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A Survey Paper on various Smart Attendance Systems

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Abstract: ***The attendance systems for most of the organizations have always been a very important concern. Ample of time and resources are wasted in taking or marking the attendance of students.***
Most of the times, a lot of paper work is to b carried out for the attendance tally and defaulters list creation. So a lot of researchers have proposed numerous systems using barcodes or Aadhar cards or biometrics of RFIDs etc to overcome the manual process.
In this paper, we survey about the previously proposed systems & thereby analyse the drawbacks of those systems for proposing the advanced and efficient solution to automation of attendance.
Keywords: Biometrics, RFID Tags, Barcode recognition, Attendance System, Wireless communication, GPRS System, Haar Cascading Algorithm

I. INTRODUCTION

Student participation in knowledge transfer has always been of utmost importance in a lot of institutions and organizations. This makes it mandatory for students to be present for the scheduled timetable wise lectures.
Many of the colleges still follow the traditional paper work system for marking the attendance. One of the very prevailing technique for attendance marking is passing the attendance sheet in the entire class while the professor is conducting the lecture.. This method gives birth to the cheating approach of students where proxy attendance of absent students is marked by their friends present in the class. Also there are high chances that such physical sheets of attendance gets misplaced of damaged if the water spills over it, of if he paper gets torn.
The alternative to passing sheet attendance system is that professor individually calls out the roll numbers of the students and personally verify the roll call giving candidate for his/her presence. But this system is then more time consuming as ample of valuable time is wasted in attendance marking. Therefore, these problems demand a solution, which will be automated, paperless and error free.
So, various authors have provided the automate and paperless approaches or attendance marking which avoid any manual work as most of the approaches have the online database to make sure the data is consistent. Also, apart from he paperless work benefit, there is additional benefit of not wasting the time in non-productive things and spending more time in learning during the lectures. There have been a few systems which are paperless , but make use of a lot of hardware such as RFID tags , RFID readers etc which may lead to cost crunching for institutions.
With this consideration, authors have proposed to find out the solution which will be having mini8mal hardware and on the same line lesser hardware cost incurred. The further section gives the detailed information of the review of existing systems done to analyse the existing systems, their short comings and the additional efforts that can be taken to overcome the short comings. A system with RFID reader had a feature to have a RFID reader installed in each and every class and Laboratories, while as soon as the students enters, he/she has to present the RFID tag before the reader so as to mark the attendance. The students roll number and detai8ls will be collected through the tags by the reader and then processed further to the database for marking the attendance of gathered students' Id.
The very important short coming of the system is that if the student loses his/her card or RFID tag, he/she will have to get a new card to further mark the attendance. Also the attendance system with RFID tags has another drawback of having the multiple RFID readers installed which is highly costly.

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II. LITERATURE SURVEY

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A. Sanjay Badhe, Kunal Chaudhari, Sneha Kale, Tejaswi Mane, "Smart Attendance Management System"

To manage the attendance systems of the multiple students at a time is a tedious task. Another major drawback is there is a very high probability of having the fake attendance marked. The system in this research has the fingerprints stred in a standalone machine. This information can be transferred to authorized academic authorities with manipulations. So zigbee , a wireless attendance system came up with a mechanism to have the attendance marked. The system requires low power and high performance is obtained. The author in this system proposed a zigvee based fingerprint attendance system with GPS for employee attendance tracking. But the major drawback of the system is that this system makes us of the hardware and sensors which again increases t host of the entire proposed system and is not too handy for the institutions for making it implement in real time scenario [1].

B. Chatrati Sai Krishna, Naidu Sumanth, C. Raghava Prasad, "RFID based student monitoring and attendance tracking system"

India, a leading education hub, has huge number of colleges and institutions. The students attendance can be marked using the RFID tags which can be read by the RFID readers mounted in the colleges. This system makes sure that if the student is physically in the classroom, only can then the attendance be marked and that too without the use of papers or manual roll calls as the RFID tags already comprises the roll number of the students As described earlier, the RFID reader and RFID tags cost increases as the number of students increase and there is also the probability of the RFID tags being lost. Major drawback of the RFID based system is that any candidate can carry some other candidates RFID tag and the absent candidates attendance can still; be marked [2]

C. Subhadeep Dey, Sujit Barman, Ramesh K. Bhukya, Rohan K. Das, "Speech Biometric Based Attendance System"

In this research, author proposed a system with speech recognition biometric feature for marking attendance system. As speech has a very unique feature of having different pitch, amplitude and tone. So a person can be uniquely identified by his/her speech. With this concept into consideration, author proposed a system which captures the voice of the user or student and recognize the corresponding candidate and thereby mark the attendance. Ideally using the speech for authenticating the person is called speaker verification system. But the major drawback of the system is that organizations usually are founbd to be mostly crowded areas and the speech to be properly identified needs single speech input, and then the speech based attendance system fales in such environments. Also the speech can be mimicked. There are many candidates who mimic the sound of other people which then again makes the system vulnerable to fake attendance marking . [3]

