

Vikrant Gurav

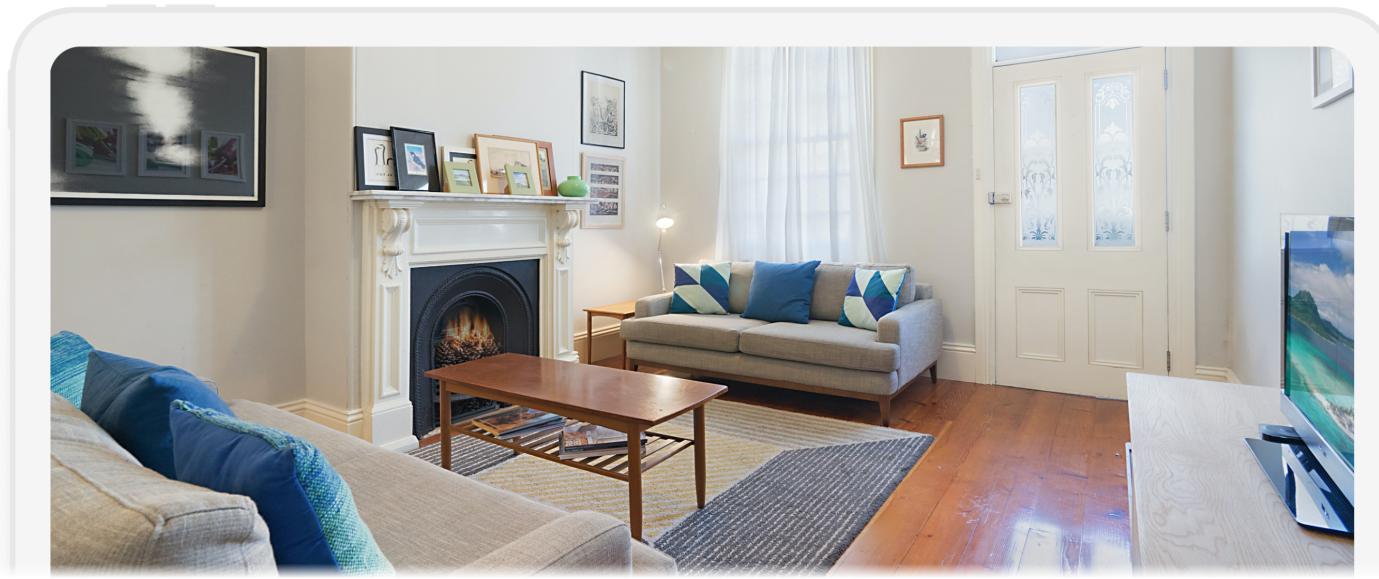
This is a document to show some of the most recent projects I have worked on.

Scroll down to have a look !

Mobility Assistance for the Visually Impaired Using LiDAR

LiDAR Swift ArKit RealityKit

Research Paper on this project accepted to be published in IEEE Xplore

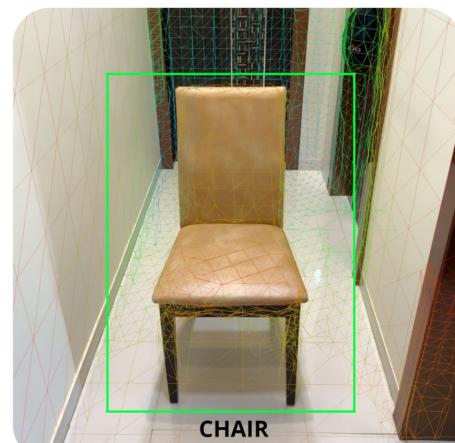


- This project consists of a mobile application which mainly acts as a substitute for walking canes for the visually impaired. Using LiDAR (Light Detection and Ranging), a 3D model of the environment is constructed in real time.
- The user, through haptic feedback/vibrations can be aware if an obstacle exists in his view. The frequency of this haptic feedback is inversely proportional to the distance from the obstacle.
- Furthermore, using a CNN model, which has an input of the spatial features and depth features of the environment, the user can identify the type of obstacle that exists in their view through synthesized speech.



Real Time 3D Construction of the environment

Using the mesh generated using the LiDAR scanner, a real time 3D construction of the user's environment is generated. Depending, on the distance from an object in the users path, a haptic feedback/vibration would be produced on the mobile device. The frequency of the haptics/vibrations would be inversely proportional to the distance from an object in the user's path.



Object recognition

Using a convolutional neural network, the obstruction in the path of the user is recognised. An image with the spatial and depth features generated from the LiDAR scanner would be fed to the neural network to detect the type of obstruction in the user's path. The neural network would be able to accurately recognise a detected obstruction.

