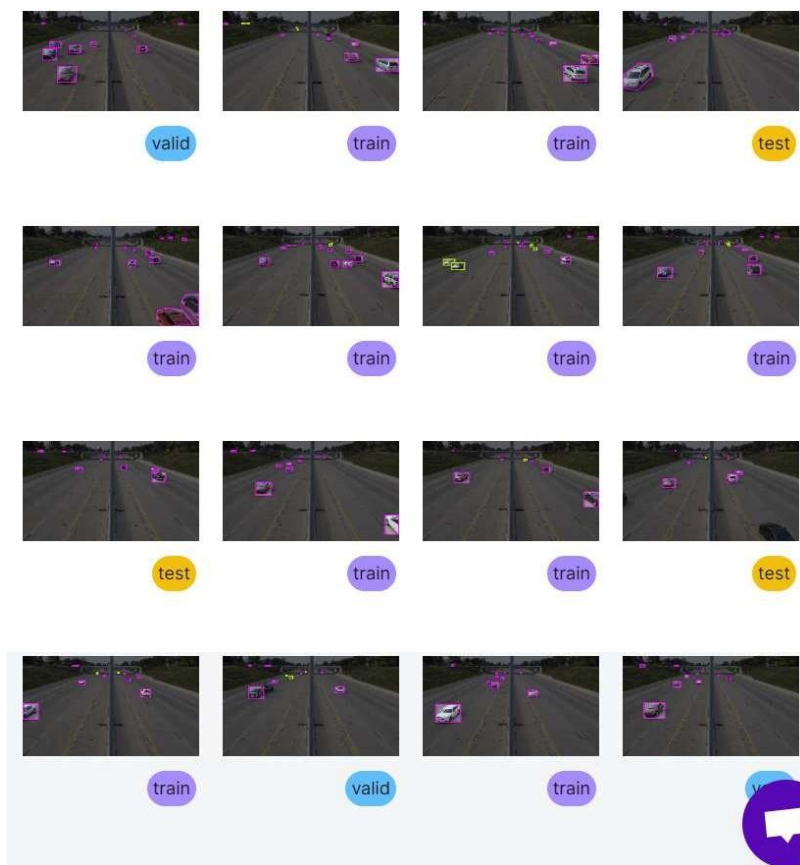**Fig3: Metrics on the model**

Fig4: Example of Images we used to manually annotate cars on Roboflow

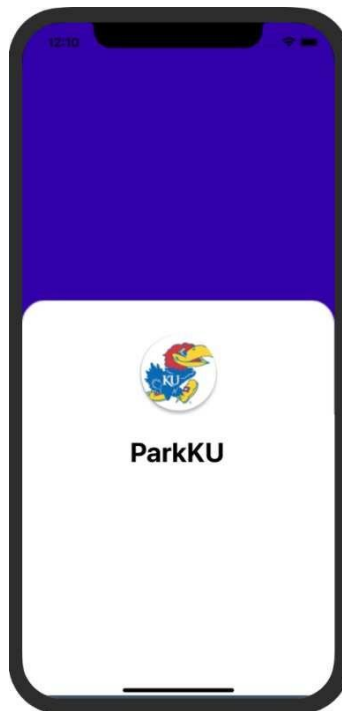Following are the screenshots of the screens we have made so far for the app:
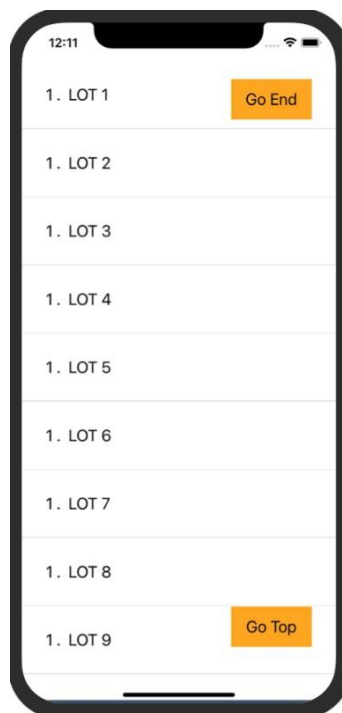

Fig5: Start Screen of the app

Fig6: Screen that will list down all the lots and permits they require

Park KU

Parking Lots
Permits
Explore Lots
Settings

Fig7: Menu Screen

Permits

Red
Yellow
Blue
Brown
Gold

Fig8: Permits Screen

Parking Lots

WESCOE HALL

SUMMERFIELD HALL

DOWNS HALL

ALLEN FIELDHOUSE

ENGEL RD

Fig9: Parking Lots Screen

Worked on the recognition model and increased the epochs to 170. Ran the model over the video collected from our camera. The video is inside an engineering building. The model detects some cars for some reason inside, especially when the camera is being moved. But, we will have to debug the situation more. The camera still doesn't connect to the WIFI and we may need to take it to the IT so that they can help us connect it.

