
BLOCKENDANCE
attend with confidence, track with certainty

Agenda

- Introduction
- Face Recognition
- Blockchain
- Project Implementation
- Results and Conclusion
- Future Work

Introduction

Face recognition is a process by which a computer system or software can identify the individuals in a digital image or video by analyzing and comparing patterns in the facial features of the individuals to a database of known faces.

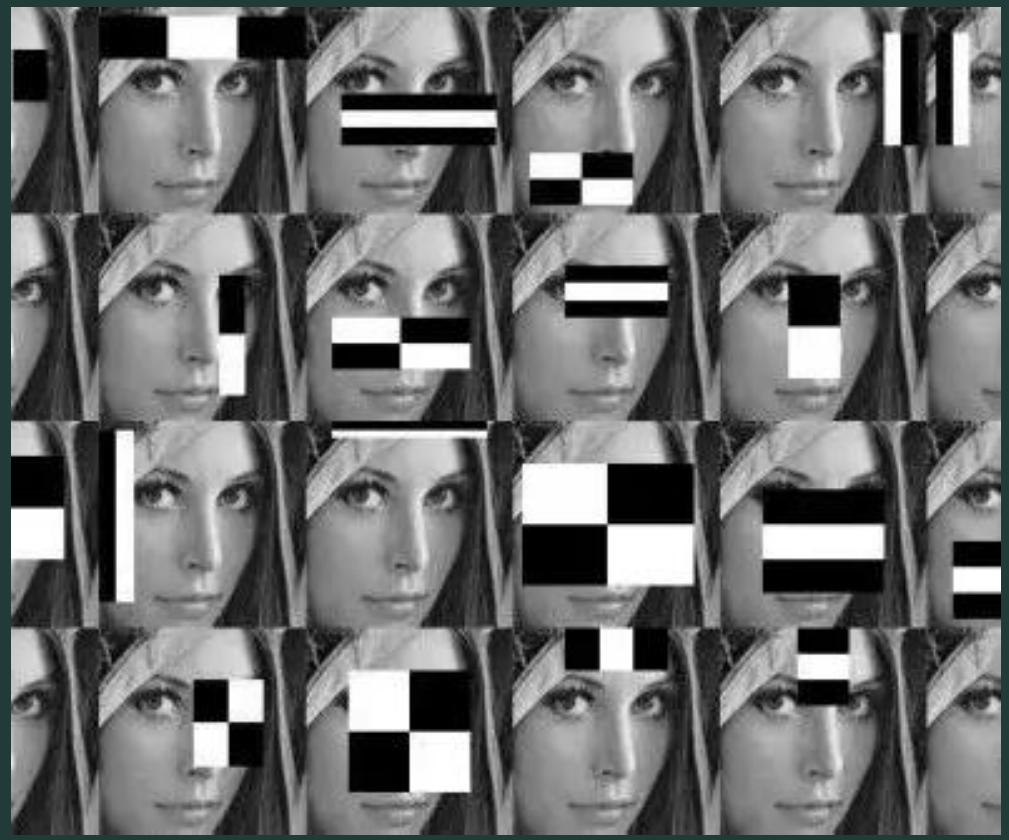
A blockchain is a decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network.

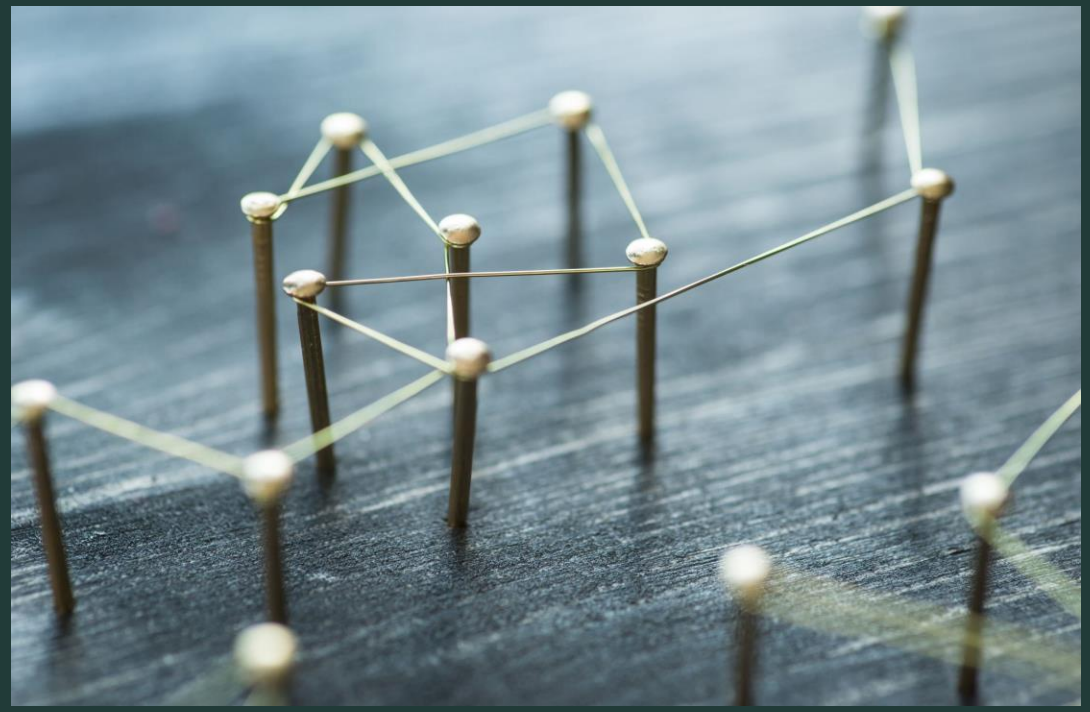
Blockandance is a attendance management system that uses blockchain technology to securely and efficiently track and verify attendance for educational or professional settings.