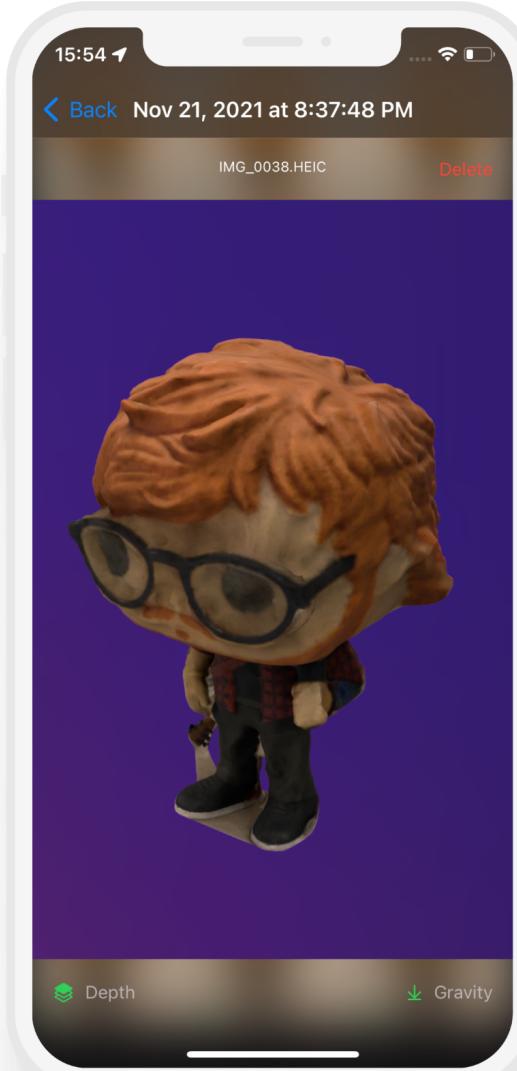


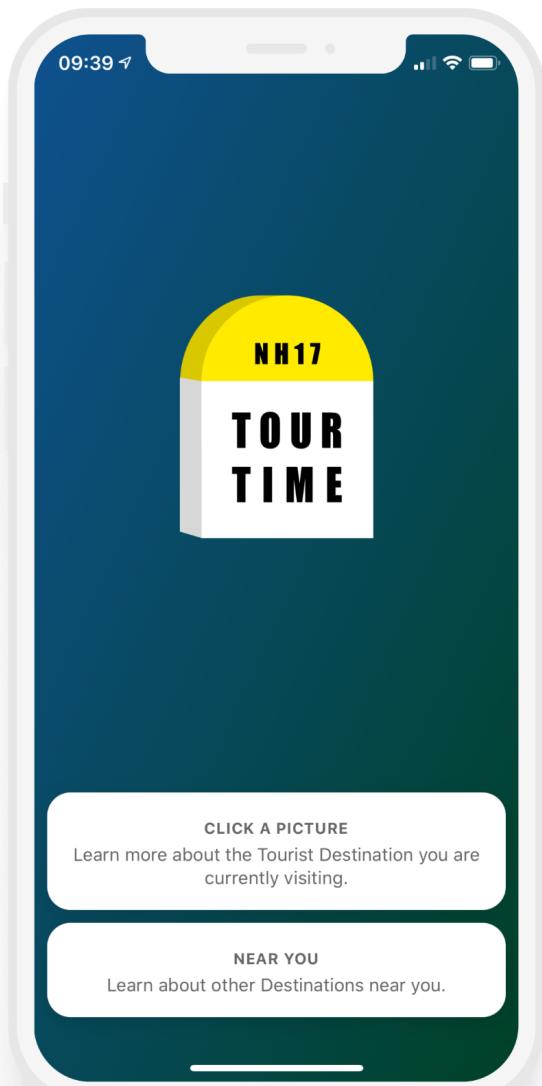
Body Motion Capture & Object Scanning Using Photogrammetry & ML

swift tensorflow LiDAR RealityKit ARKit

A mobile application for scanning objects or environments with textures using LiDAR and photogrammetry and body motion capture using machine learning.

- Full body motion capture using machine learning with skeletal features which can be used to animate a 3D character model.
- Scanning a room/object's topological features with textures using LiDAR and photogrammetry and viewing it in AR or exporting it as a 3D model in an .obj file to be used in various 3D editing softwares.
- Both of which can either be viewed in AR or used in rendering tools such as Blender, Cinema 4D, Unity, etc to create 3D model assets and character animations.