D. Siti Aisah Mohd Noor, Norliza Zaini, Mohd Fuad Abdul Latip, Nabilah Hamzah, "Android-based Attendance Management System"

Attendance to be marked using the application deployed over the android phones(of professors) has been proposed in this system. This application, once installed can be used to download the students list from a designated web server. Based on the downloaded list of students, the device will then act like a scanner to scan each of the student cards one by one to confirm and verify the student's presence. The device's camera will be used as a sensor that will read the barcode printed on the students' cards. The updated attendance list is then uploaded to an online database and can also be saved as a file to be transferred to a PC later on. This system will help to eliminate the current problems, while also promoting a paperless environment at the same time. Since this application can be deployed on lecturers' own existing Android devices, no additional hardware cost is required. [4]

E. Tarun Sharma ; S. L. Aarthy." An automatic attendance monitoring system using RFID and IOT using Cloud"

In this system, author found that there are lot of tools to use and reduce the burden of lecturers. Using RFID is the one example of that. So Author combined the RFID and IOT (Internet of Things) so as to do attendance marking automatically and there is no need to do it by lectures. So the authors tried to make use of the integration of cloud with the hardware i.e IOT making it more easy for storage of database for students attendance. But the major drawback of the system is that the system makes it very much dependant on the availability and accessibility of the cloud system, which may hamper the working of attendance system [5].

F. Fawaz Alassery, "A Smart Classroom of Wireless Sensor Networks for Students Time Attendance System"

In this paper, author proposed a system that makes use of IOT and WSN together to build a smart attendance system with wireless feature. The system makes use of the integrated load sensing chairs to make the use of sensing the presence of the students in the class and send the attendance count as per the availability of loads sensed from the chairs. Along with the sensed loads, the classrooms has

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also to be mounted with fingerprint sensors to detect who exactly is present and who is absent. The load sensed from eh intelligent IOT integrated chairs can be sent to server via smartphones application installed on professors cell phone. But this system has a very expensive requirement and chairs to be integrated with IOT load sensor having again the riskof damage and repair cost incurred.[6]

III.LIMITATIONS OF EXISTING SYSTEMS

A. In paper [1], zigbee technology is made use of. Which in turn requires the use of one of the processor to get connected to the zigbee and therefore connect to the server for marking the attendance. This increase the hardware cost and maintenance cost.

B. In paper [2], every student is allocated a unique RFID tag for marking the attendance which requires again an RFID reader and other hardware components to communicate to server for marking the attendance. Also, college students are prone to losing their ID cards and so also prone to losing the RFID cards which again is a huge barrier for this system.

C. In paper [3], the attendance is marked with speech recognition while it is the most noisy in colleges to determine the candidate on the basis of voice recognition. Also the voice can be mimicked and so the problem of proxy attendance does not get solved.

D. In paper[4], though the use of smartphones is done, the attendance marking is done by professors manually by marking the attendance from application which reduces the paper work but not the time consumption.

E. In paper[5], the system makes use of RFID tags with cloud thereby making the use of hardware as well as software technology which increases the cost of the overall system and as it makes use of cloud, there is also the threat of data security.

F. In paper [6], the authors used Wsn's for marking the attendance which are ideally very costly for colleges to implement in real-time just for the sake of attendance. Most of the colleges do not invest a lot for attendance marking process as they rely on professors to do the same.

IV.PROPOSED SYSTEM

As per the survey done, the existing systems wither make use of hardware or high cost techniques for attendance marking which makes us propose a novel , hardware free and cost efficient system for attendance marking and reducing the paper work and time required.

Here, the proposed system makes use of facial recognition which is a technique under image processing. We are proposing this system so that we can mark the issue of student's attendance management by using an Android Application for the same. Herein, the lecturer or a staff member would be authorized to capture the student's images inside a classroom to mark their attendance accordingly. We purposely selected Android devices for our system as they are compact, handy and portable, due to which allows they are easily accessible anywhere anytime. An admin would be authorized to register the staff members or teachers wherein he/she can monitor or view the activity of teachers such as their lecture durations, scheduling times, etc. The image captured by the staff member in the class gets uploaded to the server and the python face recognition algorithm determines the trained faces from the image and automatically marks the attendance for the students in the image. The students who are not in the image are automatically considered to be absent for the day. The proposed system architecture is shown in fig 1.

