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IoT – Based Beard Detection System using Id-Card for Enhanced Security

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Abstract: *In today's dynamic and technology-driven world, attendance management systems are undergoing transformation through the integration of Internet of Things and Facial hairdetection and segmentation play an important role in forensic facial analysis. In this paper, we propose a fast, robust, fully automatic and self-training system for beard/moustache detection and segmentation in challenging facial images. In order to overcome the limitations of illumination, facial hair color and near-clear shaving, our facial hair detection self-learns a transformation vector to separate a hair class and a non-hair class from the testing image itself. A feature vector, consisting of Histogram of Gabor (HOG) and Histogram of Oriented Gradient of Gabor (HOGG) at different directions and frequencies, is proposed for both beard/moustache detection and segmentation in this paper. A feature-based segmentation is then proposed to segment the beard/moustache from a region on the face that is discovered to contain facial hair.*

Keywords: Oriented Gradient of Gabor

I. INTRODUCTION

Facial hair analysis has recently received significant attention from forensic and biometric researchers because of three important observations as follows . Firstly , changing facial hair style can modify a person's appearance such that it affects facial recognition systems. Secondly, most females do not have beard or moustache. Therefore, detecting facial hair helps to distinguish male against female with high confidence in the gender classification problem. Finally, opposed to babies and young adults, only male senior adults generally have beard or moustache classification, facial recognition.

II. EXISTING SYSTEM

we using the security guards for beard/mustache detection in the college, Providing salaries for security guards, and be a part of it some students manage the security guards. For overcome this types of problems we developed an software in IoT domain called as "beard detection system using ID card for enhanced security "by this software we can easily classify the students who are with beard and without beard if student with beard they need to scan their ID card then the details goes to principal.

III. PROPOSED METHOD

The system uses Personal Image Classifier and MIT App Inventor to create a mobile app that can be used to take input images through camera and classifies the image consists of beard or without beard. If the image consists of beard it will give the output as "scan the bar code" otherwise it will sounds that "please enter". The app then sends the data who are scanned their ID card bar code it will be recorded in the google sheet.

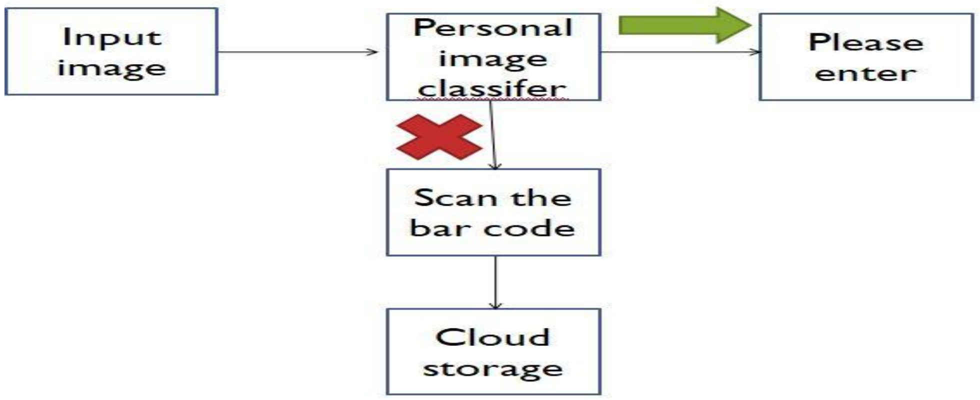


Figure: Block diagram of proposed method

IV. SOFTWARE USED

4.1 Personal Image Classifier

This section is composed of three parts. First, we present our proposed feature extraction approach These features are employed in both facial hair detection and segmentation. Second, Section details the facial hair detection algorithm on challenging beard/moustache images. Finally, the detection results will be used as the inputs in the facial hair segmentation. The proposed method was personal image classifier. The personal image classifier classifies the input image consists of beard or without beard. The personal image classifier gives the output to the MIT app inventor. It gives the sound i.e, if the person consist of beard it sounds "**scan the bar code**", if the person does not consist of beard it gives the sound "**please enter**". To get the model file(structure of model file:filename.mdl) of personal image

