



BARODAWEB

Virtual AD management

Through OpenCV



Presented by Aayush Shah (19BCE245)



Overview

Here is an quick overview of what contents are covered in this presentation of Virtual AD management through openCV internship done at Barodaweb Company.



- Overview
- About the Company.
- Vision, Mission and Goals
- Introduction
- Objective & Scope
- Preliminary work & Important findings
- Results
- Summary & Conclusion
- Future work
- Team





About the Company

Aayush Shah

- Summer Internship is done as BarodaWeb which is an end-to-end IT outsourcing service provider company.
- It has proven capabilities and deep domain expertise as they address business changes through their integrated IT and business process outsourcing solutions which tackle critical business functions.
- In our internship, One aspect of major project of virtual ad management system assigned. We were told that this was the company's dream project.

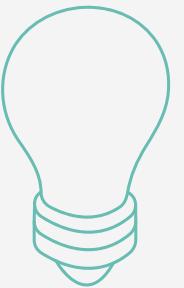


MR. RUPESH SHAH
CEO, BARODAWEB



Vision

- As the leader among Internet Service Providers in Vadodara, Gujarat, India, Barodaweb is working for recognition as "The Brand You Can Trust"
- They provide a wide array of high-quality services that are tailored to their requirements, budget, expertise, and culture to meet our customers' needs regarding Internet presence and applications.



Mission

- At present the company had developed more towards the field of web development but is tending to ameliorate their skills in other domains also.
- With the objective of building the Internet community in Vadodara, Gujarat, India, Barodaweb will continue to provide its customers with a variety of facilities and innovative Internet, Intranet, and extranet solutions



Goals

- Deliver IT solutions that provide competitive advantages to our clients, helping them achieve milestones of success.
- We aim to build a team that will make us emerge higher by developing quality and customized solutions for our clients.

Roadmap

- REQUIREMENTS GATHERING

- Things to be covered
- Functionalities
- More ideas
- Execution

- EXPLORATION OF ALGORITHMS

- Overviewed various articles, research papers and git repositories
- Finding efficient algorithms for different tasks

- PYTHON SCRIPT

- making script for individual task i.e. Face recognition, Gaze tracking, Age, Gender and Emotion detection
- Testing various test cases

- ASSEMBLING SCRIPTS

- Compiling every individual scripts in one single notebook
- Django implementation
- Mobile app development



Introduction

Virtual AD management through openCV

- Our project title was AD management through openCV. In which we were assigned the ML/DL part which consists Facial feature recognition module.
- We have to develop python script for backend server which analyses the following features : Face Detection, Face Recognition and after that, Gender, Age, Emotion and Gaze tracking were also implemented.
- These provides crucial data for future AD recommendations (For AD broadcaster) and product improvement (for the Product AD company).

Aayush Shah





Objective	Scope
<ul style="list-style-type: none">The main objective of the project was to do AD management through Computer Vision.	<ul style="list-style-type: none">We have to cover all the screen types from restaurant table tab, Movie theatre poster screen, and Flyers on road.
<ul style="list-style-type: none">We have to analysis various features of person in front of the tab or screen which may be put in restaurants tables or flyers on road.	<ul style="list-style-type: none">Each and Every person who gives attention to the screen, we add his/ her face's feature in our database if it's new user for our database.
<ul style="list-style-type: none">The screen will show various ADs and our task was to detect human emotions, gender, gaze, age and recognition of whether that user is previously showed up in front of any of our existing screens or not.	<ul style="list-style-type: none">face recognition algorithm will be run first to check whether the user is new or existing.



Preliminary work	Important Findings
<ul style="list-style-type: none">• We gathered the requirements first for analysis what are the important aspects of feedback which contains human interaction and which can be useful to advertising companies.	<ul style="list-style-type: none">• We searched for various efficient algorithms for face recognition as well as different modules like gaze tracking, gender and age detection. GitHub played a useful role for finding suitable python packages.
<ul style="list-style-type: none">• Here we find out that gender, race, age, attention span (gaze tracking) and emotion of the person in front of screen can give proper data for the advertising company that how their product impressed the user and that data can also be useful for us (AD broadcaster) for recommending more related ADs.	<ul style="list-style-type: none">• Also some research papers were also examined before the gathering of all the modules in one. Medium articles and other web resources provided the step- by-step tutorials for some basics of working with camera and images in python.

