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| Image result for ZCOER | **ZEAL EDUCATION SOCIETY’S**  **ZEAL COLLEGE OF ENGINEERING AND RESEARCH**  **NARHE │PUNE -41 │ INDIA** | | | C:\Users\Admin\Downloads\Zeal 25 Years Logo.jpg |
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| Record No.: **ZCOER-ACAD/R/44B** | | Revision: **00** | Date:**17/06/2021** | |

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| **PROJECT REPORT** |

**Student Attendance system via face recognition**

We are living in a world where everything is automated and linked online. The internet of things, image processing, and machine learning are evolving day by day. Many systems have been completely changed due to this evolve to achieve more accurate results. The attendance system is a typical example of this transition, starting from the traditional signature on a paper sheet to face recognition.

The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Many problems arise when the authority is unable to enforce the regulation that exist in the old system. Thus, by means of technology, this project will resolve the flaws existed in the current system while bringing attendance taking to a whole new level by automating most of the tasks. The technology working behind will be the face recognition system.

The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals. Stage is then replicated and developed as a model for facial image recognition (face recognition) is one of the much-studied biometrics technology and developed by experts.

**CHAPTERR 1**

**INTRODUCTION**

The main objective of this project is to develop face recognition based automated student attendance system. In order to achieve better performance, the test images and training images of this proposed approach are limited to frontal and upright facial images. The test images and training images have to be captured by using the same device to ensure no quality difference. In addition, the student have to register in the database to be recognized. The enrolment can be done on the spot through the user-friendly interface.

**Background**

Face recognition is crucial in daily life in order to identify family, friends or someone we are familiar with. We might not perceive that several steps have actually taken in order to identify human faces. Human intelligence allows us to receive information and interpret the information in the recognition process. We receive information through the image projected into our eyes, by specifically retina in the form of light.

Light is a form of electromagnetic waves which are radiated from a source onto an object and projected to human vision. Robinson-Riegler, G., & Robinson-Riegler, B. (2008) mentioned that after visual processing done by the human visual system, we actually classify shape, size, contour and the texture of the object in order to analyse the information. The analysed information will be compared to other representations of objects or face that exist in our memory to recognize. In fact, it is a hard challenge to build an automated system to have the same capability as a human to recognize faces However, we need large memory to recognize different faces, for example, in the College, there are a lot of students with different name and gender, it is impossible to remember every face of the individual without making mistakes. In order to overcome human limitations, computers with almost limitless memory, high processing speed and power are used in face recognition systems.

The human face is a unique representation of individual identity. Thus, face recognition is defined as a biometric method in which identification of an individual is performed by comparing real-time capture image with stored images in the database of that person .

Nowadays, face recognition system is prevalent due to its simplicity and awesome performance. For instance, airport protection systems and FBI use face recognition for criminal investigations by tracking suspects, missing children and drug activities. Apart from that, Facebook which is a popular social networking website implement face recognition to allow the users to tag their friends in the photo for entertainment purposes.

The work on face recognition began in 1960. Woody Bledsoe, Helen Chan Wolf and Charles Bisson had introduced a system which required the administrator to locate eyes, ears, nose and mouth from images. The distance and ratios between the located features and the common reference points are then calculated and compared. The studies are further enhanced by Goldstein, Harmon, and Lesk in 1970 by using other features such as hair colour and lip thickness to automate the recognition. In 1988, Kirby and Sirovich first suggested principle component analysis (PCA) to solve face recognition problem. Many studies on face recognition were then conducted continuously until today.

**CHAPTER 2**

**LITERATURE REVIEW**

**Student Attendance System**

Arun Katara et al. (2017) mentioned disadvantages of RFID (Radio Frequency Identification) card system, fingerprint system and iris recognition system. RFID card system is implemented due to its simplicity. However, the user tends to help their friends to check in as long as they have their friend’s ID card. The fingerprint system is indeed effective but not efficient because it takes time for the verification process so the user has to line up and perform the verification one by one. However for face recognition, the human face is always exposed and contain less information compared to iris. Iris recognition system which contains more detail might invade the privacy of the user. Voice recognition is available, but it is less accurate compared to other methods. Hence, face recognition system is suggested to be implemented in the student attendance system.

