

EEE3009
DIGITAL IMAGE PROCESSING

IoT Based Smart Attendance system using IBM cloud services and OpenCV



Agenda

01.

Introduction

02.

Proposed Architecture

03.

Face Detection, Training
and Recognition

04.

Registration Process

05.

Recognition Scenario 1

06.

Recognition Scenario 2

07.

Key Features

08.

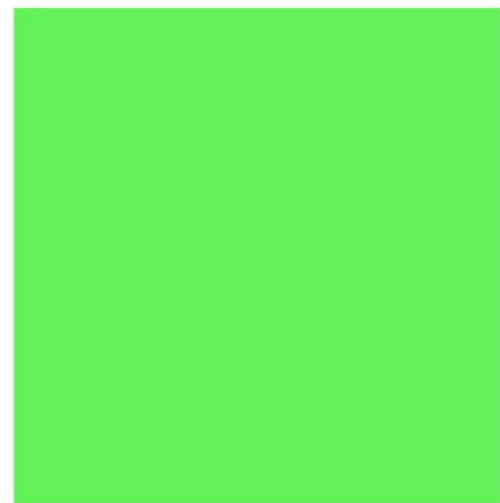
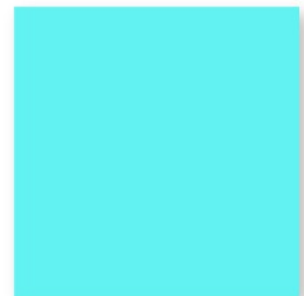
How are we different ?

09.

Future Aim

10.

Work Done by
Teammates



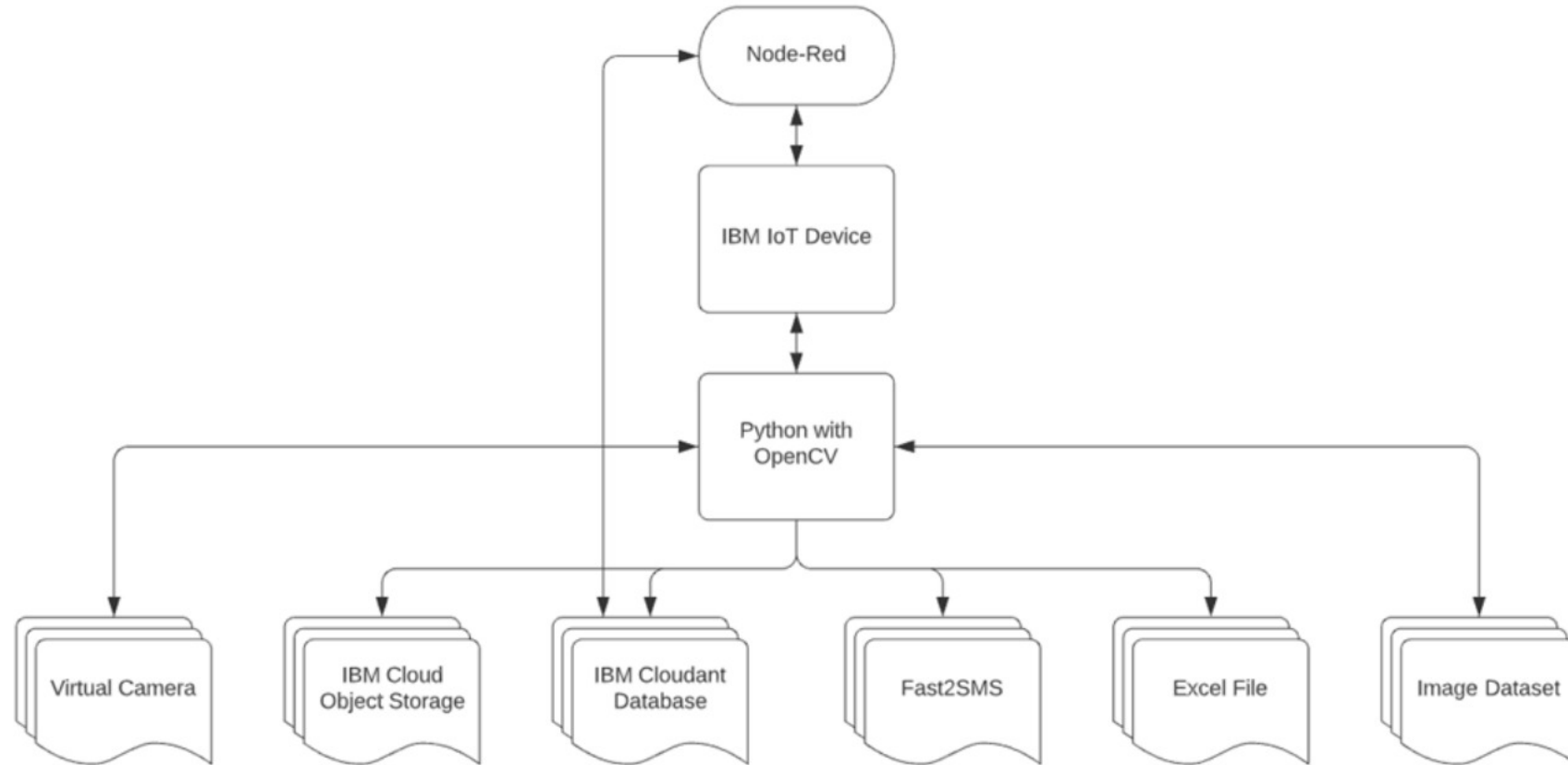
Introduction

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.