4.2 MIT App Inventor

MIT App Inventor is a visual programming platform that empowers individuals, particularly those without prior coding experience, to create mobile applications for Android devices. Developed by the Massachusetts Institute of Technology (MIT), this user-friendly tool eliminates the need for traditional coding by offering a drag - and- drop interface. App Inventor enables users to design apps by arranging predefined blocks that represent Various functions, such as user interface components, logic statements, and data manipulation. These blocks visually represent the app's behavior and interactions. The platform simplifies complex coding concepts into manage able building blocks, making app development accessible to wider audience. The platform includes a wide range of features, like sensors (accelerometer, GPS),media playback, social media integration, and databases. This empowers creators to design diverse apps, from educational tools and games to utilities and productivity applications.

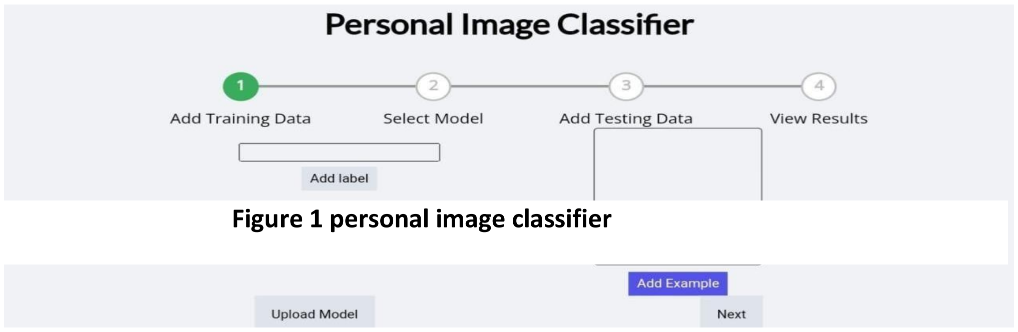


Figure 1 personal image classifier

Figure 4.1: MIT App Inventor

App Inventor supports real-time testing, allowing users to preview their apps on Android devices or emulators. Once satisfied with the app's functionality, users can export the app as an APK file for installation on Android Devices.

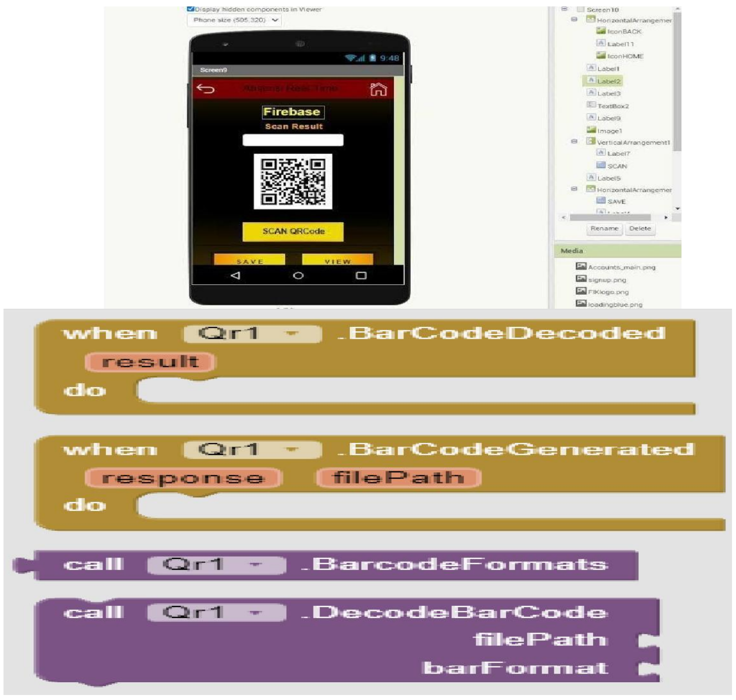
After developing the model file in the personal image classifier next need to develop the app using the MIT app inventor. We need to add 2 screens and the required buttons and inputs. Add the personal image classifier model file to the APP. Then attach the Google sheet for the response, the output of the responses are in the respective Gmail sheets.

