Outpass Automation System Using Firebase And Face Recognition

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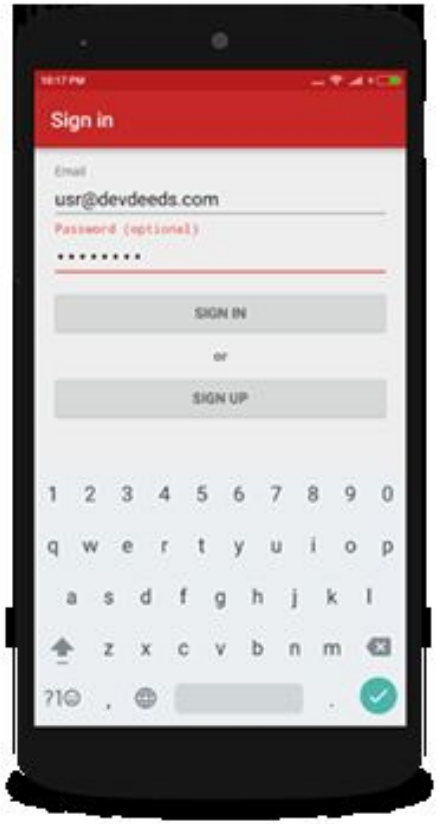
ABSTRACT

This project is titled “Outpass Automation System Using Firebase And Face Recognition”. In this, we have discussed about the existing Outpass system for girls in IIIT Allahabad and how we can automate the entire process and make it more efficient, secure and reliable, and just at the touch of our hand.

Getting College paperwork done for things like Outpass, Mess Rebate, Leave Application and so on requires a lot of time, manual work and student effort, which makes the whole process tedious.



Firebase

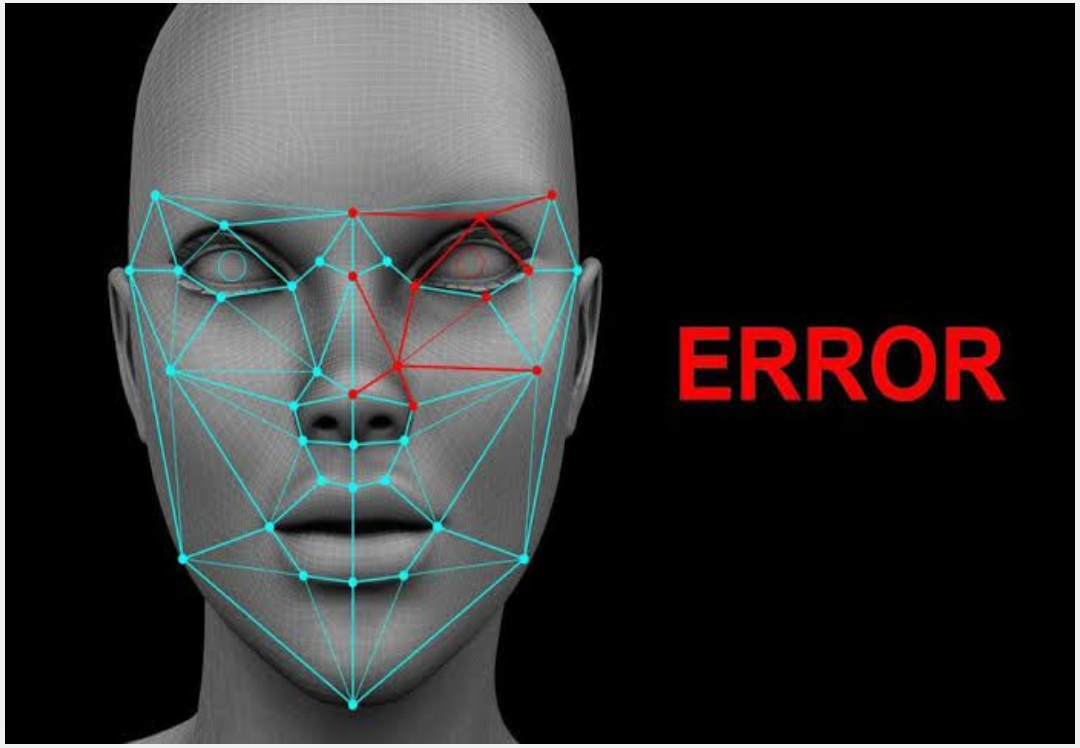
INTRODUCTION

- This application is focused or aims at making student’s life simpler at IIIT Allahabad, time saving and relaxed.
- The aim is to create an automated system to fill the details in out-pass application,so that physical effort is reduced from both the sides,i.e., from the staff side as well as student side.
- It also helps us to improve the reliability of the data which is maintained and provides a faster and efficient interface for the users of this app.

PROBLEM STATEMENT

This project was visualized by considering the difficulties faced by the students of college(s) in doing the official document work such as, the paperwork related to girls for going outside the Institute campus, which requires permissions and paperwork, signatures from authorities, which makes the whole process tiring and tedious,which is unnecessary and also time and energy consuming.

This project will provide a solution to the above mentioned problems by automating the entire process from Outpass generation to Student authentication using Facial Recognition.



