BLOCK CHAIN BASED REAL-TIME ATTENDANCE MONITORING SYSTEM USING OPEN CV TECHNOLOGY

Dr.B.V.S.T.Sai, Shaik Subhani V.Roshan Kumar

Professor in Dept of Mathematics and CSE, St.Mary's Group of Institutions Guntur, Email: bvstsai@gmail.com

Assoc Professor in Dept of CSE, St.Mary's Group of Institutions Guntur, Email: subbu.buddu@gmail.com

Assistant Professor in Dept of CS, Bapatla Engineering College, Email: roshan4linux@gmail.com

ABSTRACT: In a vast majority of fields, the use of facial recognition for authentication is expanding. In this information age, authentication has become vital, and the need for faster and more secure methods of user authentication has been on the rise. The introduction of image processing technologies such as OpenCV has increased society's reliance on face recognition. Using blockchain, information could be stored in blocks throughout the blockchain network. Blockchain is an extremely secure means for storing and protecting data from intruders. It is a highly disruptive technology that has the ability to alter every plane of society. This paper intends to implement open-source computer vision (OpenCV) to construct a facial detection model that will be employed in a blockchain-secured Attendance Monitoring System. Maintaining Attendance data of students in educational institutions is a very important task and it must be hard to exploit it. Forgery of data is common. Attendance data stored in conventional databases or paperwork might lead to manipulation of data. Hence, block chain technology can be used. Block chain does not allow anyone to manipulate data.

KEYWORDS: Authentication, Automation, Block chain, Face Recognition, Open cv**.**

1. INTRODUCTION

Attendance is a common part in all educational institutions. The problem of forging attendance can be reduced using block chain technology. There are several institutions using original documents to a person, who has never been to the university before and never participated in any of the academic activities. To prevent the fake attendance and fake certificates issued by the educational institutions block chain technology finds a solution here. This solution aims in using block chain technology in recording attendance of the students, since the data present in the block chain is immutable and unchangeable, it is difficult to forge the attendance or to add any other fake student to the previous academic years and it can be easily identified by others whether the student is real or fake and issuing of fake certificates can be controlled easily. Here the block

chain technology is used for storing and securing attendance and web application is created for taking attendance and a dashboard for both teachers and for students to see the simultaneous results. And also sending an alert message if the student is absent for any lecture and indicates the students whoever are having lesser attendance percentage than a certain allotted point. A block chain is a chain of blocks, which records all recent transactions and completed transactions are stored permanently as database. A new block is created for every new transaction. Bloc kchain is famously known for its features, it is constantly growing ledger, where all the transactions are permanently recorded that turn up in chronological, secure and immutable way. The need of blockchain is for its security, time reduction, unchangeable transactions, collaboration, reliability and its decentralized nature. The blocks in the block chain consists of multiple blocks and the first block is capped as genesis block where each block has three basic components

2. LITERATURE SURVEY

TITLE:"A Block chain Implementation of an Attendance Management System"

An attendance management system (AMS) is a useful system for personal management in organizations. The existing AMSs include traditional manual method, smart-card identification, fingerprint recognition, face recognition and so on. An awkward problem with these systems is that the recorded data could be forged by malicious users. Fortunately, the block chain is emerging which can be used to decentralize management and protect sensitive data. In this paper, we present block chain architecture for the AMS and its implementation in detail.

TITLE:"Automated Attendance System Using Open CV"

Student Attendance mainframe structure is defined to manage the student's class attending files using the concept of face detection and recognition through open computer vision. The principle reason this system has been put forward is to improve the traditional attendance system of various universities to avoid the misuse of time and assets. The pointing-sides of automation world have forced an idea of switching from standard attendance to the digital system by using face detection and recognition methods. This is how the Student Attendance structure is being developed by introducing the dataset of an individual. The

major reason of building this system is to improve the adaptability and performance of the attendance system procedure besides reducing the long term time load, work and disposables used. The main purpose of the Student Attendance mark up structure is to perform, adding and manipulating attendance notes of an individual, automatic calculation on number of presents and absentees based on subject and affability of the class and then generates the automated document or spreadsheet. This idea is completely based on general purpose language named as python through which we use the concept of open computer vision. For face detection system we used Haar cascade and for face recognition, we used LBPH model; then the training of individual student happened 10 and finally the system generates the spreadsheet which provides the no. of students present in classroom with an image or video capturing live.

