Final Year Project (Mid term)
Session:2021-2022

Gesture Recognition for Specially Abled People

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DEPARTMENT NAME

Description Of The Topic

- Sign Languages are a medium of communication for specially-abled people who are having difficulties while speaking and listening.
- They provide a gesture for them to communicate and get along with the life with others.
- It is a visual form of language that uses expression and movements to convey the emotions and meanings.

Feasibility Study

- Specially-abled peoples who have problems with speaking and hearing tend to use this sign language the most.
- Because of this Online-system due to pandemic of COVID-19 their words being going unheard or missed.
- Our platform identifies that issue and tend to come up with a solution which may benefit the whole communication process by allowing them to express more efficiently.

Existing Solutions/Literature Review

- **GnoSys**

Netherlands-based start-up has developed an artificial intelligence (AI) powered **smartphone app** for deaf and mute people, which it says offers a low-cost and superior approach to translating sign language into text and speech in real time.

- **SignAll Launches Ace ASL App**

AI-empowered solution enables users to practice American Sign Language (ASL). The system uses a camera to recognize signing and provide feedback. Ace ASL app is based on the same sign recognition technology that makes possible automated and spontaneous translation between American Sign Language and English. The mobile application is the first ASL learning **app** to provide real-time feedback on signing.

GAPS in existing solution/literature review

- All the recognition or detection apps have launched their **separate application** which includes a **prepaid cost** for the use in real world.
- Our approach is based on integrating our project with **leading meeting platforms** which will allow everyone to come together at the same medium.
- Because if the specially abled person is having an Online meeting then it will not be easy for them to convey their message.
- By integration of our project with these platforms we can ensure good **customer attention** and will benefit all.

Problem Statement

- To identify what the person is trying to convey via sign language over an online or virtual meeting on platforms like Google Meet, Microsoft Teams, Zoom.