PRODUCT FUNCTIONS

- It provides a digital solution to the out-pass mechanism currently used in the College.
- Students can see the status of their request, whether it is accepted or not.
- Students can also check their history.
- Students can also give the feedback, which can be technical or general feedback.
- It keeps the database of the students for the entry-exit timings, which can be accessed by the wardens to check the details

PRODUCT FUNCTIONS

- It keeps a check on the students, who are currently not inside the campus premises, which might be useful/handy in certain situations.
- It also has a function which adds the latecomers to the list of defaulters, which is accessible to the warden.
- It also has a function through which warden will get to know about the list of pending requests.
- Warden also has the option to provide the feedback.
- It uses the face recognition to identify the particular student(such that the
- system may not be misused by other student).

Implementation of application

It uses the live feed from the camera which will take various user’s faces as an input so as to recognise them using the facial recognition.

Android app will act as an interface between the user and the ML part.

In the android application part, different fragments and activities are used to avail the user with different functions.
.Xml files are used to create the layout for various activities.

Navigation activity is used as the leading activity for the student as well as the Caretaker part.
Toasts are used at different positions to display the status messages.

Implementation of application

Firebase is used to store the user data. Requests made by the user for an outpass gets added to the database, hence updating the database instantaneously.

On updating the firebase by the user's request, caretaker's data be automatically gets updated.

And the updation of the status by the caretaker will be added to the caretaker's history as well as to the user's history too.

Cardview and Recyclerview are used to add animations in the application.
Various dependencies are also used to run the application.

Implementation of face recognition

The camera will be streaming the live video. When the user comes in the frame of the video then the model will detect a human face and surround it by a rectangular box.

Once the model detects a face, it crops it and converts it into the a grayscale image, so that only the relevant information is stored.

This gray scale image is comprised of hundreds of pixels which have different intensity values. now, we will implement the technique called Histogram of Gradients (HOG),so we will convert these pixel intensity values to light flow gradients, which will more accurately describe the face data.