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| **System type** | **Advantages** | **Disadvantages** |
| RFID card system | Simple | Fraudulent usage |
| Fingerprint system | Accurate | Time-consuming |
| Voice recognition system | - | Less accurate compared to others |
| Iris recognition system | Accurate | Privacy Invasion |

**Table 2.1 Advantages & Disadvantages of Different Biometric System** (Arun Katara et al., 2017)

**Face Detection**

Difference between face detection and face recognition are often misunderstood. Face detection is to determine only the face segment or face region from image, whereas face recognition is to identify the owner of the facial image. S.Aanjanadevi et al. (2017) and Wei-Lun Chao (2007) presented a few factors which cause face detection and face recognition to encounter difficulties. These factors consist of background, illumination, pose, expression, occlusion, rotation, scaling and translation. The definition of each factor is tabulated in Table 2.2.

|  |  |
| --- | --- |
| Background | Variation of background and environment around people in the image which affect the efficiency of face recognition. |
| Illumination | Illumination is the variation caused by various lighting environments which degrade the facial feature detection. |
| Pose | Pose variation means different angle of the acquired the facial image which cause distortion to recognition process, especially for Eigen face and Fisher face recognition method. |
| Expression | Different facial expressions are used to express feelings and emotions. The expression variation causes spatial relation change and the facial-feature shape change. |
| Occlusion | Occlusion means part of the human face is unobserved. This will diminish the performance of face recognition algorithms due to deficiency information. |
| Rotation, scaling and translation | Transformation of images which might cause distortion of the original information about the images. |
|  |  |

**Table 2.2 Factors Causing Face Detection** **Difficulties** (S.Aanjanadevi et al., 2017)

There are a few face detection methods that the previous researchers have worked on. However, most of them used frontal upright facial images which consist of only one face. The face region is fully exposed without obstacles and free from the spectacles.

Akshara Jadhav et al. (2017) and by P. Arun Mozhi Devan et al. (2017) suggested Viola-Jones algorithm for face detection for student attendance system. They concluded that out of methods such as face geometry- based methods, Feature Invariant methods and Machine learning based methods, Viola-Jones algorithm is not only fast and robust, but gives high detection rate and perform better in different lighting condition. Rahul V. Patil and S. B. Bangar (2017) also agreed that Viola-Jones algorithm gives better performance in different lighting condition. In addition, in the paper by Mrunmayee Shirodkar et al. (2015), they mentioned that Viola-Jones algorithm is able to eliminate the issues of illumination as well as scaling and rotation. In addition, Naveed Khan Balcoh (2012) proposed that Viola-Jones algorithm is the most efficient among all algorithms for instance the AdaBoost algorithm, the Float Boost algorithm, Neural Networks, the S-AdaBoost algorithm, Support Vector Machines (SVM) and the Bayes classifier.

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| **Face detection method** | **Advantages** | **Disadvantages** |
| Local Binary pattern | 1. Simple computation.  2. High tolerance against the monotonic illumination changes. | 1. Only used for binary and grey images.  2. Overall performance is accurate |
| AdaBoost algorithm  (part of Viola jones algorithm) | Need not to have any prior knowledge about face structure. | The result highly depends on the training data and affected by weak classifiers. |
| SMQT Features and SNOW Classifier Method | 1. Capable to deal with lighting problem in object detection.  2. Efficient in computation. | The region contain very similar to grey value regions will be misidentified as face. |
| Neural-Network | High accuracy only if large size of image were trained. | 1. Detection process is slow and computation is complex.  2. Overall performance is weaker than LBPH algorithm. |

