**ATTENDANCE RECORDING BOT**

**-Team TechnoVision**

**IDEA AND MOTIVATION:**

For the Institute Technical Summer Project-2018, our team intends to build an Attendance Recording Bot to record the attendance of all the students present that day who have registered for the course.

In order to tackle the loopholes in the current methods of manual attendance and introduce tech in various schools and colleges, we came up with this idea to make a bot that could use face recognition to mark the attendance of students while they are sitting for the lecture. We are also planning to create an app for the students such that they get to check their attendance and also receive a notification immediately when the bot records their attendance.

We would like to start for a small classroom with not many students to test this idea of ours.

**OUTLINE OF THE WORKING OF OUR BOT AND APPS:**

1. Students will have an app wherein they will have to login. We will show the attendance of the student also in that app for all courses that he/she has registered.
2. The bot will be controlled by the professor using an app.
3. The bot will perform regular movements with differential turning mechanism. We will also attach servos to the camera stand on the bot to facilitate turning of the camera using the Bot Controller app.
4. The phone camera attached to the RPi will send a live streaming of the class with students.
5. Using the previous training about the faces of registered students, the bot will recognize the students’ faces in the live video. We plan to implement this by using either “face\_recognition” package or “eigenfaces algorithm” in OpenCV.
6. As soon as a student is recognized, his attendance will be marked in a backend database maintained by us.
7. As soon as the attendance is marked, it would reflect in the attendance sheet that the student views in his account in the app.

**TENTATIVE LIST OF MATERIALS/EQUIPMENTS REQUIRED:**

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| **MATERIALS/EQUIPMENTS** | **COST (INR)** |
| Raspberry Pi | 3000-5000 |
| Camera | (Phone Camera to be used) |
| Chassis and Stand for Phone | ~500 |
| Hollow Rod for Neck of Bot | ~200 |
| Wheels (4) | (from XLR8) |
| 100 RPM Motors (4) | 600 |
| Servo Motors | (from RC Plane) |
| L293D Motor Driver Module | 150-175 |
| Bluetooth Module (HC05) | (from XLR8) |
| Battery (Lead Acid) | ~500 |
| Jumper Wires (as required) | 200-400 |
| Nuts/Bolts (as required) | ~100 |

**ESTIMATED OVERALL COST OF THE PROJECT:**

The overall costing for this project should come out to be approximately INR 6000-8000.

**PROGRESS DURING PHASE 1:**

* Checked out all python packages that might be required for our project including numpy, face\_recognition, and OpenCV.
* Gained theoretical knowledge about fundamentals of Image processing and Computer Vision :
  + Edge Detection
  + Transformation
  + Convolution theorem
  + Eigenfaces algorithm
* Rigorous learning & practice of app development using Android Studio. The basic outline of our app with required activities and their interactions has been formulated in Phase 1.
* Started off learning Django and SQL to create the backend framework of our attendance system. Also discussed about the tables and data stored in them.
* Learnt basics of RPi and how to handle camera input. (Waiting for the Bootcamp for Hands-on training)
* Got accustomed to Git and Github for collaboration required in the project over the course of time.

**TENTATIVE PLAN OF ACTION:**

(We have prepared this keeping in mind at least 1 day every week to review and debug all the stuff that we would have done by that particular week)

* WEEK 1:
  + Finalising BOT design
  + Hands-on practice and getting familiarised with RPi module
  + Start creating the script for our bot to recognize faces and display them.
  + Mechanical development of bot (begin)
* WEEK 2:
  + Mechanical development of bot (towards completion)
  + Backend database designing
  + Manipulate the script to store data in the backend in real time.
* WEEK 3:
  + Creating the front-end of app for students
  + Final tweaking the scripts for desired results
* WEEK 4:
  + Completing remaining frontend and backend app requirements
  + Final touch to bot structure as required.
  + Testing + Debugging of app
* WEEK 5
  + Developing an app to control the bot
  + Final integration of bot and apps
  + Final Documentation

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