3 SYSTEM ANALYSES

3.1 EXISTING SYSTEM

Some existing systems in attendance monitoring use facial recognition technology, which automates the attendance process by identifying individuals based on their faces as they enter an area. Additionally, blockchain technology is employed in certain systems for secure data storage and access control. These systems often use a combination of hardware like cameras and software, including machine learning for facial recognition and smart contracts on a blockchain network. They capture attendance data and store it securely, making it tamper-proof and transparent. While these systems might not match your exact project's abstract, they serve as a foundation for developing a comprehensive solution that combines the benefits of facial recognition and block chain for attendance monitoring.

3.2 LIMITATION OF EXISTING SYSTEM

The limitations of existing systems for attendance monitoring, particularly those using facial recognition and blockchain technology, can include the following:

Privacy Concerns: Facial recognition technology can raise privacy issues as it involves the collection and processing of biometric data. Some individuals may be uncomfortable with their facial data being stored and used for attendance tracking.

Accuracy: Facial recognition technology may still have limitations in terms of accuracy, especially in varying lighting conditions or with individuals of different ethnic backgrounds. False positives and negatives can occur.

Data Security: While block chain technology is considered secure, vulnerabilities and breaches have occurred in some block chain networks. Security measures must be implemented effectively to protect the data stored on the block chain.

3.3 PROPOSED SYSTEM

The proposed system aims to address the limitations of existing attendance monitoring solutions by combining facial recognition with block chain technology. This system will leverage the accuracy of facial recognition for real-time attendance tracking. It will use open-source computer vision (Open CV) to develop a robust facial detection model. The attendance data, along with entry times, will be stored in a secure block chain network, ensuring tamper-proof and transparent records. Access to the data will be controlled through smart contracts, enhancing data security and privacy. The system will offer scalability to accommodate a growing number of users. It will be designed with privacy regulations in mind, obtaining consent and ensuring data protection. By uniting facial recognition and block chain, this system aims to provide a reliable and secure solution for attendance monitoring in various sectors, such as education and corporate environments.

4. SYSTEM ARCHITECTURE

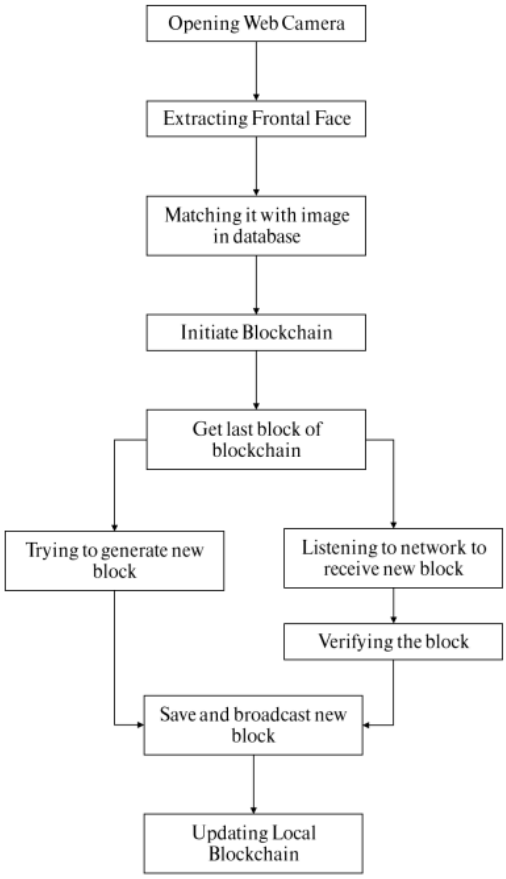

Fig 4: System Architecture

5. METHODOLOGY

This describes the steps that were followed to accomplish the specified objectives of this research with an elaboration of the reason why the chosen approach is preferred. It consists of the techniques and tools that were used in data collection, study, and analysis of the research to further comprehend the requirements of the system. The achievability analysis tools and techniques of the proposed system, the system implementation, testing, and validation processes are all enclosed in this chapter