**Table 2.3 Advantages & Disadvantages of Face Detection Methods** (Varsha Gupta and Dipesh Sharma, 2014)

**CHAPTER 3**

**PROBLEM STATEMENT**

Traditional student attendance marking technique is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking technique such as marking attendance on paper. There causes distraction for students during exam sessions and there are human errors many times. The lecture class especially the class with a large number of students might find it difficult to have the attendance sheet being passed around the class . Thus, face recognition student attendance system is proposed in order to replace the manual signing of the presence of students which are burdensome and causes faculties get distracted in order to sign maintain student attendance. Furthermore, the face recognition based automated student attendance system able to overcome the problem of fraudulent approach.

One of the difficulties of facial identification is the identification between known and unknown images. In addition, paper proposed by Pooja G.R et al. (2010) found out that the training process for face recognition student attendance system is slow and time-consuming. In addition, the paper proposed by Priyanka Wagh et al. (2015) mentioned that different lighting and head poses are often the problems that could degrade the performance of face recognition based student attendance system.

Hence, there is a need to develop a real time operating student attendance system which means the identification process must be done within defined time constraints to prevent omission. The extracted features from facial images which represent the identity of the students have to be consistent towards a change in background, illumination, pose and expression. High accuracy and fast computation time will be the evaluation points of the performance.

**Aims and Objectives**

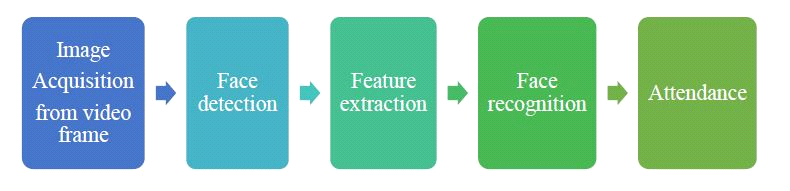
The objective of this project is to develop face recognition based automated student attendance system. Expected achievements in order to fulfill the objectives are:

🕐 To detect the face segment from the video frame.

🕐 To extract the useful features from the face detected.

🕐 To classify the features in order to recognize the face detected.

🕐 To record the attendance of the identified student .



**Figure 1.1 Block Diagram of the General Framework**

**CHAPTERR 4**

**PRE-PROCESSING**

cropping of detected face and colour image was converted to grayscale for pre-processing. They also proposed affine transform to be applied to align the facial image based on coordinates in middle of the eyes and scaling of image to be performed. histogram equalization to be applied to facial image, and scaling of images was performed for pre-processing.

Pre-processing enhances the performance of the system. It plays an essential role to improve the accuracy of face recognition. Scaling is one of the important pre-processing steps to manipulate the size of the image. Scaling down of an image increases the processing speed by reducing the system computations since the number of pixels are reduced. The size and pixels of the image carry spatial information. spatial information is a measure of the smallest discernible detail in an image. Hence, spatial information has to be manipulated carefully to avoid distortion of images to prevent checkerboard effect. The size should be same for all the images for normalization and standardization purposes. PCA (Principal Component Analysis) to extract features from facial images, same length and width of image is preferred, thus images were scaled to 120 × 120 pixels.

Besides scaling of images, colour image is usually converted to grayscale image for pre-processing. Grayscale images are believed to be less sensitive to illumination condition and take less computational time. Grayscale image is 8 bit image which the pixel range from 0 to 255 whereas colour image is 24 bit image which pixel can have 16 77 7216 values. Hence, colour image requires more storage space and more computational power compared to grayscale images. If colour image is not necessary in computation, then it is considered as noise. In addition, pre-processing is important to enhance the contrast of images. Histogram equalization is one of the methods of pre-processing in order to improve the contrast of the image. It provides uniform distribution of intensities over the intensity level axis, which is able to reduce uneven illumination effect at the same time.

