EEE3009
DIGITAL IMAGE PROCESSING

IoT Based Smart Attendance system using IBM cloud services and OpenCV

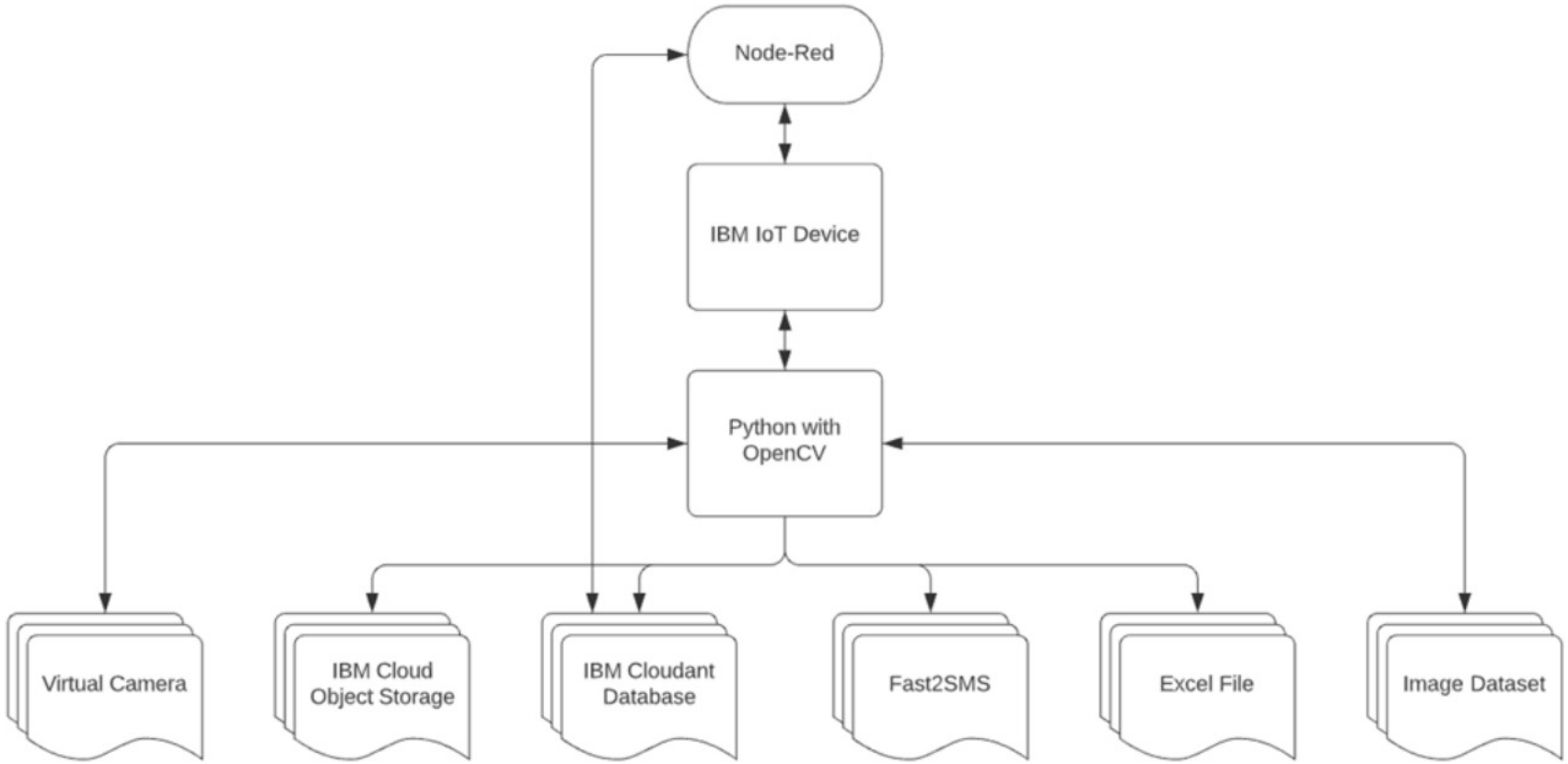
Agenda

Introduction

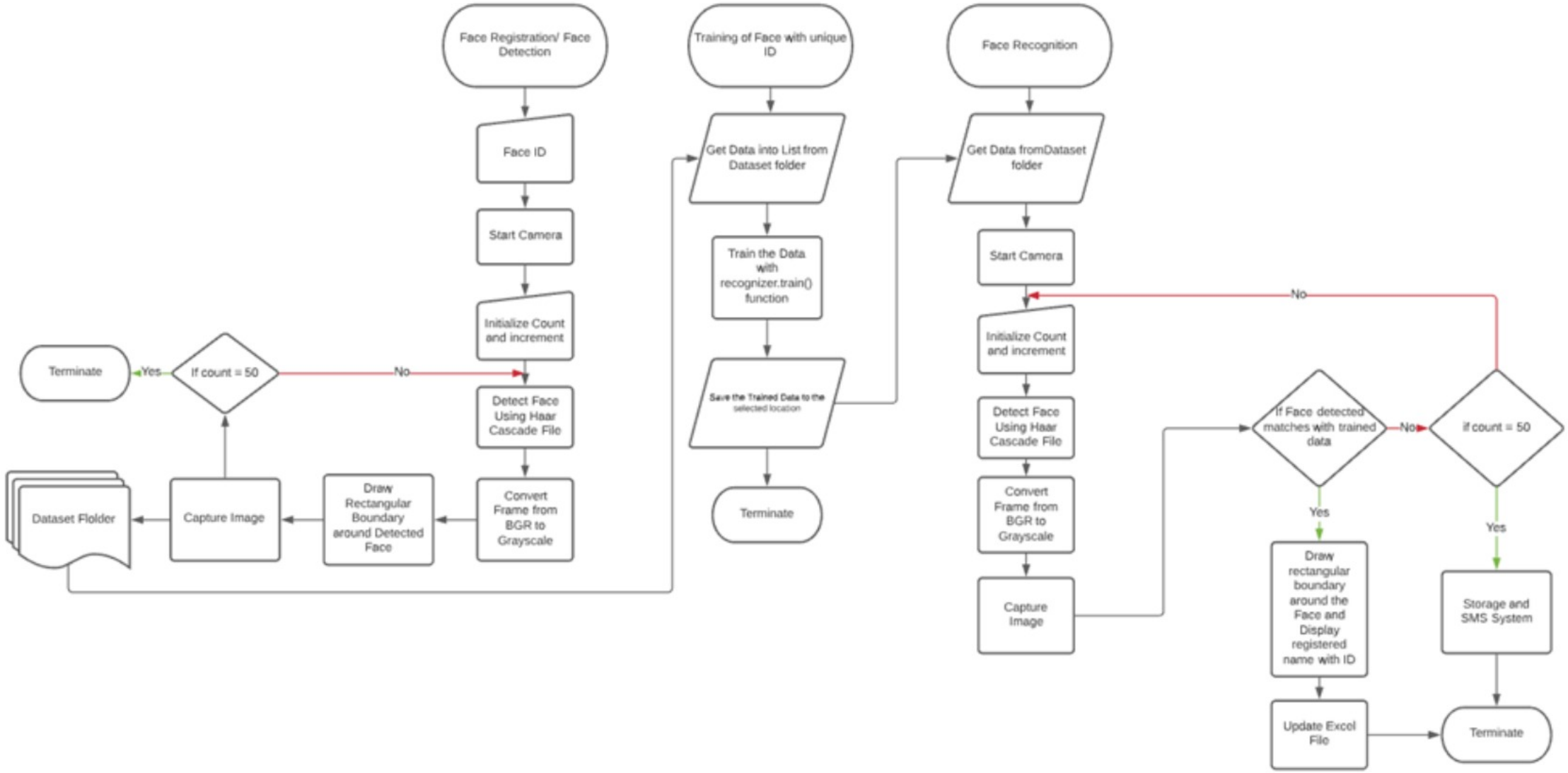
Attendance is a must in any organization. Keeping an attendance register on a daily basis is a challenging and time-consuming task. There are several automated ways available for the same, such as biometrics, RFID, eye detection, speech recognition, and many more. This project deals with one of the most efficient and accurate Attendance systems based on facial Recognition. Face recognition provides an accurate method that solves ambiguities such as fraudulent attendance and time consumption since it is understood that any human's primary identity is their face. This project uses OpenCv library with python to register, train, and recognize face of a particular individual through a front-end on Node-RED dashboard and then store the data of the individual whose is not recognized into IBM Cloud Object and Cloudant database and notify the admin with a SMS consisting of the link where the image taken of that individual is stored. It also uses the excel sheet to mark the people present on the particular day.