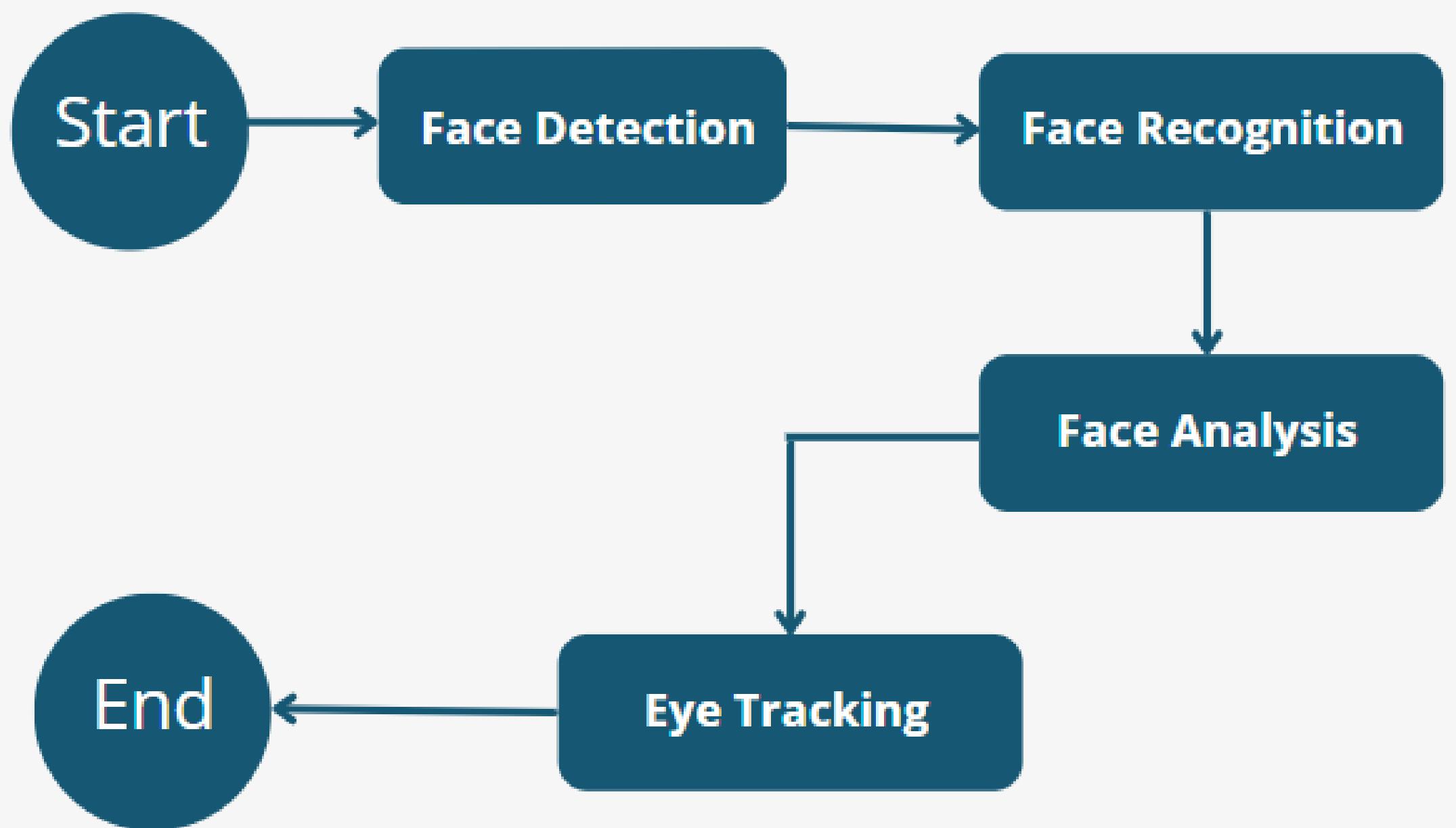
Libraries

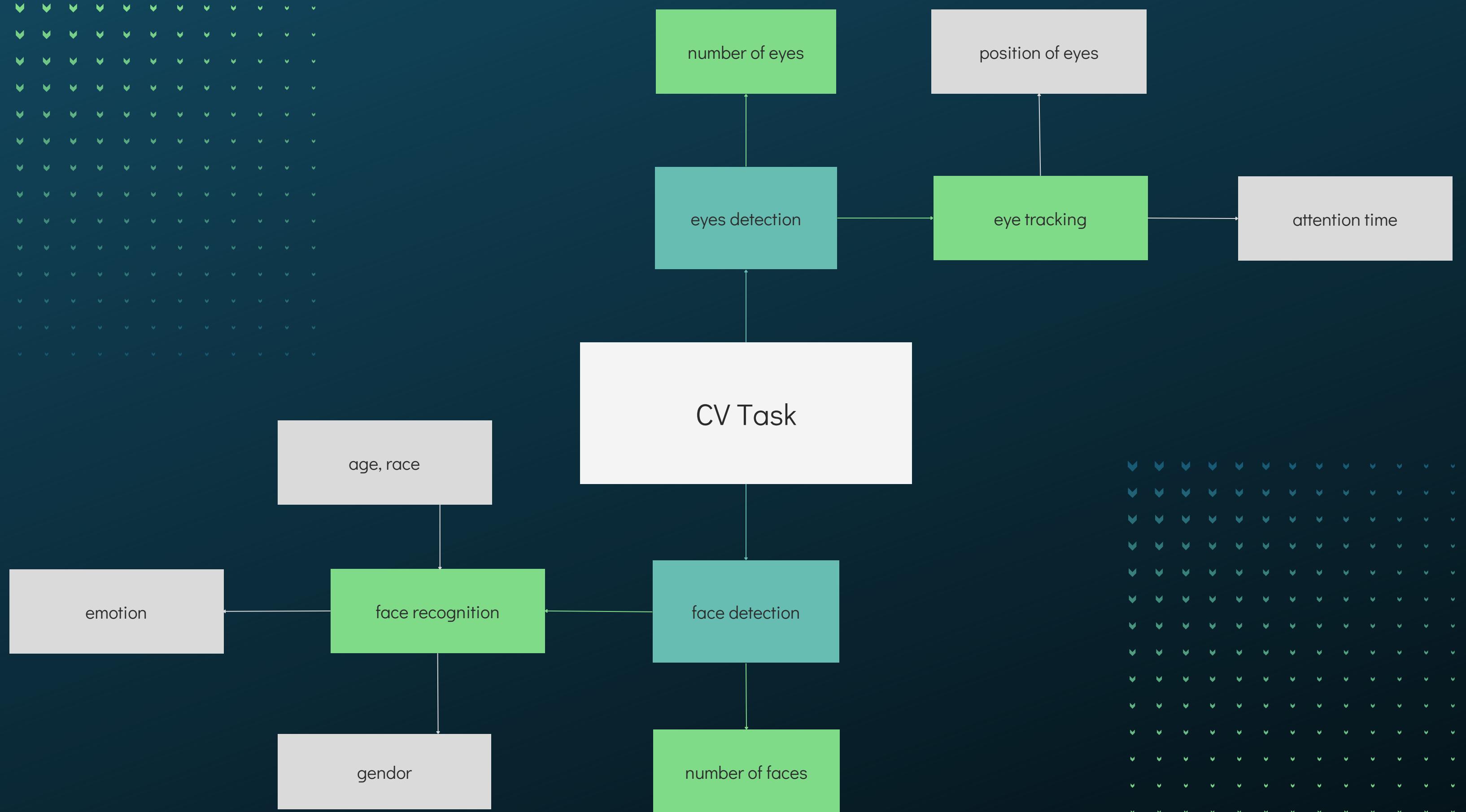
There are many programming languages but we used Python to access to great libraries and frameworks for AI and machine learning provided by Python