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| **Method** | **Concept** | **Advantages** | **Disadvantages** |
| Histogram equalization | Contrast enhancement is performed by transforming the intensity values, resulting in uniformly distributed histogram. | 1. Less sensitive to noise. | 1. It depends on the global statistics of an image.  2. It cause over enhancement for some part, while peripheral region need more enhancement. |
| Contrast Limited Adaptive Histogram Equalization  (CLAHE) | Unlike, HE which works on entire image, it works on small data regions. Each tile's contrast is enhanced to ensure uniformly distributed histogram. Bilinear interpolation is then used to merge the neighbouring tiles. | 1. It prevent over enhancement as well as noise amplification. | 1. More sensitive to noise compared to histogram equalization. |

**Table 2.4 Summary of Contrast Improvement**

**Feature Extraction**

The feature is a set of data that represents the information in an image. Extraction of facial feature is most essential for face recognition. However, selection of features could be an arduous task. Feature extraction algorithm has to be consistent and stable over a variety of changes in order to give high accuracy result.

There are a few feature extraction methods for face recognition. PCA is famous with its robust and high speed computation. Basically, PCA retains data variation and remove unnecessary existing correlations among the original features. PCA is basically a dimension reduction algorithm. It compresses each facial image which is represented by the matrix into single column vector. Furthermore, PCA removes average value from image to centralize the image data. The Principle Component of distribution of facial images is known as Eigen faces. Every single facial image from training set contributes to Eigen faces. As a result, Eigen face encodes best variation among known facial images. Training images and test images are then projected onto Eigen face space to obtain projected training images and projected test image respectively. Euclidean distance is computed by comparing the distance between projected training images and projected test image to perform the recognition. PCA feature extraction process includes all trained facial images. Hence, the extracted feature contains correlation between facial images in the training set and the result of recognition of PCA highly depends on training set image.

LDA (Linear discriminant analysis) also known as Fisher face is another popular algorithm for face recognition, LDA was proposed for face recognition. LDA extract features by grouping images of the same class and separate images of different classes. LDA is able to perform well even with different facial expressions, illumination and pose due to its class separation characteristic. Same class is defined by facial images of the same individual, but with different facial expressions, varying lighting or pose, whereas facial images of person with different identity are categorized as different classes. Same class images yield within-class scatter matrix meanwhile different class images yield between-class scatter matrix. LDA manage to maximize the ratio of the determinant of the between-class scatter matrix over the determinant of the within class scatter matrix. LDA is believed to have lower error rates compared to PCA only if more samples per class are trained and small size of different class.

**Figure 2.7 Class Separation in LDA**

The original LBP (Local Binary Patterns) operator was introduced by the paper of Timo Ojala et al. (2002). proposed LBP to extract both texture details and contour to represent facial images. LBP divides each facial image into smaller regions and histogram of each region is extracted. The histograms of every region are concatenated into a single feature vector. This feature vector is the representation of the facial image and Chi square statistic is used to measure similarities between facial images. The smallest window size of each region is 3 by 3. It is computed by thresholding each pixel in a window where middle pixel is the threshold value. The neighbourhood larger than threshold value is assigned to 1 whereas the neighborhood lower than threshold value is assigned to 0. Then the resulting binary pixels will form a byte value representing center pixel.

**Figure 2.8 LBP**

LBP has a few advantages which make it popular to be implemented. It has high tolerance against the monotonic illumination changes and it is able to deal with variety of facial expressions, image rotation and aging of persons. These overwhelming characteristics cause LBP to be prevalent in real-time applications.

**CHAPTER 5**

**PROJECT EXEECUTION SCENARIO**

**Step1:** First Admin will make “signup” and will make “login” so as start using our proposed system

**Step2:** As login get successful admin home page will get open. There First button is **NEW**. Admin needs to click on **NEW** button and the “Add New Student Details page” will get open. Admin will need to fill up this form by adding new student details there and hit **Next** button.

**Step3:** As **Next** button get clicked the camera will be started and face recording will get starts. After successful completion of face recording the training will be started and the faces will get trained and trainingData.yml file will be created. Here all the recorded faces will be stored in the Faces folder.