Face Recognition

HAAR CASCADE

- Object detection method used to identify objects in images or video
- It was proposed in 2001 by Paul Viola and Michael Jones
- Haar cascades use "Haar-like" features, which are simple rectangular features that are calculated by subtracting the sum of pixels in one part of the image from the sum of pixels in another part of the image.
- Haar cascades are trained using the Adaboost algorithm.
- According to a study by Anirudha(2021) et al. Haar cascade is 96.24%



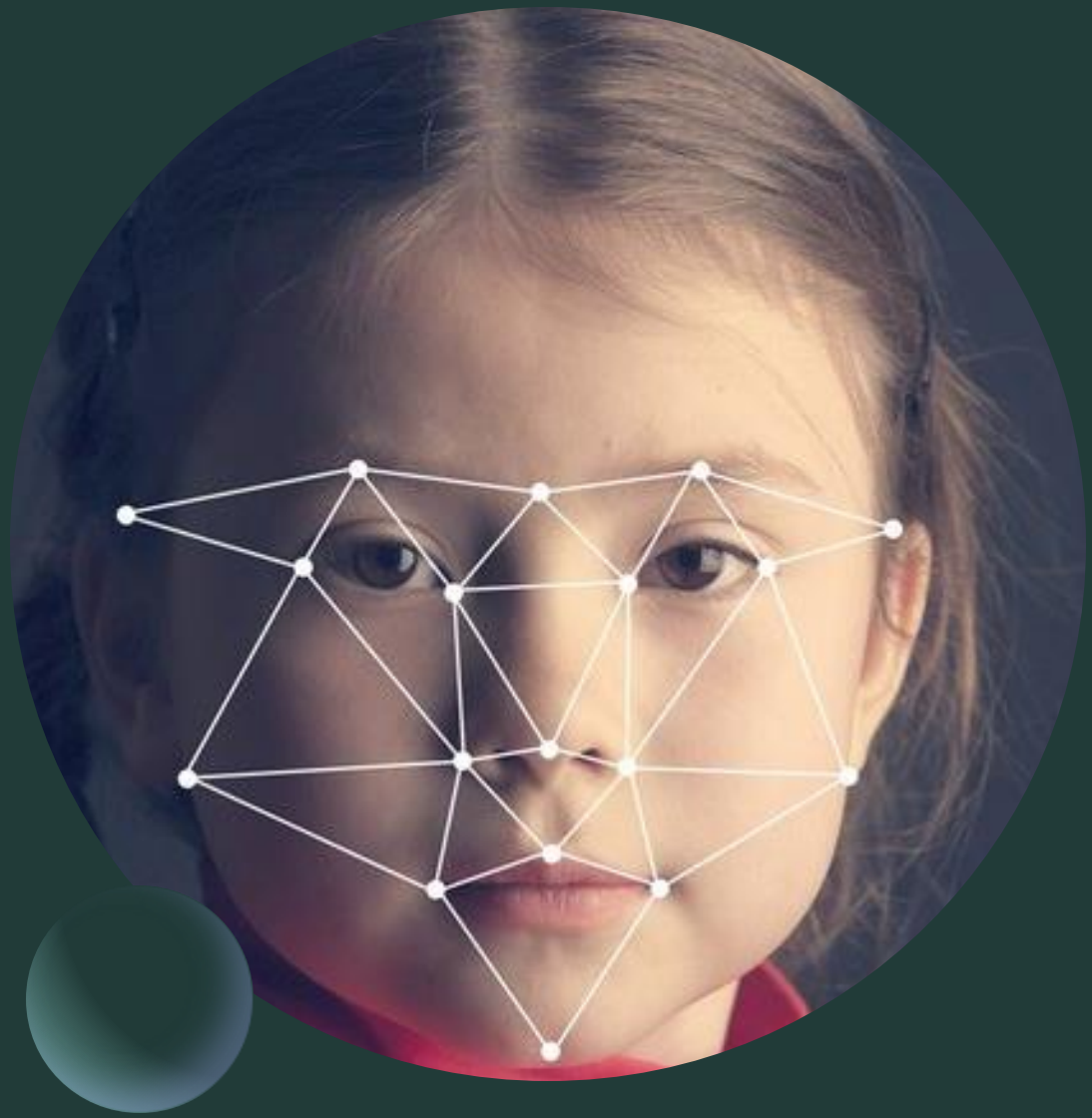


LBPH

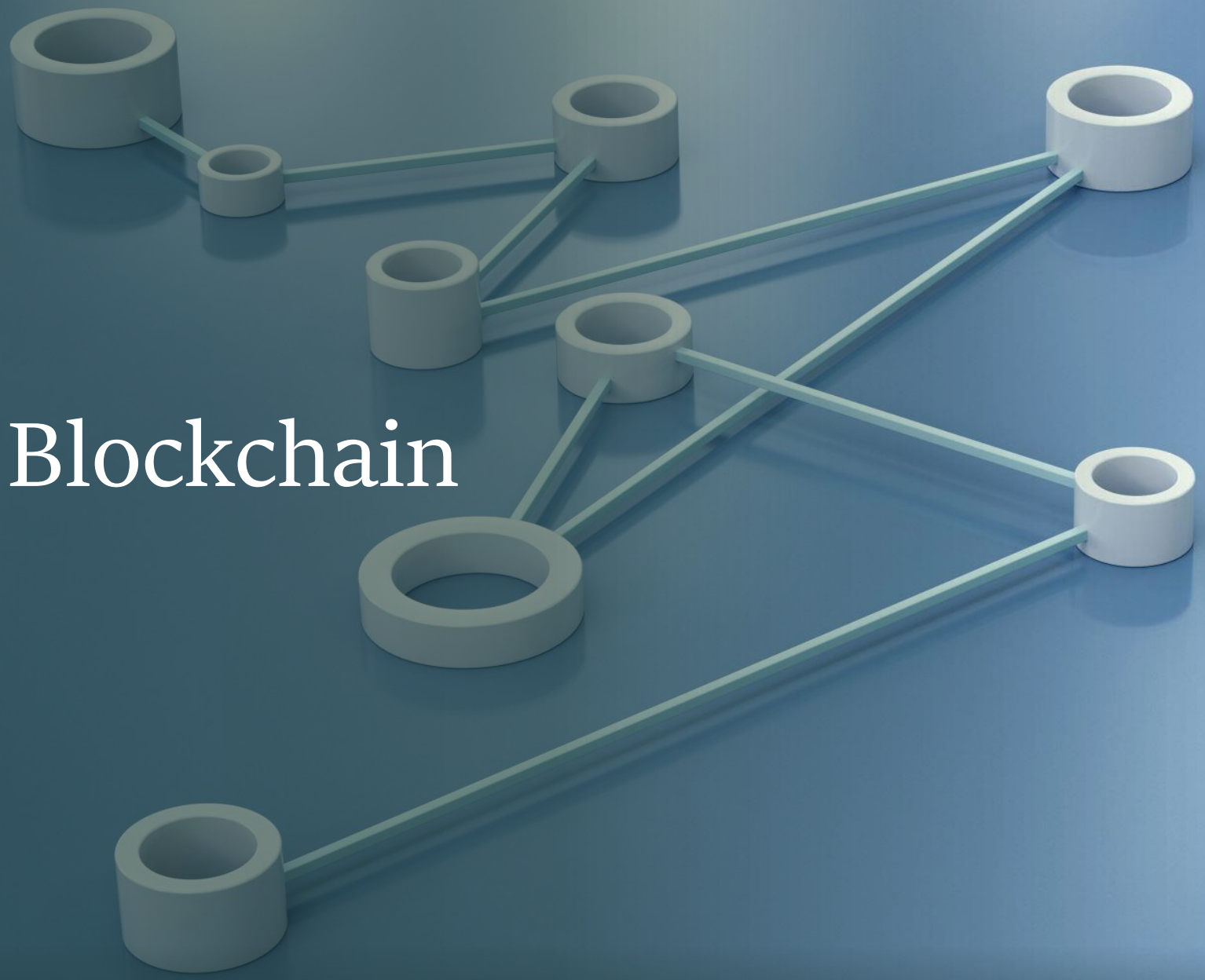
- The LBPH (Local Binary Patterns Histograms) algorithm is a facial recognition method used to identify and verify individuals based on their facial features.
- It works by extracting local binary patterns (LBP) from an image of a person's face and creating a histogram of these patterns.
- The LBPH algorithm compares the histograms of two images to determine their similarity. If the histograms are similar, the algorithm considers the images to be of the same person.
- Accuracy for LBPH classifier was 94.74%.

Advantages of LBPH

- One advantage of the LBPH algorithm is that it is robust to changes in lighting and facial expressions.
- It can also be used to recognize faces in images with low resolution or poor quality.
- The LBPH algorithm is relatively simple and fast, making it suitable for real-time facial recognition applications.
- It can be trained using a small number of images, making it suitable for applications where a large dataset is not available.



Blockchain



SMART CONTRACT

01

A smart contract is a self-executing contract with the terms of the agreement between parties written into lines of code.

02

The code and the agreements contained therein are stored on a blockchain platform and can be executed automatically when certain conditions are met.