https://en.wikipedia.org/wiki/Chart

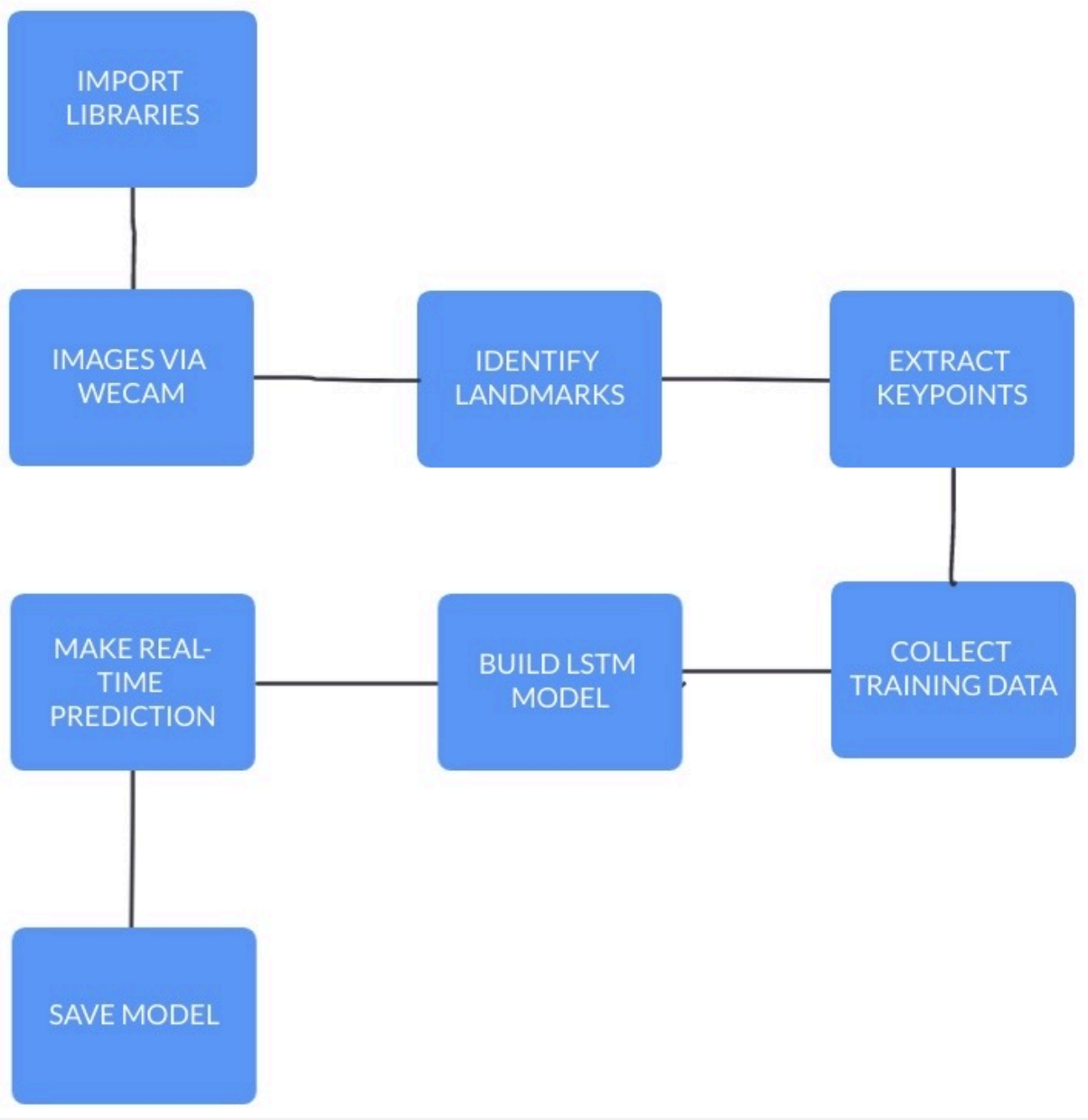
Objectives

- To help the specially-abled people get to express their view in the Online-system by leveraging deep learning and image processing techniques.
- The project will display the meanings of the sign made by the person on the screen.

Tools/platform Used

Technologies
Python
OpenCV
Flask
HTML, CSS
Deep Learning
LSTM

Flowchart


IMPORT LIBRARIES
IMAGES VIA WECAM
IDENTIFY LANDMARKS
EXTRACT KEYPOINTS
COLLECT TRAINING DATA