4.3 QR Scanning

QR codes (Quick Response codes) are 2D barcodes that store information, which can be scanned using a smart phone's camera. In MIT App Inventor, you can generate and scan QR codes to exchange data between devices.

To generate a QR code, you can use the "Barcode Scanner" component, set its properties like data to be encoded, and create a button to trigger the code generation. To scan QR codes, use the "Barcode Scanner" component in conjunction with the "Camera" component. When the code is scanned, the app can extract the encode d data, allowing you to perform actions or display information.

QR codes can be used for various purposes, such as sharing contact information, URLs, text, or even triggering specific app functions. MIT App Inventor simplifies the integration of QR code functionality into your app, enhancing user experience by enabling quick data exchange Through code scanning.



```
when Qr1 .BarCodeDecoded
  result
do

when Qr1 .BarCodeGenerated
  response  filePath
do

call Qr1 .BarcodeFormats

call Qr1 .DecodeBarCode
                  filePath
                  barFormat
```

Figure: QR code Scanning and blocks

4.4 Google Sheets

Working with Google Sheets in MIT App Inventor opens up possibilities for storing and retrieving data for your app. Here are two main approaches to consider:

Using the Google Sheets API:

- This is the official and most powerful way to interact with Google Sheets from your app. It requires some setup but offers full control over your data:

Setup:

- Enable Google Sheets API: In your Google Cloud Platform project, enable the Google Sheets API.
- Create Service Account: Create a service account and download its credentials file (JSON).
- Configure in MIT App Inventor: Import the downloaded JSON file into your project and use the "Google Sheets" component.

Blocks:

- Use blocks like "Get Range" and "Set Range" to read and write data from specific cell ranges.
- You can also perform actions like creating spreadsheets, deleting rows, and searching for data.

Using Extensions:

- Several extensions provide easier access to Google Sheets:

Google Sheets for App Inventor :

- A popular extension with simple blocks for reading and writing data to specific cells or ranges.

Spreadsheet Extension:

- Offers various features like creating, deleting, and modifying spreadsheets, manipulating data, and more.

JEWEL Login and Register with Google Sheets & Apps Script:

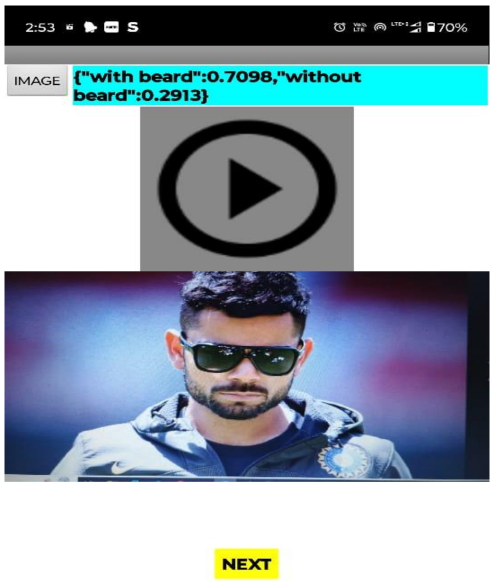
- Enables user login and registration functionality using data from your Google Sheets.

Choosing the Right Approach:

Use the Google Sheets API for: Complex interactions with your data, requiring precise control over cell ranges and functionalities.