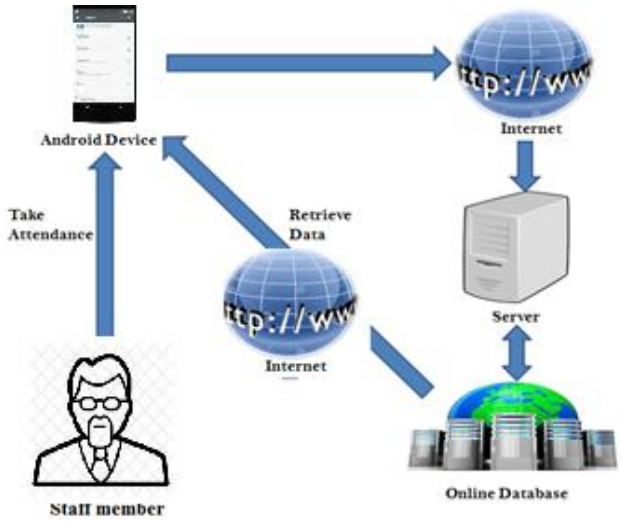


Fig 1. Proposed System architecture.

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V. CONCLUSIONS

Thus the survey on smart attendance system depicts the use of various software based or hardware based, barcode based or RFID based, biometric based or face recognition based techniques which have few advantages as well as few shortcomings. Many of the existing systems in the literature proposed the system which requires additional hardware requirement for achieving the desired results. And the system which do not need additional hardware, do not give efficient working model as only one attendance at a time can be marked.

Thus there is a need of an efficient system which will not only save the attendance marking time, but will save paper and give efficiency as well.

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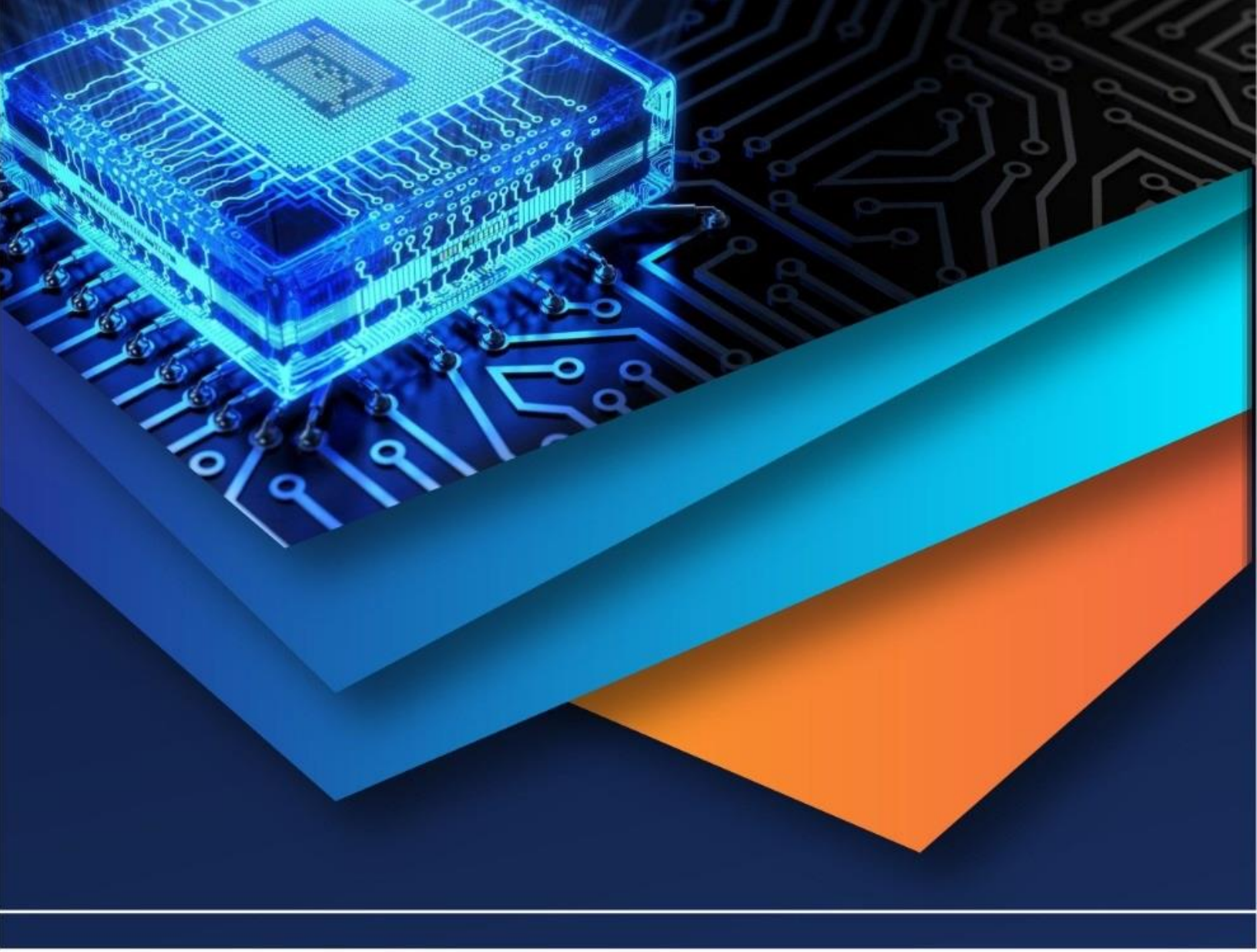
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