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Face Recognition based Wireless Attendance Monitoring with Embedded Systems

Nandini S[1], Varsha D C[2], Ranjitha S Gowda[3], Rajeshwari Pujar P B[4], Vanitha[5]
[1]Department of Electronics and Communication Engineering, BGSIT, Mandya.

Abstract: Students group action within the room is incredibly necessary task and if taken manually wastes plenty of your time. There are several automatic strategies out there for this purpose i.e, biometric group action. of these strategies conjointly waste time as a result of students must build a queue to the touch their thumb on the scanning device. This work describes the economical rule that mechanically marks the group action while not human intervention. this technique consists of 4 phases- face info, face detection, face recognition and marking group action. This group action is recorded by employing a camera connected within the room that's ceaselessly capturing pictures of scholars. The system initial stores the faces within the info, then the faces are detected within the pictures. The detected faces are compared with the faces hold on within the info throughout face recognition. If the system acknowledges faces, the group action gets marked directly of recognized faces.
Keywords: Attendance; Microcontroller; Face Recognition; Zigbee.

I. INTRODUCTION

Maintaining the group action is terribly vital in all the institutes for checking the performance of students. each institute has its own technique during this regard. Some are taking group action manually victimisation the previous paper or file based mostly approach and some have adopted ways of automatic attendance using some biometric techniques. There are several automatic ways out there for this purpose i.e. biometric group action. All these ways additionally waste time as a result of students need to create a queue to bit their thumb on the scanning device. this technique uses the face recognition approach for the automatic group action of students in the schoolroom atmosphere while not student's intervention. This group action is recorded by victimisation a camera hooked up within the schoolroom that's unendingly capturing pictures of scholars, notice the faces in pictures and compare the detected faces with the info and mark the group action. A biometric system is actually a pattern recognition system that operates by deed biometric knowledge from a private, extracting a feature set from the non heritable knowledge, and comparison this feature set against the model set within the info. reckoning on the applying context, a biometric system might operate either in verification mode or identification mode.

The initial step of human face identification is to extract the relevant options from facial pictures. Analysis within the field primarily intends to get sufficiently affordable familiarities of human faces in order that another human will properly determine the face. The question naturally arises on however well countenance will be quantity. If such a quantisation if attainable then a laptop capable of recognizing a face had given a group of options. Bound facial characteristics are employed by kinsmen to spot faces. There are 3 major analysis teams that propose 3 totally different approaches to the face recognition drawback. The biggest teams have controlled facial characteristics that are employed by kinsmen in recognizing Individual faces. The second cluster performs external body part identification supported feature vectors extracted from profile silhouettes. The third cluster uses feature vectors extracted from a frontal read of the face.

II. LITERATURE SURVEY

A wide variety of systems requires reliable personal recognition schemes to either confirm or determine the identity of an individual requesting their services. The purpose of such schemes is to ensure that the rendered services are accessed only by a legitimate user and no one else. Examples of such applications include secure access to buildings, computer systems, laptops, cellular phones, and ATMs. In the absence of robust personal recognition schemes, these systems are vulnerable to the wiles of an impostor. Biometric recognition or, simply, biometrics refers to the automatic recognition of individuals based on their physiological and/or behavioral characteristics. Linear Discriminate Analysis (LDA) has been successfully applied to face recognition which is based on a linear projection from the image space to a low dimensional space by maximizing the between class scatter and minimizing the within-class scatter. LDA allows objective evaluation of the significance of visual information in different features of the face for identifying the human face. The LDA also provides us with a small set of features that carry the most relevant information for
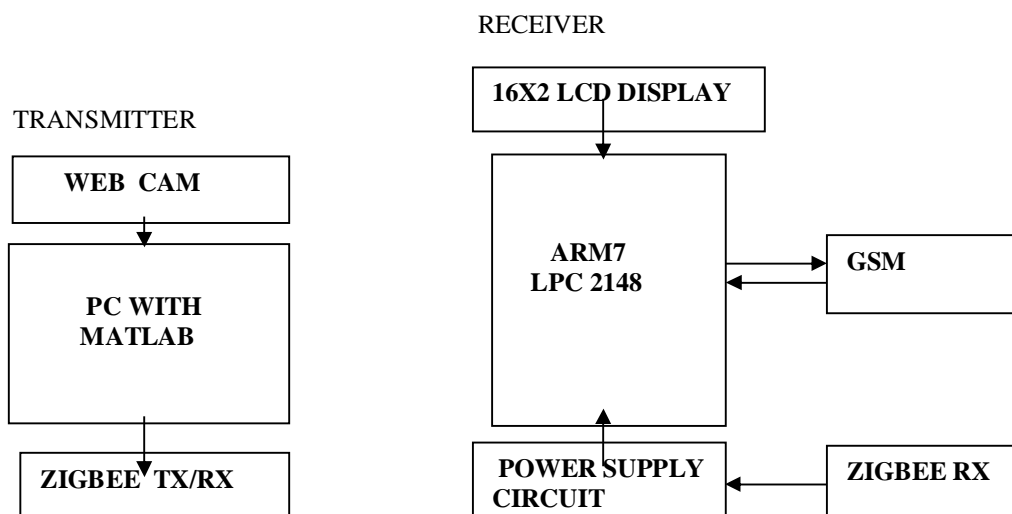
classification purposes. LDA method overcomes the limitation of Principle Component Analysis method by applying the linear discriminate criterion. This criterion tries to maximize the ratio of determinant of the between-class scatter matrix of the projected samples to the determinant of the within-class scatter matrix of the projected samples.