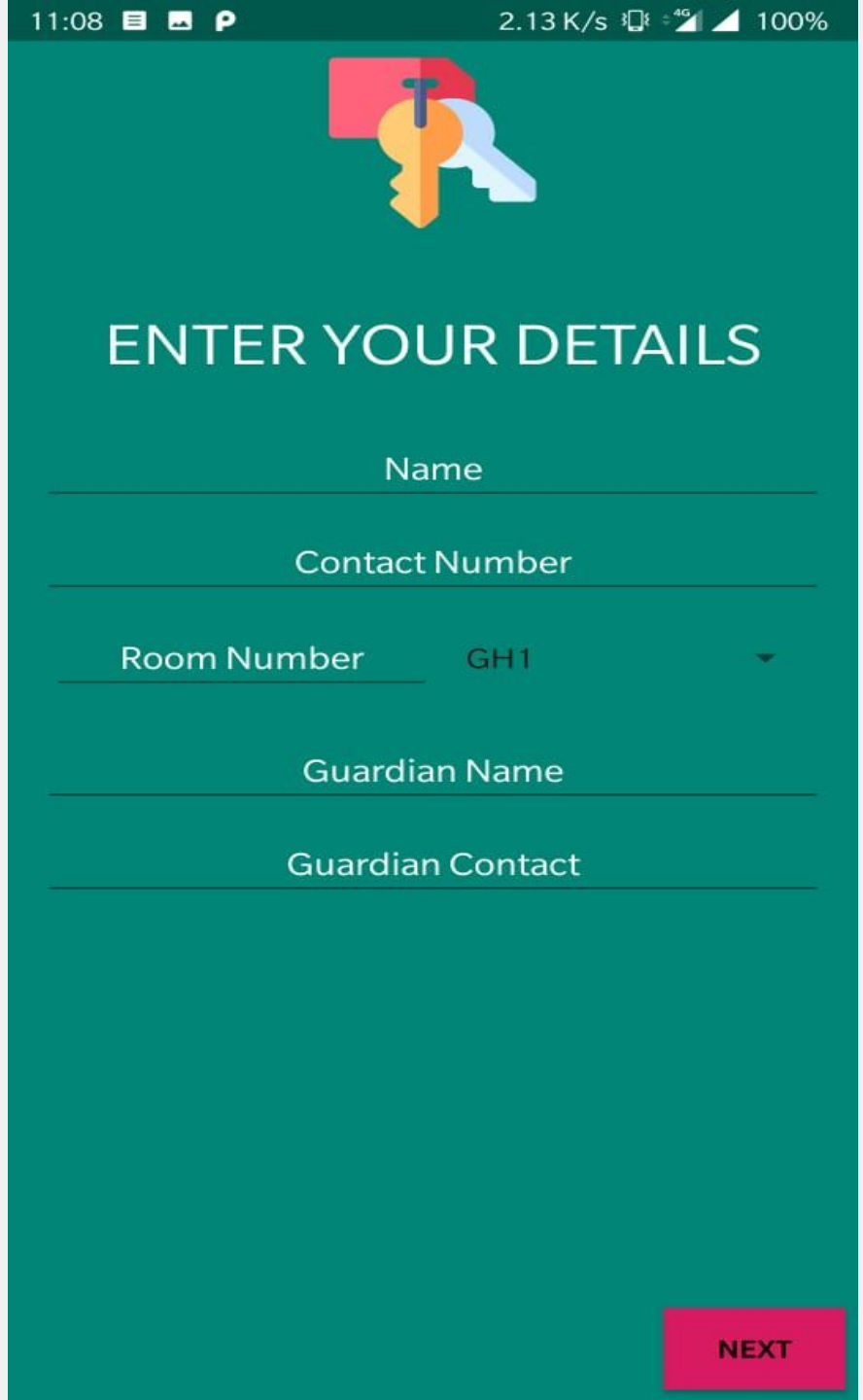
Implementation of face recognition

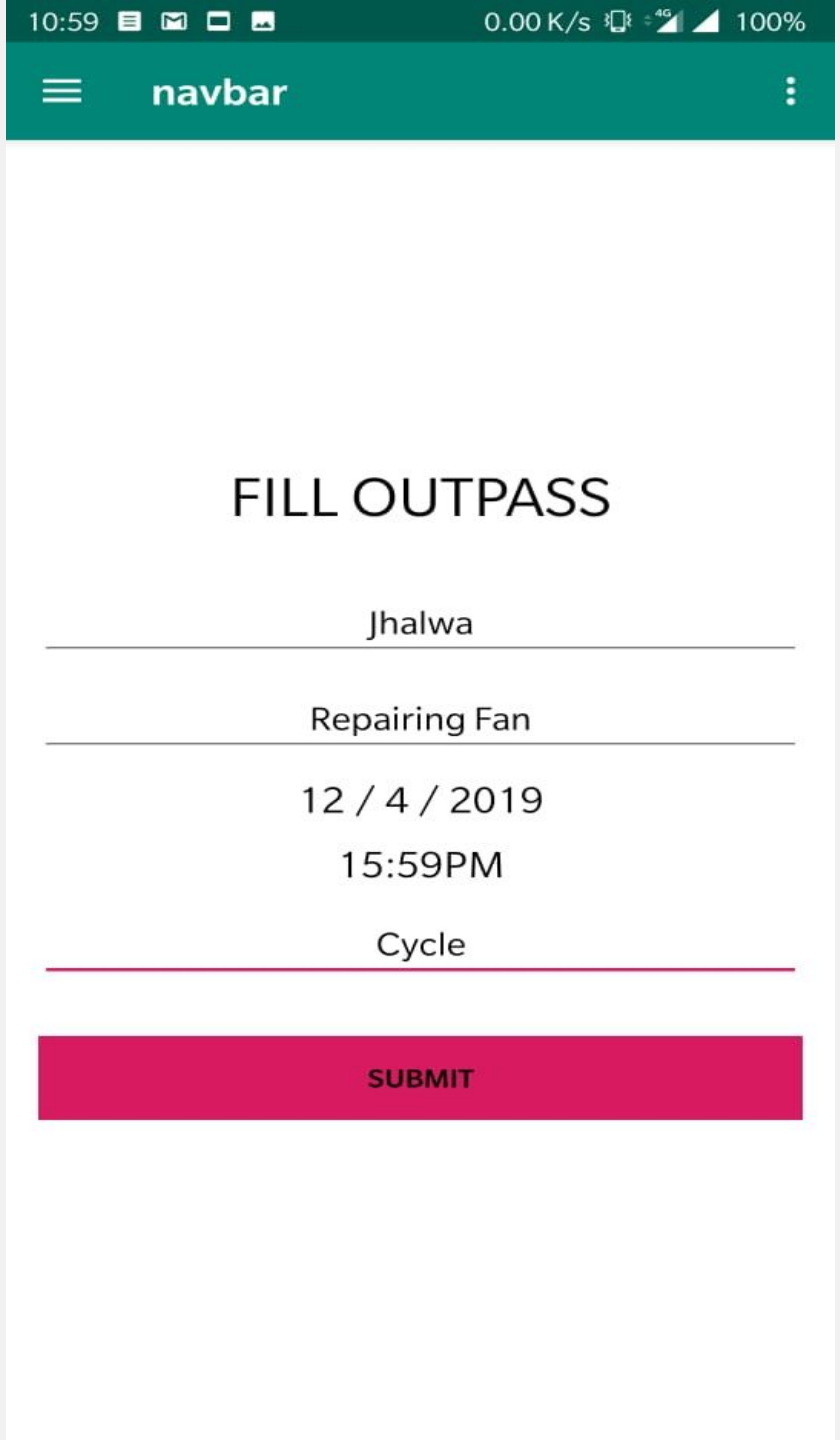
Now, the basic idea is that we will come up with 128 specific points called Landmarks that exist on every face and together can uniquely identify a face like a fingerprint identifies a person.
They are from the top of the chin, the outside edge of the each eye, the inner edge of each eyebrow etc.

Then, we train a ML model to be able to find these specific points on any face.
Once we are done with the encoding of the face, then we will be matching it with all the remaining image encodings of those students who are registered in the database