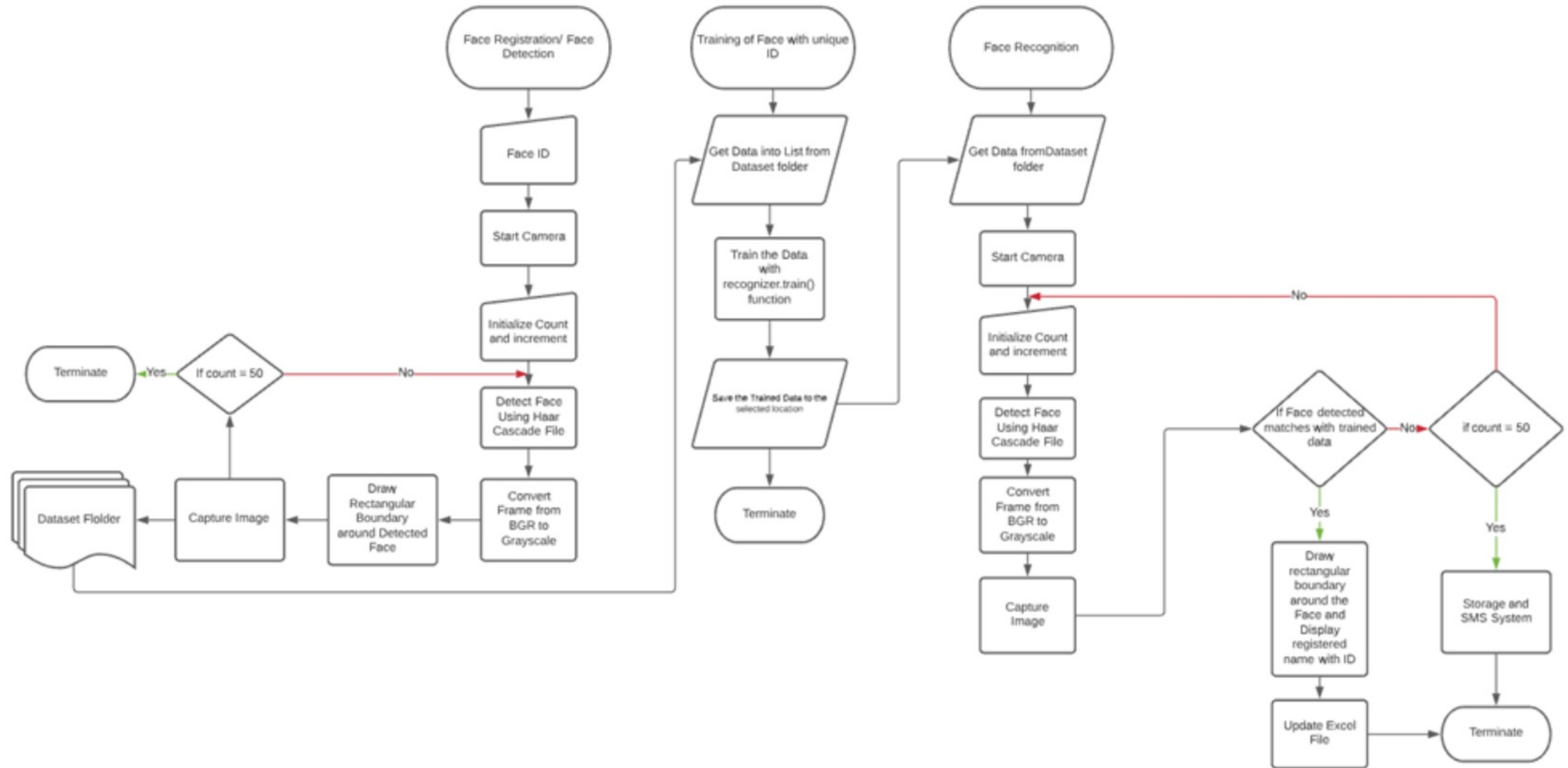


Proposed Architecture

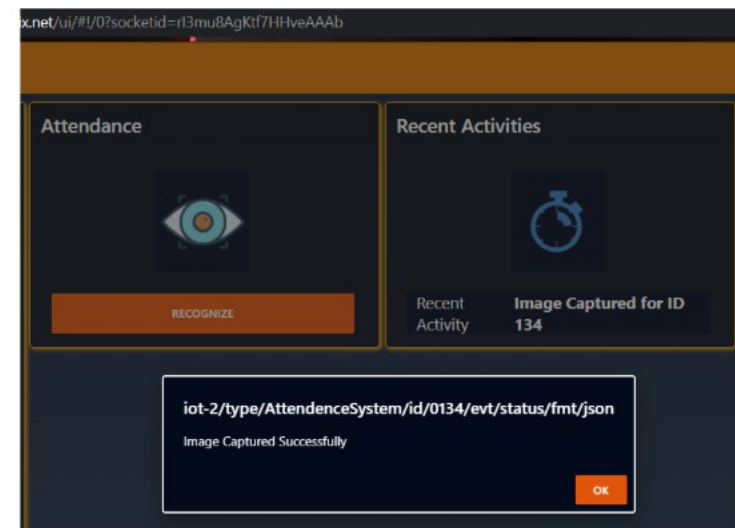
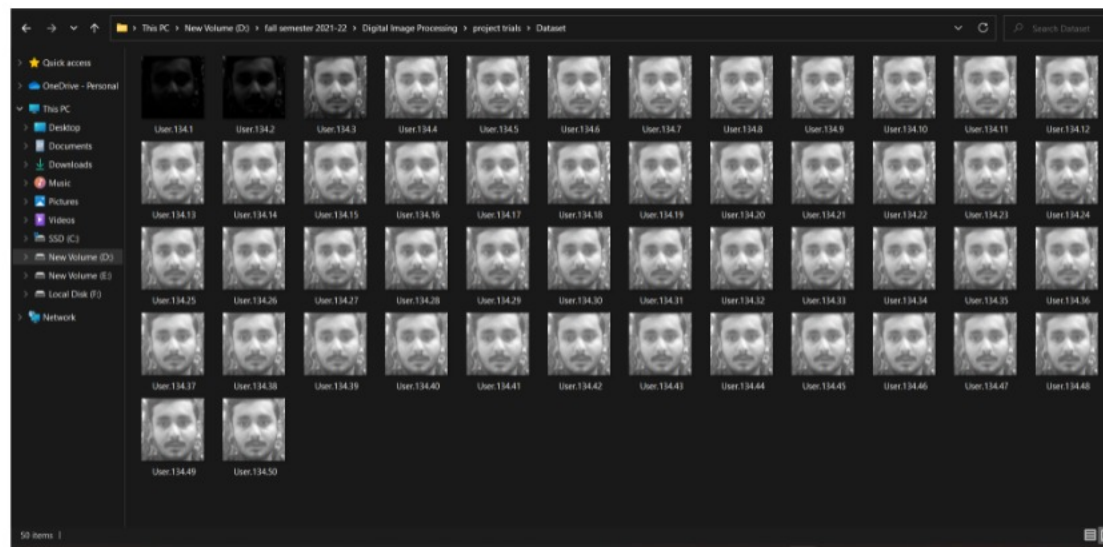