03

Smart contracts are written on Solidity

InterPlanetary File System

- IPFS (InterPlanetary File System) is a decentralized, peer-to-peer file sharing network that allows users to share and access files in a distributed manner rather than through a central server.
- IPFS uses a content-addressable system, which means that each file is assigned a unique cryptographic hash that serves as its address. This makes it easy to locate and access files on the network.
- Infura is a service that allows developers to access the Ethereum blockchain and IPFS without running a full node. It provides a convenient way to interact with these technologies, particularly for developers who do not have the resources or bandwidth to run their own nodes. Infura is owned by ConsenSys, a blockchain software company.

Implementation

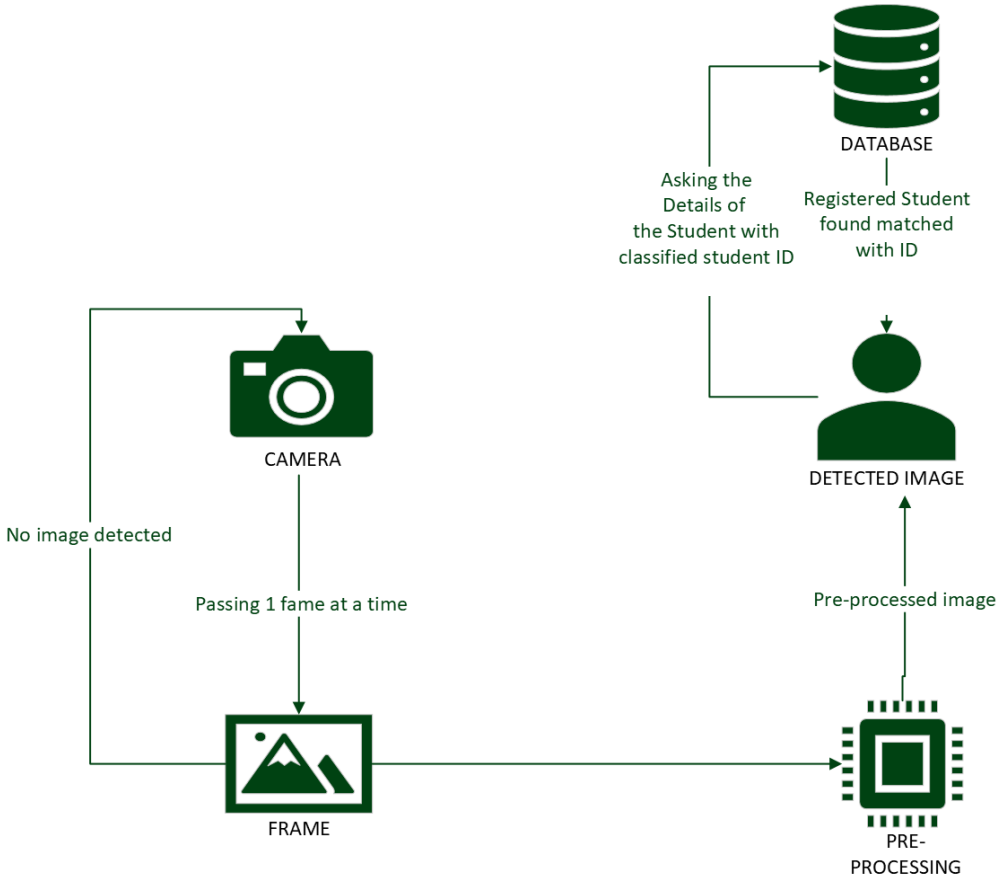
Dataset

The reason we collected 50 images is that for the classifier we are using it is best to collected minimum 50 pictures to get the best accuracy

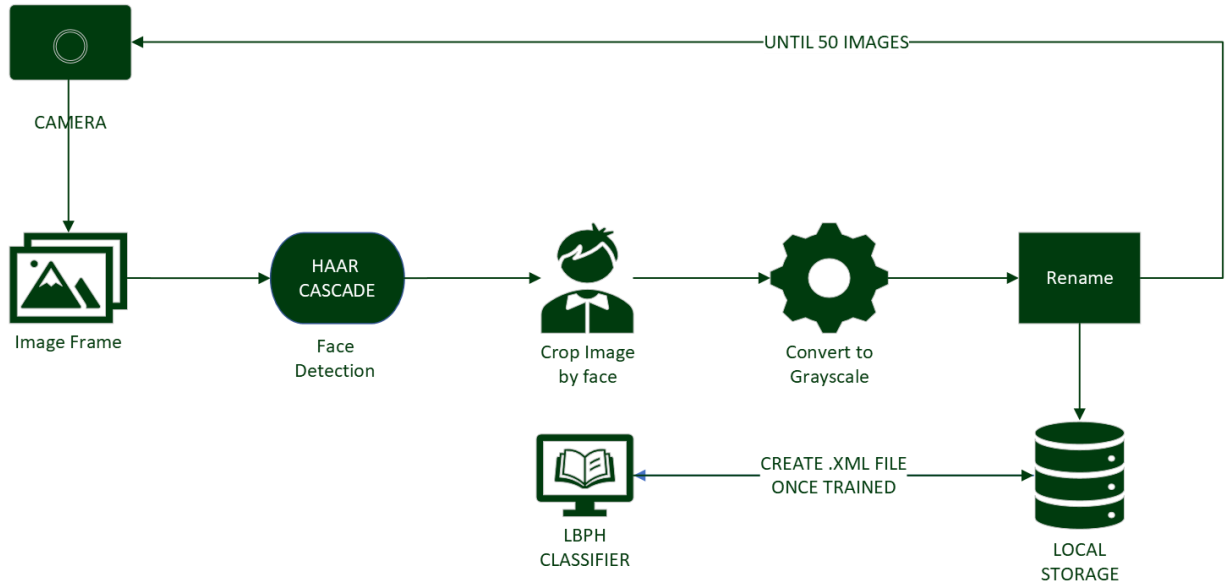
Once the images are collected it was pre-processed and stored in 400 x 400 grayscale format in ’data folder’