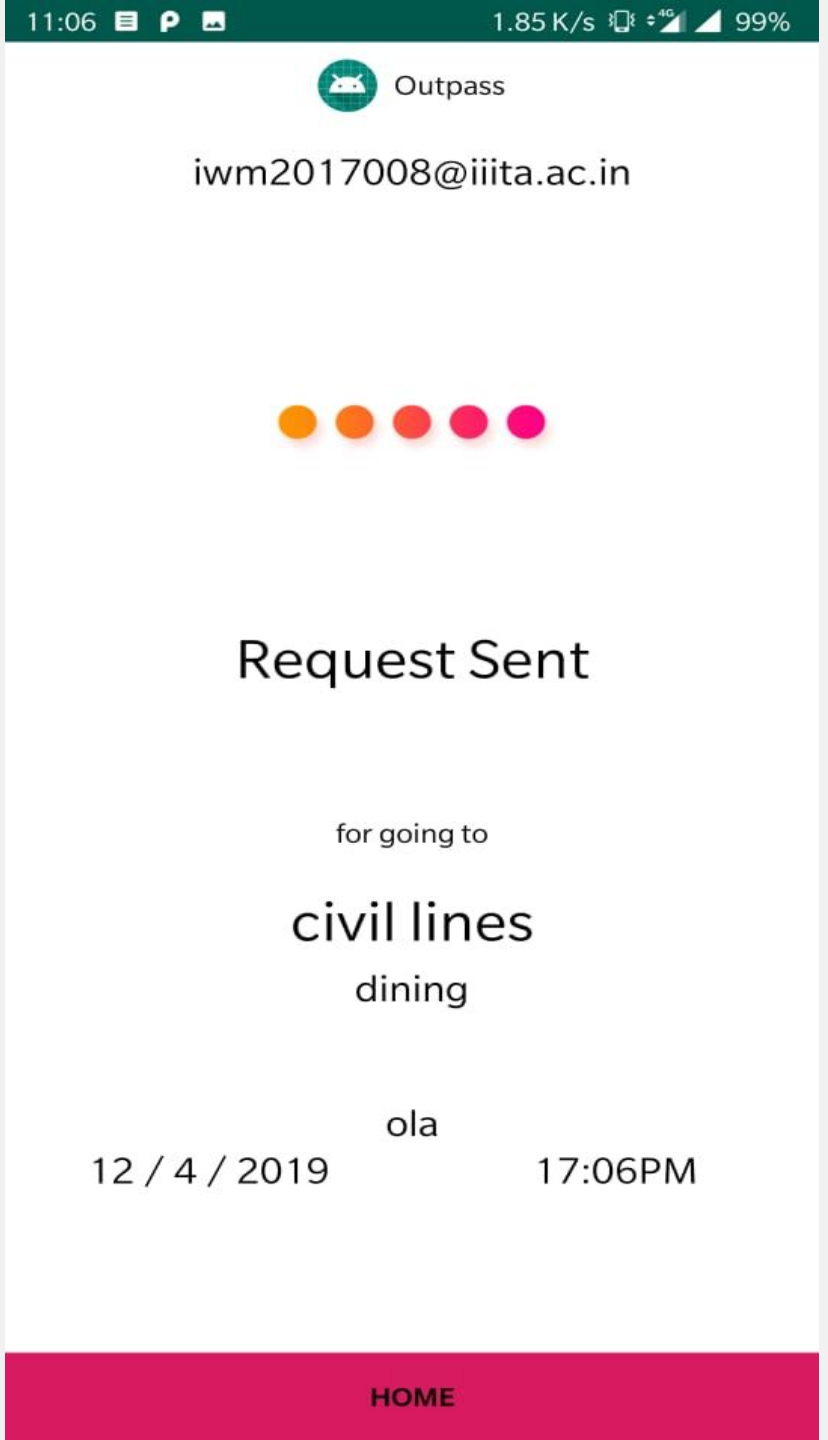

10:58
0.00 K/s
100%
iim2017003
@iiita.ac.in
LOGIN
Forgot Password ?
New User ? Click here to register