An Efficient method for face recognition using Principal Component Analysis(PCA). The PCA has been extensively employed for face recognition algorithms. It is one of the most popular representation methods for a face image. It not only reduces the dimensionality of the image, but also retains some of the variations in the image data. The system functions by projecting face image onto a feature space that spans the significant variations among known face images. The significant features are known as "Eigen faces", because they are the eigenvectors (Principal Component) of the set of faces they do not necessarily correspond to the features such as eyes, ears, and noses. One necessary component of every business system is recording employees' work hours and activities, despite the capacity of the system. This process could be time consuming if it is managed manually. As a result of a rapid growth in information technologies, automatic solutions have become a standard option for these types of business processes. There are now plenty of systems which differ in many aspects: core technology they are based on, way of use, cost, reliability, security and etc. Many of those depend on employees having to carry specific identification devices. One of the common types of the attendance systems is Radio Frequency Identification (RFID) where employees have to carry appropriate RFID cards. There are also location based attendance tracking systems. The location of an employee can be determined via Global Positioning System (GPS).

III. METHODOLOGY

The system consists of a camera that captures the pictures of the scholars sitting within the room and sends it to the image improvement module. Within the image improvement module, pictures are increased thus that matching will be performed simply.

A. Block Diagram

RECEIVER

TRANSMITTER

WEB CAM

PC WITH MATLAB

ZIGBEE TX/RX

16X2 LCD DISPLAY

ARM7 LPC 2148

GSM

POWER SUPPLY CIRCUIT

ZIGBEE RX

After improvement, the image comes in the Face Detection and Recognition modules so the group action is marked in the information. At the time of enrollment, templates of face pictures of individual students are keep within the Face information. Here all the faces are detected from the input image and the algorithmic rule compares them one by one with the face information. If any face is recognized the group action is marked within the information from wherever anyone will access and use it for various functions. academics are available in the category and simply press a button to begin the group action method and the system mechanically gets the attendance while not even the intensions of scholars and teacher. During this method lots of your time is saved and extremely securing method nobody can mark the group action of different.
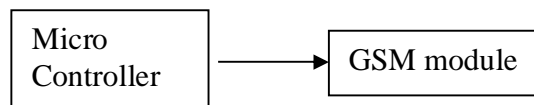
Camera takes the pictures unceasingly to sight and acknowledge all the students in the room. so as to avoid the false detection we have a tendency to are mistreatment the skin classification technique. Mistreatment this technique enhance the potency and accuracy of the detection method. during this method initial the skin is assessed so solely skin pixels remains and all different pixels in the image are set to black, this greatly enhance the accuracy of face detection method. For face recognition we have a tendency to have used PCA Principle part associatealysis is an economical methodology for face recognition. It not solely retains a number of the variations within the image knowledge. The system functions by sticking out face image onto a feature house that spans the

numerous variations among famed face pictures.The important options are called "Eigen faces", as a result of they're the eigenvectors of the set of faces they do not essentially correspond to the options like eyes, ears, and noses. The projection operation characterize Associate in Nursing individual face by a weighted total of the Eigen faces options so to acknowledge a specific face it is necessary solely to compare these weights to those people.
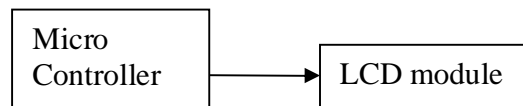
B. Technical Specifications

1) Operative voltage of embedded electronic equipment is three vdc.
2) Current consumption of device in active mode 200mill amp
3) Operative frequency of device is twenty to sixty MHz

C. GSM Module

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┌──────────────┐        ┌──────────────┐
│    Micro     │───────▶│  GSM module  │
│  Controller  │        │              │
└──────────────┘        └──────────────┘
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The GSM web utilized by cell phones provides a coffee price, long range, wireless line for applications that require property instead of high knowledge rates. it's accustomed send the SMS to movable. Send the group action details of the scholars to the students, oldsters and school mobile phone.