Proposed Architecture

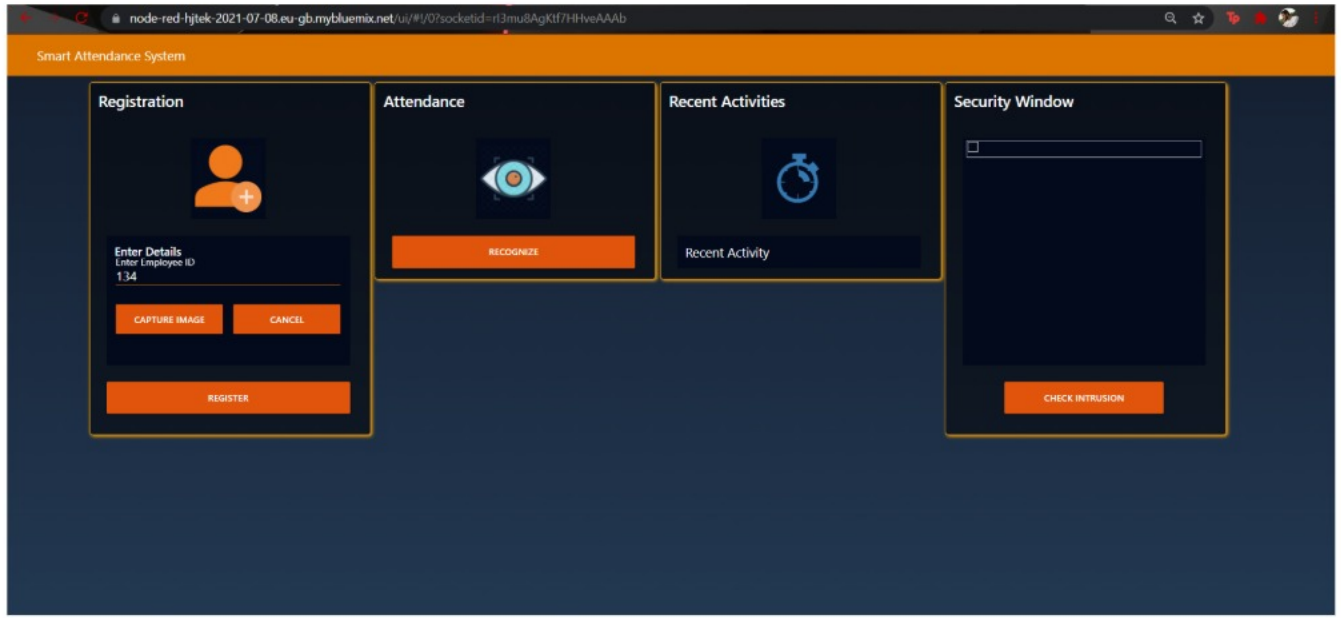
9 Pillars of Smart Attendance

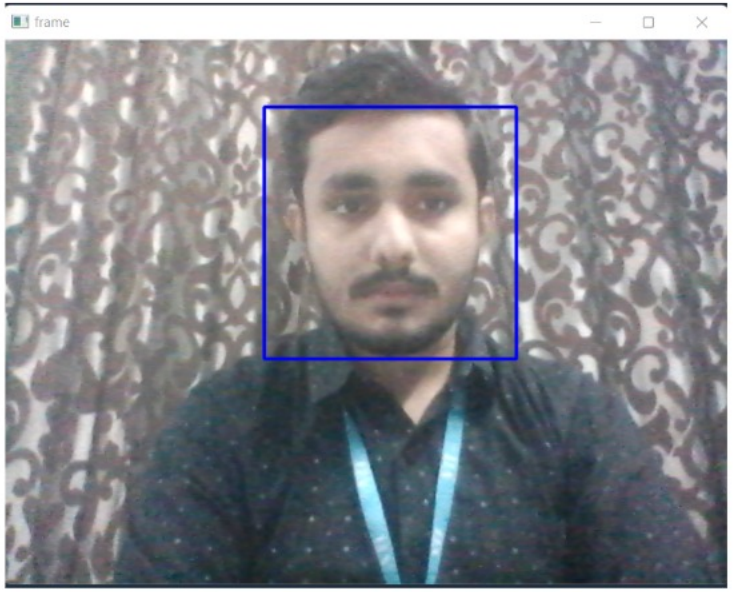


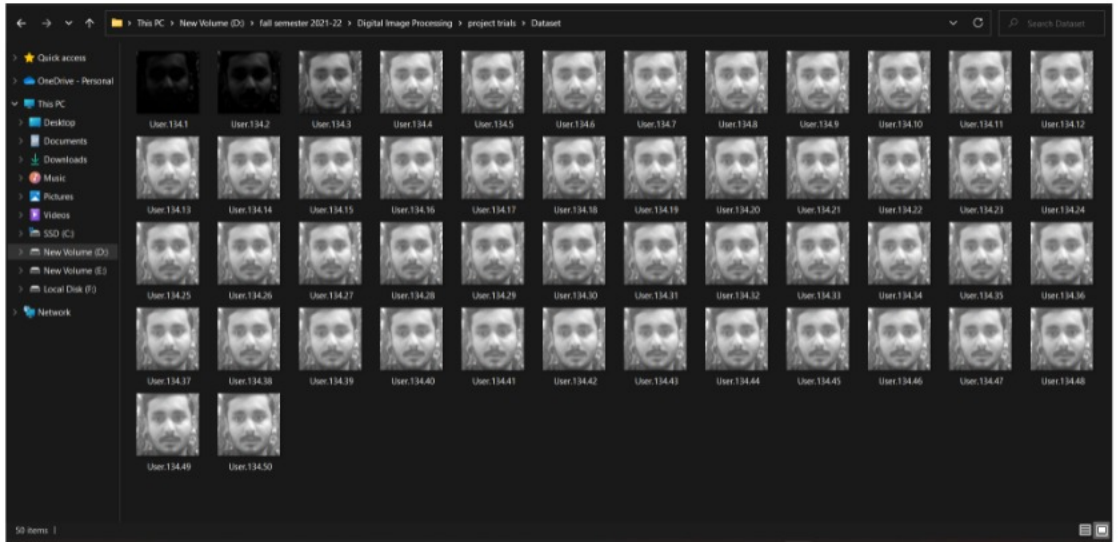
Face Detection, Training and Recognition

