iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4639

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Live Attendance System via Face Recognition

Himanshu Tiwari[1], Sachin Goyal[2], Ratish Agrawal[3], Mahesh Pawar[4]
[1, 2, 3, 4]*Department of Information Technology, UIT RGPV, Bhopal, India*

Abstract: ***In this work we propose a Live Attendance Marking System for institutional purpose. This system will enable the department to mark the attendance of students automatically by recognizing their faces. The system is based on the face detection and recognition algorithms and automatically recognizes a student whenever he/she comes across the camera module. Further after the recognition it automatically updates his/her attendance in the database. The basic architecture and all the algorithms used in the model are described in the paper elaborately. Moreover in order to evaluate and enhance the performance of the system many of the filter functions are used which provide the capability to capture and recognize the images even in dull and low light places. This paper also suggests the technique to ensure that a student can mark the attendance only once in a day. The live attendance system is much more efficient to traditional attendance systems both in saving time and in maintaining the database.***

Keywords: Face Recognition, Biometric based system, Live attendance system, LBPH, OPENCV face recognition

I. INTRODUCTION

Today in the fast growing world, on one hand the data is increasing in an exponential rate and on the other hand the margin of error as well as time is decreasing drastically. In this situation a task to be accomplished in a manual way is bit riskier. Instead the common man or any organization per say tends to prefer the automatic way in order to complete the task in time and with much more accuracy. Following the trend comes the Live Attendance System, which is an enhancement in traditional manual way of marking the attendance. Live or Automated attendance system can be classified in three ways:-

1) Biometric based
2) Smart-Card based
3) Web based

The manual way of marking the attendance is a time consuming process and its performance degrades with the enormous amount of data. The Live Attendance System is much preferable as it saves the time and reduces the complexity of the system.

In our model we are using the biometric based attendance system to mark the attendance of the students automatically by detecting and recognizing their faces. The system consists of creating the dataset of images, followed by training the dataset and finally detecting the person next time he comes across the camera module of the system. Further the system is linked with the Wamp Server consisting of the database of the students. The system has the capability to automatically update the attendance of a student once he gets recognized. The following sections of the paper present the literature reviews, description of various steps in the model, results, conclusion and scope for improvement.

II. LITRATURE REVIEW

This section gives a summary of the research results. We first present some of the automated attendance models based on the various biometrics and then a set of summaries of research papers that brought us to the concept of building the face recognition system. Then a brief summary of various face recognition techniques are presented which in turn is the key concept behind the system. Results of most of the papers show that robust face recognition in uncontrolled illumination environment is still one of the unsolved challenges.

In [1] the authors give the idea of finger print based attendance system. In this model a portable finger print scanner is used which is passed among students and they mark their attendance one by one. This model ensures the full-proof attendance of the students. However it suffers with the problem of distraction when the scanner is passed among the students.

In [2] the authors present the idea of marking the attendance using RFIDs. Here the students have to place their RFIDs into the RFID scanner and their attendance will be marked successfully. This system has a drawback of fraudulent access i.e. any unauthorized person can get the access if he has the authorized ID of the institution.

In [3] The Daugman's algorithm for iris recognition is being presented by the authors. This system exploits the iris recognition which is done by capturing iris image, extracting it's features, storing it in the database and finally matching them. But it faces the difficulty of maintaining the accuracy in case of low brightness.

In [4] authors give a significant idea of maintain the attendance via a real time face recognition system. The system is much accurate, precise, secure and reliable them=n other biometric based systems. However it needs some kind of improvement in various lightning conditions.

In [5] authors intend to represent the facial profiles as curves followed by finding their vectors or norms and then with the use of deviation from the norms classifying other facial profiles. Basically it is suggested to create a independent measured vector which can further be compare with other vectors in the database.

In [6] author is using the Sirovich Eigenface algorithm which can also be termed as Karhunen Loève expansion, eigenpicture, eigenvector, and principal component . Here the fundamental approach is to represent the pictures of faces efficiently. Further they state that any of the image of the faces can be redeveloped by a collection of weights for each face and standardized face picture which is termed as the eigenpicture. Moreover the weights which are describing the faces are gathered by inflating the image of face across the eigenpicture.

