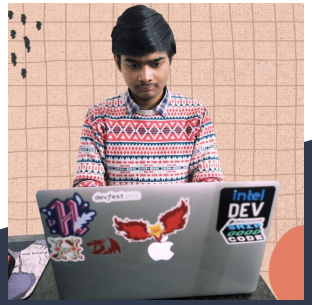
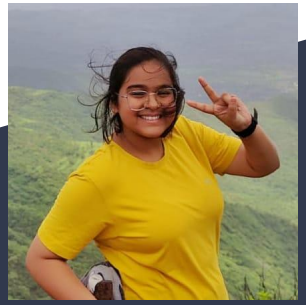
Team Shamblet

Meet The Team

We are University students who are enthusiastic about engineering solutions to the problems faced by people in their daily lives.
Recently we noticed our peers having trouble finding vacant classrooms during their free lectures, so we built an app that tells students which rooms are empty instantly without them needing to roam around and check each room. The app has be downloaded by 700+ users till now.
Now we are observing another issue related to Library usage which we want to solve by the use of computer vision in this hackathon



Ankush Singh
(Full Stack Developer)



Savita Shrivastava
(ML Developer)

Develop an Computer Vision enabled application to provide analytics of Library usage by students and also create a platform to promote healthy competition and collaborative studying

One **common problem** a majority of university **students** face is the unavailability of space in their campus libraries. We are university juniors, our seniors faced this, we are facing this, but we don't want our future juniors to face the same problem.

That's why we are developing an **AI based automated system** that will indicate, how crowded a library is at a given time by utilising **computer vision** and use data collected over time to **predict** when it will me more or less crowded, in **real time** through the **Awiros** platform.

The platform will be **gamified** through leaderboards, **collaborative** study sessions, virtual **rewards**, concept of **study buddies** and so on.

Assumptions

- **Camera** - Pre existing infrastructure like surveillance cameras can be used for easy implementation
- Other than camera, the library punch-card entry system can be used for more accuracy
- We are developing a platform which we believe has potential to become a full fledged product

Our Approach

Inflow, Outflow tracking in Libraries

Objective:

- To measure current crowd, people entering and leaving the Library throughout the day.
- Analyse the data collect to figure out the different days and times when the libraries are most or least crowded.
- Analyse the Library visiting patterns for users to provide recommendations and predictions

Key Features:

1. Accurate measurement of inflow and outflow at a library
2. Time recommendation system based on daily crowd

Technology Stack:

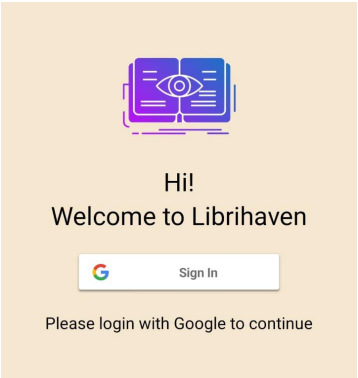
- **AI/ML** : Python, OpenCV
- **Mobile App** : React Native + Expo
- **Backend** : Flask, Firebase Database

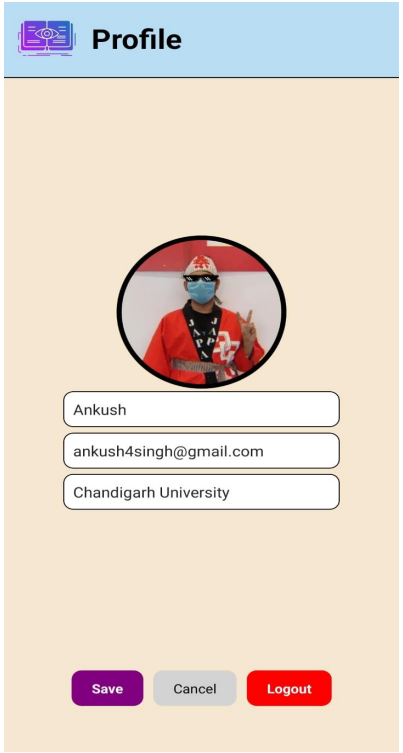
	System Logic
01	The app at the library will use computer vision to measure inflow, outflow, current number of people
02	The data collected is time-stamped and stored on a database
03	The mobile app will fetch the measured numbers and display them to the user
04	An ML model running on our backend will analyze the movement of people using the Library
05	The ML model will output the favourable timings at which students could use the Library.
06	The app will have features for collaborative study sessions and a rewarding system based on amount of time they study in a Library
07	

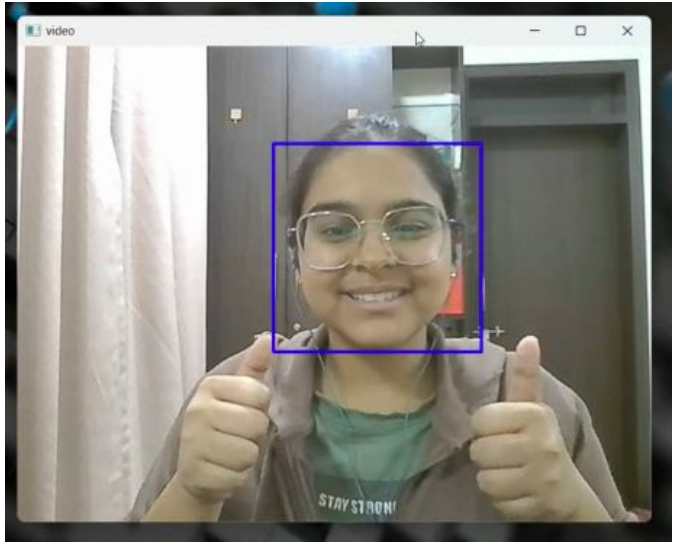
Details about the models

	Model Name	Model Type	Framework	Input Format and Shape	Output Shape	Custom Tweaks
Primary Model Architecture	HaarCascade Classifier	Classifier	OpenCV	Image of size 640x480	An array of bounding boxes [x1,y1,x2,y2] And quantity of faces detected	None
Time based prediction model	To Be Decided	Predictor	Tensorflow	A table of timings and crowd count for all week (TBD)	An array of favourable timings and predicted crowd at library (TBD)	TBD

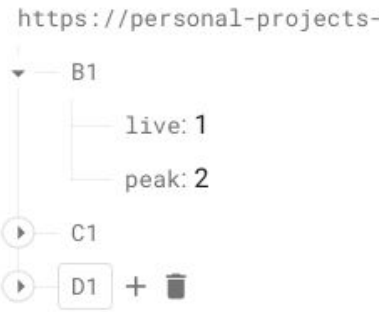
App In Action







Face detection



Database scheme

Demo Video: https://youtu.be/mKca14F3njo

Github Repository:
https://github.com/ankushKun/awiros-appathon-mobile-app

Future Scope

- A platform as a service (PaaS) to increase healthy studying practices by students
- Implementing a prototype of our system into our college infrastructure in real life
- This system is not just limited to Libraries, but any place where there is lots of crowd - marketplaces, temples, pop culture conventions
- The system can be upgraded and utilised by the government agencies related to maintaining public order, such as traffic control departments

Thank You