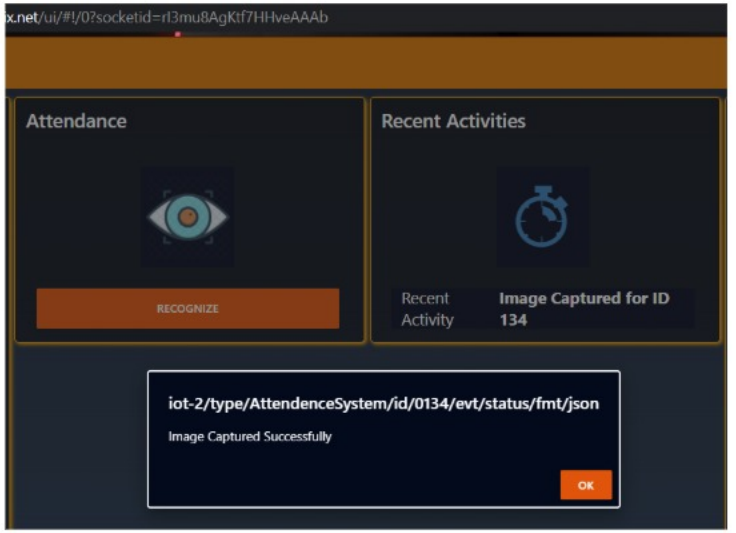


Registration Process









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