**Step4:** Now if user wants to update any of the student details then he will need to click on **UPDATE** button. It will ask for id as admin has entered ID of particular student then the “Update form” will get open. There admin will need to make changes in that update form and then need to hit **SAVE & UPDATE** button.

**Step5:** If admin wants to delete any of the student record from database then he will need to click on **DELETE** button. It will ask for the Id of student record to be deleted and admin need to hit **DELETE RECORD** button which will delete record from database.

**Step6:** To start our proposed application to recognise faces admin will need to go to the “home page” and will need to click on **START RECOGNITION** button. It will start recognising faces and will add the recognised person attendance.

In this application there is Student portal where student can see daily timetable, lecturers details, his personal details with his attendance.

**Fig1: Architecture Diagram of Face Recognition based Attendance System**

**CHAPTER 6**

**SOFTWARE & HARDWARE REQUIREMENTS**

**HARDWARE REQUIREMENTS**

* HDD: Min. 1GB
* RAM: Min. 2GB
* PROCESSOR: i3
* CAMERA DEVICE: Min. 1

**SOFTWARE REQUIREMENTS**

* FRONT END: PYTHON
* BACK END: SQLITE
* IDE: PYTHON IDLE
* OS: WINDOWS 7/8/10
* **PYTHON**

**What is Python?**

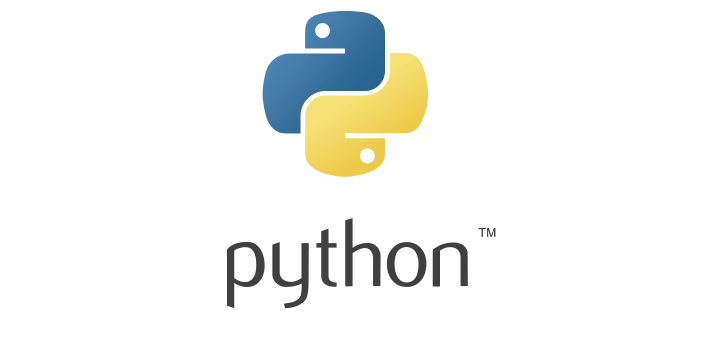
Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

* web development (server-side),
* software development,
* mathematics,
* System scripting.

What can Python Do?

* Python can be used on a server to create web applications.
* Python can be used alongside software to create workflows.
* Python can connect to database systems. It can also read and modify files.
* Python can be used to handle big data and perform complex mathematics.
* Python can be used for rapid prototyping, or for production-ready software development.



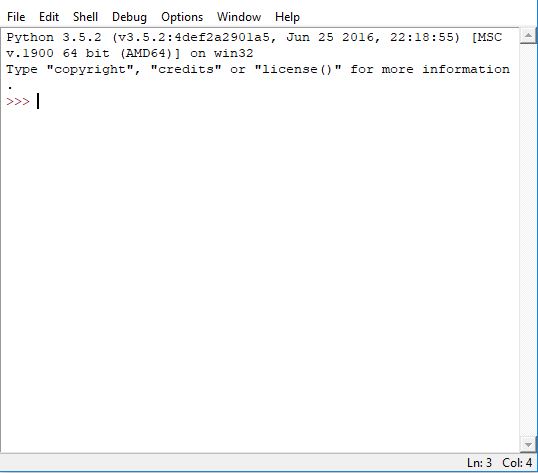
Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).Python has a simple syntax similar to the English language. Python has syntax that allows developers to write programs with fewer lines than some other programming languages. Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick. Python can be treated in a procedural way, an object-orientated way or a functional way. Python was designed for readability, and has some similarities to the English language with influence from mathematics. Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses. Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

Applications of Pythons

As mentioned before, Python is one of the most widely used language over the web. I'm going to list few of them here:

* **Easy-to-learn** − Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
* **Easy-to-read** − Python code is more clearly defined and visible to the eyes.
* **Easy-to-maintain** − Python's source code is fairly easy-to-maintain.
* **A broad standard library** − Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
* **Interactive Mode** − Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
* **Portable** − Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
* **Extendable** − You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
* **Databases** − Python provides interfaces to all major commercial databases.
* **GUI Programming** − Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
* **Scalable** − Python provides a better structure and support for large programs than shell scripting.
* **PYTHON IDLE**

IDLE is Python’s Integrated Development and Learning Environment.