The validation error is going down which is a good indicator for the model accuracy. We will still keep working on it as we collect video from our camera.The test video has been uploaded on github.
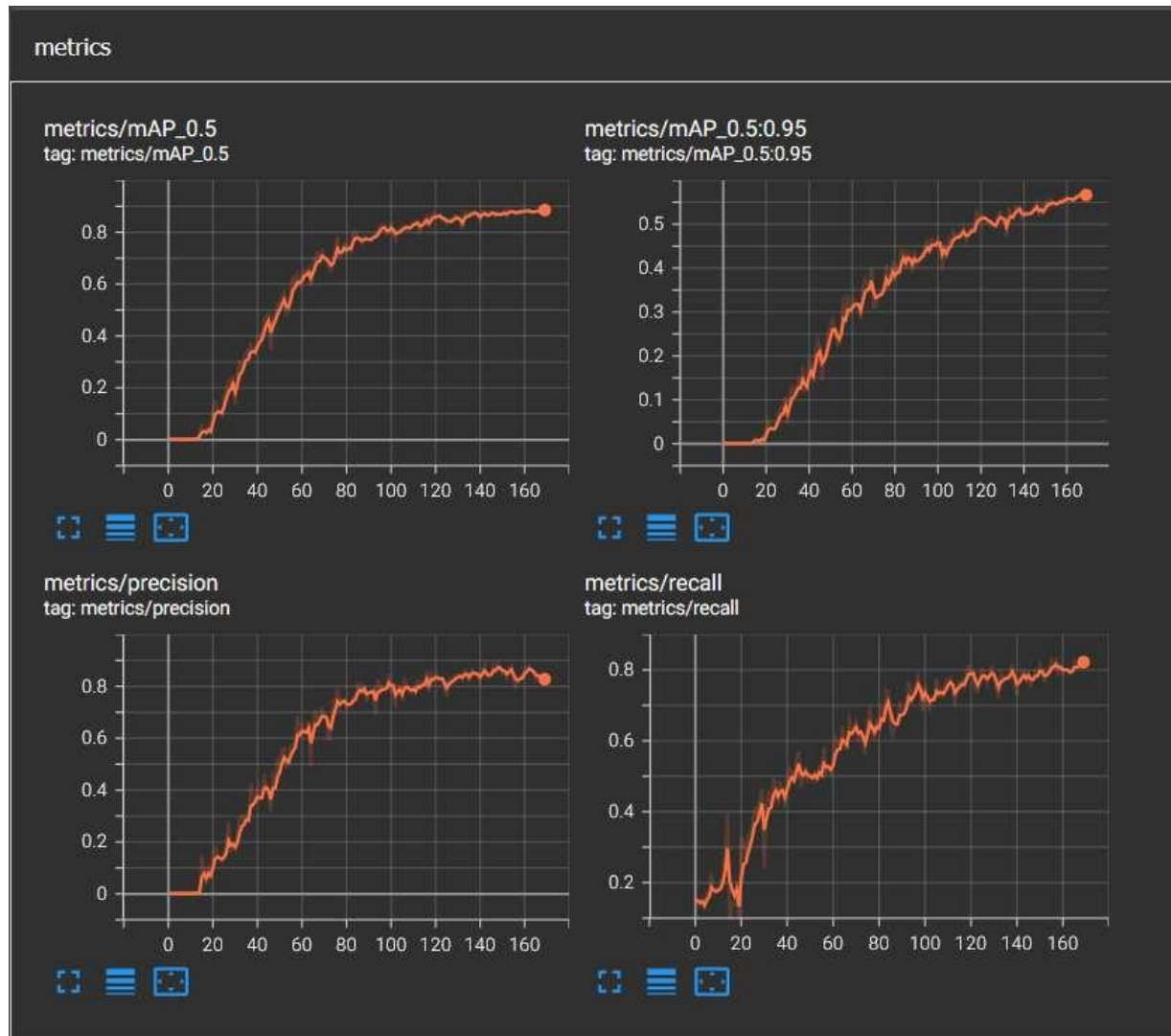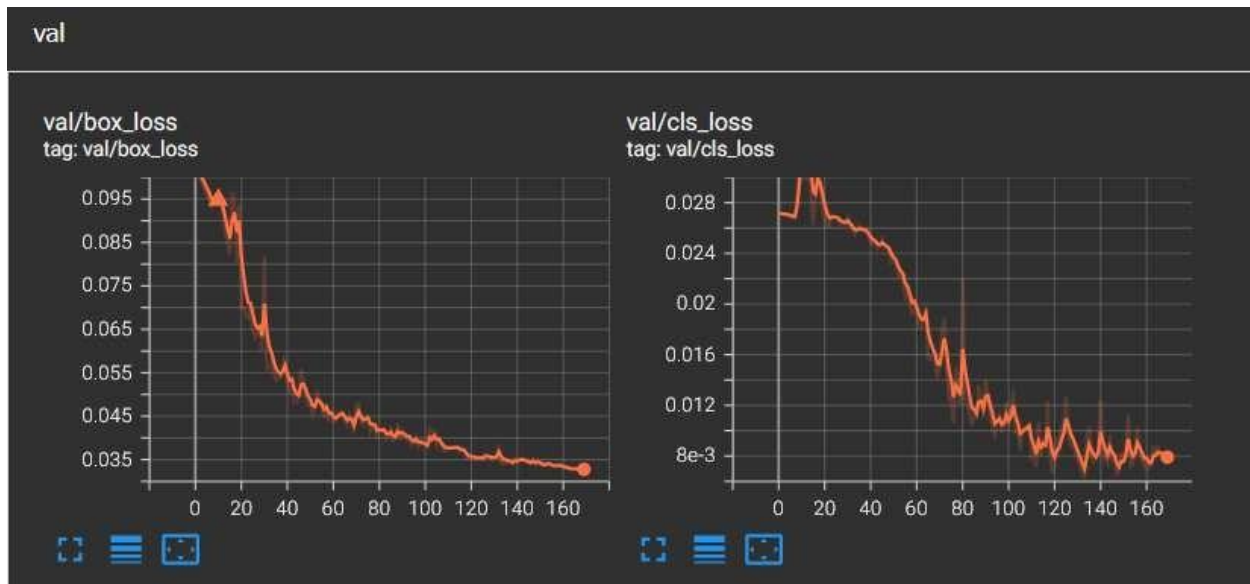