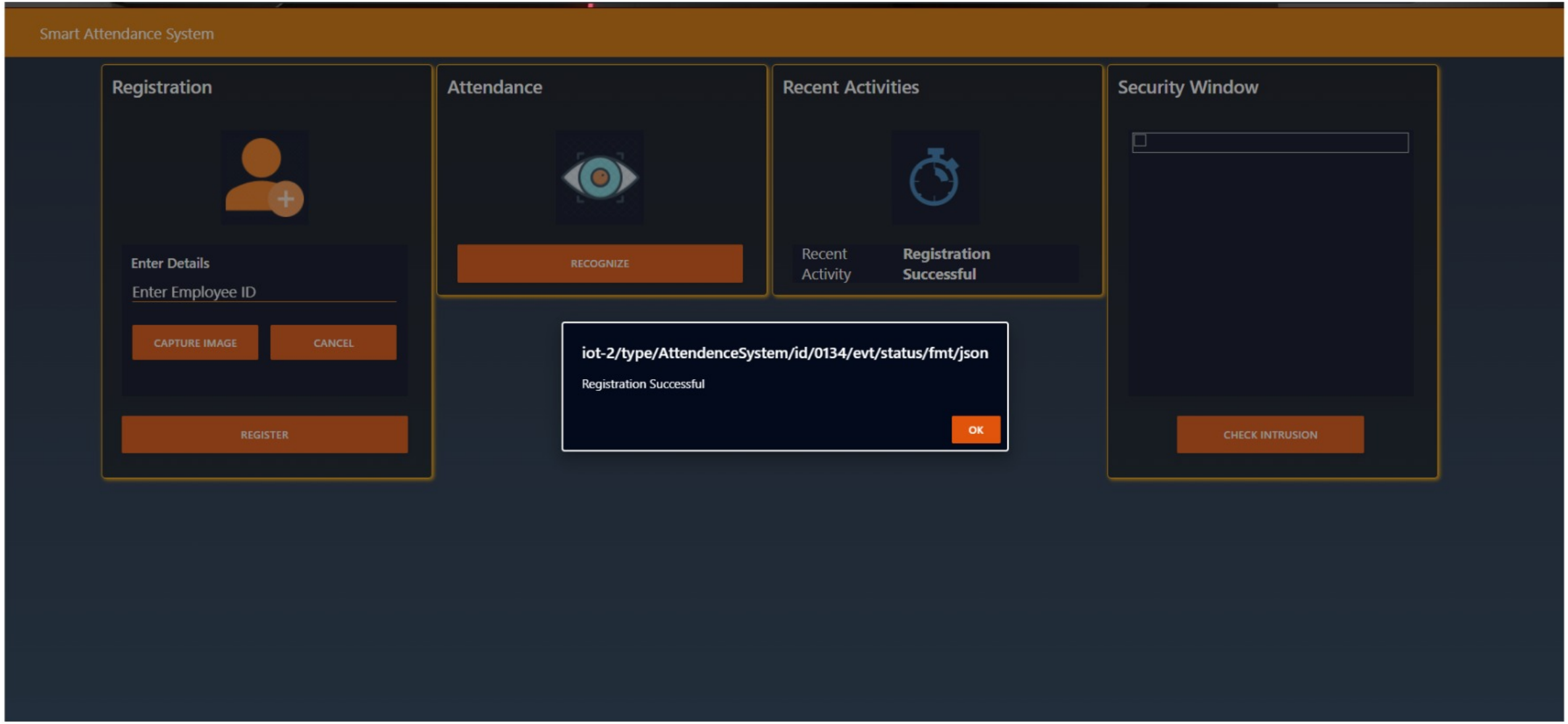
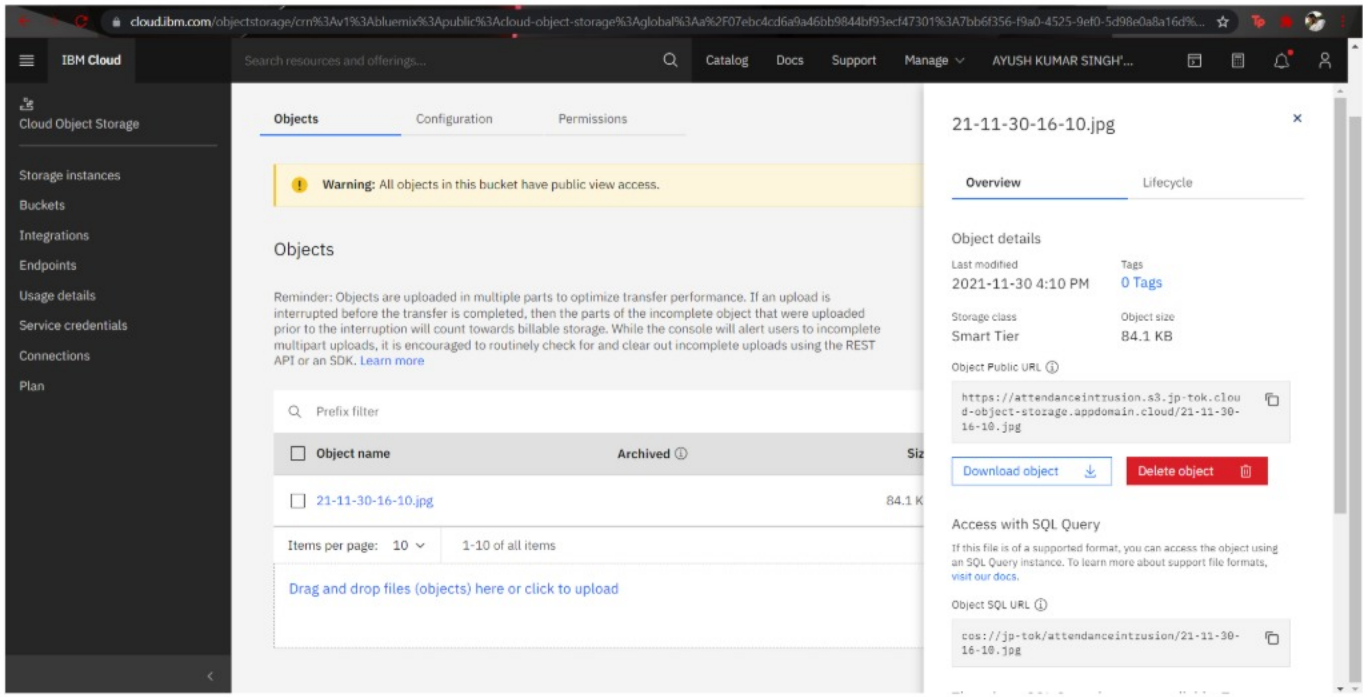
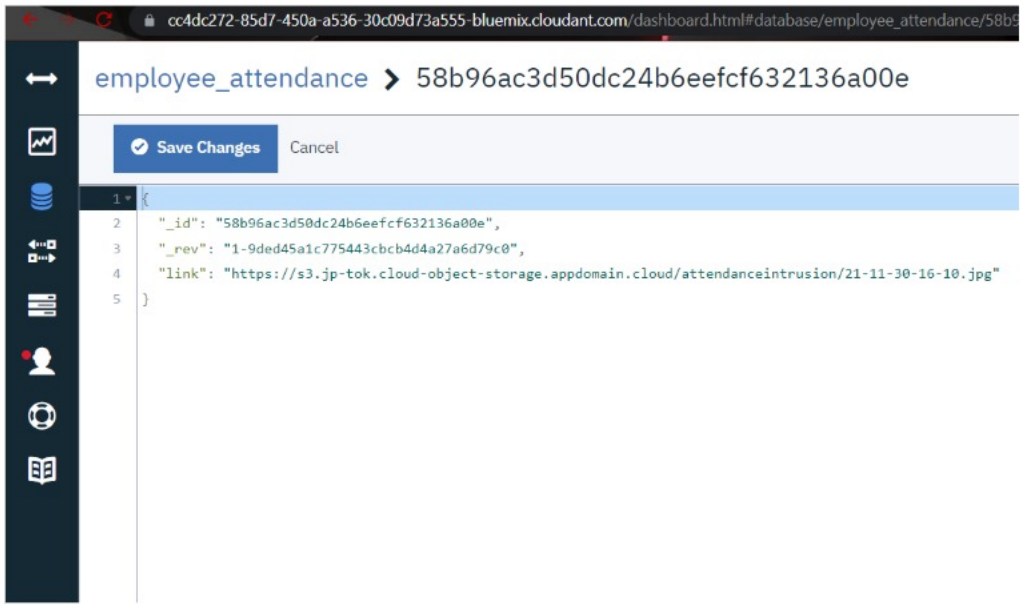