IDLE has the following features:

* coded in 100% pure Python, using the [tkinter](https://docs.python.org/3/library/tkinter.html#module-tkinter) GUI toolkit
* cross-platform: works mostly the same on Windows, Unix, and macOS
* Python shell window (interactive interpreter) with colorizing of code input, output, and error messages
* multi-window text editor with multiple undo, Python colorizing, smart indent, call tips, auto completion, and other features
* search within any window, replace within editor windows, and search through multiple files (grep)
* debugger with persistent breakpoints, stepping, and viewing of global and local namespaces
* configuration, browsers, and other dialogs
* **SQLite**

**What is SQLite**

SQLite is a software library that provides a relational database management system. The lite in SQLite means light weight in terms of setup, database administration, and required resource.

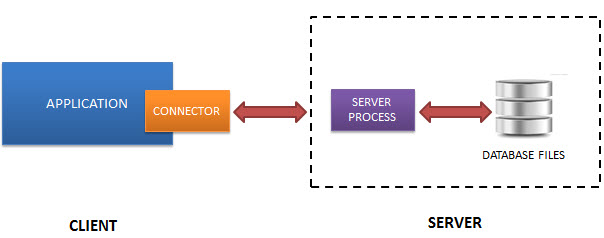


SQLite has the following noticeable features: self-contained, serverless, zero-configuration, transactional.

**Serverless**

Normally, an RDBMS such as MySQL, PostgreSQL, etc., requires a separate server process to operate. The applications that want to access the database server use TCP/IP protocol to send and receive requests. This is called client/server architecture.

The following diagram illustrates the RDBMS client/server architecture:

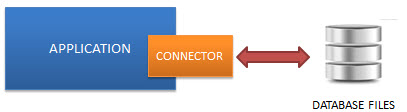


SQLite does NOT work this way.

SQLite does NOT require a server to run.

SQLite database is integrated with the application that accesses the database. The applications interact with the SQLite database read and write directly from the database files stored on disk.

The following diagram illustrates the SQLite server-less architecture:



### Self-Contained

SQLite is self-contained means it requires minimal support from the operating system or external library. This makes SQLite usable in any environments especially in embedded devices like iPhones, Android phones, game consoles, handheld media players, etc.

**Zero-configuration**

Because of the serverless architecture, you don’t need to “install” SQLite before using it. There is no server process that needs to be configured, started, and stopped.

In addition, SQLite does not use any configuration files.

**Transactional**

All transactions in SQLite are fully ACID-compliant. It means all queries and changes are Atomic, Consistent, Isolated, and Durable.

In other words, all changes within a transaction take place completely or not at all even when an unexpected situation like application crash, power failure, or operating system crash occurs.

* **WEBCAM**

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A **webcam** is a [video camera](https://en.wikipedia.org/wiki/Video_camera) that feeds or [streams](https://en.wikipedia.org/wiki/Streaming_media) an image or video in real time to or through a [computer](https://en.wikipedia.org/wiki/Computer) to a [computer network](https://en.wikipedia.org/wiki/Computer_network), such as the [Internet](https://en.wikipedia.org/wiki/Internet). Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware. Webcams can be used during a video chat session involving two or more people, with conversations that include live audio and video. For example, [Apple](https://en.wikipedia.org/wiki/Apple_Inc.)'s [iSight](https://en.wikipedia.org/wiki/ISight) camera, which is built into Apple laptops, iMacs and a number of [iPhones](https://en.wikipedia.org/wiki/IPhone), can be used for video chat sessions, using the [iChat](https://en.wikipedia.org/wiki/IChat) instant messaging program (now called [Messages](https://en.wikipedia.org/wiki/Messages_(Apple))). Webcam software enables users to record a video or stream the video on the Internet. As video streaming over the Internet requires much [bandwidth](https://en.wikipedia.org/wiki/Bandwidth_(computing)), such streams usually use [compressed formats](https://en.wikipedia.org/wiki/Video_compression). The maximum resolution of a webcam is also lower than most handheld video cameras, as higher resolutions would be reduced during transmission. The lower resolution enables webcams to be relatively inexpensive compared to most video cameras, but the effect is adequate for video chat sessions