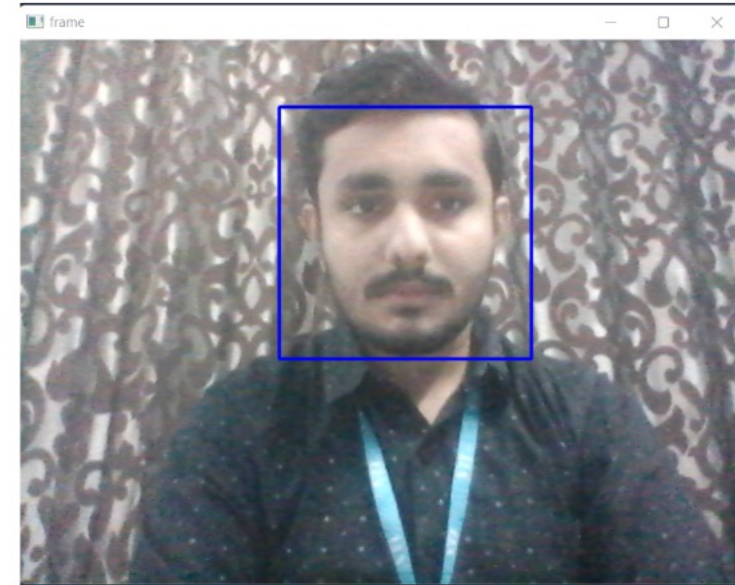
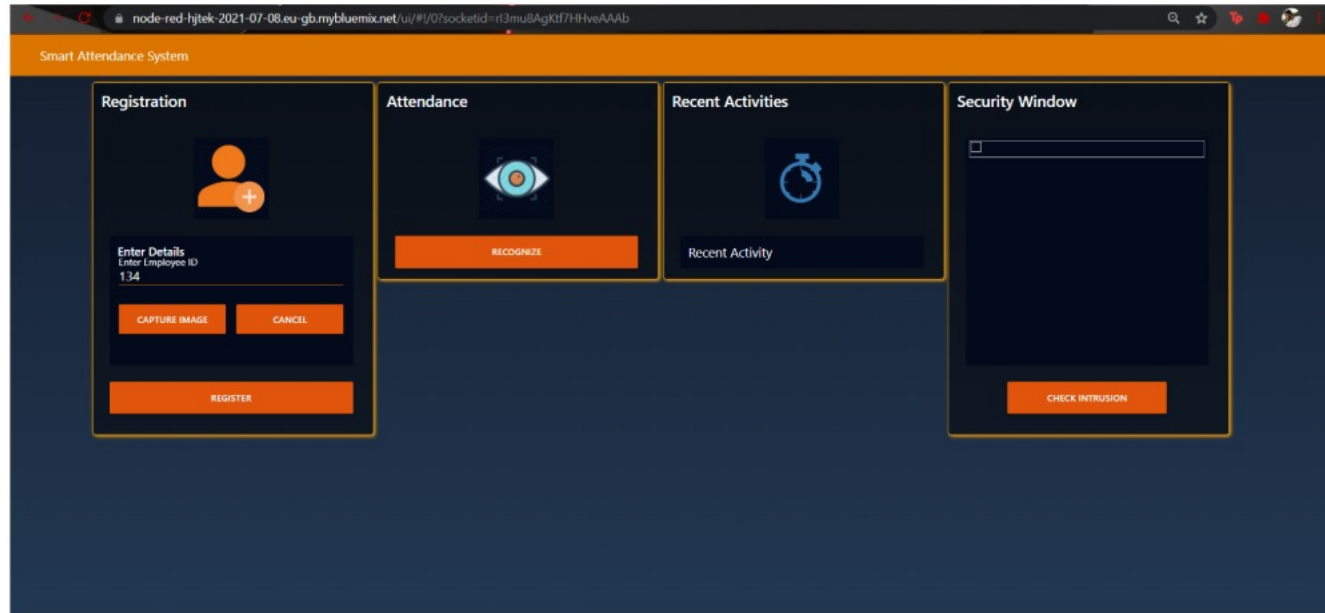
9 Pillars of Smart Attendance