BUILD LSTM MODEL
MAKE REAL-TIME PREDICTION
SAVE MODEL

Design Methodology

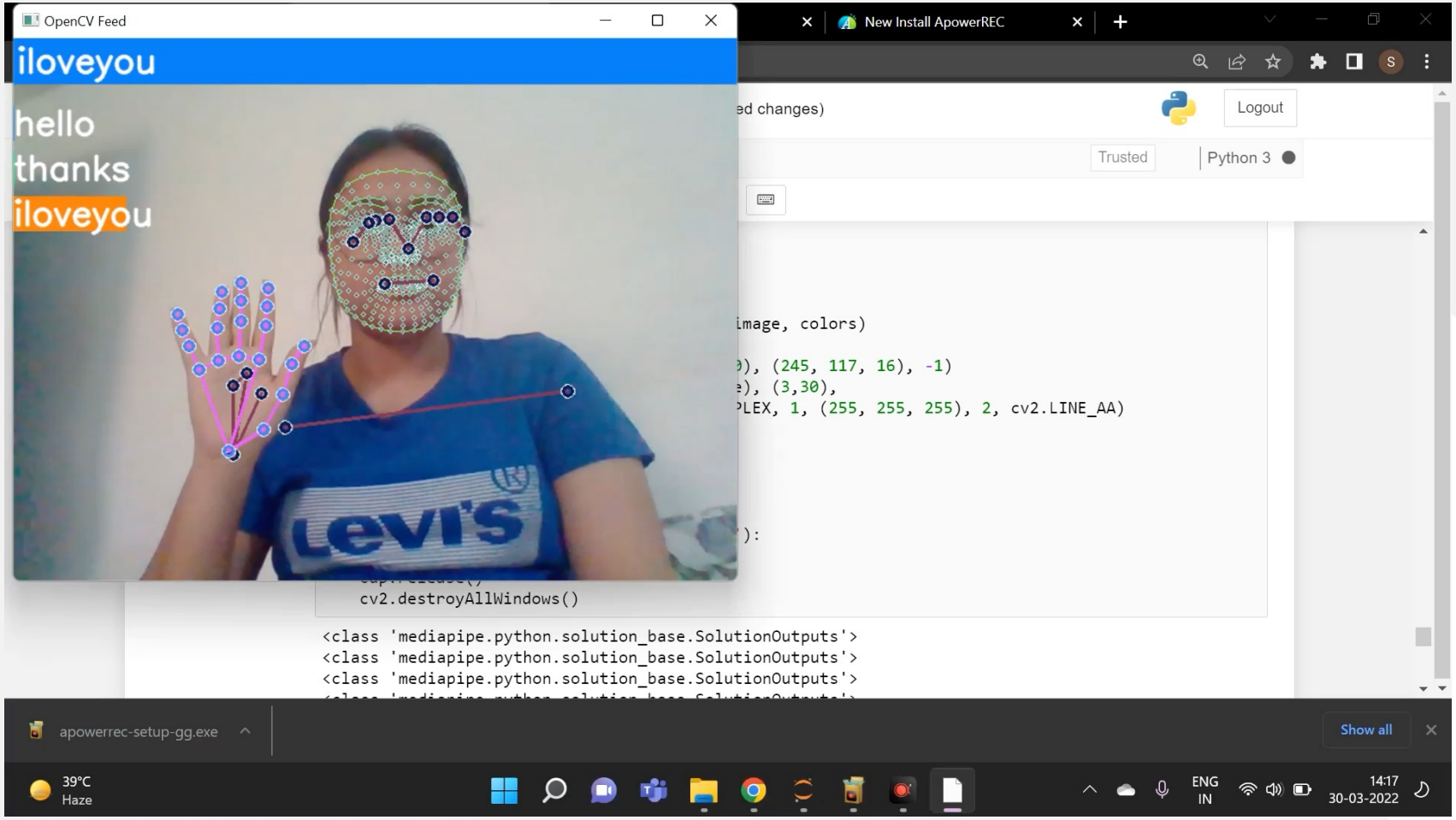
- Firstly we started with gathering the data on how to continue with this project and what will ne the requirements.
- Then we researched about the libraries that can help us with the sign recognition.
- Afterwards we tried to integrate the libraries with camera input.
- Later a prototype was ready that showed how the final project will look.
- Finally to increase the accuracy we used LSTM model.