Recognition Scenario 1

The Person is NOT Recognized





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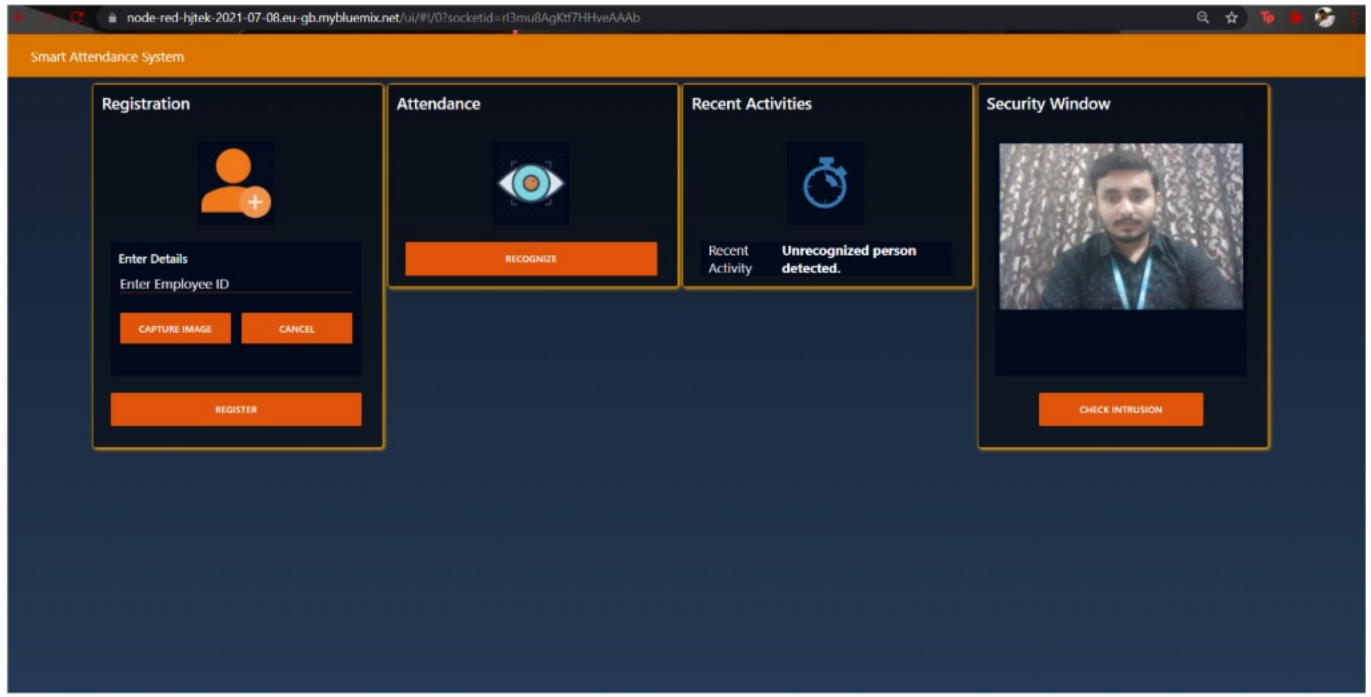