Face Detection, Training and Recognition




Registration Process



Registration Process

Smart Attendance System

Registration



Enter Details


Enter Employee ID

CAPTURE IMAGE

CANCEL


REGISTER

Attendance



RECOGNIZE

Recent Activities



Recent Activity

Registration Successful

Security Window

☐

CHECK INTRUSION

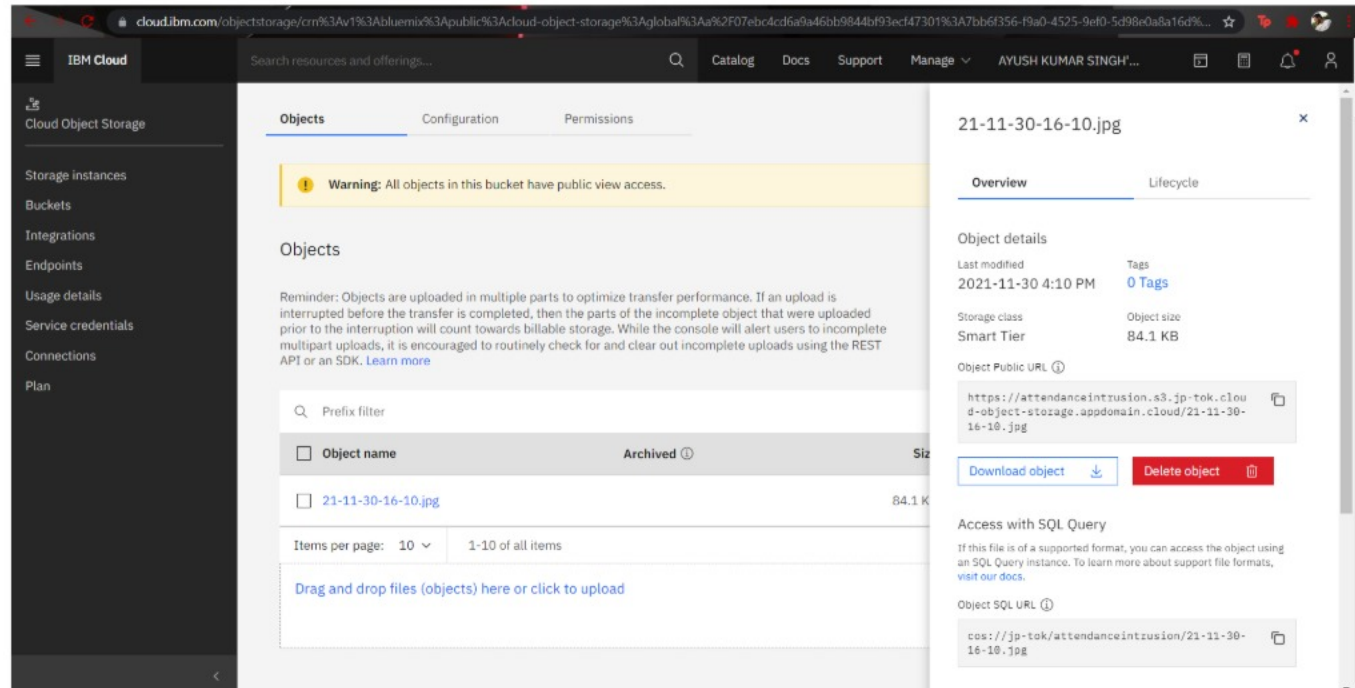
iot-2/type/AttendanceSystem/id/0134/evt/status/fmt/json