Challenges and Issues identified

Challenges Identified	Solution
Compatibility, Communication, Long Distance	To overcome this we used application like **AnyDesk** to connect our computers and work on each others systems.
New Languages like Flask, HTML, CSS	Learned about each of them and got reference from websites like **stackoverflow**
Mediapipe integration with Flask and HTML	No reference was available for this part. We worked on this on our own.

Demo Video

- Before integrating with Flask:



Demo Video

- After Flask integration

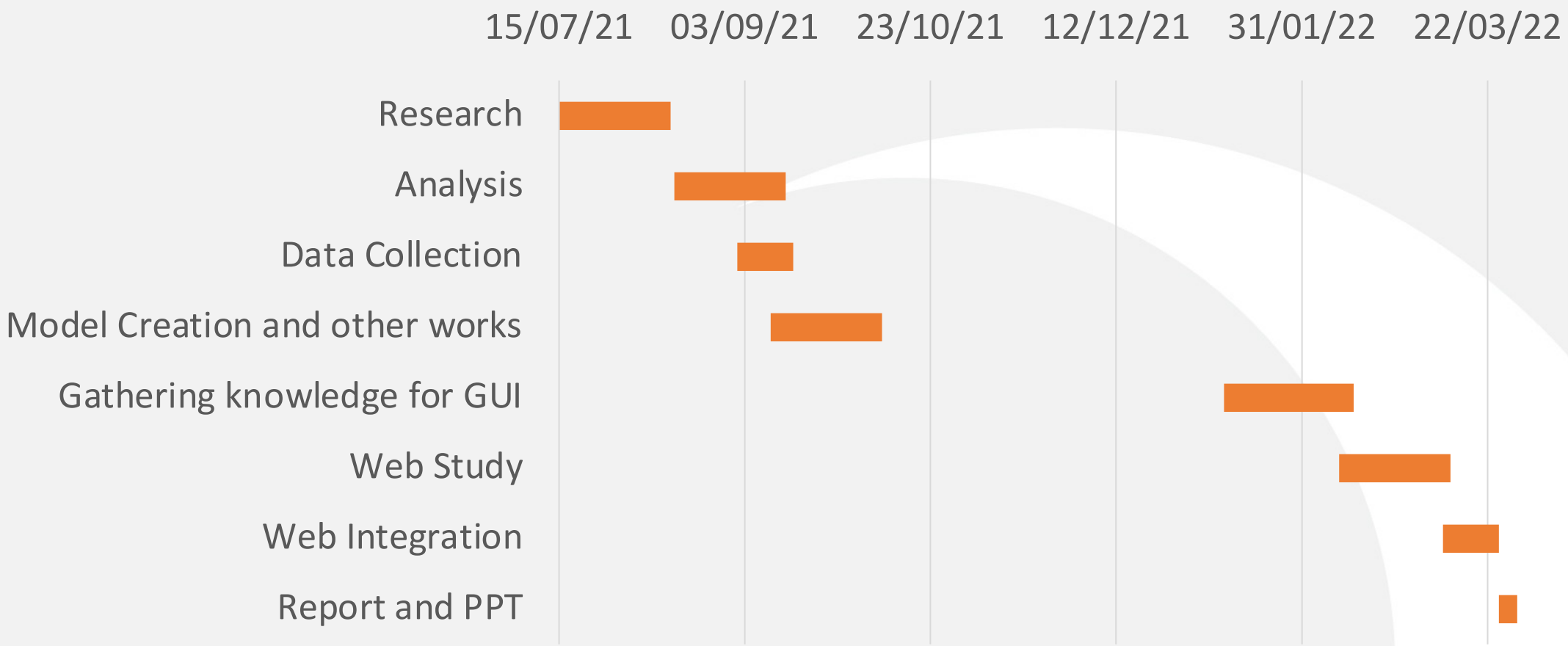
Testing and Performance Evaluation

- As we use mediapipe library, developed by Google, at the backend, the accuracy is **95.7%**
- Link for above - https://google.github.io/mediapipe/solutions/hands.html#:~:text=With%20the%20above%20techniques%2C%20we,of%2095.7%25%20in%20palm%20detection.
- Also our LSTM model gives an accuracy of 100%

```
accuracy_score(ytrue, yhat)
```

```
1.0
```

GANTT Chart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Research
Analysis
Data Collection
Model Creation and other works
Gathering knowledge for GUI
Web Study
Web Integration
Report and PPT

Responsibility Chart

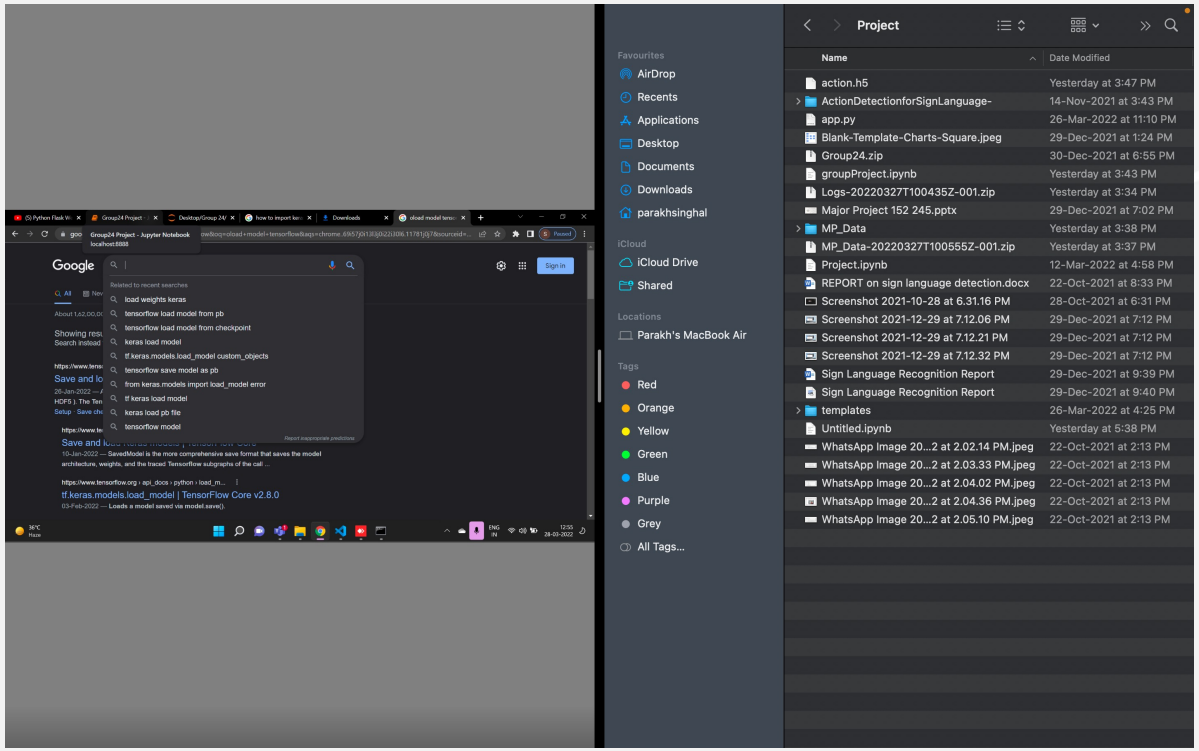
Responsibility	Parakh Singhal	Shweta Saini
Research	3	3
Analysis	3	3
Data Collection	2	2
Model Creation and other works	3	3
Gathering knowledge for GUI	2	2
Web Study	2	2
Web Integration	1 (Flask)	1 (HTML, CSS)
Report and PPT	3	3

1. Responsible; 2. Assist Role; 3. Cumulative

Broader Impact factor Status/ Business Plan

- This work can help a lot of people with speaking and hearing difficulties.
- Who rely onto third party applications while in the meetings.
- Our work can be integrated with the leading meeting platforms like **Google Meet, Microsoft Teams, Zoom,** etc, which in return will help the people to interact more significantly and won't affect their pockets much.
- This integration will help us to gather good audience and further we can launch iur own application which will have many more features than provided with meeting platforms.

Screenshot of MS-Meetings(online)/comments(offline) by Guide



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