In [7] authors exploit the use of eigenfaces following the technique of Sirovich and Kirby which was used for face detection and recognition.

In [8] author surveyed and followed the long research based on the Active Appearance Models.

In [9] authors provide a research in depth of Active Shape Models and further relates them to gather images up against the model of acceptable face appearances, taking the advantage of face specific boundaries of curved shapes. These models have an upper hand when multiple expressions and poses come across the system. But they impose the complexity issues during the case of neutral faces with more of the normal expressions.

In [10] authors tend to focus on similarity transformations and thus to use the training images as the appearance model. This approach of iterative transformation and registration reflect the idea of Lucas-Kanade algorithm..

In [11] authors suggest using LBPH algorithm in its enhanced form with the use of OPENCV 2.4. OPENCV 2.4 has a new class called Face-Recognizer for the purpose of face recognition. LBPH is a much enhanced and modified form of LBP algorithm which is notably known in providing good texture description.

In [12] authors give the idea of extending the histograms into much spatial histograms encoding both of the spatial relations and the appearance if the facial regions. Here the histograms are identified for ‘m’ regions generating ‘m’ histograms. Thus it provides the description of the faces on three altogether different locality levels. Moreover the LBP labels of the histograms consist of the information of the patterns on the pixel level. Further all the labels are collected together in a small region in order to generate the regional level information and the description of the face is built by the concatenation of regional histograms.

III. PROPOSED WORK

The proposed model is based on face recognition mechanism. The basic methodology is presented in figure 1. Whenever a student enters the class and comes across the camera module of the system his image is captured in the system and is recognized and validated if he is a student of the class. If recognized then his attendance is automatically marked via post processing of the system.

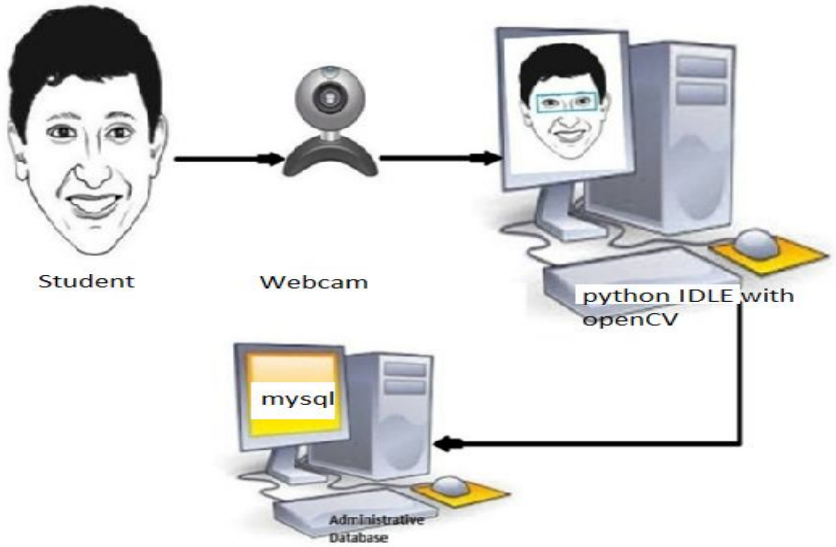


Figure 1 : basic methodology of the system

The elaborated architecture of the system is shown in figure 2. The system architecture consists of various stages and steps ranging between creating dataset and updating of the database. These steps are discussed vastly in the following sections.