Registration Successful

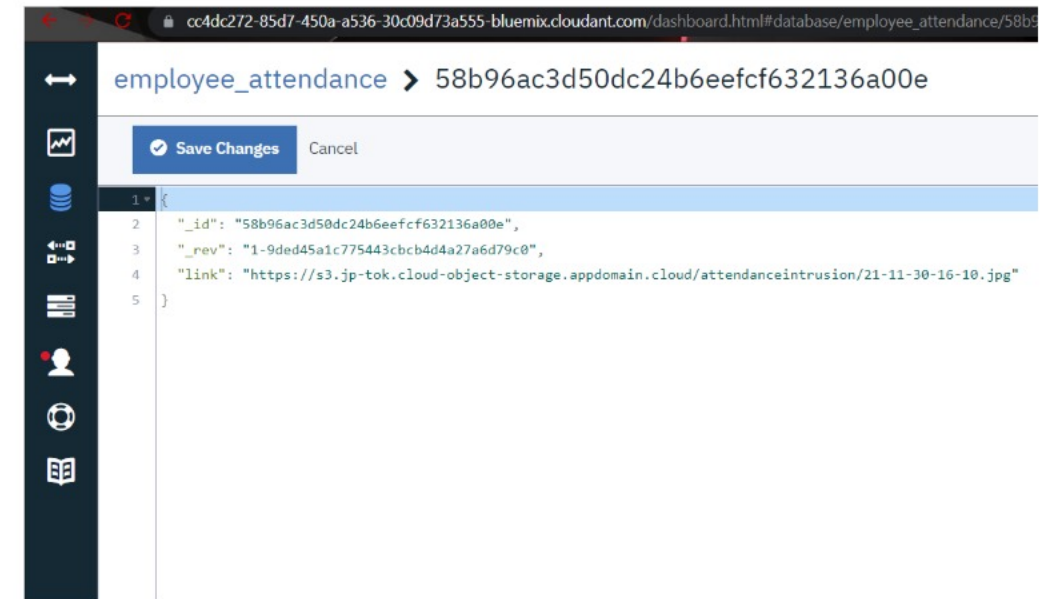
OK

Recognition Scenario 1

The Person is NOT Recognized



The screenshot shows the IBM Cloud Object Storage console. A warning banner at the top states: "Warning: All objects in this bucket have public view access." Below this, the "Objects" tab is active, displaying a list of objects. The object "21-11-30-16-10.jpg" is selected, and its details are shown on the right. The details include: Last modified: 2021-11-30 4:10 PM, Storage class: Smart Tier, Object size: 84.1 KB, and Object Public URL: <https://attendanceintrusion.s3.jp-tok.cloud-object-storage.appdomain.cloud/21-11-30-16-10.jpg>. There are also buttons for "Download object" and "Delete object".