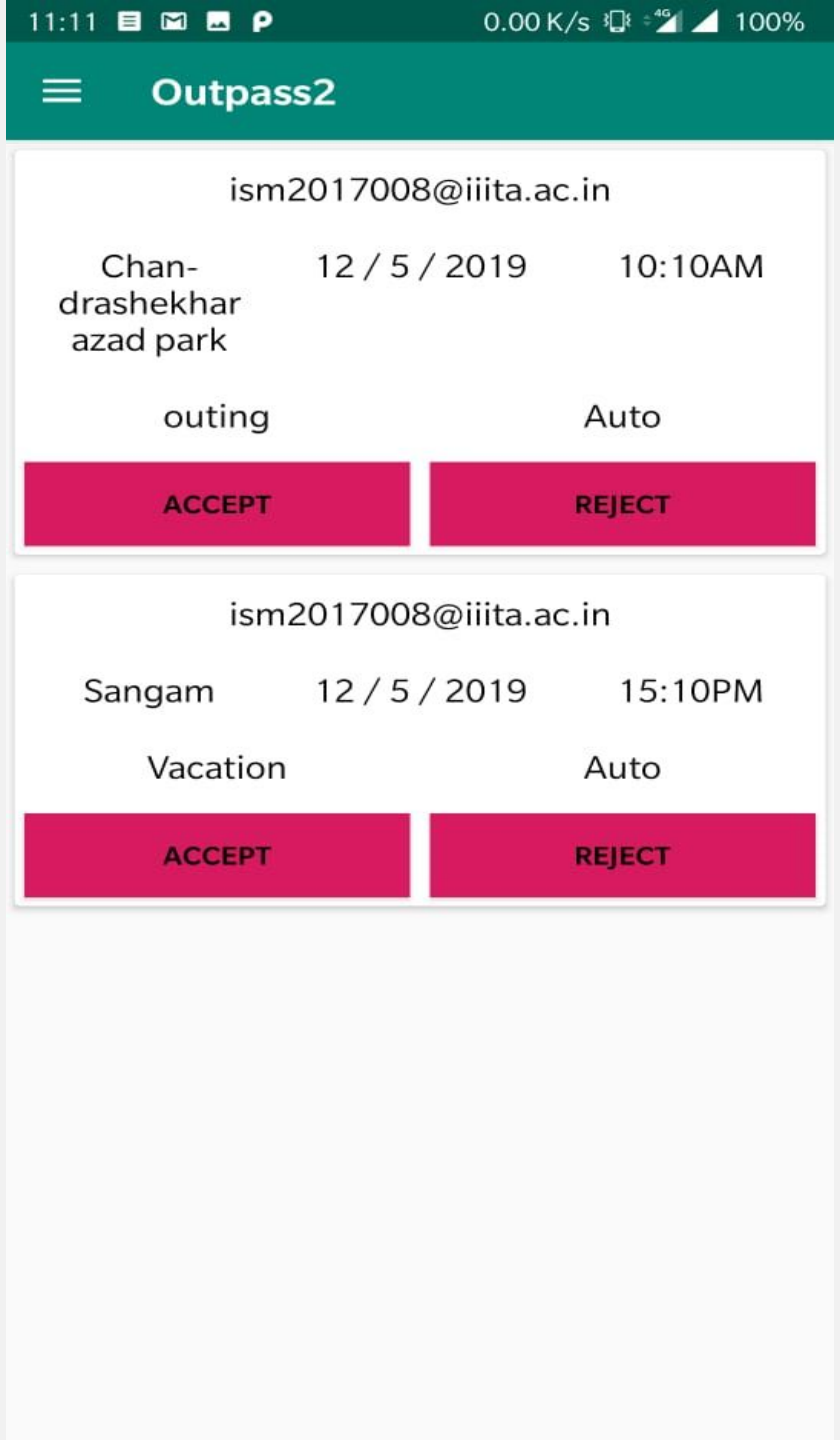
THE APP


11:08
2.13 K/s
100%
ENTER YOUR DETAILS
Name
Contact Number
Room Number
GH1
Guardian Name
Guardian Contact
NEXT

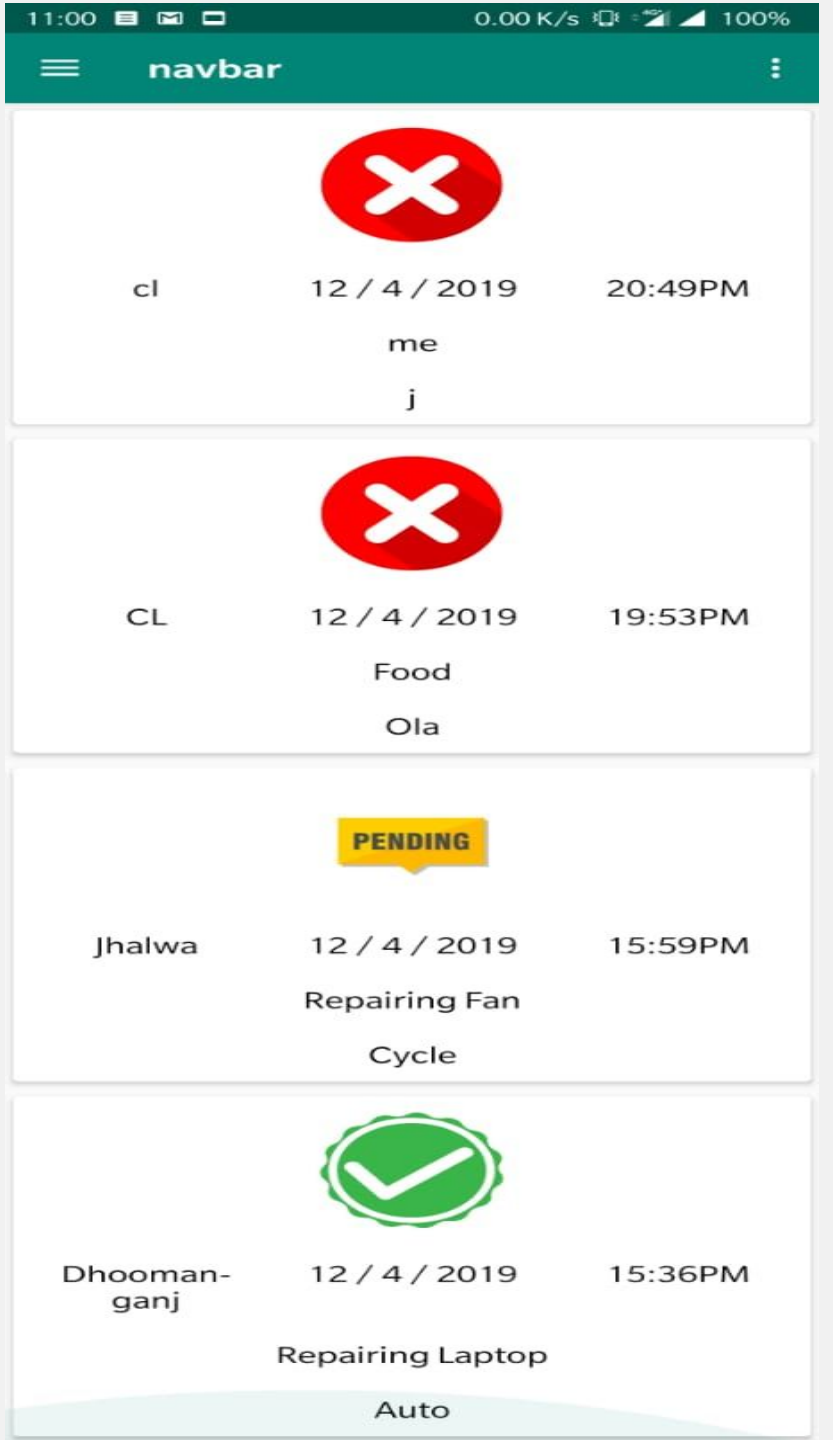

10:59
0.00 K/s
100%
navbar
FILL OUTPASS
Jhalwa
Repairing Fan
12 / 4 / 2019
15:59PM
Cycle
SUBMIT