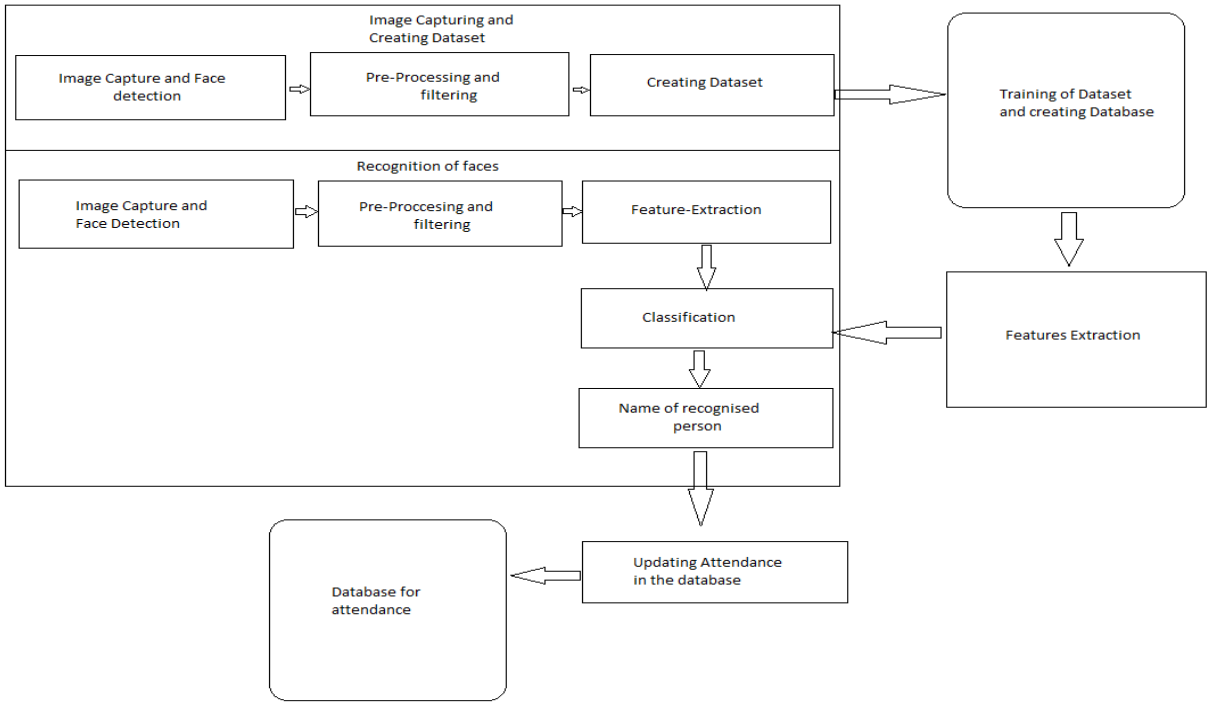


Figure 2: System Architecture

A. Face Detection and Recognition

a. Creating Dataset: In this step we are going to create a dataset of 21 images for each student one by one. This step may broadly be termed as the image capturing stage of the system.

Here in order to detect the faces i.e. to bound the face of the person in rectangular shape we will use a 'Cascade Classifier' in the form of a xml file. By default we are going to use 'haarcascade_frontalface_default.xml' in the following manner.

```
Face Detect=cv2.CascadeClassifier('haarcascade_frontalface_default.xml');
cam=cv2.VideoCapture(0);   // Enabling default webcam to capture image
```

Now distinguishing each user with an Id a dataset can be created in the following way. Also all the images will be first converted in the Gray Scale format so that during training and recognition of the image no ambiguity would appear due to the colour of a particular image.

1) *Training Dataset:* In this step we are going to feed the data and respective names of each face to the recognizer. In this way it can learn about all the images with corresponding ids.

The basic code is as follows:-

```
recognizer=cv2.face.LBPHFaceRecognizer_create();
path='dataSet'
```

2) *Recognition of Images:* In this step we are going to feed the new faces of the same user and see if the face recognizer we just train can detect them or not. For recognition of images we are using LBPH algorithm which is described in the following sections.

B. LBPH Face Recognizer Algorithm

Here, in LBPH algorithm the motive is to concentrate on local and small features of an image rather than looking at the whole. The algorithm compares the relative and local pixels of an image in order to generate the local set of the image structure.

Take a 3x3 window and move it one image, at each move (each local part of an image), compare the pixel at the center with its neighboring pixels. The neighbors with intensity value less than or equal to center pixel are denoted by 1 and that with intensity gratet than the centre are denoted by 0. Then reading 0/1 values in a clockwise order will give you some binary pattern such as

001100 which will be local to some are of the image. Following this technique for the whole image will give you a complete list of binary patterns for the whole image.