Fig9: Metrics on the model

Fig9: Validation metric of the model

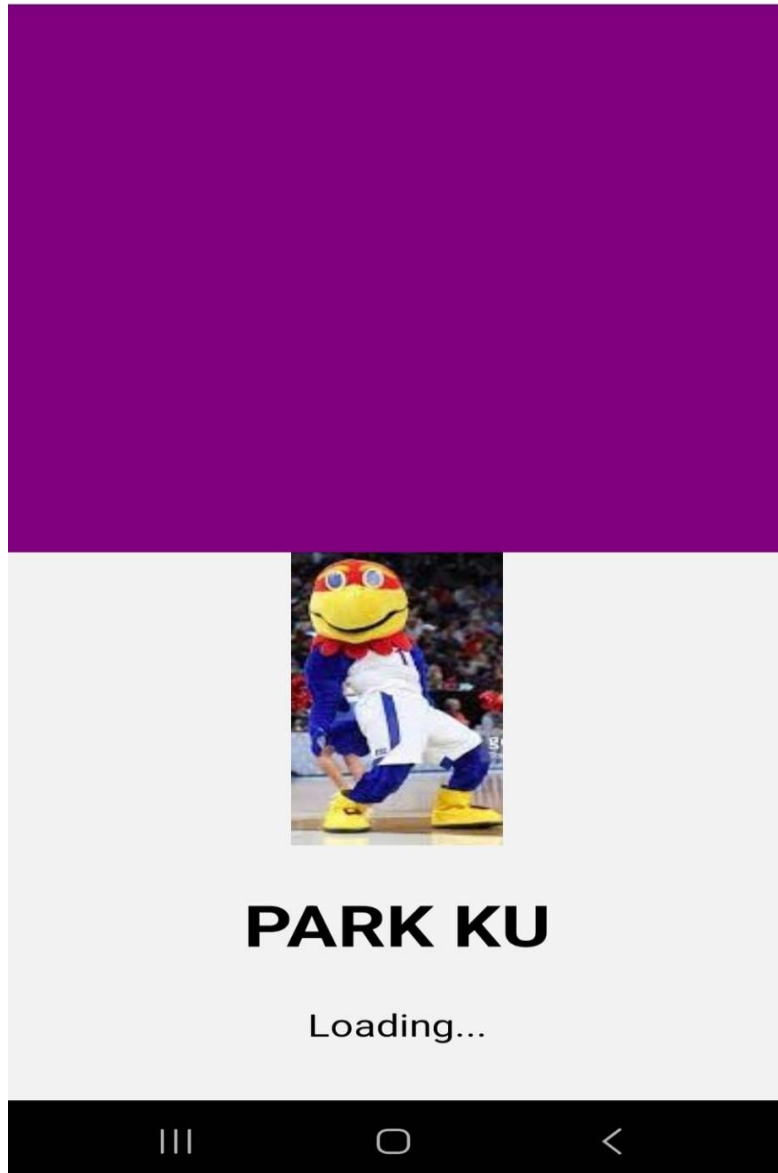**EECS 582 Final Project**
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Project Artifacts
We have coded half of the screens and have finalized the user interface for them as well. UI might be adjusted as we move forward, and minor changes to the screens might be needed as we make progress. We have been able to create and design the following screens:

1. **Home Screen:**

PARK KU

Loading...