THE APP

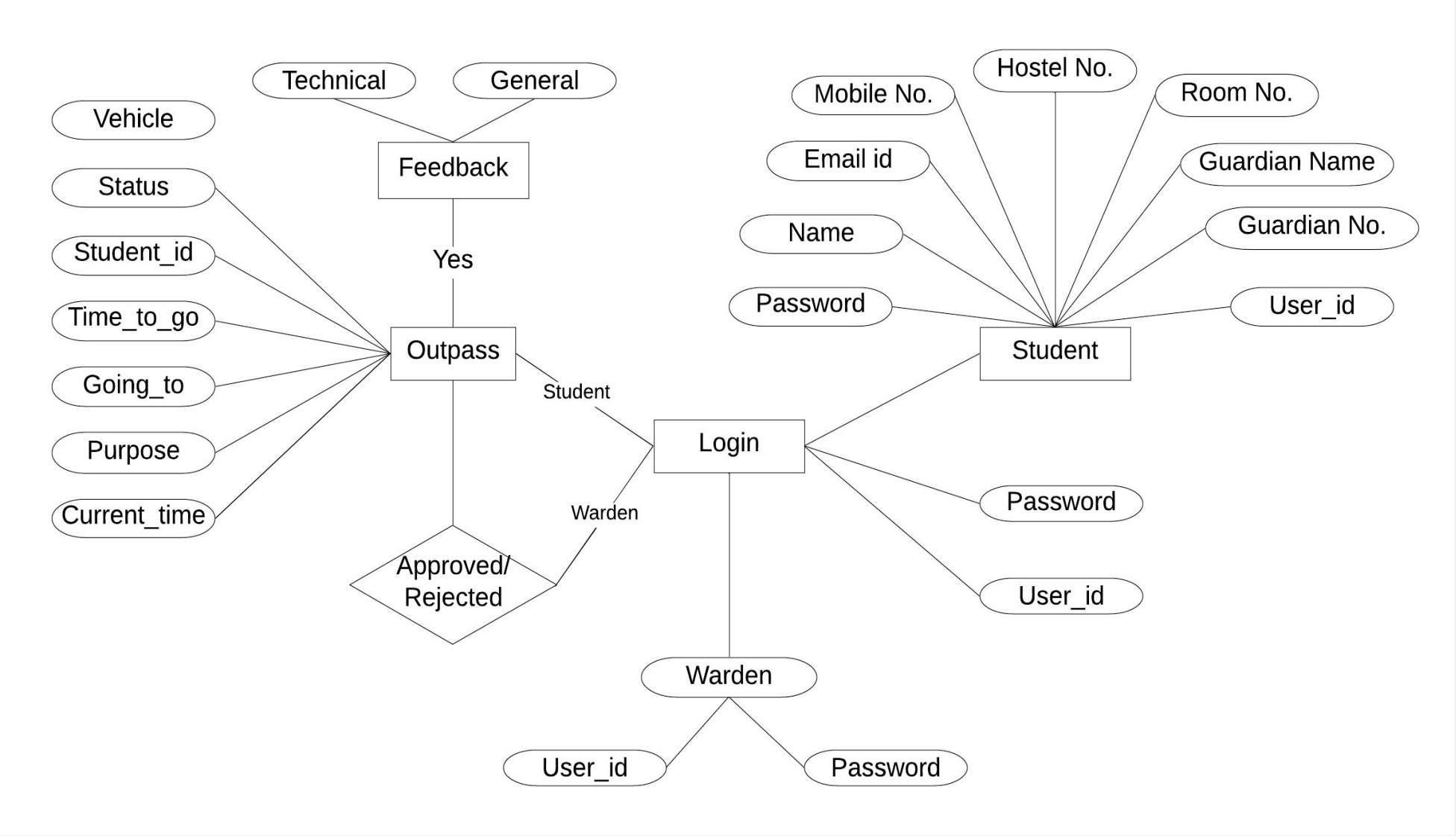

11:06
1.85 K/s
99%
Outpass
iwm2017008@iiita.ac.in
Request Sent
for going to
civil lines
dining
ola
12 / 4 / 2019
17:06PM
HOME


11:11
0.00 K/s
100%
Outpass2
ism2017008@iiita.ac.in
Chan-drashekhar azad park
12 / 5 / 2019
10:10AM
outing
Auto
ACCEPT
REJECT
ism2017008@iiita.ac.in
Sangam
12 / 5 / 2019
15:10PM
Vacation
Auto
ACCEPT
REJECT

THE APP


11:00
0.00 K/s
100%
navbar
cl
12 / 4 / 2019
20:49PM
me
j
CL
12 / 4 / 2019
19:53PM
Food
Ola
PENDING
Jhalwa
12 / 4 / 2019
15:59PM
Repairing Fan
Cycle
Dhooman-ganj
12 / 4 / 2019
15:36PM
Repairing Laptop
Auto