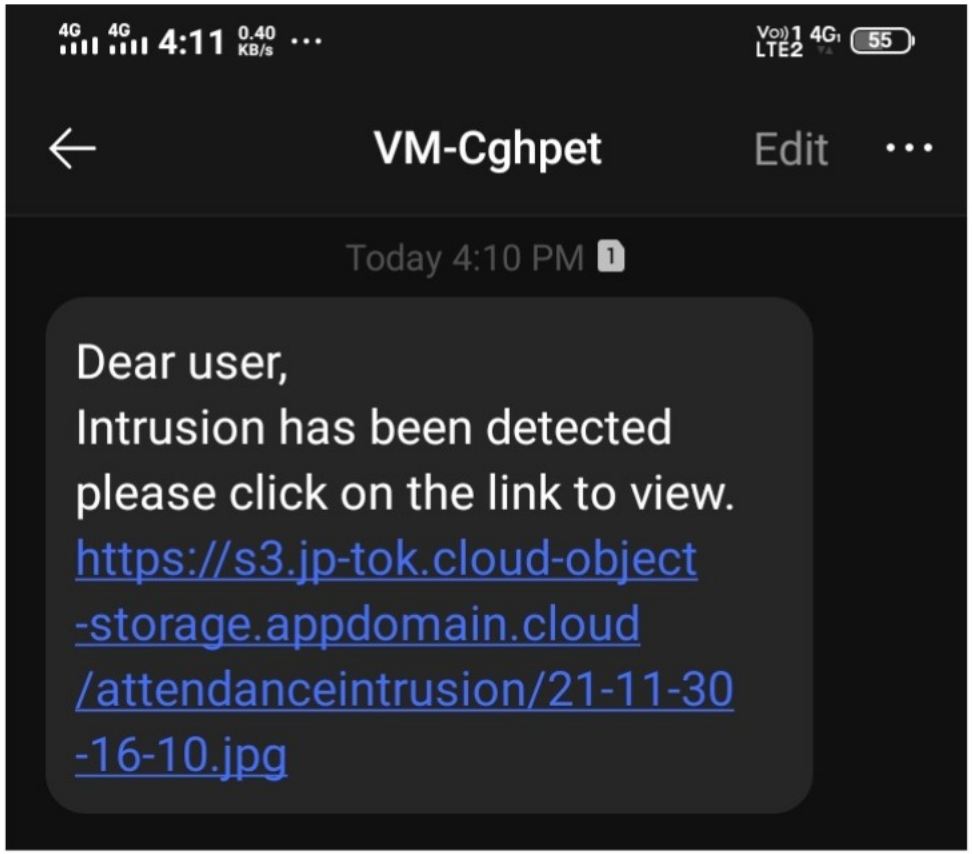
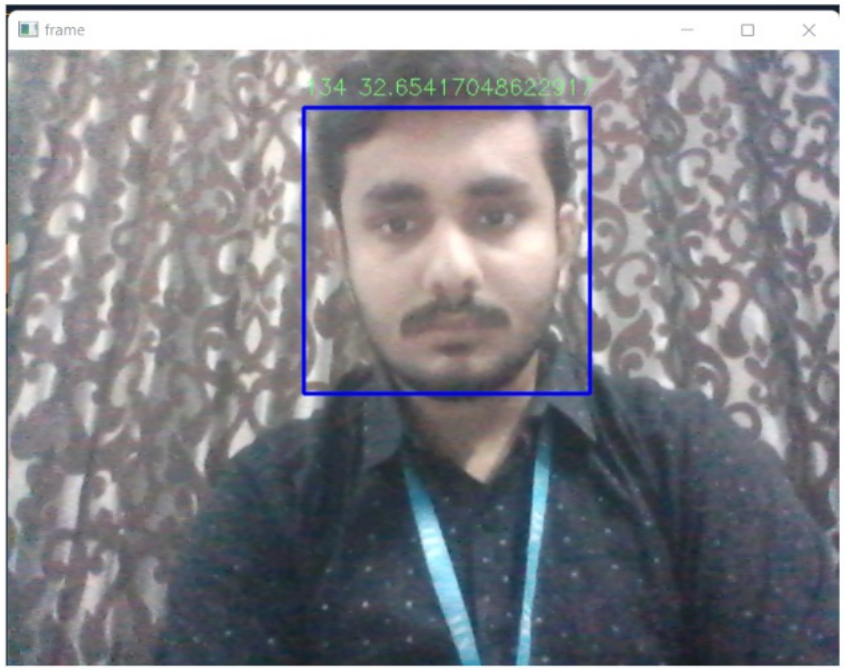
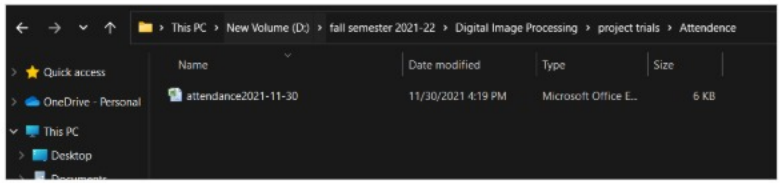