- CV2 : we used cv2/openCV to read video through webcam and process that video frame by frame. Moreover, face detection from frames is also done using CV2.
- DeepFace : This library contains trained DL models for analysing face images. We used this library to analyse emotions, age, race and gender of faces captured in frames of video.
- Face_recognition : This library contains trained models for recognising faces. We used this library to recognise faces in video and provide unique id to new faces
- Gazetracking : This library have trained models for detecting eyes and analysing position of eyes. We used this library to capture and analyse movement of eyes from faces captured in video
- All of the above libraries used tensorflow library which provides support for machine learning and deep learning tasks

Flow Chart

As shown in flow chart, we first read video from webcam using cv2 library, process each frame of the video. In each frame we detect faces using face cascade and recognise faces then analyse that faces using deepface and track eyes using gaze-tracking.
All of this data gets displayed in output video at real time.





Results

The basic aim of this project was to provide the data to the organization who are currently watching the advertisement.

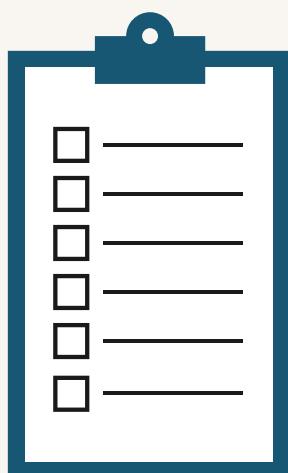
Every photo is provided with unique ID and if the image does not exist in database then new id is provided

We ensured that every new person's photo is updated in the database only if he resides in front of the camera for certain amount of time

Finally a dataframe is used to store all the data of the people.

Summary and Conclusion

We have seen various types of methods for face recognition and eye gazing, and finally decided to accumulate the most accurate method for this project.



The data stored can be helpful for advertising the marketing companies which eventually can result the interest of any customer towards a specific and relevant product

Summary

- The basic aim of this project was to provide the data to the organization who are currently watching the advertisement. The data which we have collected is age, gender, eye-gazing (currently what is the status of eye whether blinking, looking left, looking centre, etc), emotion, race and recognition of face whether the specific person is new or already exists in the database.
- We ensured that every new person's photo is updated in the database if he resides in front of the camera for certain amount of time otherwise the people who are just passing in front of the camera will also be detected and a new amorphous photo will be stored in the database.
- This is the sample photo of the person whose photo is already stored in the database. If any new person came in front of the camera, then his photo will be saved as 'number.png', where number is the increasing count of the people whose photo is stored in the database.



Conclusion

- We have seen various types of methods for face recognition and eye gazing,
- finally decided to accumulate the most accurate method for this project. The data stored can be helpful for marketing companies.