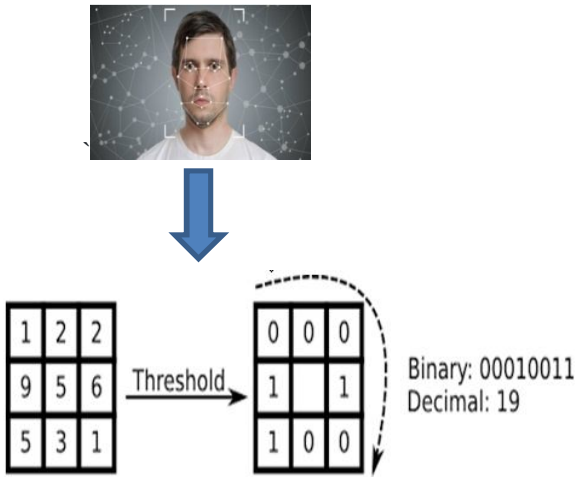


Figure 3: Overview of LBPH algorithm

In the LBP algorithm and operations it turns out to be an efficient way to convert the image in gray scale format. This drastically enhances the robustness of the system.

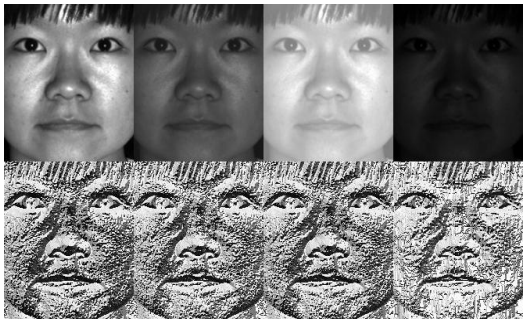


figure 4: Converting image into gray scale

Now we have to add the spatial information into face recognition model. Here we are going to divide the LBP image into some number of local regions say 'm' and then extracting a histogram for each region. In this way by concatatinating all the local histograms we will obtain a enhanced featured vector. These histograms are nothing but the Local Binary Pattern Histograms.

C. Data Storage

Now the time is to describe about the second aspect of the model i.e. creating database for keeping the record of the attendances of each student on a routine basis. For this we are going to use the WAMP SERVER to create a local host in our PC. Further in the 'phpmyadmin' section we will create the database

In this part in order to maintain the number of attendance of each student we are going to create a database through MySql.

1) Features of MySql: MySQL is an open-source relational database management system(RDBMS).

Major features as available in MySQL are :

- *a)* Cross-platform support
- *b)* Stored procedures, using a procedural language
- *c)* Triggers
- *d)* Cursors

2) Linking MySql to Python

a) Install pymysql package.

b) In python IDLE, import pymysql.

c) Connecting mysql with python - conn=pymysql.connect(host=''localhost'',user=''root''passwd= " ",db=''attendance_system'')

d) Creating cursor -

mycursor=conn.cursor()

(cursor provides all database operations of MySQL)

3) Writing Sql queries in Python

myCursor.execute (*** CREATE TABLE attendance

{

Id int primary key,

Name varchar(20)

Attendance_count int

}

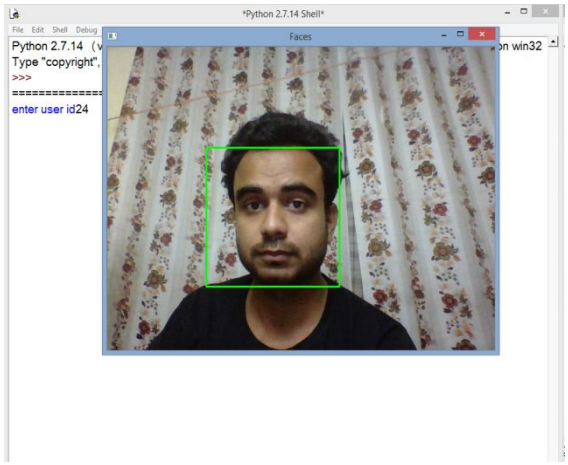
***)