The naming of the images are done by registration number of the student followed by ’_’ and then followed by the image count

Implementation

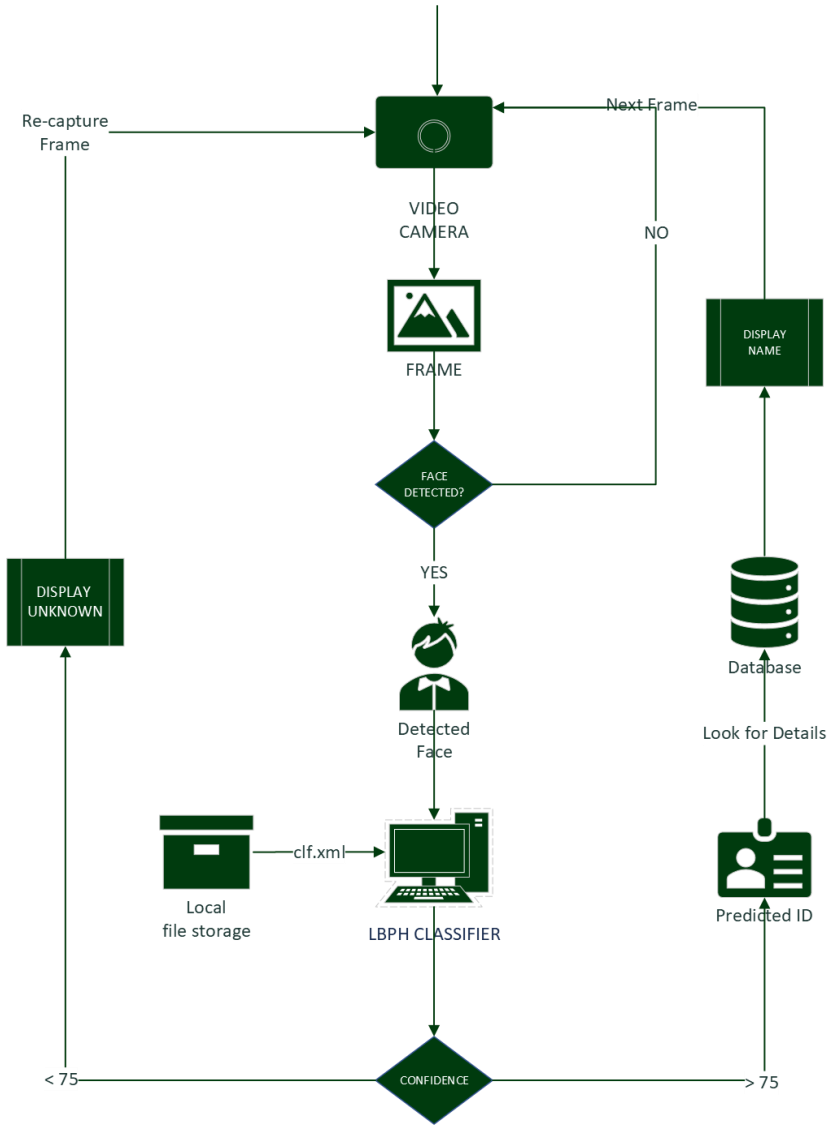


Data Collection

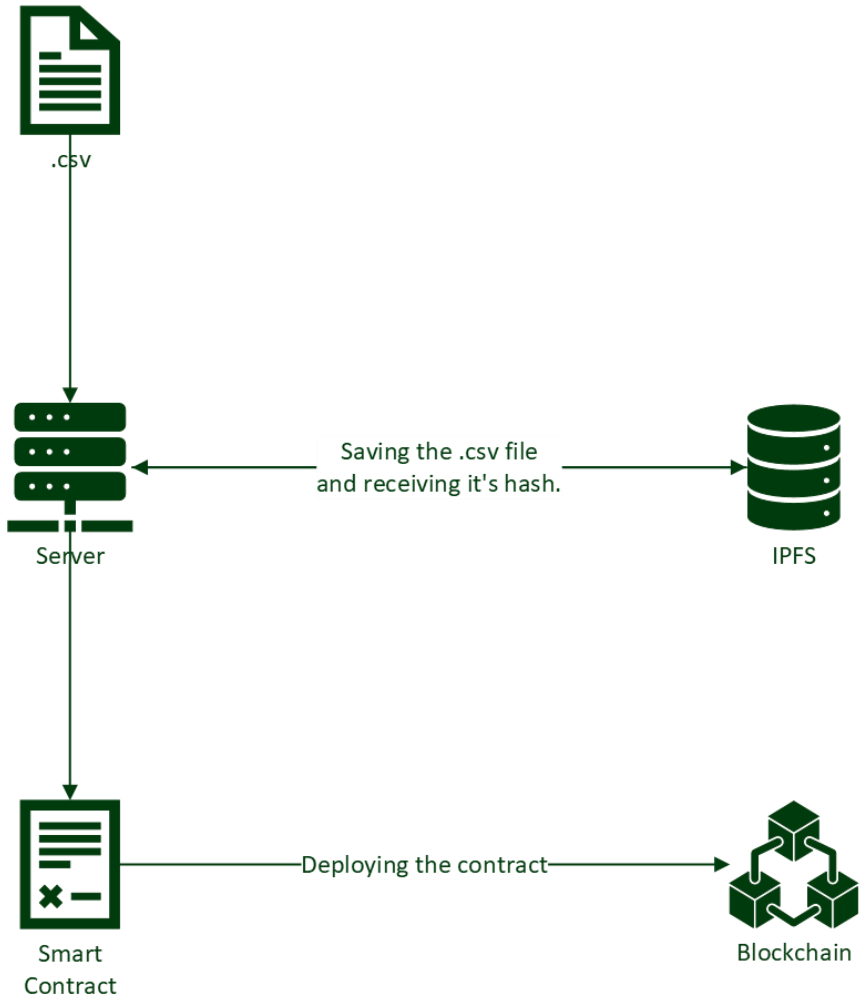


Face Detection

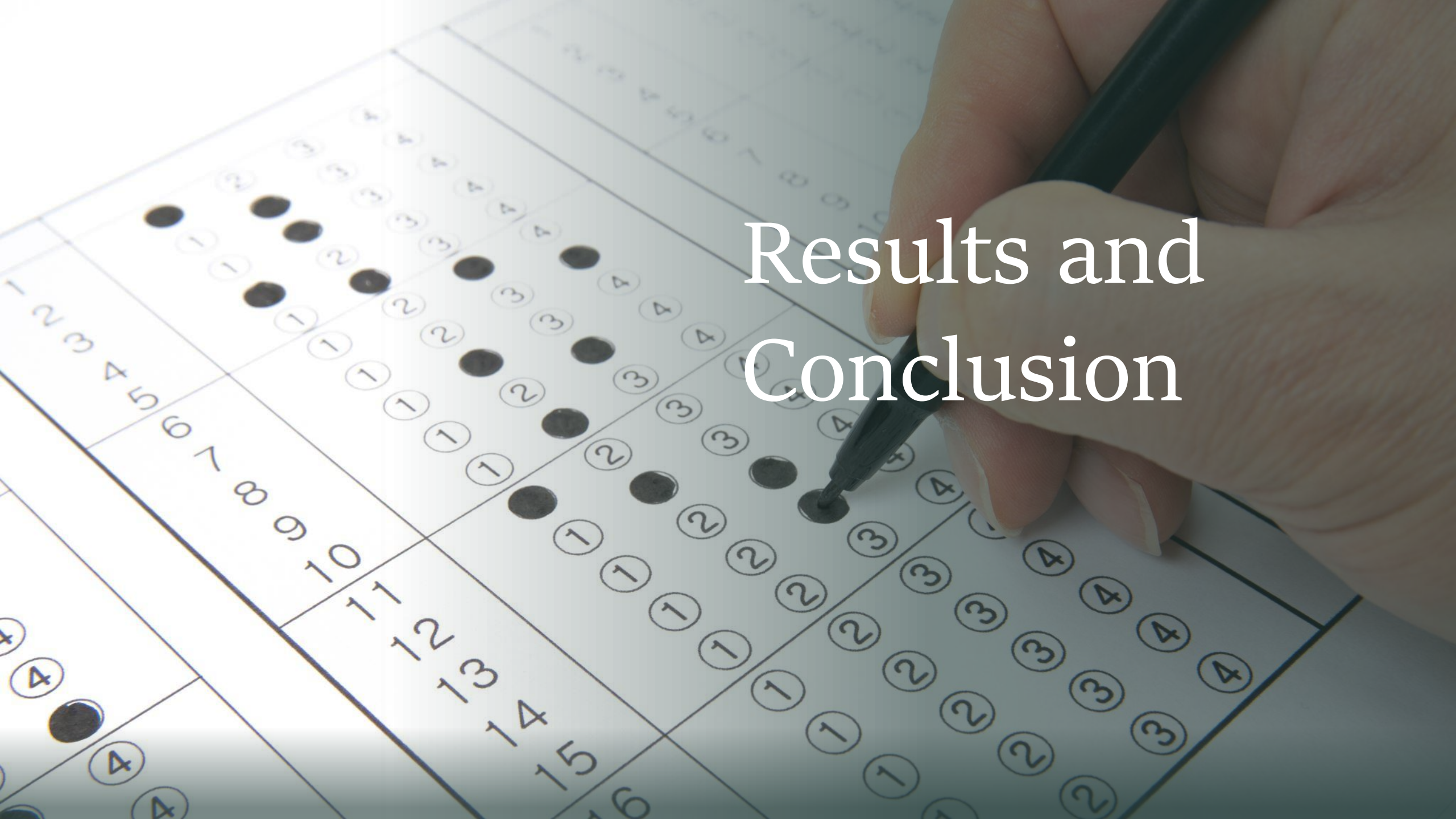