The term "webcam" (a [clipped compound](https://en.wikipedia.org/wiki/Clipped_compound)) may also be used in its original sense of a [video camera](https://en.wikipedia.org/wiki/Video_camera) connected to the [Web](https://en.wikipedia.org/wiki/World_Wide_Web) continuously for an indefinite time, rather than for a particular session, generally supplying a view for anyone who visits its [web page](https://en.wikipedia.org/wiki/Web_page) over the Internet. Some of them, for example, those used as online [traffic cameras](https://en.wikipedia.org/wiki/Traffic_camera), are expensive, rugged [professional video cameras](https://en.wikipedia.org/wiki/Professional_video_camera).

**CHAPTER 7**

**APPLICATIONS & ADVANTAGES**

**1) APPLICATIONS**

**School:** This our proposed system is useful to take a attendance of students in schools so as to manage their daily attendance schedule.

**College:** Proposed application is very useful in colleges to take attendance of students so as to manage the schedule of their.

**2) ADVANTAGES**

1) This our propose system is very useful to take attendance of students.

2) It saves time as compared to traditional attendance systems.

3) It saves cost

4) physically handicap person can also use

5) No extreme manpower is required

6) It is very easy to handle

**CHAPTER 8**

**LIMITATIONS & FUTURE SCOPE**

In this proposed approach, there are a few limitations. First, the input image has to be frontal and a upright single facial image. Second, the accuracy might drop under extreme illumination problem. Third, false recognition might occur if the captured image is blurred. Besides, LBP is textural based descriptor which extracts local features. Hence, test image and train image have to be the same quality which is captured by using the same device in order to have high accuracy. Lastly, if an individual wears make up in the image for face recognition, the important features will be covered.

In fact , a better camera with a better lighting source able to reduce the illumination problem and also able to avoid the captured of blurred images. In this proposed approach, laptop built in camera is a default device. However the lighting source of the laptop camera is very dim, this cause the system to be unstable.

For future work, a better camera and a better lighting source can be used in order to obtain better result. This can reduce the dependency on the brightness of environment, especially the places to capture test and train images. Furthermore, a face recognition system which has more faces other than a single facial image can be designed. This can increase the efficiency of the system. The test image and train image in this approach is highly related to each other and highly dependent on the image captured device. The capture device has to be the same for this approach to perform better.

**CHAPTER 9**

**CONCLUSION**

In this approach, a face recognition based automated student attendance system is thoroughly described. The proposed approach provides a method to identify the individuals by comparing their input image obtained from recording video frame with respect to train image. This proposed approach able to detect and localize face from an input facial image, which is obtained from the recording video frame. Besides, it provides a method in pre-processing stage to enhance the image contrast and reduce the illumination effect. Extraction of features from the facial image is performed by applying LBP. The algorithm designed LBP able to stabilize the system by giving consistent results. The accuracy of this proposed approach is 100 % for high-quality images, 92.31 % for low-quality images.

As a conclusion for analysis, the extraction of facial feature could be challenging especially in different lighting. In pre-processing stage, Contrast Limited Adaptive Histogram Equalization (CLAHE) able to reduce the illumination effect. CLAHE perform better compared to histogram equalization in terms of contrast improvement.

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