The main technologies used in the system are as follows:

• Open CV(version 4.6.0) Open CV is an open-source/free technology that is used for image processing. The latest version of it is 4.6.0.OpenCV was developed with the motivation of automating the image-processing system

• Ethereum block chain The current value of each ether is approximately 1,28,337 INR. All the services of Ethereal are free by default. It securely implements the application code and also verifies it.

• Solidity is an object-oriented programming language that was created specifically by the Ethereal Network team for use in developing and implementing smart contracts.

• Truffle Suite Truffle suite package comes up with tools for implementing and migrating contracts as well as setting up a block chain network locally.

• Meta mask It is a wallet for interacting with web3 accounts and conducting transactions between them.

• Flask It is a web framework that is written in Python Language. Flask is useful for creating single-page applications as it provides app routes that speed up the whole working of the website.

6. MODULES

i)Facial Recognition Module: This module is responsible for capturing and processing facial data from cameras, identifying individuals, and verifying their attendance.

ii)Block chain Integration Module: Implement block chain technology for storing and securing attendance records in a decentralized and immutable ledger.

iii)User Management Module: Manage user profiles, permissions, and access control, ensuring that only authorized users can interact with the system.

iv)Data Pre-processing Module: Prepare and clean the attendance data before storing it on the bloc kchain, ensuring data quality and consistency.

v)Real-time Monitoring Module: Enable real-time attendance tracking and monitoring for administrators, including live updates

vi)Smart Contracts Module: Develop and deploy smart contracts on the block chain to automate attendance record- keeping and enforce security and access rules.

vii)Data Visualization Module: Create a user-friendly dashboard for administrators to view attendance data, generate reports, and analyze attendance patterns.

viii)Security and Privacy Module: Implement security measures to protect both

facial recognition data and attendance records, addressing privacy and data.

ix)User Interface Module: Design a user-friendly interface for students, employees, and administrators to interact with the system, allowing them to mark attendance or view their

x)Machine Learning Model Module: If needed, build and train machine learning models for facial recognition and attendance verification.

xi)Compliance and Reporting Module: Implement features for regulatory compliance, auditing, and generating compliance reports.

xii) Maintenance and Update Module: Develop a system for updating and maintaining the software, including patches, upgrades and improvements.

7. RESULT

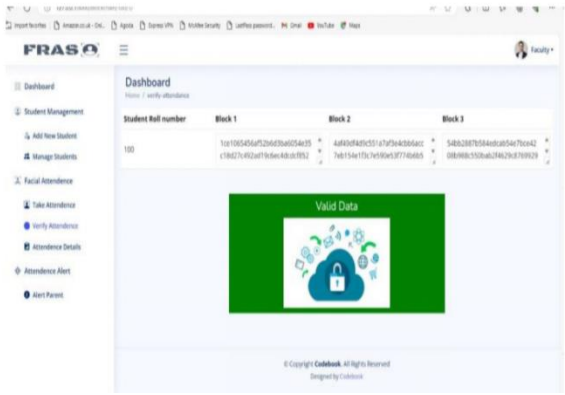

Fig 7.1: Output for Attendance Monitoring

We conducted a series of experiments to illustrate the system performance under different situations. By carrying out those tests, we were able to get the graph shown above (Distance vs Confidence Level). We may deduce from the graph that when the face is closer to the camera, the confidence level is higher, and vice versa. Therefore, by keeping a threshold for confidence level, we can mark attendance to the person according

