Class Management System Using Biometric Technology Based On Web Application

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Abstract- *Biometric traits such as fingerprint, retina scan, and palm-prints are used to identify a person at attendance monitoring, banking, passport, travel, and many other applications. This Class Management System Is used to store the class timetable in Database and we will notification send subject incharge Faculty Member mail. Fingerprint attendance system aims to automate the attendance taking procedure of an educational institute using biometric technology. It saves the time consumed by the traditional method. This study proposes a system which is flexible, easy to use and capable to integrate with future development of an educational institute. It allows the faculty member of the students to monitor and follow up on the attendance of their students via Internet. The Proposed system Database stored the class timetable and we will notification send subject incharge Faculty Member mail. Fingerprint attendance system aims to automate the attendance taking procedure of an educational institute using biometric technology. It saves the time consumed by the traditional method. This study proposes a system which is flexible, easy to use and capable to integrate with future development of an educational institute. It allows the faculty member of the students to monitor and follow up on the attendance of their students via Internet. The implementation of this system will enhance both the attendant taking process and overall management of the attendant information.*

Keywords- Fast Determination (FD), Convolutional neural network (CNN), K-Nearest Neighbors Algorithm (KNN), Fuzzy logic (FL).

I. INTRODUCTION

During class hours, attendance is usually recorded in two ways. The first method would be the teacher calling out the student's name one after another and would record the attendance to those who responds. The other method would have the attendance sheet Passed around the class for the students to sign in with their signature. The problem with both of these methods is that it can either be a time consuming and tedious job for the teacher, or it could run the risk of having "false attendances" where a student signs in on behalf of another friend who was not present.

There are also other problems that are faced with these methods such as not being able to hear the teacher‘s voice during name call, or the sheet not being properly passed around during class. To eliminate these hassles an automatic attendance sheet is made which not only significantly reduce the time taken to record attendance and avoid false attendances, but it can also allow the teachers and students to focus more on the lectures than anything else.

The automatic attendance system that is being implemented requires two components which are the Biometric Scanner, and SQL Server (version 2005 or higher). The barcode scanner will be the hardware, which would scan the barcode found in the student‘s ID cards, and it would feed this information to Excel. The Excel, which is the software component, would take that information from the scanner and give a desired specific output automatically.

There can be many platforms used to create the software portion of the attendance sheet, such as using Java Coding, C++, html, and etc. However, the idea is to have a user interface system that appears user-friendly and easy to use, so that anyone can operate it with minimum struggle. Hence, Microsoft Excel was used as the main platform, as most users are somewhat familiar with the basics of how to operate it. In Microsoft Excel, the coding language used is Visual Basic (VBA). Emphasis will be made in this language to make the attendance sheet automatic and simple for the users.

1. A "sign in" function that would prompt the student's barcode ID as input, match it with the ID in its database and then automatically record and display the date and time of input in the student‘s respective row.
2. An "Absent" function that would allow a teacher to mark all those who are absent within a click of a button.
3. A function that would calculate the total number of absents, total number of late, and total number of Present automatically.
4. A "password" function to protect the file from unauthorized access (optional).

II. EXTRACTION OF MINIATURE POINTS AND MATCHING

After the extraction of edges, the points are marked in it. Those points which are detected after edge detection are known as miniature points. The miniature points that are extracted are compared with already stored image. In order to find the matching process the correlation factor and the Euclidean distance has to be found out. Based on the tolerance value the matching results can be found out.

