Medvision: Facial ID Health System

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ABSTRACT: MedVision's Facial ID Health System is a cutting-edge healthcare solution designed to revolutionize patient identification and health record management. Leveraging facial recognition technology and artificial intelligence, this system prioritizes accuracy, efficiency, and data security. It offers a convenient and secure patient check-in process while seamlessly integrating with electronic health record systems, promoting comprehensive and real-time patient care. By enhancing patient safety, streamlining administrative processes, and ensuring data privacy, MedVision represents a significant advancement in healthcare technology. This innovative platform caters to healthcare facilities of all sizes, contributing to a more efficient and patient-centric healthcare experience. MedVision's Facial ID Health System redefines patient identification and health record management, leveraging cutting-edge facial recognition technology and artificial intelligence to empower healthcare facilities of all sizes. Its advanced algorithms accurately identify individuals upon arrival, eliminating manual registration and minimizing human error. Seamless integration with electronic health record systems ensures instant access to patient records, enabling informed decision-making and personalized care. MedVision prioritizes patient safety by safeguarding sensitive data through secure facial recognition technology, preventing unauthorized access and protecting patient privacy.

Keywords: Healthcare solution, Facial recognition technology, web application, service platform.

I. INTRODUCTION

MedVision is a cutting-edge healthcare system that introduces a revolutionary approach to patient identification and record management. This innovative platform harnesses the power of facial recognition technology, merging it with artificial intelligence to streamline and enhance various aspects of healthcare processes. At its core, MedVision offers a facial recognition-based authentication system, ensuring that patient health records are precisely matched to the correct individuals. This not only reduces the risk of medical errors but also elevates patient safety. Patients can now seamlessly check in for appointments by merely scanning their faces, eliminating the need for traditional paperwork and identification cards, thereby expediting the registration process. Moreover, MedVision prioritizes security with advanced measures to safeguard patient data. This system integrates seamlessly with electronic health records, providing healthcare providers with real-time access to patient information, thus promoting comprehensive patient care. Furthermore, patient privacy and consent are of utmost importance, and MedVision complies with all relevant data protection regulations. With its focus on precision, security, and efficiency, MedVision aims to transform patient identification and record management in the healthcare industry, promising a brighter future for healthcare technology.

II. METHODOLOGY

To integrate the literature review into the system architecture, we will systematically align prior works with the proposed functionalities of MedVision's Facial ID Health System. This involves synthesizing relevant findings from existing literature on facial recognition technology and AI in healthcare. Concurrently, we will conduct a thorough requirements analysis, outlining both functional and non-functional software requirements with a focus on clarity in specifications. This step ensures that the system architecture aligns precisely with the identified needs and standards. The user flow will be visualized to create a clear representation of the journey from the Login/Sign-up phase to the various features accessible through the Dashboard. This visualization aids in understanding the user experience and ensures that the design is intuitive and user-friendly. Emphasizing key features for farmers is integral to the methodology, ensuring that the system is tailored to meet their specific needs effectively. This step aligns with the overarching goal of providing a solution that truly caters to the healthcare facilities of all sizes. Through iterative refinement, the methodology will continuously evolve based on feedback and insights, ensuring alignment with the project's overarching goals. This adaptive approach guarantees that MedVision's Facial ID Health System remains at the forefront of innovation, meeting the dynamic requirements of the healthcare industry.

III. System Architecture

1. System Overview:

The architecture represents a hospital management system named MedVision, integrated with a facial recognition module for patient identification and management.

2. Components and Workflow:

- **Start:** The entry point for the system.
- **Medvision :** Central system managing hospital operations, interfacing with various modules.
- **Facial Recognition Module:** Utilized for identifying patients using facial recognition technology.
- **Medical Staff:** Medical staff interact with the system to track and manage patient visits.
- **Database:** Centralized repository for storing patient data, including facial data, visit records, and categorized patient information.

3. Facial Recognition Module:

- **Identify Patient:** Facial recognition module attempts to match the patient's face with stored data.
- **Patient Identified**: If a match is found, the system retrieves the patient's data from the database.
- **Patient Not Identified**: If no match is found, the patient is registered, and their face is stored in the database for future reference.

4. Patient Management Data:

- **Retrieve Patient Data from Database:** Once a patient is identified, their existing data is fetched from the database.
- **Update Patient's Records**: Medical staff can update patient information as needed.
- **Store and Update Data in Database**: All updates to patient records are stored back in the database to ensure data consistency and availability.

5. Track Patient:

- **Track Patients:** Medical staff track patient visits, ensuring proper record-keeping of each visit.
- **Update Patient's Visit in Database:** Each patient visit is logged in the database, maintaining a comprehensive visit history.

6. Data Flow and Storage:

- Data flows between the facial recognition module, medical staff,

and the database to ensure seamless patient management.