Implementation



Face Recognition



Blockchain Deployment

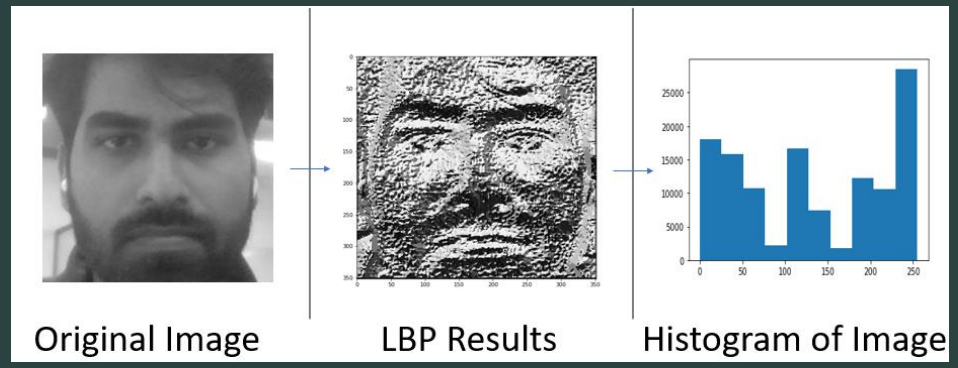


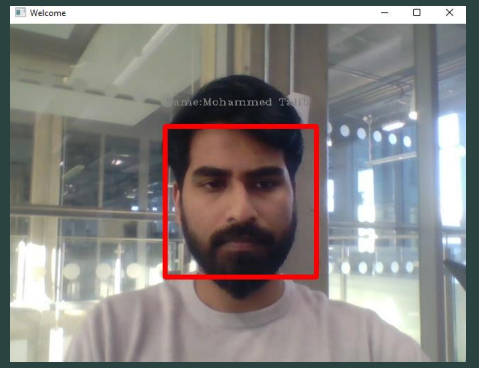
Results and Conclusion

4 Scenarios

Scenario 1: Good Light – 4k camera	Scenario 2: Good Light – 720p camera	Scenario 3: Low Light – 4k camera	Scenario 4: Low Light – 720p camera