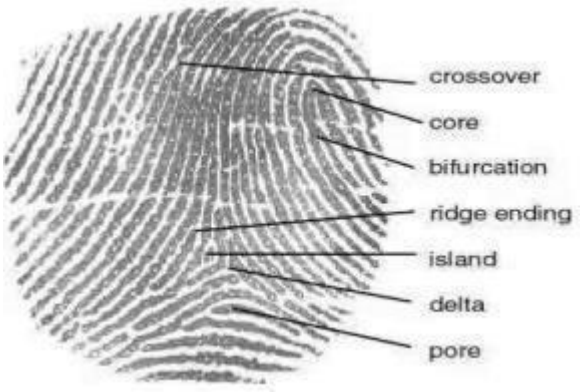

FIGURE 1: EXTRACTION OF MINIATURE POINTS AND MATCHING

AUTHENTICATION MODULE

The task of the authentication module is to validate the identity of the person who intends to access the system. The person to be authenticated indicates his/her identity and places his/her finger on the fingerprint scanner. The fingerprint images captured is enhanced and thinned at the image processing stage, and at feature extraction.

Stage, the biometric template is extracted. It is then fed to a matching algorithm, which matches it against the person‘s biometric template stored in the system database to establish the identity.

During authentication, for staff attendance, a staff supply his/her department and name, then places his/her finger over the fingerprint reader, the fingerprint recognition unit compares the fingerprint features with those stored in the database, after a successful match, the staff‘s employee number is sent to the database alongside the time of making such an attendance and update the status (either present/absent) of user‘s attendance for the day. Staff attendance is captured twice a day for both arrival and departure time.

For student attendance, the lecturer (or a designated personnel as the case may be) selects his/her department, level, course code, attendance type (for example lecture, practicals etc) and the attendance ID, then the student places his/her fingerprint on the fingerprint reader; the fingerprint recognition unit compares the fingerprint features with those stored in the database, after a successful match, the student‘s matriculation number is sent to the database alongside the time of making such attendance and update the status (either present/absent) of student‘s attendance for the class. Student attendance is captured only once for each attendance type.

TM- SHIFT Module

The Timetable Management System Database abbreviated as (ttms). It stores data of students, lecturers, users, degree programs, subjects, timetables and some more. Student data, resources data, lecturer data, batch data, subject data and timetable data which can retrieve from the database. Admin has the authority of modifying and deleting data. Student, lecturer and course details were taken from the faculty of Information Technology The system also improves the flexibility of timetable construction. It will be able to generate on timetabling. Alternate of the timetable management system must be introduced To increase the optimization, generated timetables can be fine-tuned.

SYSTEM DATABASE

The attendance management system database consists of tables that stores records, each of which corresponds to an authorized person that has access to the system. Each record may contain the minutiae templates of the person‘s fingerprint and user name of the person or other information such as pin no as an index to the template. The database design for the system implements relational data model which is a collections of tables in which data are stored. The database was implemented in Microsoft SQLServer database (Sql Server, 2005). SQLServer is fast and easy, it can store a very large record and requires little configuration.

III. RELATED WORK

EXISTING SYSTEM

Colleges monitor the students ‘attendance the simple way by just using an attendance sheet in registers. Having a sign in attendance sheet can be very quick and convenient. But it takes long time for the lecturer to call out each student and mark attendance. There are chances of proxy attendance. However, this manual system could be outdated in a business organization and is difficult to maintain. It can easily get lost as there will be only one saved copy of it and it is inconvenient if it gets lost.

PROBLEM STATEMENT

Over the last couple of decades, technology has vastly improved leading it to be used by many businesses. As the manual way of maintaining attendance in sheets and registers is old technology, we need a system to maintain student attendance where only student present can get attendance.

PROPOSED SYSTEM

We need a system which can mark attendance based on the presence of students. For this purpose, biometrics is used. Fingerprint authentication is one of the best biometric authentications that can be used for this purpose. Fingerprint authentication refers to the automated method of verifying a match between two human fingerprints. Authentication by biometric verification is becoming increasingly common in corporate and public security systems and applications. We propose a system where we use biometric as authentication. Student attendance tracking system using biometric is a business attendance system for students used by the college and schools. System records attendance data of Students based on registered fingerprints. It is interactive GUI for adding efficiency and for automating organization procedures. We install the biometric scanner in each and every class which can scan the students fingerprint.