D. LED

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┌──────────────┐        ┌──────────────┐
│    Micro     │───────▶│  LCD module  │
│  Controller  │        │              │
└──────────────┘        └──────────────┘
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A liquid-crystal show (LCD) could be a flat panel display, electronic visual show, or visual display unit that uses the sunshine modulating properties of liquid crystals. Liquid crystals don't emit light-weight directly. LCDs are offered to show impulsive pictures (as in an exceedingly general laptop display) or fastened images which might be displayed or hidden, like planned words, digits, and 7-segment displays as in an exceedingly digital clock. They use the identical basic technology, except that impulsive pictures are created of an outsized variety of tiny pixels, whereas different displays have larger parts. The information collected from the sensors and GPS is showed on the alphanumeric display display.

E. Input And Output

The input 1st taken is that the face pattern of a replacement student. The face pattern is analyzed with the assistance of camera and ARM Controller helps to manage the complete method. The patterns once collected may be keep within the info together with the student's details. Throughout the entry of the coed, the system checks for every of their faces' patterns and searches for a similar match within the info connected as shown in the figure a pair of. If there's an identical pattern matching for atmost eighty five, then a worth one is came back to the info that marks group action standing for the corresponding student as "present". Otherwise zero is came back just in case of miss match and group action is marked "absent".
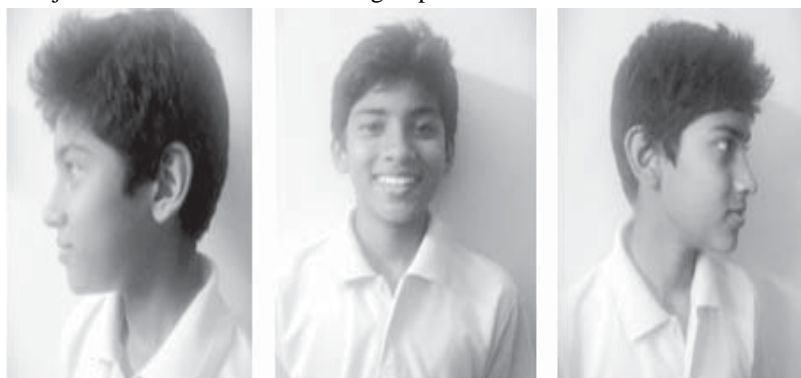

Fig 2: Image Pattern Analysis

The face recognition is feasible even in numerous environments which is shown within the figure three.

Fig 3: Image Pattern Analysis

Sample output of the group action marks retrieved from info is shown within the figure four.

DATE	NAME	1	2	3	4	Present/Absent 5	6	7	8
2/1/2017	Maanik S.	1	1	1	1	1	1	1	1
3/1/2017	Pavan B.	1	0	1	1	1	1	1	1
4/1/2017	Virat K.	1	0	0	0	1	1	1	1

Fig 4: Sample output of an attendance

F. Advantages
1) Low price and straightforward of operation.
2) Saves students and Staffs time.
3) Correct operating.
4) Effectively maintains the group action.
5) Simple maintenance.

G. Applications
1) In faculties
2) Mobile corporations
3) To test the election result.
4) Within the ration Cards

IV. CONCLUSIONS

Attendance automation victimization face recognition could be a non-intrusive technique Associate in Nursingd it helps the management to take care of an correct attending information because the check image is more established completely different levels. The in-time and out-time of the student's is checked and supported the time the attending is marked. Hence this method if enforced, it'd prove to be a secured and documented system with high performance.

V. FUTURE ENHANCEMENT

The system are often increased in future by change internal marks for every of the scholars together with their attending and therefore the collected information can be therefore uploaded within the individual portals. A whole info of the scholars are maintained during a secured method. Additionally the push messages may be sent to the oldsters once the attending of their ward is marked absent.

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