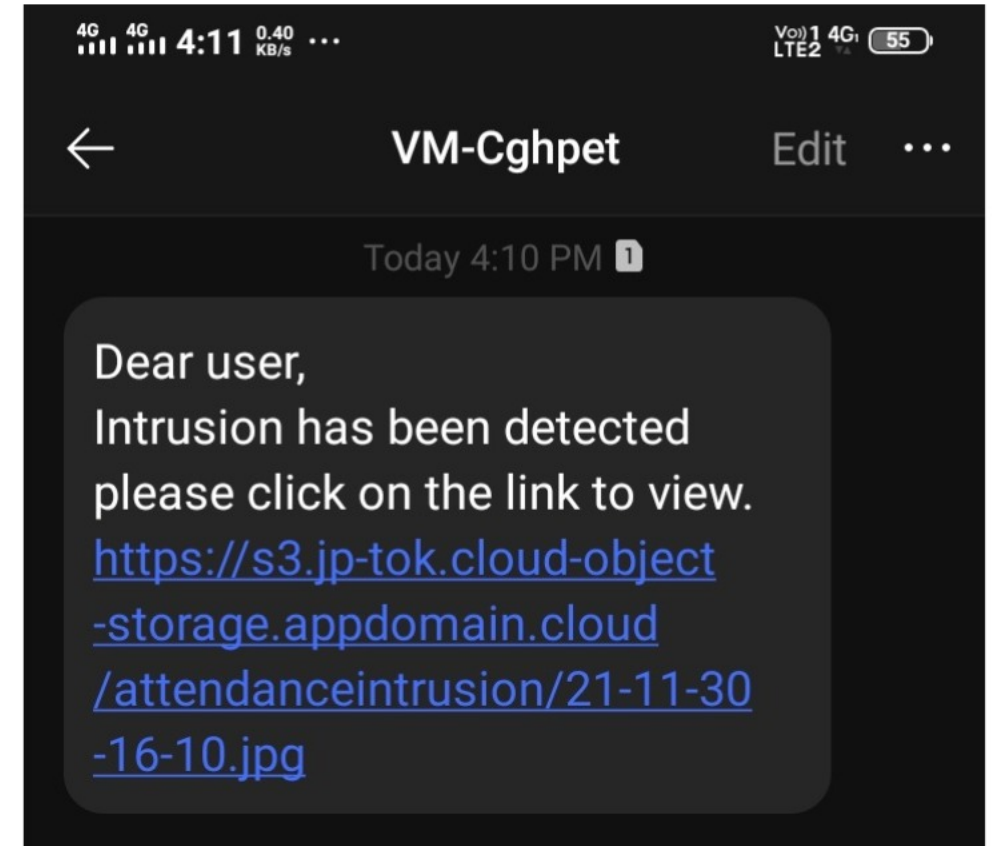
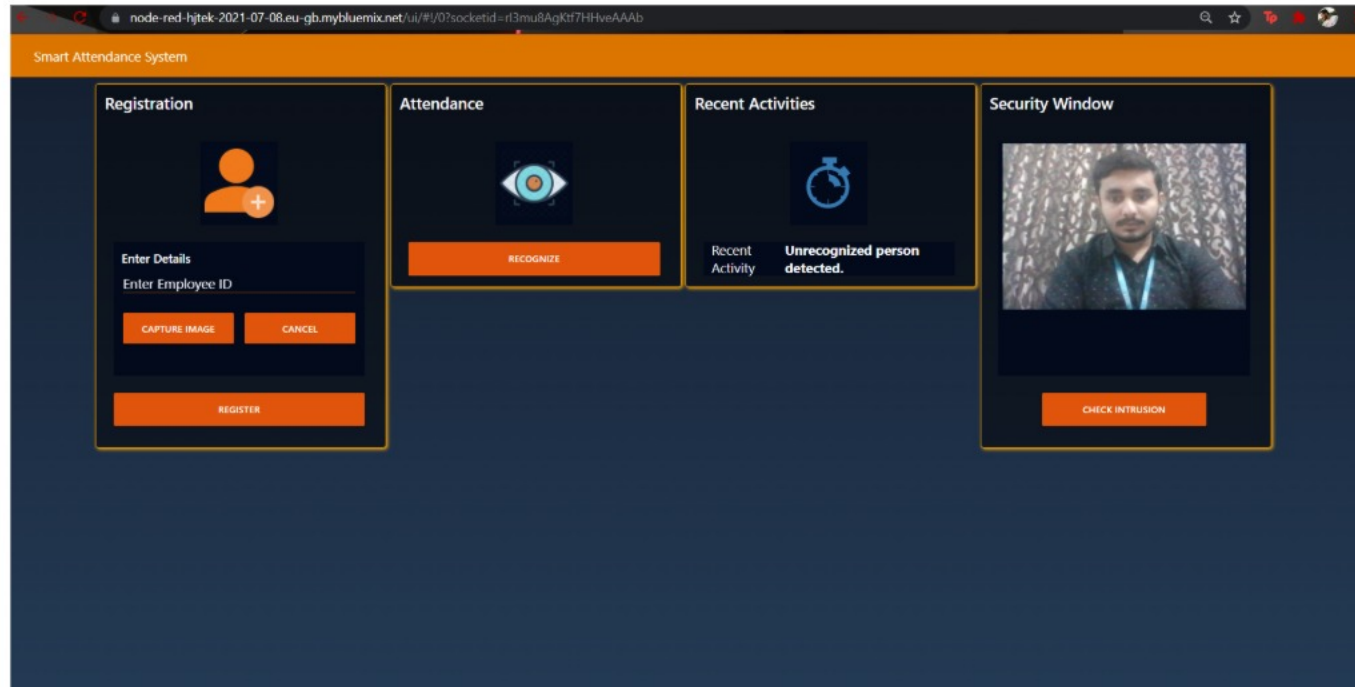


The screenshot shows a database console interface. The breadcrumb navigation indicates the path: `employee_attendance > 58b96ac3d50dc24b6eefcf632136a00e`. Below the breadcrumb, there is a "Save Changes" button and a "Cancel" button. The main area displays a JSON record with the following fields:

```
1 {
2   "_id": "58b96ac3d50dc24b6eefcf632136a00e",
3   "_rev": "1-9ded45a1c775443cbcb4d4a27a6d79c0",
4   "link": "https://s3.jp-tok.cloud-object-storage.appdomain.cloud/attendanceintrusion/21-11-30-16-10.jpg"
5 }
```