E-R DIAGRAM


Technical
General
Feedback
Vehicle
Status
Student_id
Time_to_go
Going_to
Purpose
Current_time
Yes
Outpass
Student
Login
Warden
Approved/
Rejected
Hostel No.
Mobile No.
Room No.
Email id
Guardian Name
Name
Guardian No.
Password
User_id
Student
Password
User_id
Warden
User_id
Password

Use Case Diagram

HISTOGRAM OF ORIENTED GRADIENTS

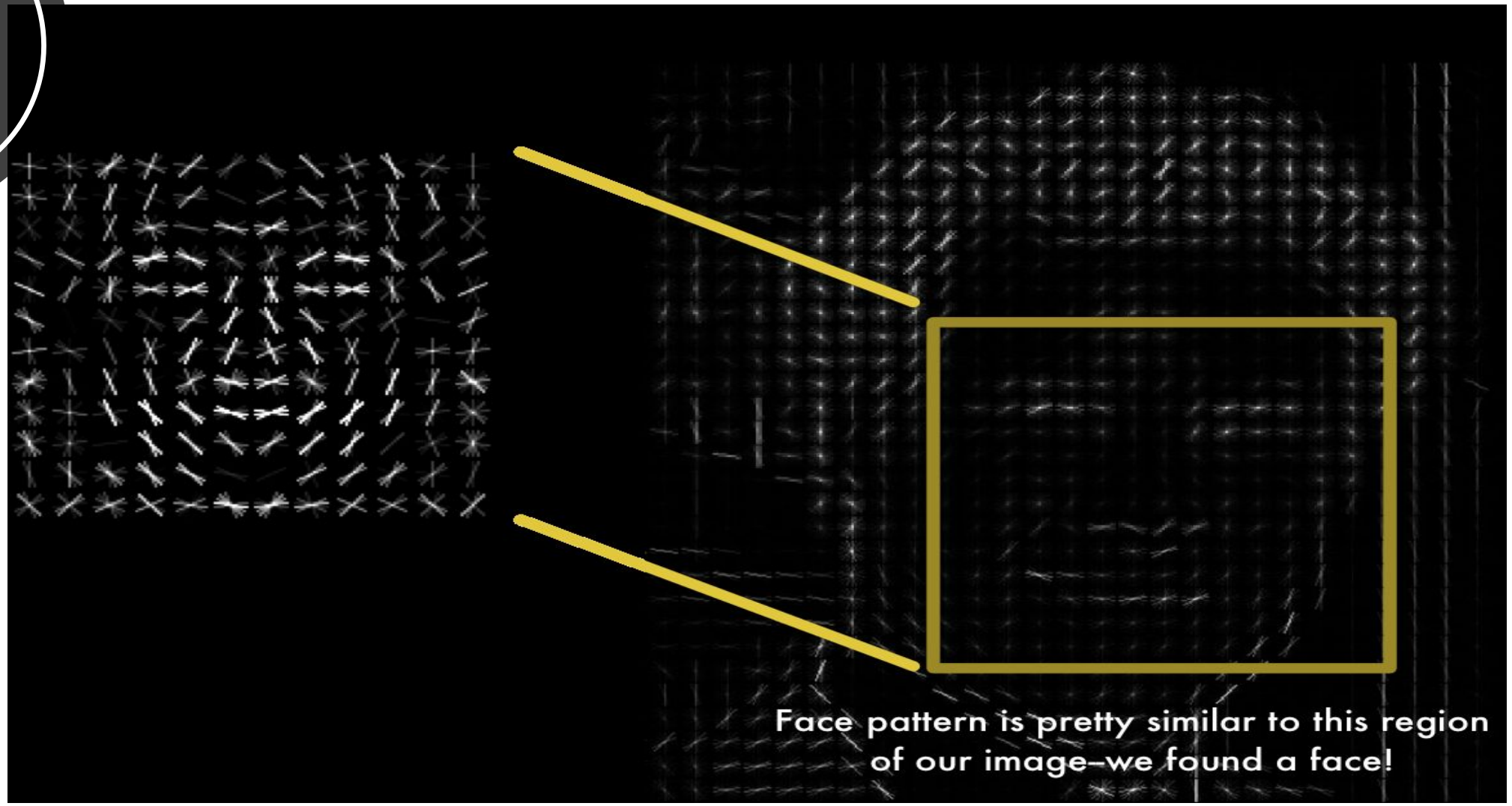
The histogram of oriented gradients (HOG) is a feature descriptor used in computer vision and image processing for the purpose of object detection. The technique counts occurrences of gradient orientation in localized portions of an image.

We will implement HOG,so we will convert these pixel intensity values to light flow gradients, which will more accurately describe the face data.