conn.commit() // to save changes in mysql

IV. RESULT

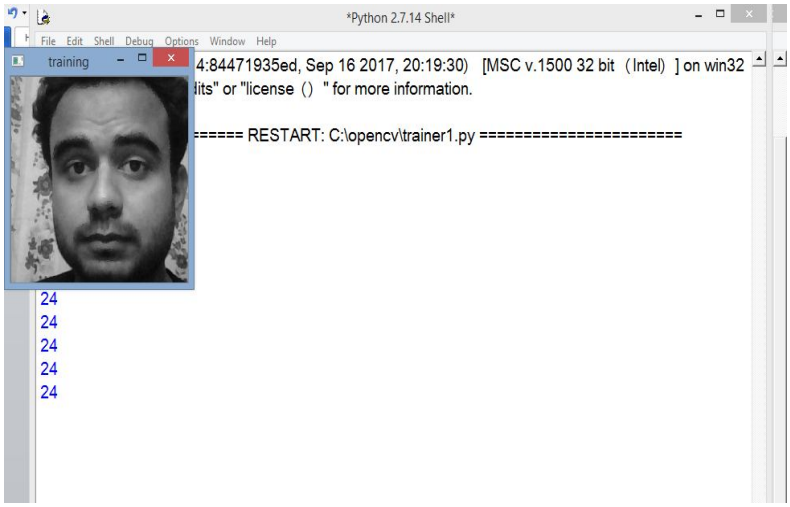
The testing of the model was performed for a group of 30 students and marked their attendance correspondingly on a daily basis. Also we kept in mind that each student use the system only once in a day otherwise the system will not mark his/her attendance. Some of the pictures of the basic steps are as follows:-