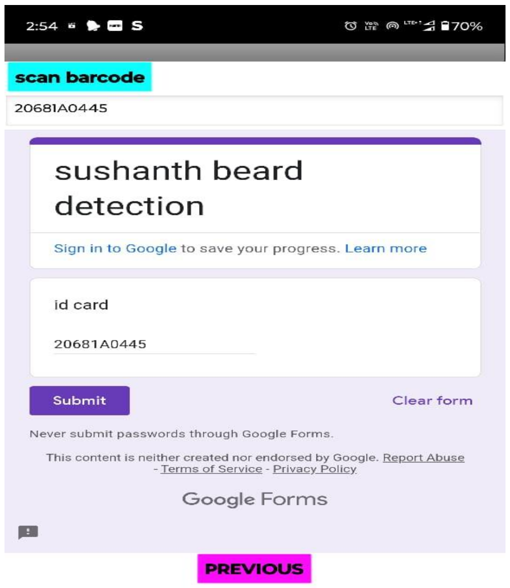
Use Extensions for: Simpler solutions and quick implementation if your needs involve basic data read/write operations.

V. RESULTS AND DISCUSSION



{"with beard":0.7098,"without beard":0.2913}

Figure 2 APP Screen 1



20681A0445

sushanth beard detection

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id card

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Figure 3 APP Screen 2

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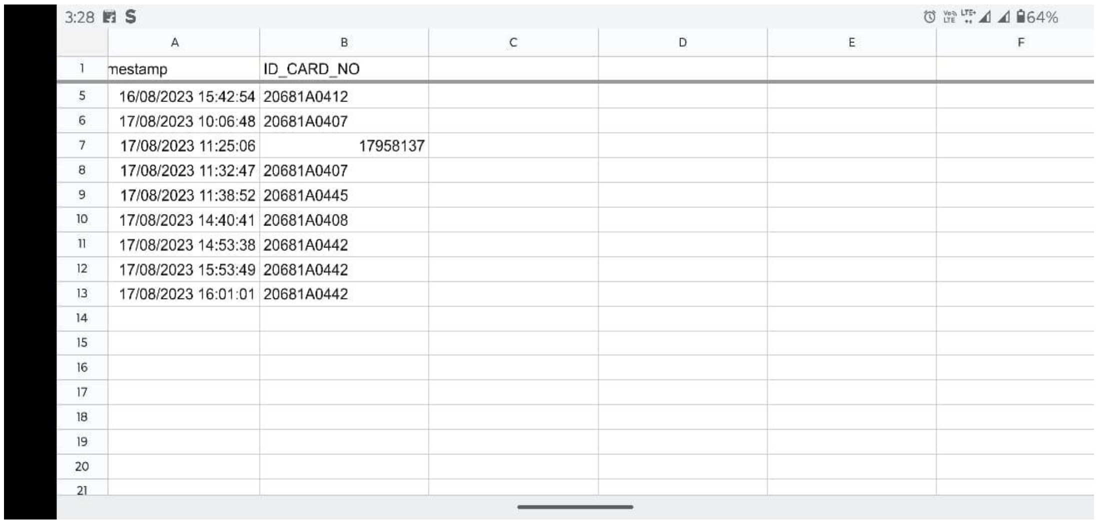
Beards can significantly alter facial appearance, making face recognition systems less accurate. Beard detection can help mitigate this issue by providing additional data points for identification. Certain types of beards, like fake ones used for disguises, can be flagged by beard detection systems, potentially deterring fraudulent activities. In high-security settings, identifying individuals with specific beard characteristics (e.g., length, style) could be used for targeted surveillance of potential threats. The result will be noted in the google form with date, time, seconds as shown in below figure.



	A	B	C	D	E	F
1	mestamp	ID_CARD_NO				
5	16/08/2023 15:42:54	20681A0412				
6	17/08/2023 10:06:48	20681A0407				
7	17/08/2023 11:25:06	17958137				
8	17/08/2023 11:32:47	20681A0407				
9	17/08/2023 11:38:52	20681A0445				
10	17/08/2023 14:40:41	20681A0408				
11	17/08/2023 14:53:38	20681A0442				
12	17/08/2023 15:53:49	20681A0442				
13	17/08/2023 16:01:01	20681A0442				
14						
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21						

Figure: Google form response sheet

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