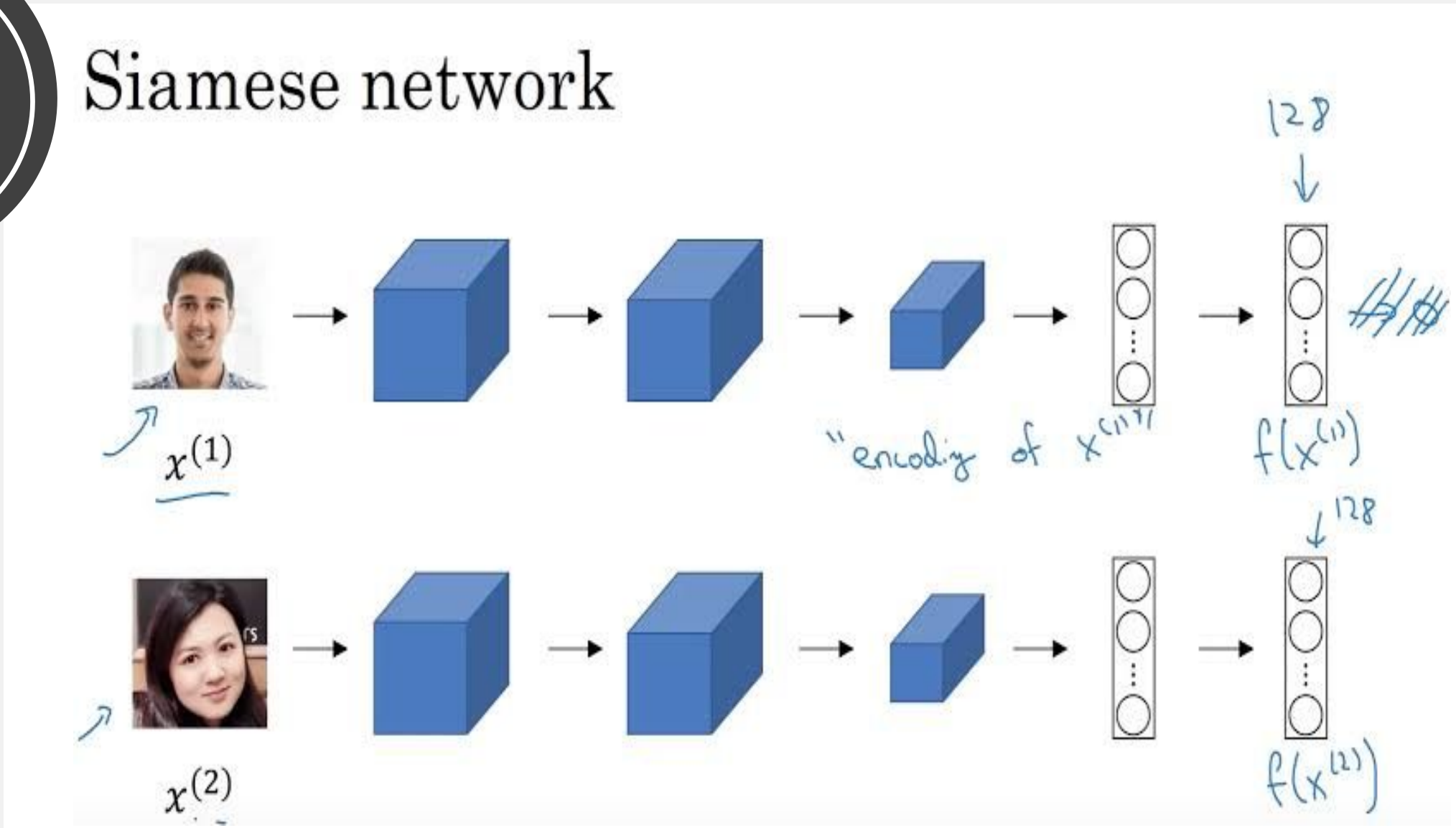
SIAMESE NETWORK

A siamese neural network is an artificial neural network that uses the same weights while working in tandem on two different input vectors to compute comparable output vectors. Often one of the output vectors is precomputed, thus forming a baseline against which the other output vector is compared.

HISTOGRAM OF GRADIENTS



SIAMESE NETWORK



Result Analysis

We are successfully able to complete the project along with working model of the project giving correct output. We are able to detect the face correctly with great accuracy and are able to make the Outpass system for girls of our college more safe and secured.

Conclusion

Our project automates the girls out-pass system of our college. It is way better than the manual system which is currently used. It provides more efficient and secured solution to this problem. Initially what used to happen was that the students need to search for the warden, take permission then finally they are allowed to go out. But now we provided them with a solution that will make them do all the task required from room only. All they need is just to register and fire the request regarding the same. We personally feel that multiple features can be further added to this App making it more useful for the students of IIIT-A (and other colleges as well).

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Future scope

We are thinking of adding mess rebate claim window and Leave application approval option too. We all know that this girls out-pass system , leave approval and mess rebate claim do require a lot of paper-work, time, effort, and a lot of meetings with the respective administration. But once we are done with all these features of the application we will be able to do all this tasks very efficiently. It will never require that much of effort and time. Our project makes the very idea of outpass system secure and safe. It provides student, parents and concerned warden with the complete details of the entry and exit time. We will have all the past records of the student going out with proper details of entry and exit timing. We can implement this whole idea in our college campus.

Future scope

In the database which will be used further for the verification. While registering for the first time they will provide their current picture clicked by their device and we will use the same for image recognition in future. So yes, we are looking for the fully fledged implementation of this application in our college campus. Also, we can extend the Image Recognition feature to all checkpoints in college such as the pocket Gate, CC3 and other places where a manual entry to the registered is required by every student when he/she enters. Also, it will be very helpful in case of emergencies/ urgencies if we can track the entry/exit time of any student from these Cameras and automatic facial recognition.

THANK YOU