This biometric will be connected to the system which the admin can access. The admin can manage all the data required like the course details, semester details, lecturers, subjects, time table and class details. If the students are allowed to give their attendance by their fingerprint, then there is a problem. The students will be wise enough to give their fingerprint before the lecturer comes and can easily bunk the classes to get attendance. To overcome this, we have developed a concept of lecturer fingerprint authentication. If a lecturer is taking a class at a given time, according to the time table, first the lecturer has to give their fingerprint impression.

This will authenticate that the class has started and then students have to give their fingerprint to be validated. As the class finishes, the lecturer will again give their impression marking the closure of class. This will end the session indicating that all fingerprints scanned before and after the lecturer will be marked invalid. By this procedure, we can exactly get the attendance of students by their fingerprint impression. Proxy attendance is not possible as the fingerprint of a student cannot be replicated by their friends and in the absence of a lecturer. No two fingerprints are same. By this system, the lecturer will get more time for lecturing. The entire attendance will be maintained well and reports can be generated. Multiple copies can be maintained for administrative purpose.

IV. SYSTEM DESIGN

SYSTEM ARCHITECTURE

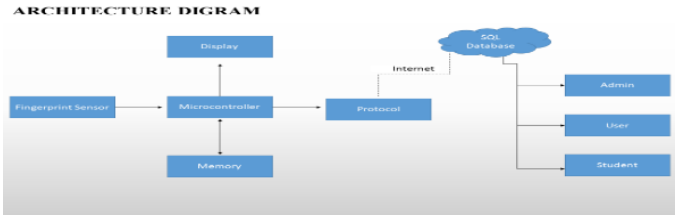

FIGURE 2: System Architecture

The purpose of the design phase is to plan a solution of the problem specified by the requirements document. This phase is the first step in moving from the problem domain to the solution domain. In other words, starting with what is needed; design takes us toward how to satisfy the needs. The design of a system is perhaps the most critical factor affecting the quality of the software; it has a major impact on the later phases particularly testing and maintenance. The design activity often results in three separate outputs

- Architecture Design.
- High level Design.
- Detailed Design.

Architecture focuses on looking at a system as a combination of many different components, and how they interact with each other to produce the desired result. The focus is on identifying components or subsystems and how they connect. In other words, the focus is on what major components are needed. As a developer, the .NET framework and Visual Studio present many choices for choosing the right architecture, from placing the data access code directly in the UI through datasets and data source controls, to creating a data access layer that talks to the database, all the way to creating an architecture approach that consists of multiple layers, and use data-transfer objects to pass data back and forth.

V. HARDWARE ENVIROMENT

FINGERPRINT SENSOR

Fingerprint scanner will be used to give fingerprint of teachers/students to the computer software. LCD display will be displaying rolls and name of those whose attendance is marked. Computer Software will be interfacing fingerprint

scanner and LCD and will be connected to the network. It will input fingerprint, will process it and extract features of fingerprint for matching. After matching, it will update database attendance records of the students.

FIGURE 3: FINGERPRINT SENSOR

SOFTWARE ENVIROMENT

VISUAL STDIO .NET

(VB.NET) is an object oriented computer programming language implemented on the.NET Framework. Although it is an evolution of classic Visual Basic language, it is not backwards compatible with VB6, and any code written in the old version does not compile under VB.NET. Like all other .NET languages, VB.NET has complete support for object - oriented concepts. Everything in VB.NET is an object, including all of the primitive types (Short, Integer, Long, String, Boolean, etc.) and user - defined types, events, and even assemblies. All objects inherits from the base class Object. VB.NET is implemented by Microsoft's .NET framework. Therefore, it has full access to all the libraries in the .Net Framework. It's also possible to run VB.NET programs on Mono, the open -source alternative to .NET, not only under Windows, but even Linux or Mac OSX.

.Net Framework

The .Net framework is a revolutionary platform that helps you to write the following types of applications:

Windows applications Web applications Web services The .Net framework applications are multi – platform applications. The framework has been designed in such a way that it can be used from any of the following languages: Visual Basic, C#, C++, Jscript, and COBOL, etc.All these languages can access the framework as well as communicate with each other. The .Net framework consists of an enormous library of codes used by the client languages like VB.Net. These languages use object - oriented methodology.