Face Recognition






```
f1_score(y_test,predictions,average="macro")
1.0
[48] accuracy_score(y_test,predictions)
1.0
```

Scenario 1

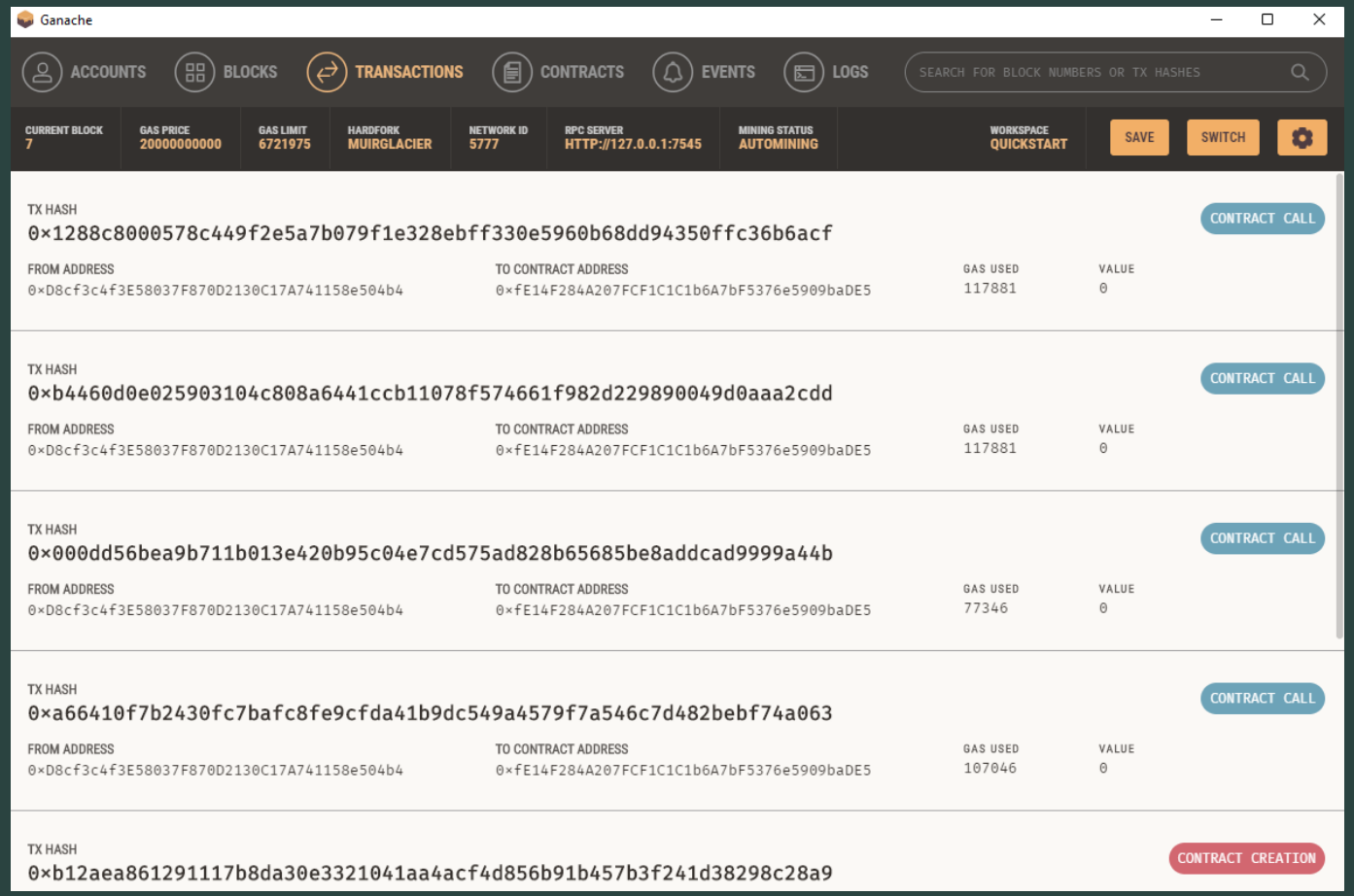
```
f1_score(y_test,predictions,average="macro")
0.997999199679872
[42] accuracy_score(y_test,predictions)
0.998
```