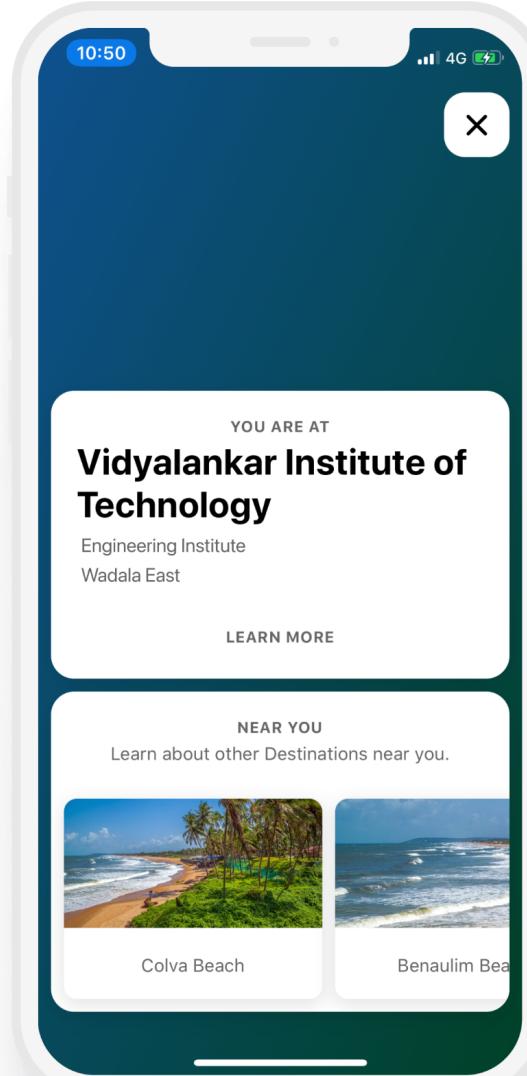


Virtual Tourist Guide

tensorflow ionic native typescript python docker

A mobile application which helps the user identify various landmarks and tourists attractions by taking a picture of the landmark.

- This project involves a Mobile Application on which the user's primary interaction with the system is clicking a picture of a Landmark or Tourist Destination they are visiting. The image will be processed by a Convolutional Neural Network in the Cloud to identify the landmark and then return information about it, as well as other nearby locations.
- The standout feature is a Guided Tour Itinerary that will be presented to the user based on frequent tourist visitation patterns and curated to perfection. The users of the platform can submit new information about the locations they visit, and these facts will go through a crowd review process.



Third Person Open World Game - Unity 3D

Unity 3D Blender

An open-world third person game built using Unity 3D. The open-world sandbox consists of various biomes with different global lighting conditions and effects.