APPLYING MACHINE LEARNING ALGORITHM

We have used three different supervised machine learning algorithms for crop yield prediction which is given as follows.

KNN ALGORITHM

KNN is a nonparametric supervised learning technique that uses training sets to segment data

Points into given categories. In simple classifications, the word collects information from all educational cases and similarities based on the new case. Look at the training for the most similar (neighbour) K cases and predict the new instance (x) by summarizing the output variables for these K cases. Classification is the class value mode (or most commonly). A flow diagram of the KNN algorithm is shown in Figure 4.

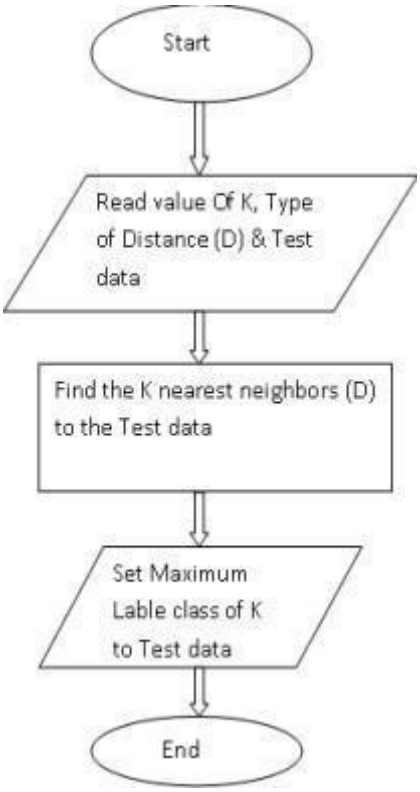

FIGURE 4: KNN Algorithm

FUZZY ALGORITHM

Fuzzy Logic (FL) is a method of reasoning that resembles human reasoning. The approach of FL imitates the

way of decision making in humans that involves all intermediate possibilities between digital values YES and NO.

The conventional logic block that a computer can understand takes precise input and produces a definite output as TRUE or FALSE, which is equivalent to human‘s YES or NO.

The inventor of fuzzy logic, Lotfi Zadeh, observed that unlike computers, the human decision making includes a range of possibilities between YES and NO, such as

CERTAINLY	YES
POSSIBLY	YES
CANNOT	SAY
POSSIBLY	NO
CERTAINLY	NO

IMPLEMENTATION

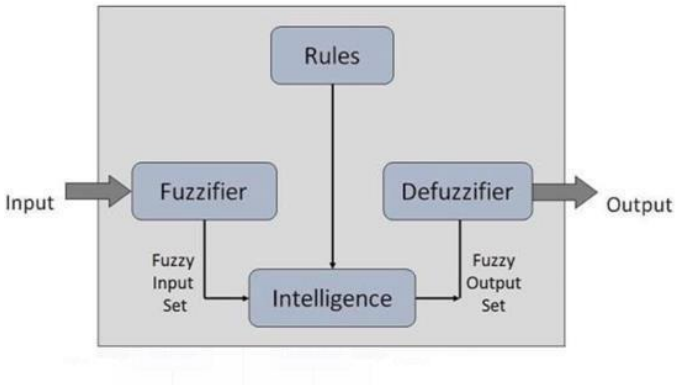

FIGURE 5: FUZZYALGORITHM

It can be implemented in systems with various sizes and capabilities ranging from small micro-controllers to large, networked, workstation-based control systems.

It can be implemented in hardware, software, or a combination of both.

VI. CONCLUSION

The proposed system, finally all works partially online mode using, biometric authentication. The developed web based student attendance system using, biometric authentication technology. This system will save time and reduce the amount of work for the administrator. This biometric system is easy to deploy and integration. It can be used to keep better controls on employee attendance, which in turn reduces payroll costs for Educational Institutions. This system stored student’s details and certifications with image formats so it is easy to Download or Print.

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