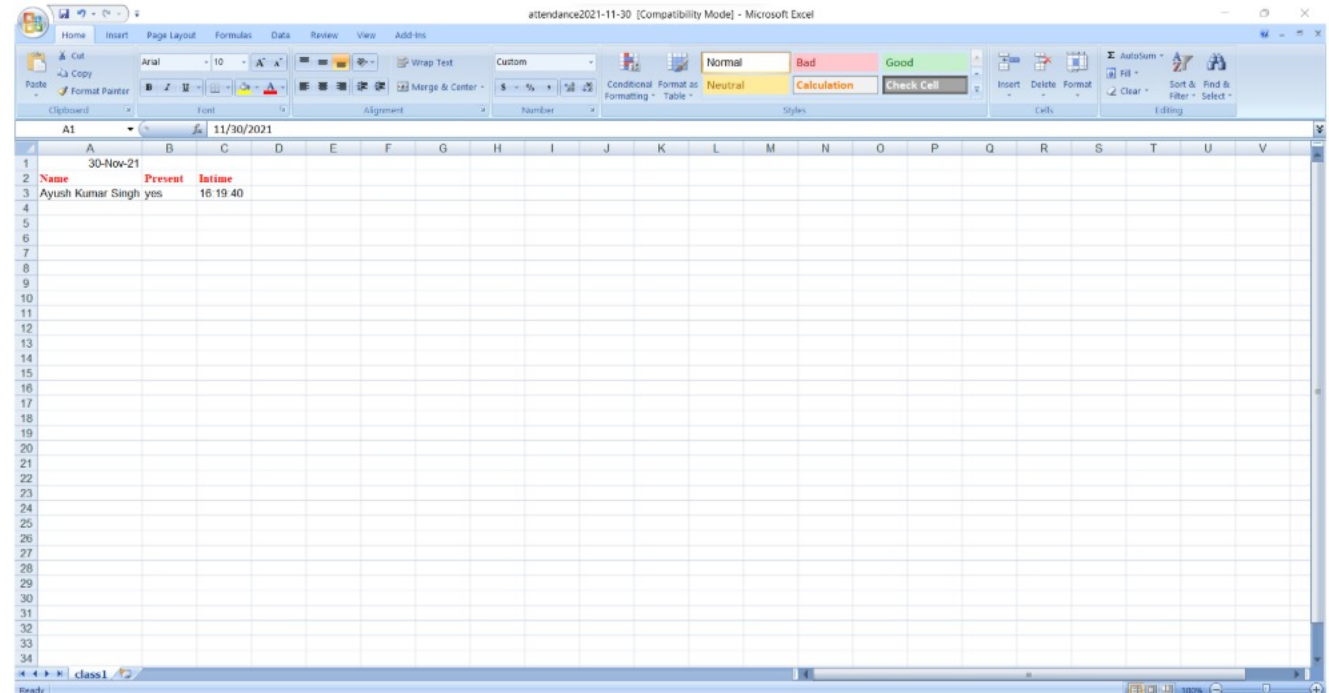
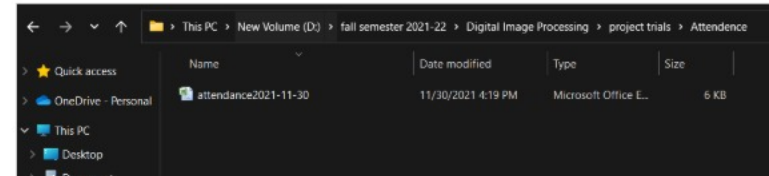
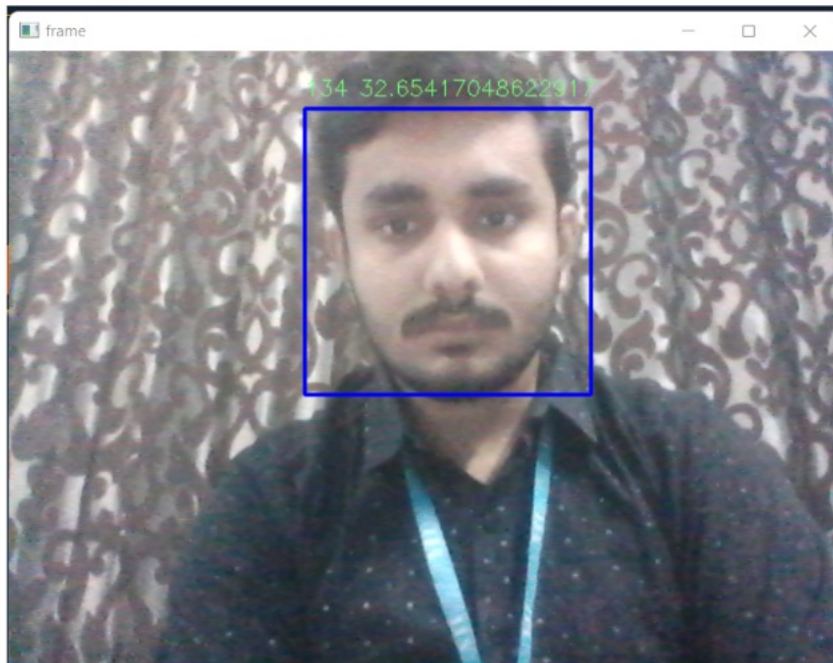

Recognition Scenario 1

The Person is NOT Recognized



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.