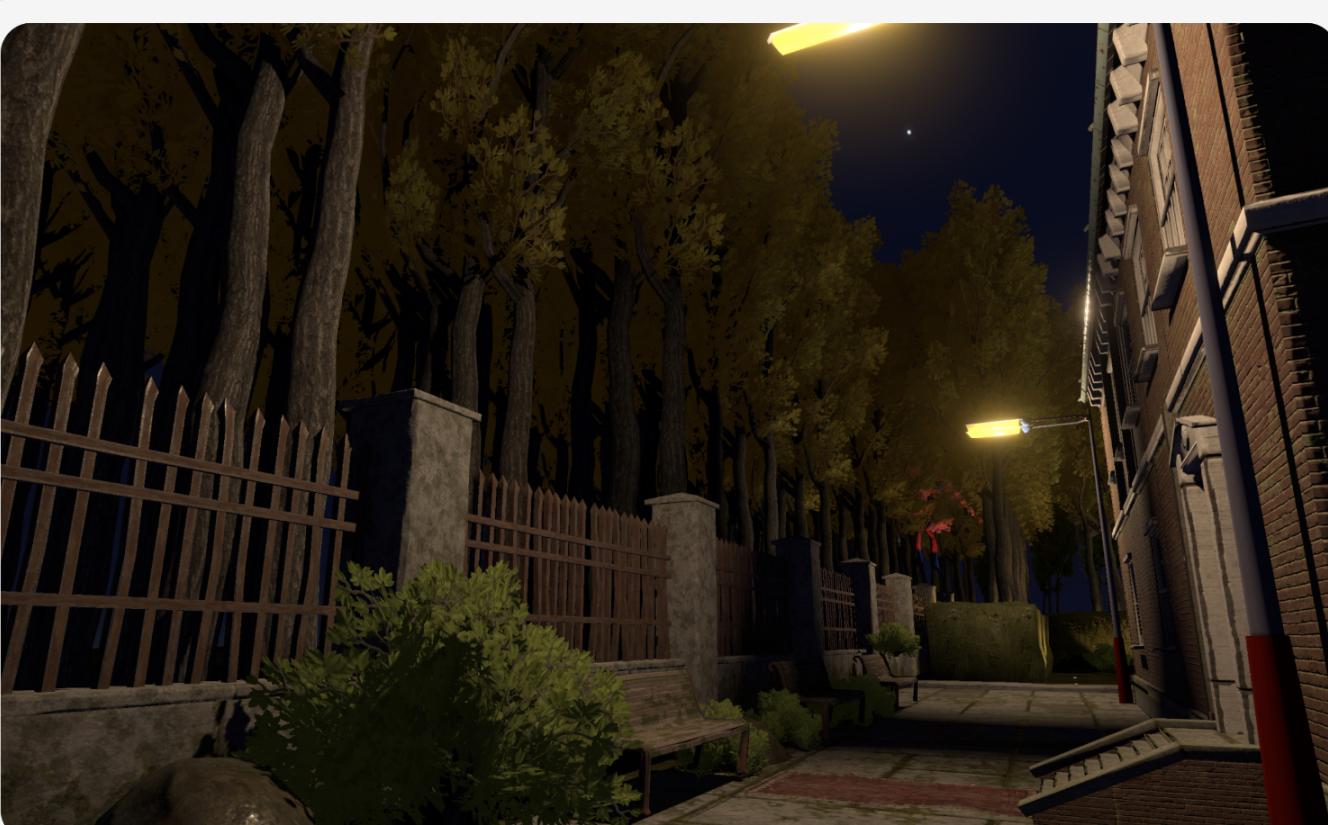
Post-Processing

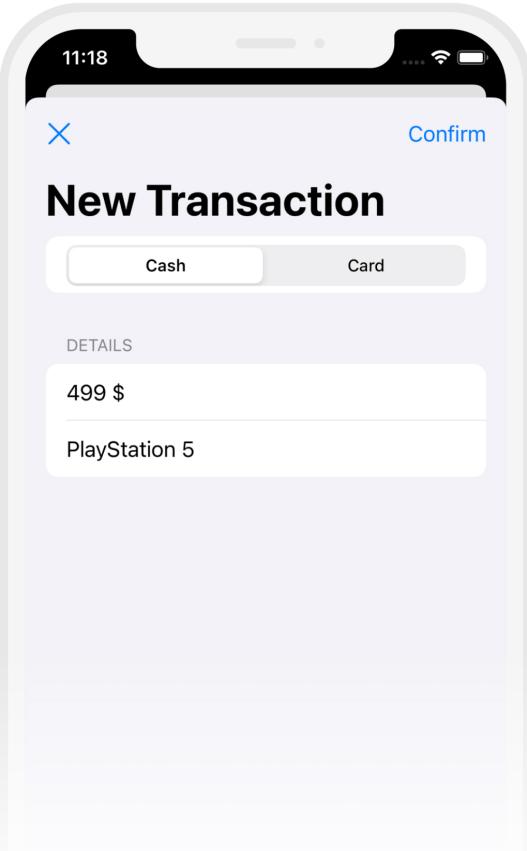
The game uses various post processing techniques such as Ambient Occlusion and Screen Spaced Reflections for visual appeal.



Third Person Camera Controller

A third person camera controller with basic actions to traverse around the open-world.

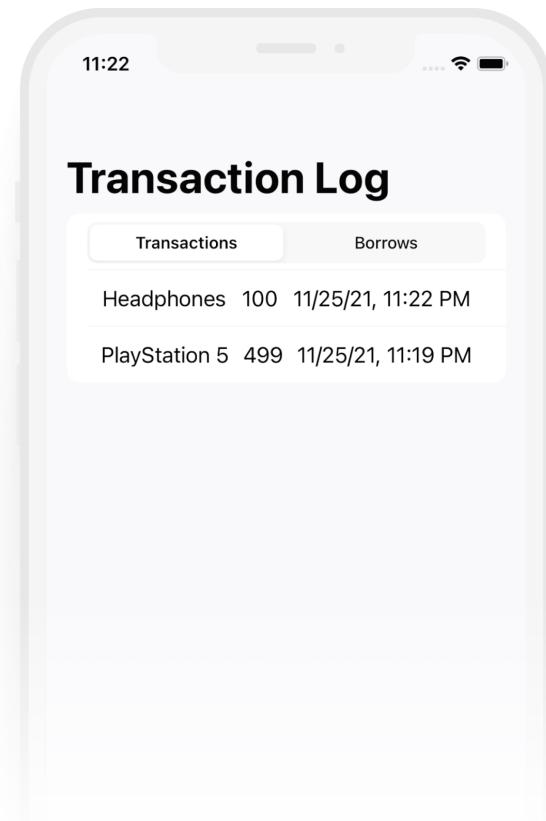




Wallet App - iOS

SwiftUi CoreData

An iOS application which helps users keep track of their transactions daily with friends, stores, etc.



- The user can add transactions and their details and have them tracked in a transaction log.
- The user can also add friends to keep track of lent or borrowed money between a friend.