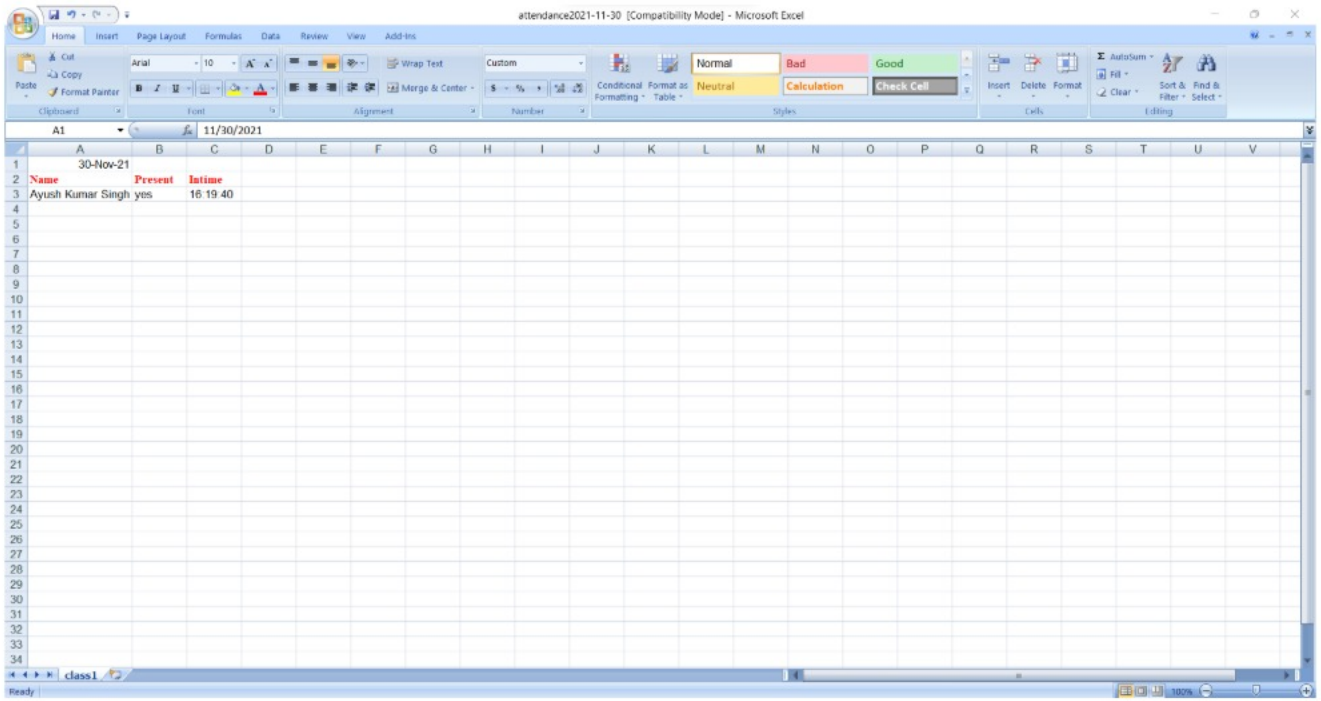


Recognition Scenario 2

The Person is Recognized

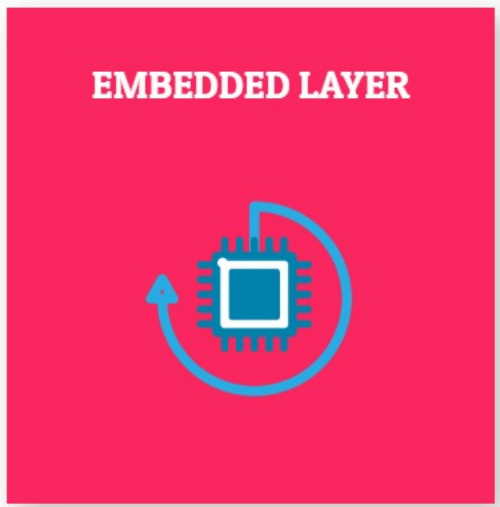


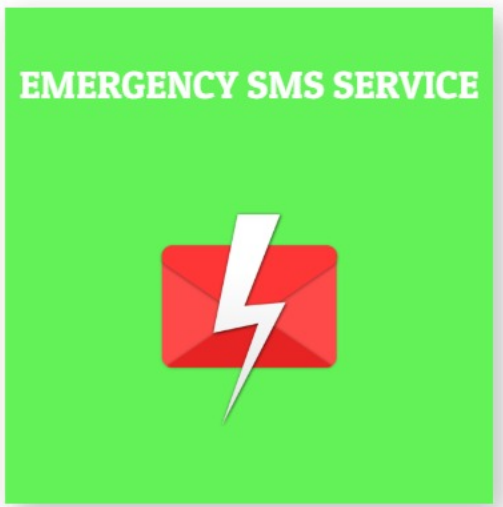




Key Points

- Good Data - The Dataset used provides both quality and quantity.
- Grayscale - Converting BGR image to grayscale saves a lot of memory by reducing the size of image captured.
- Embedded layer - The IBM IoT device is a hidden layer and acts as a buffer.
- Emergency SMS Service - The SMS sent to user containing the link of intrusion image provides double layer security.





How are we different?

- Reliable Image Storing Process - Cropped image of Facial region stored with the title as Unique ID.image number.
- IBM Cloud Object and Cloudand Database - The unrecognized image is stored as an object and the link of that object is stored in Cloudand Database.
- Excel Write - The Excel file name contains the current the current date, time, status and also do not stores duplicate values.

01.

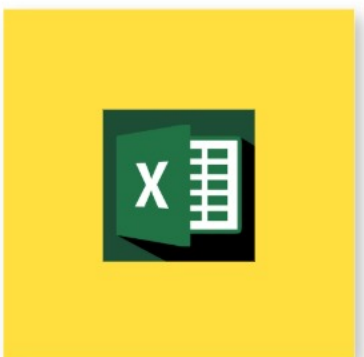
Reliable Image Storing Process

02.

IBM Cloud Object Storage and Cloudand Database

03.

Excel Write



Future Aim

01.

Educational sector

02.

Corporate Industries

03.

Medical Sectors

04.

Financial Industries

05.

Manufacturing Industries

06.

Smart Home

Work Done by Teammates

Ayush Kumar Singh

1. Python Code for Excel.
2. Cloudant, Cloud Object Storage coding.
3. Python Code for IBM IoT communication.

Sanskriti Binani

1. Node-RED flow.
2. Web Design.
3. HTTP Communication

Aman Mandal

1.Python code for registration.
2.Python code for storing Image data.

Aditya Om

1. Python code for retrieving Image data.
2. Python code for training data.

Shraman Jain

1. Python code for facial recognition.
2. SMS API Integration.


Thank you!