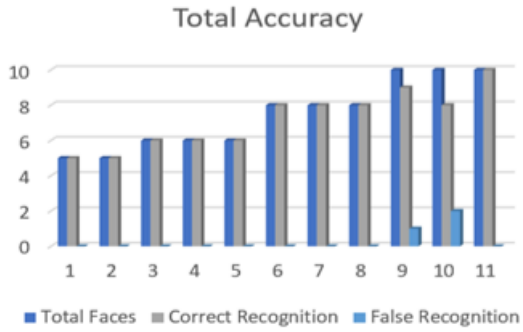

Fig 7.2: accuracy for attendance monitoring

8. CONCLUSION& FUTURE SCOPE

The integration of block chain technology with facial recognition-based attendance recording systems provides a secure and efficient solution for monitoring attendance. The technology offers several benefits, including increased security and transparency, as well as a more efficient and streamlined process for recording and processing attendance data. However, the implementation of the technology also faces several challenges and limitations, including privacy concerns, implementation costs, and accuracy issues. Therefore, it is important to consider these challenges and limitations

when implementing the technology and to evaluate and optimize the performance of the system to ensure that it provides accurate and reliable results. Future advancements in machine learning algorithms can lead to improved accuracy in facial recognition, making the attendance monitoring system more reliable and efficient. This could involve developments in deep learning architectures, better feature extraction techniques, and optimization of algorithms for real-time processing.

REFERENCES

[1] Md. Shakil and RabindraNath Nandi, "Attendance Management System for Industrial Worker using FingerPrintScanner", in Global Journal of Computer Science and Technology Graphics and Vision,Feb 2018.

[2] Siddharth Rajput, Archana Singh, Smiti Khurana, Tushar Bansal, SanyuktaShreshtha,"Blockchain Technology and Cryptocurrenices",06 February 2019.

[3] H.H. Soliman, et al,"A comparative performance evaluation of intrusion detection techniques for hierarchical wireless sensor networks", Egyptian Informatics Journal (2012) 13 Jan 2020.

[4] Naman Gupta, Purushottam Sharma, Vikas Deep, Vinod Kumar Shukla, "Automated Attendance System Using OpenCV", June 4-5, 2020.

[5] Hasna Ardina,I Gusti Bagus Baskara Nugraha,"Design of A Blockchainbased Employee Attendance System",19 Nov 2019

[6] Jingyao Tu, Zhenhua Duan(B), Cong Tian(B), Nan Zhang(B), and Ying Wu ,"A Blockchain Implementation of an Attendance Management System",09 February 2019.

[7] Naman Gupta,Purushottam Sharma,Vikas Deep,Vinod Kumar Shukla,"Automated Attendance System Using OpenCV",June 4-5, 2020.

[8] LIXIANG LI1, XIAOHUI MU1, SIYING LI ,HAIPENG PENG"A Review of Face Recognition",Technology"21 July 2020.

[9] Setia Budi, Oscar Karnalim, Erico D. Handoyo, Sulaeman Santoso, Hapnes Toba,Huyen Nguyen†, Vishv Malhotra "IBAtS -" Image Based Attendance System: A Low Cost Solution to Record Student Attendance in a Classroom", 10 December 2018.

[10] Muthunagai, Muruganandhan, Rajasekaran.P,"Classroom Attendance Monitoring Using CCTV",10 July 2020.

[11] Kaneez Bhatti, Laraib Mughal, Faheem Khuhawar, Sheeraz Memon, "Smart

Attendance Management System Using Face Recognition", 31 July 2019.

[12] Sudhir Bussa, Ananya Mani, Shruti Bharuka, Sakshi Kaushik, "Smart Attendance System using OpenCV based on Facial Recognition", 11 March 2020.

[13] Samridhi Dev, Tushar Patnaik, "Student Attendance System using Face Recognition", 10-12 September 2020.

[14] A Arjun Raj, Mahammed Shoheb, K Arvind, K S Chethan, "Face Recognition Based Smart Attendance System", 17-19 June 2020.

[15] Kolipaka Preethi, Swathy Vodithala, "Automated Smart Attendance System Using Face Recognition", 06-08 May 2021.