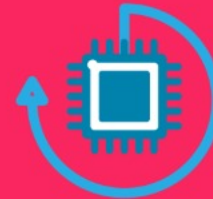
GOOD DATA



GRAYSCALE



EMBEDDED LAYER



EMERGENCY SMS SERVICE

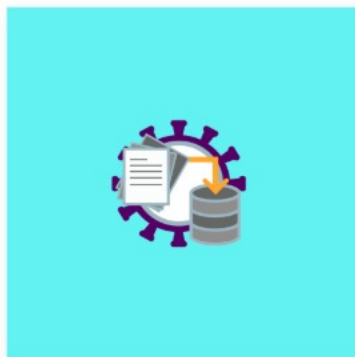


How are we different?

- 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.

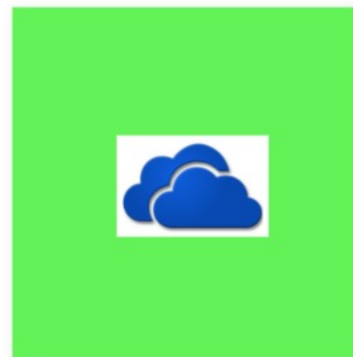
01.

Reliable Image
Storing Process



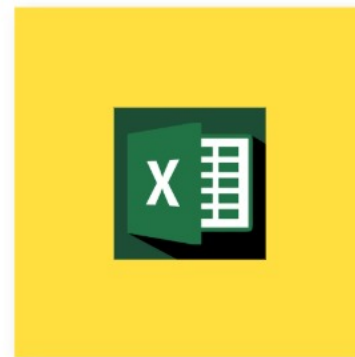
02.

IBM Cloud Object
Storage and
Cloudand Database

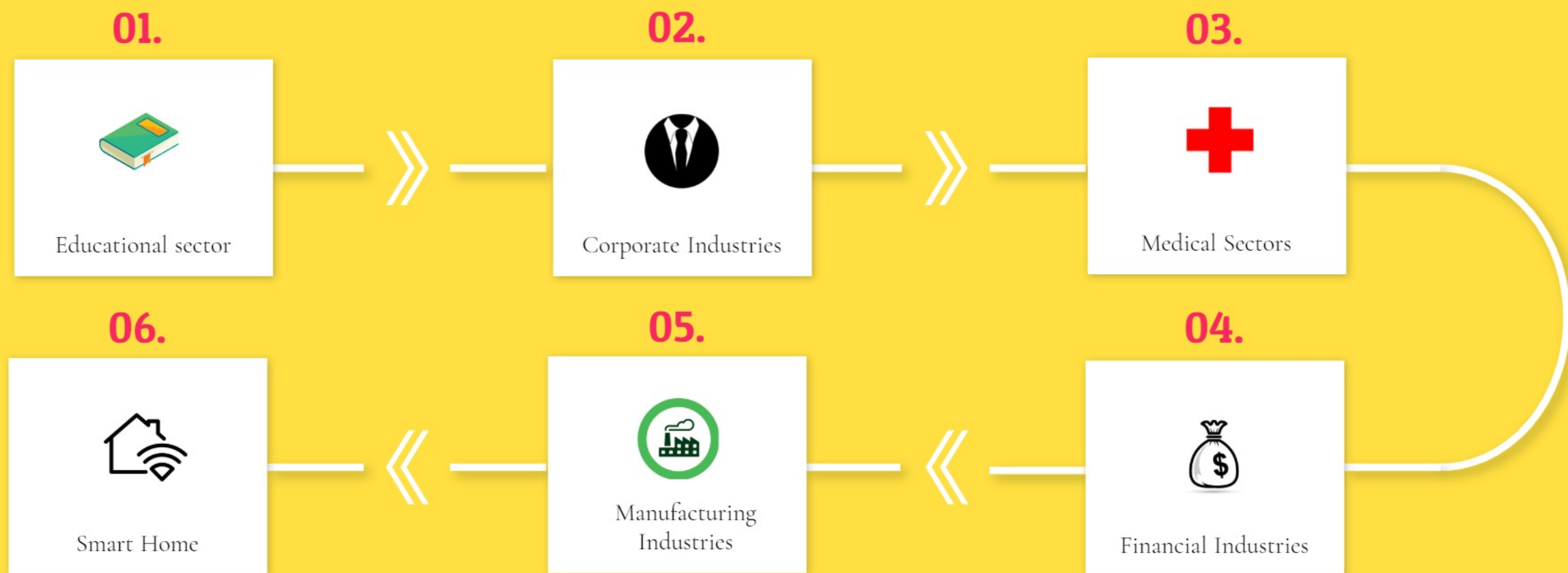


03.

Excel Write



Future Aim



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!