A. Dataset Creator

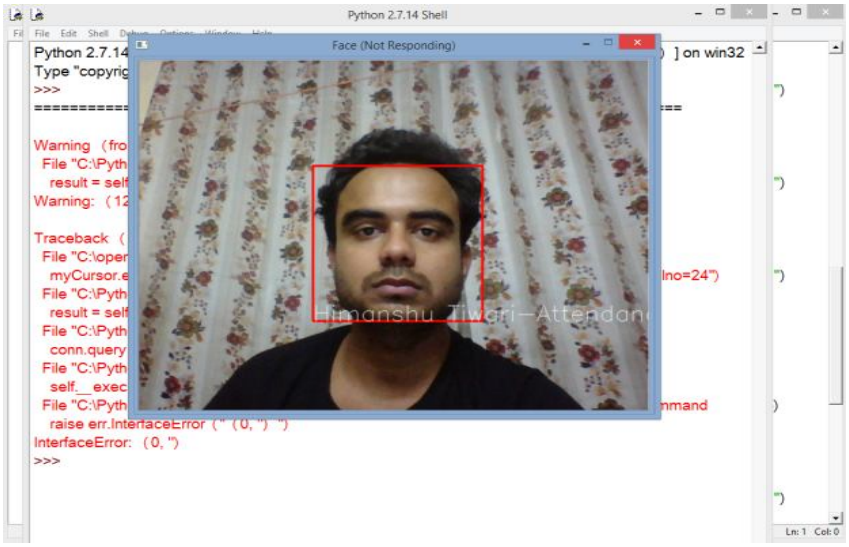


B. Data Set

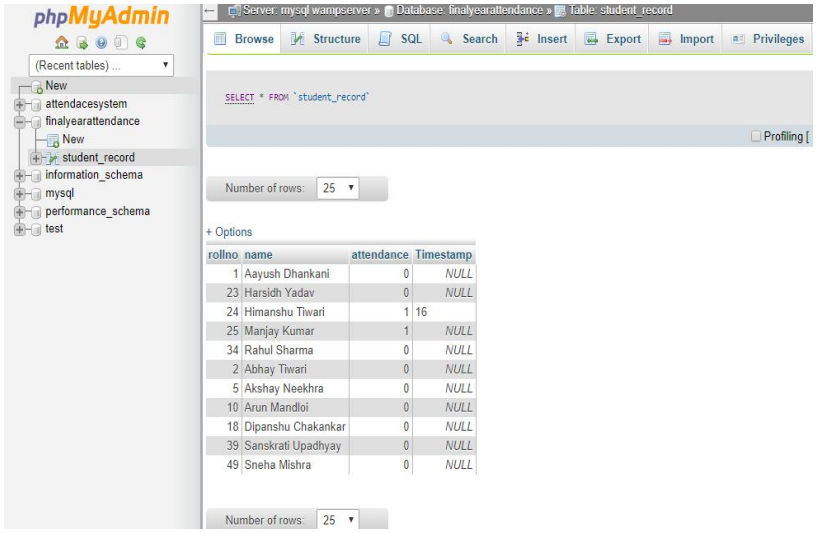
C. Training DataSet



D. Recognising Faces



E. Marking Attendance in the Database



F. Graphical User Interface using Tkinter (library in Python)

V. CONCLUSIONS

From this model we can recognise the faces of students and can mark their attendance automatically in real time without human intervention. The feasibility of the model can be increased drastically if we hire a cloud space in order to store the data of the students. In this way this model can even be built for the entire college in the respective departments. There are so many algorithms which can be used for face detection and recognition. Some of them are Eigen Faces Algorithm, Fisher Faces Algorithm, Local Binary Pattern Histograms Algorithm (LBPH) etc. Out of all those algorithms we choose LBPH algorithm. Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by comparing the neighborhood of each pixel and considers the result as a binary number. Using the LBP combined with histograms we can represent the face images with a simple data vector. Also it is possible to get great results (mainly in a controlled environment). Moreover this is a basic model which can be used in many more fields. Some of them are listed below:-

A. Payments

We all know that the field of business wants all the payments to be easy. Some of the examples are online shopping and the payment through plastic cards. However with the advent of a new technology FaceTech, customers need not to use even the plastic cards. They can just pay via face recognition. Also in 2016, MasterCard opened a new face recogniser app called as the selfie app which enables the user to confirm the payment using their mobile camera.

B. Access and security

Similarly the facial recognition system can be incorporated with the physical devices and instead of using passwords, mobile phones or any other electronic device can be accessed by recognising the face.

C. Criminal identification

The US Police forces and defence agencies are using the FaceTech recognition tedchnology to identify a criminal by looking at his driving licence or any other ID proof. This technique is facilitated by using the features og=f the Machine learning as well.