Scenario 3

```
[61] f1_score(y_test,predictions,average="macro")
0.9509719133968856
[62] accuracy_score(y_test,predictions)
0.951063829787234
```

Scenario 4

Blockchain


Ganache
ACCOUNTS
BLOCKS
TRANSACTIONS
CONTRACTS
EVENTS
LOGS
SEARCH FOR BLOCK NUMBERS OR TX HASHES
CURRENT BLOCK 7
GAS PRICE 20000000000
GAS LIMIT 6721975
HARDFORK MUIRGLACIER
NETWORK ID 5777
RPC SERVER HTTP://127.0.0.1:7545
MINING STATUS AUTOMINING
WORKSPACE QUICKSTART
SAVE
SWITCH
TX HASH
0×1288c8000578c449f2e5a7b079f1e328ebff330e5960b68dd94350ffc36b6acf
FROM ADDRESS
0×D8cf3c4f3E58037F870D2130C17A741158e504b4
TO CONTRACT ADDRESS
0×fE14F284A207FCF1C1C1b6A7bF5376e5909baDE5
GAS USED
117881
VALUE
0
CONTRACT CALL
TX HASH
0×b4460d0e025903104c808a6441ccb11078f574661f982d229890049d0aaa2cdd
FROM ADDRESS
0×D8cf3c4f3E58037F870D2130C17A741158e504b4
TO CONTRACT ADDRESS
0×fE14F284A207FCF1C1C1b6A7bF5376e5909baDE5
GAS USED
117881
VALUE
0
CONTRACT CALL
TX HASH
0×000dd56bea9b711b013e420b95c04e7cd575ad828b65685be8addcad9999a44b
FROM ADDRESS
0×D8cf3c4f3E58037F870D2130C17A741158e504b4
TO CONTRACT ADDRESS
0×fE14F284A207FCF1C1C1b6A7bF5376e5909baDE5
GAS USED
77346
VALUE
0
CONTRACT CALL
TX HASH
0×a66410f7b2430fc7bafc8fe9cfda41b9dc549a4579f7a546c7d482bebf74a063
FROM ADDRESS
0×D8cf3c4f3E58037F870D2130C17A741158e504b4
TO CONTRACT ADDRESS
0×fE14F284A207FCF1C1C1b6A7bF5376e5909baDE5
GAS USED
107046
VALUE
0
CONTRACT CALL
TX HASH
0×b12aea861291117b8da30e3321041aa4acf4d856b91b457b3f241d38298c28a9
CONTRACT CREATION

Conclusion

Camera resolution (4K vs 720P) did not have a significant impact on the accuracy and f-1 score of the face recognition system.

The lighting conditions did affect the performance of the system, with the system performing worse in low lighting conditions compared to good lighting conditions.

This suggests that lighting is an important factor to consider when using a face recognition system. It may be beneficial to optimize the lighting setup in order to improve the performance of the system.

Able to generate hash of the file stored on the IPFS and deployed successfully on the blockchain.

System is designed to be agile, secure, and user-friendly, and has achieved an accuracy of above 95% in evaluations.

Future Work

Future Work

Improving the pre-processing of input images to increase accuracy in low lighting conditions and optimizing the LBPH classifier.

Evaluating the security and integrity of the blockchain.

Integrating the blockchain with the attendance management system.

Improving the user interface of the application.

Thank You