2.   **Menu Screen:**

PARK KU

PARKING LOTS

PERMITS

EXPLORE LOTS

SETTINGS

3. **Parking Lots Screen:**

PARKING LOTS

WESCOE HALL

SUMMERFIELD HALL

DOWNS HALL

ALLEN FIELDHOUSE

ENGEL RD HALL
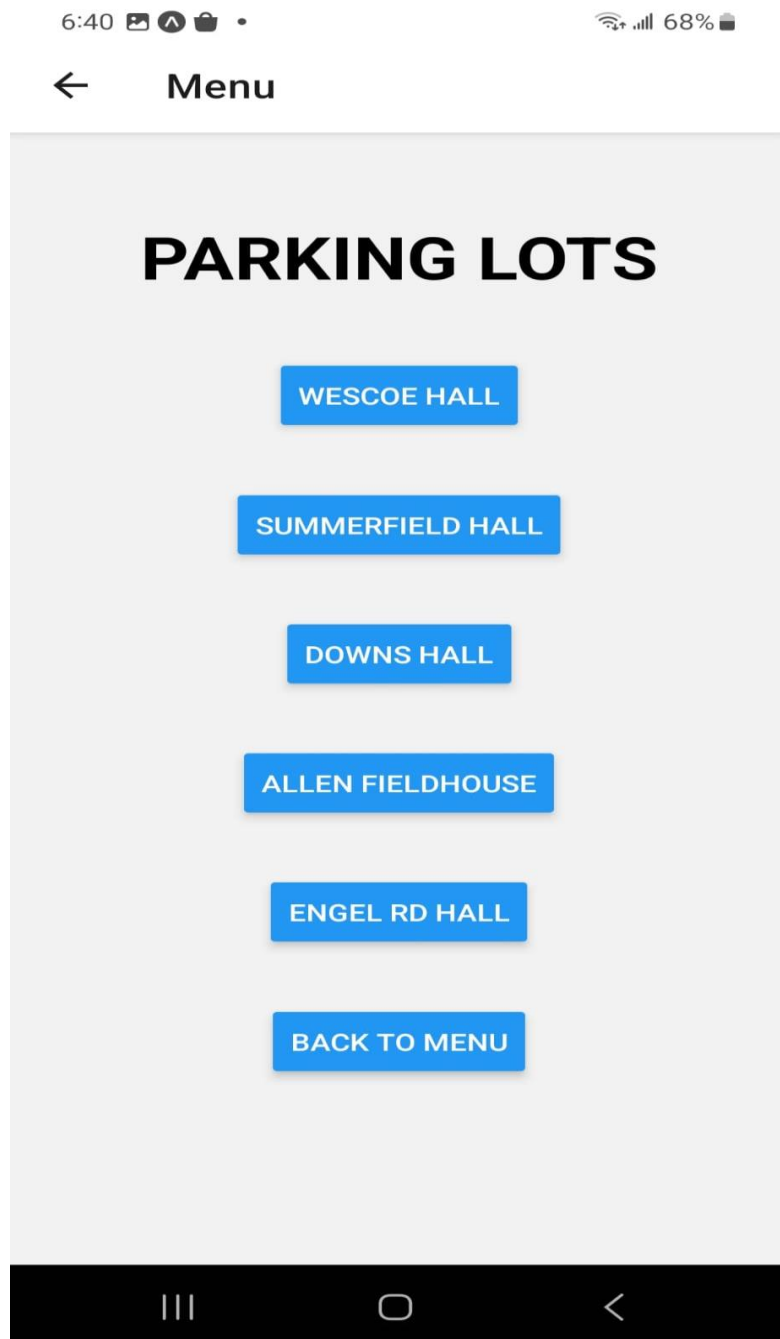
BACK TO MENU

Navigation:

Navigation has been added to the screens as well. From home screen, once we have moved forward as the app has loaded, we have the menu screen from where we can press the buttons and go to Parking Lots screen. We can also go back to Menu screen too as part of the new navigation feature we have added.