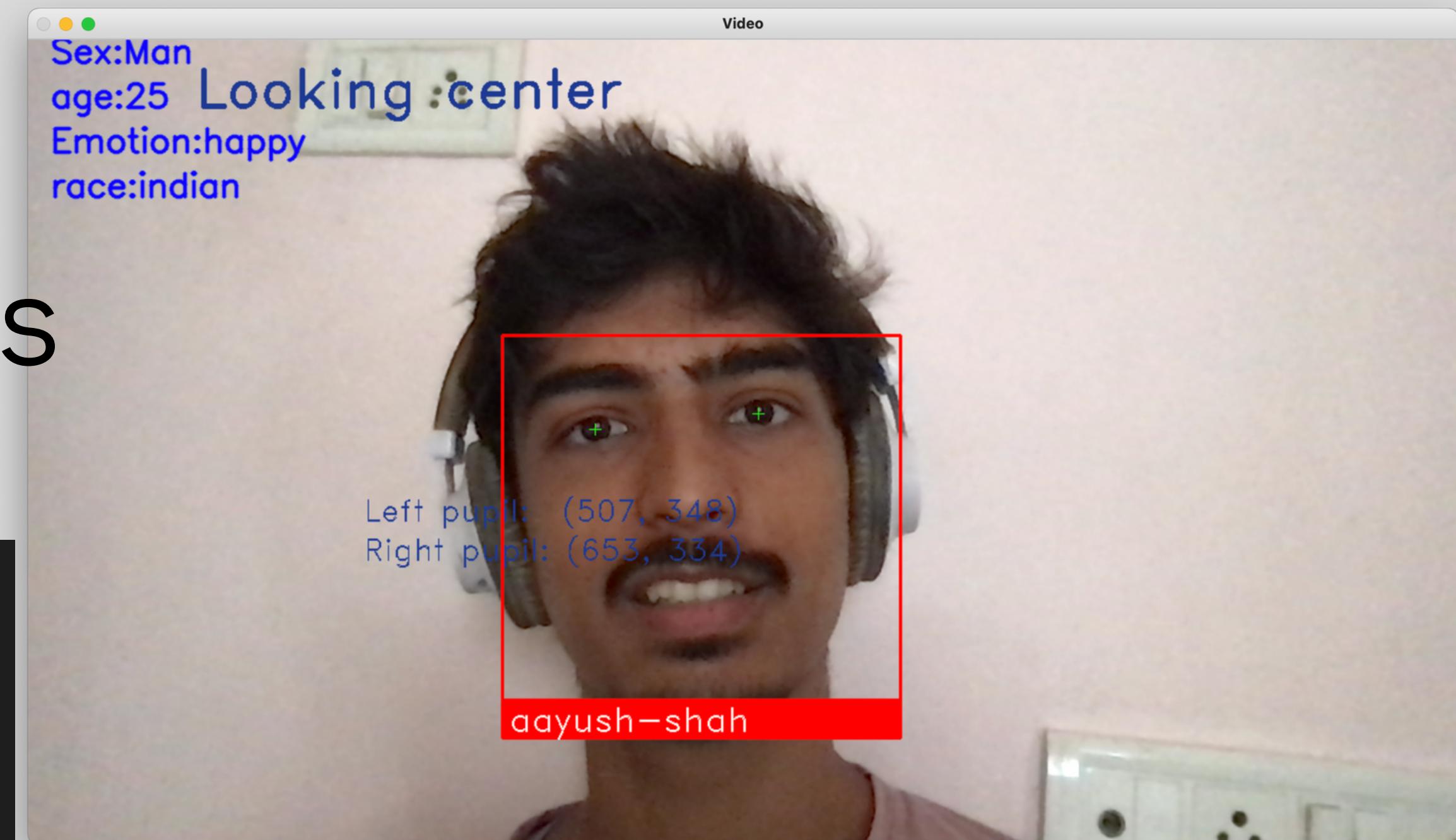


>>>

Facial Analysis

in real time

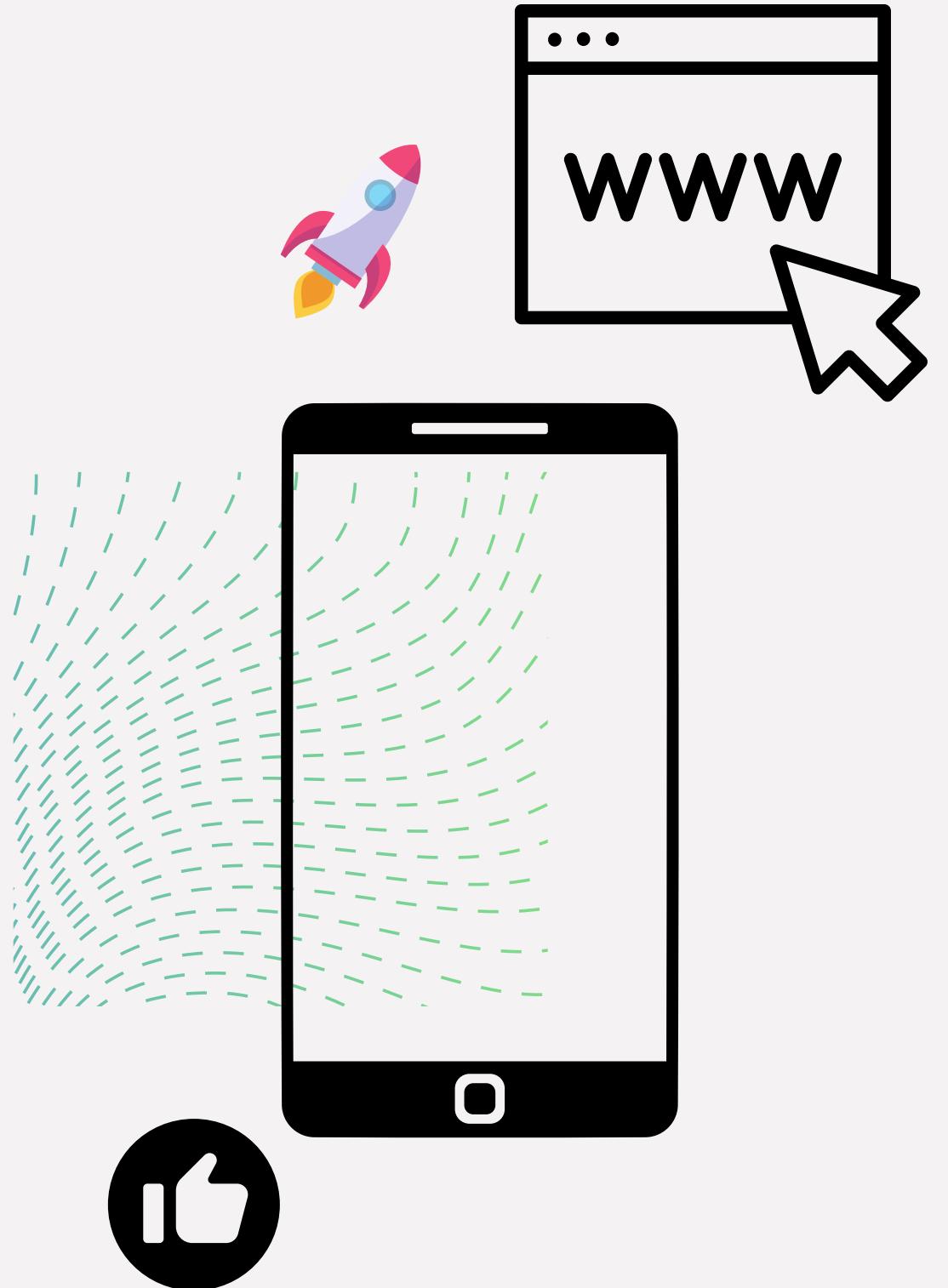
face_names : ['aayush-shah']							
Frame	Age	EyeGaze	ID	Gender	Emotion	Race	
0	1	NaN	Looking center	aayush-shah	NaN	NaN	NaN
1	2	NaN	Looking center	aayush-shah	NaN	NaN	NaN
2	3	NaN	Blinking	aayush-shah	NaN	NaN	NaN
3	4	NaN	Looking center	aayush-shah	NaN	NaN	NaN
4	5	NaN	Looking center	aayush-shah	NaN	NaN	NaN
..
97	98	31	Looking center	aayush-shah	Man	fear	white
98	99	24	Looking center	aayush-shah	Man	fear	indian
99	100	34	Looking center	aayush-shah	Man	sad	white
100	101	34	Looking center	aayush-shah	Man	neutral	white
101	102	34	Looking center	aayush-shah	Man	neutral	white



The sample table shown above indicates all the data which is needed to be stored.

Future Work

- We have created a website with the help of Django framework to accommodate the full stack development languages with the libraries of python
- At present we have the website ready but it can be further modified which can store the data in the database and can be uploaded to cloud
- The Further Development which is currently in progress is the development of the cross platform mobile app and It'll inherit all the functionalities of the current facial analysis.





BARODAWEB

The Team



Aayush Shah



Preet Patel



Ansh Ray

Thank You!