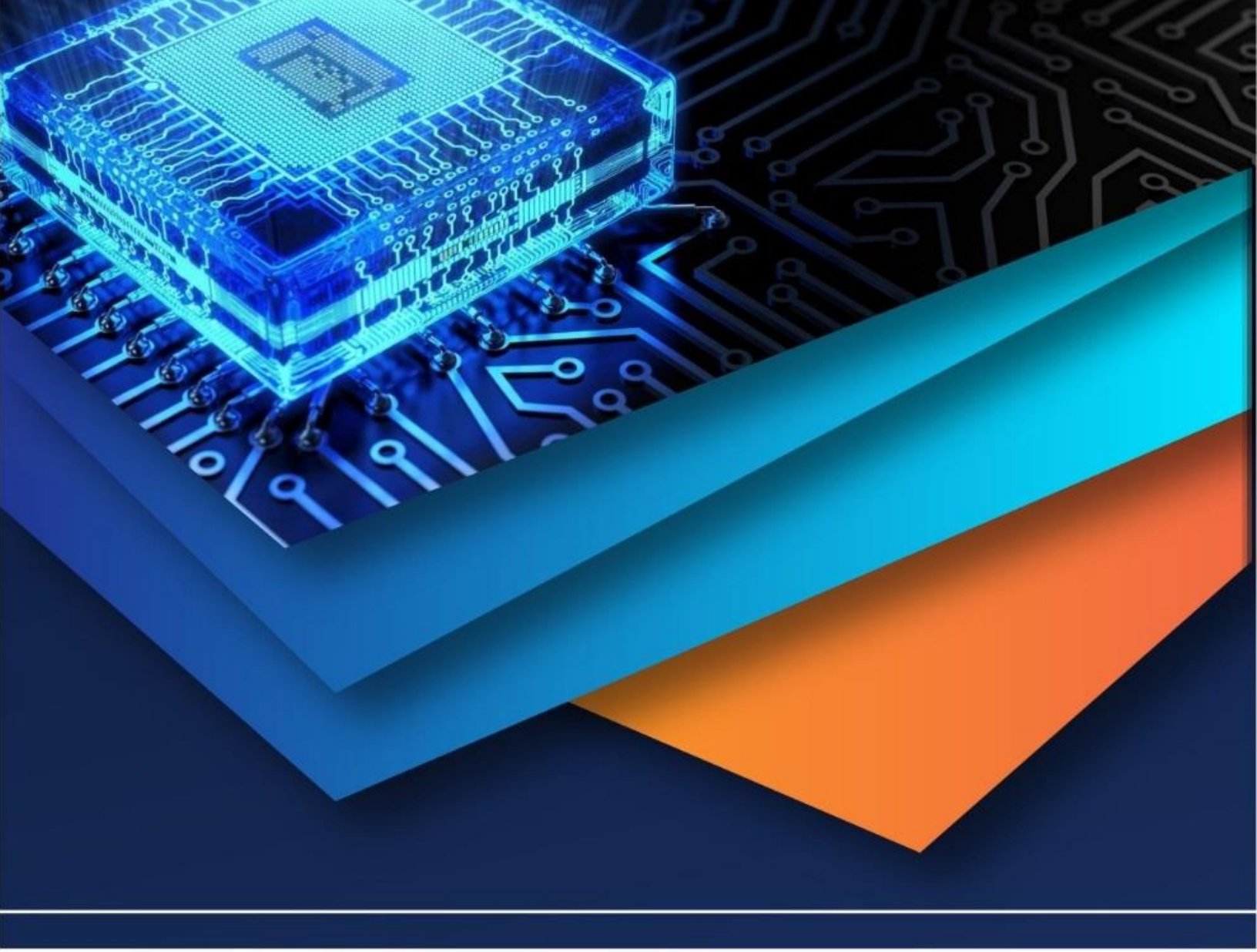
D. Advertising and Marketing

By collecting masses of personal data the companies are getting a closer look at the target markets. This can be achieved by Face Recognition technology which will allow the companies to detect and identify certain culture and demographics.

REFERENCES

[1] B. K. Mohamed and C. Raghu, “Fingerprint attendance system for classroom needs,” in India Conference (INDICON), 2012 Annual IEEE. 2012, pp. 433–438.
[2] T. Lim, S. Sim, and M. Mansor, “Rfid based attendance system,” in Industrial Electronics & Applications, 2009. ISIEA 2009. IEEE Symposium on, vol. 2. IEEE, 2009, pp. 778–782.

[3] S. Kadry and K. Smaili, "A design and implementation of a wireless iris recognition attendance management system," Information Technology and control, vol. 36, no. 3, pp. 323–329, 2007.
[4] T. A. Roshan Tharanga and S. M. Samarakoon's "Smart attendance using real time face recognition," 2013.
[5] Francis Galton's "Personal identification and description," In Nature, pp. 173-177, June 21, 1888.
[6] M. Kirby and L. Sirovich's "Application of the Karhunen- Loève procedure for the characterisation of human faces," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 12, pp. 831-835, Dec. 1990.
[7] M. Turk and A. Pentland, "Eigenfaces for recognition," J. Cognitive Neuroscience, vol. 3, pp. 71-86, 1991.
[8] David Zhang, Joseph P. Campbell, DavideMaltoni, Ruud M. Bolle, "Guest Editorial Special Issue on Biometric Systems", IEEE Transactions on Systems, Man, and Cybernetics-Part C: Applications and Reviews, VOL. 35.
[9] T. Cootes and C. Taylor, "Active shape models – 'smart snakes'," in Proceedings of British Machine Vision Conference, 1992
[10] B. Lucas and T. Kanade, "An iterative image registration technique with an application to stereo vision," in Proceedings of International Joint Conference on Artificial Intelligence, vol. 3, 1981, pp. 674–679.
[11] Mohammed Hayyan ALSIBA1, Hadi Bin Manap1 and Abdul Adam Bin Abdullah2
a) Faculty of Engineering Technology, University Malaysia Pahang, Gambang, Kuantan, Malaysia on
b) Automotive Engineering Centre, University Malaysia Pahang, Pekan, Malaysia
[12] Ahonen T. and Pietikinen M. 2006. Face Description with Local Binary Patterns: Application to Face Recognition. IEEE Transactions on Pattern Analysis.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY