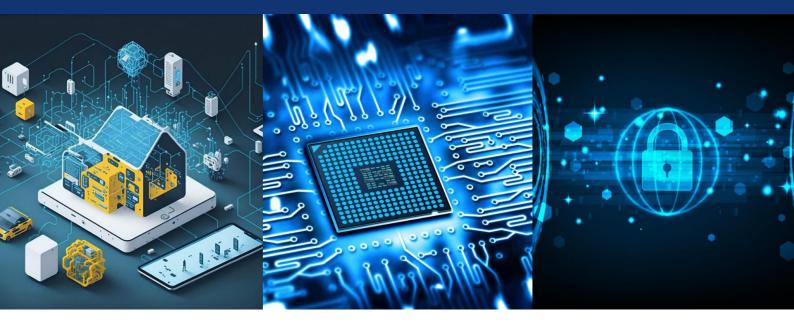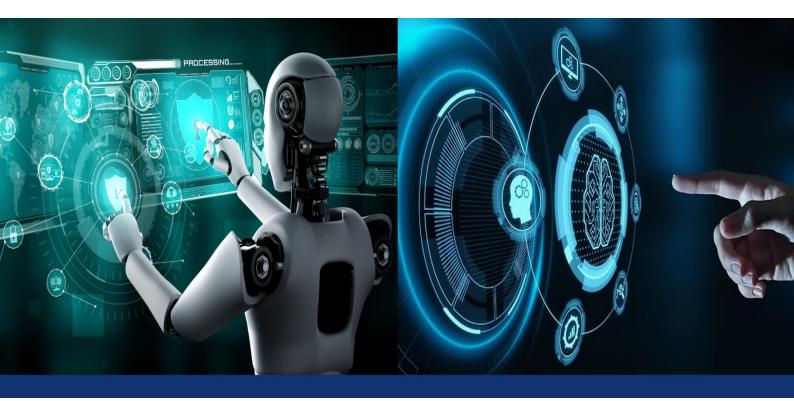# International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Smart Home Security System Leveraging Face Recognition and Block Chain Technology

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ABSTRACT: The visitor management is a modern world problem with its application a numerous fraud, privacy issues, etc. can be easily detected and avoided The visitor management system using face recognition is one of the most secure systems even better than CCTV cameras and wake through gate methods. The main focus that has to made in project is whether the cost of the system compiles with the extent of the project.

Visitor Management System is mostly used by corporate, schools, colleges now but with great advancements can extent its scope to railway stations, airports, toll stations, etc. Almost all businesses with huge facilities are incorporating Visitor Management Systems in their overall security and is constantly growing aconstant pace. Face recognition visitors' management system (FRVMS) is proposed to enhance the security of home to identify the unknown persons without manual interventions This system is not requiring any extra devices. Face recognition is using web camera that is already embedded with the computer. The detected detailed features are compared with the family of face data stored in the database of the monitoring system, and security is cancelled in case of a member, while an alarm notification is displayed to the user in case of an outsider.

I. INTRODUCTION

Locks have been around for thousands of years. Probably as long as therehave beenvaluables that people wanted to protect, locks been there to keep things secure. One can probably encounter all sorts of locksevery day. From combination locks on school lockers to deadbolt locks on frontdoors, locks are all around us. Today there are many different kinds of locks.Some are very simple locks that open with a key or a combination of numbers.Others are extremely complicated locks that open with fingerprints or special
electronic key cards.

Today's locks feature many different types of mechanical and technological systems to increase security. We were all familiar with traditional door locks on our front door. Now-a-days with the extreme use of smart devices are used to automate many of the processes. Home automation is one of the aggressively developed technology use by high end society. It's far tough to consider blindly on traditional and simple security features of the device in conventional gadget many of the doors are having mechanical lock which have
been constrained on the number of keys.

It works well but when we wish more secured environment and accountability of who locked and unlocked when is the major part was missing in traditional system. Traditional security system requires the user a key,a security password, an RFID card, or ID card to possess access to the system.However, these security systems have deficiencies; for instance, they will beforgotten or stolen from unauthorized people. As a result, there is a need todevelop a better system for higher security. For many years, people are using non-living thing (Like smart cards, plastic cards, PINS, tokens, keys) forauthentication and to urge grant access in restricted areas. So, there are chances that one might forget the pins, keys, cards, etc. but in case face recognition is used

The door operating system then there is a hope of providing higher security. Face has many features (like eyes, nose, etc.) which are unique and it can reflect many emotions of a person. One major advantage is that face recognition systems are more secure and difficult to bypass. Unlike keys, which can be lost or stolen,a person's face

cannot be easily replicated or duplicated, making it a reliable form of identification.

The system has four phases which can be named as face detection, feature extraction, face recognition and door operation. Locks have been around for thousands of years. Probably as long as there have been valuables that people wanted to protect, locks — in some form — have been there to keep things secure. One can probably encounter all sorts of locks every day. From combination locks on school lockers to deadbolt locks on front doors, locks are all around us.

Today there are many different kinds of locks Some are very simple locks that open with a key or a combination of numbers. Others are extremely complicated locks that open with fingerprints or special electronic key cards. Today's locks feature many different types of mechanical and technological systems to increase security. We were all familiar with traditional door locks on our front door.

Now-a-days with the extreme use of smart devices are used to automate many of the processes. Home automation is one of the aggressively developed technology use by high end society. It's far tough to consider blindly on traditional and simple security features of the device. in conventional gadget many of the doors are having mechanical lock which have been constrained on the number of keys. So, to overcome the aforementioned issues and traditional locking system one has to modify them and make them smart and automated.

As a result, there is a need todevelop a better system for higher security. For many years, people are using non-living thing (Like smart cards, plastic cards, PINS, tokens, keys) for authentication and to urge grant access in restricted areas. So, there are chances that one might forget the pins, keys, cards, etc.

face recognition is used recognition systemsare more secure and difficult to bypass. Unlike keys, which can be lost or stolen a person's face cannot be easily replicated or duplicated, making it a reliable form of identification. Additionally, face recognition systems offer greater convenience since there is no need to carry or keep track of keys. This can be especially useful for busy individuals who have their hands full or are prone to misplacing items. Another advantage of smart door security using face

II. SYSTEM ANALYSIS

Existing System:
One existing system for visitor authentication in smart door security using sensors is a proximity sensor-based authentication system. In this system, a   proximity sensor is installed near the smart door, and when a visitor approache the door, the sensor detects their presence and triggers a sequence of authentication checks. The first   step in the authentication process involves facial recognition technology. A camera located near the proximity sensor captures an image of the visitor's face, which is then compared to a pre-stored image of authorized visitors.

Limitations:
• Fail to simultaneously utilize the rich information and relationship between still images
• Only implement image to image matching
• Performance is less at the time of face recognition
• Need large number of datasets
• Need hardware system

Proposed System:
Smart door security using face recognition with mask recognition using deep learning is a system that utilizes advanced artificial intelligence algorithms to provide accurate and reliable authentication. Deep learning is a subset of machine learning that uses artificial neural networks to analyse and learn from data.In this system, a deep learning model is trained to detect faces and masks fromimages captured by the camera installed near the smart door. Smart doorsecurity using face recognition with mask recognition is a system that has become increasingly relevant during the COVID-19 pandemic, where wearing a mask is a necessity.

Expected Merits:

- Overcome heterogeneous face matching problem
- Build the relationship between the unbalanced distributions of still images and   video clips of different quality
- Simultaneously detect the mask and also facial features
- Complexity is low and performance is high
- Time consuming process.

III. SYSTEM REQUIREMENTS

Hardware Requirements:

- Processor : Intel processor
- RAM : 1GB
- Hard disk : 160 GB
- Compact Disk : 650 Mb
- Keyboard : Standard keyboard
- Monitor : 15 inch color monitor

Software Requirements:

- Server Side : Python 3.7.4(64-bit) or (32-bit)
- Client Side : HTML, CSS, Bootstrap
- IDE : Flask 1.1.1
- Back end : MySQL 5.
- Server : WampServer 2i
- OS : Windows 10 64 –bit

Software Description:

Python:

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

MYSQL:

MySQL is the world's most used open source relational database management system (RDBMS) as of 2008 that run as a server providing multi- user access to a number of databases. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation.

Data Science:

Python is one of the most popular languages for data science, thanks to libraries like NumPy, Pandas, and Matplotlib that make it easy to manipulate and visualize data.

Machine Learning:

Python is also widely used in machine learning and artificial intelligence, with libraries like TensorFlow, Keras, and Scikit-learn that provide powerful tools for building and training machine learning models.

Web Development:

Python is commonly used in web development, with frameworks like Django and Flask that make it easy to build web applications and APIs.

Scientific Computing: Python is used extensively in scientific computing, with libraries like SciPy and SymPy that provide powerful tools for numerical analysis and symbolic mathematics.

In addition to its versatility and ease of use, Python is also known for its portability and compatibility. Python code can be run on a wide range of platforms, including Windows, macOS, and Linux, and it can be integrated with

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other languages like C and Java.

Overall, Python is a powerful and versatile programming language that is well- suited for a wide range of applications, from data science and machine learning to web development and scientific computing. Its simplicity, readability, and large community of developers make it an ideal choice for beginners and expertsalike.

IV. LITRETURE SURVEY

- **Title :** Design of Wireless Vision Sensor Network for Smart Home (2020)
- **Author   :** TSUNG-HAN TSAI
- **Concept :** Using the different parameters of the palm such as length and width, different types of hand gestures are determined
- **Limitation:** Sensor based motion detection so cost is very high to implement
- **References:** Tsai, Tsung-Han, et al. "Design of wireless
        vision sensor network for smart home." IEEE Access 8 (2020): 60455-60467.

- **Title   :** Multispectral Facial Recognition: A Review (2020)
- **Author   :** LUÍS LOPES CHAMBINO
- **Concept   :** The most used methods for facial recognition and the ones that achieved best results are based on neural networks
- **Limitation :** Only support the image datasets
- **References:**
        L. L. Chambino, J. S. Silva, and A. Bernardino,
        ''Multispectral facial recognition: A review,'' IEEE Access, vol. 8, pp. 207871–207883, 2020

- **Title   :** UFaceNet: Research on Multi-Task Face Recognition Algorithm Based on CNN   (2020)
- **Author   :** Huoyou Li
- **Concept   :**   Reduce the hardware requirements and hardware cost of equipment
- **References :** Li, Huoyou, et al. "UFaceNet: Research on Multi-Task Face Recognition Algorithm Based on CNN." Algorithms 14.9 (2021): 268.

- **Title   :** Design for visitor authentication based on face
- recognition technology Using CCTV
- **Author   :** Mun, Hyung-Jin, and Min-Hye Lee
- **Concept   :** Introduce various object detection algorithms including CNN. CCTV detects the face of a visitor and then recognizes 81 feature points in the face to create a set of vector values basedon the features.
- **References :** Mun, Hyung-Jin, and Min-Hye Lee. "Design for visitor authentication based on face recognition technology Using CCTV." IEEE
        Access 10 (2022): 124604-124618.

VI. CONCLUSION

In conclusion, the proposed Smart Home Security System leveraging Face Recognition and Blockchain Technology offers a robust and secure solution for home security. The system's face recognition capabilities and blockchain technology provide a secure and immutable way to store and manage security data. With its real-time alerts and notifications, the system provides an additional layer of security and peace of mind for homeowners.

This can be especially useful for busy individuals who have their hands full or are prone to misplacing items. Another advantage of smart door security using face recognition is that it allows for greater control and customization of access. The system can be programmed to recognize specific faces and grant access only to those individuals, allowing for greater control over who is allowed into the building. The system can also be configured to restrict access during certain times of the day or to specific areas of the building, making it easier to manage access and increase security.

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1. Tsai, Tsung-Han, et al. "Design of wireless vision sensor network for smart home." IEEE Access 8 (2020): 60455-60467.
2. L. L. Chambino, J. S. Silva, and A. Bernardino, ''Multispectral facial recognition: A review,'' IEEE Access, vol. 8, pp. 207871–207883, 2020
3. Waseem, Muhammad, et al. "Face recognition for smart door lock system using hierarchical network." 2020 International Conference on Computational Intelligence (ICCI). IEEE, 2020.
4. Li, Huoyou, et al. "UFaceNet: Research on Multi-Task Face Recognition Algorithm Based on CNN." Algorithms 14.9 (2021): 268.
5. Mun, Hyung-Jin, and Min-Hye Lee. "Design for visitor authentication based on face recognition technology Using CCTV." IEEE Access 10 (2022): 124604- 124618

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