- The database acts as the central repository, ensuring that all patient-related data is securely stored and easily retrievable.

7. **System Benefits:**
   - **Enhanced Patient Identification**: The use of facial recognition improves accuracy and speed in patient identification, reducing administrative errors.
   - **Streamlined Operations**: Integration with the hospital management system ensures efficient workflow, from patient registration to visit tracking and categorization.
   - **Improved Data Management**: Centralized database ensures consistent and up-to-date patient records, enhancing data reliability and accessibility.

IV.   Background

4.1 Flask

Flask is a flexible framework written in python and is easy to use. Created by Armin Ronacher and released in 2010. Flask is built on the WSGI toolkit and Jinja2 templating engine, which allows for simple yet powerful web development. One of its key features is its minimalistic core, which provides just the essential components needed for building web applications, leaving developers the freedom to choose additional tools and libraries as needed. This modularity makes Flask particularly well-suited for both small projects and large applications where customizability and control are important. Flask's simplicity in setup and ease of use, along with a large supportive community and comprehensive documentation, make it an excellent choice for developers ranging from beginners to advanced professionals seeking to create dynamic and robust web applications.

4.2 Xampp

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. It is designed to be easy to install and use, providing a comprehensive suite of tools necessary for developers to set up a local web server environment for testing and development purposes. XAMPP stands for Cross-Platform, Apache, MariaDB, PHP, and Perl. It runs on various operating systems, including Windows, Linux, and macOS. XAMPP is widely used by developers for creating and testing web applications in a controlled and secure environment before deploying them to a live server. It includes features like phpMyAdmin for database management, and it simplifies the process of managing web server configurations, making it an ideal tool for both beginners and experienced developers.

4.3 MySQL

MySQL is a widely used open-source relational database management system (RDBMS). It is known for its speed, reliability, and ease of use. Developed by MySQL AB, which was later acquired by Oracle Corporation, MySQL supports a broad range of applications, from small-scale single-user applications to large-scale enterprise applications. It uses Structured Query Language (SQL) for database access and management and is compatible with numerous programming languages, including PHP, Java, and Python. MySQL is a key component of the LAMP (Linux, Apache, MySQL, PHP/Perl/Python) stack, a popular web service solution stack. It is available under the GNU General Public License (GPL), making it free to use, with additional enterprise features available under a commercial license. MySQL is favoured for its performance, flexibility, and robust data security features, making it a top choice for web-based applications.

V.   Literature Survey

5.1 A Contactless Healthcare System with Face Recognition

Nowadays, healthcare is becoming a new issue increasingly that worthy to care. Healthcare measurement methods can be categorized into two main areas: contact and contactless. Among them, contactless has more flexibility and comfort. In this paper, they combined the pulse rate measurement and face recognition based on deep learning into an embedded system. The system can help people measure their pulse rate in real-time after recognize the face. Our system contains a graphics processing unit (GPU) and central processing unit (CPU) co-design platform in order to processing face recognition in real-time. The experimental results show the recognition average accuracy is 98.

5.2   Health   Monitoring Approaches   towards   Face Recognition based System

Face recognition is the most advanced technique of identification and authorization, having evolved significantly over the last ten years. Face recognition software is now widely utilized in a variety of applications, including security and other businesses. The purpose of this study is to develop a facial recognition-based automated attendance management system with active learning capabilities. To create a dependable and secure attendance tracking system, the proposed proposal employs a number of technologies. Active learning is added to address the issue of children's facial feature alterations. The technique is recommended to be used in schools, universities, businesses, and prisons.

5.3 Facial Recognition and Verification System for Accessing Patient Health Records

This paper proposes an Image processing based embedded system to access patient health records by face recognition. Nowadays carrying all the medical report during every visit became a tedious process and hence the medical reports are stored in a database and accessed with a unique identification number. In this paper, face recognition is used instead of a unique identification number. In emergency situations, this helps to know the medical history of the patients. The proposed system consists of a Raspberry Pi 3 processor and a webcam which is used to capture the face. Local Binary Pattern (LBP) and HAAR Cascade algorithms are used to detect and recognize the face. The features of the face are extracted using LBP and HAAR cascade algorithm. The extracted features are given to classifier which compares these features with the trained ones and displays the data and reports stored in the database. Both algorithms are implemented in python using OpenCV. Experimental results indicate that LBP algorithm is more efficient than HAAR cascade classifier algorithm in terms of execution time, classification accuracy, confusion matrix, and F1 score.

5.4 Patient Identification using Facial Recognition

The medical history of patients and previous meetings to a doctor have been traditionally recorded and maintained using paper and pen. This research is done with an aim to throw some light on the field of Computer Vision that can potentially revolutionise the way that prescriptions are given to patients since ages. In this paper, an implementable idea of using the advanced Computer Vision Technology to eliminate printed prescriptions and physical components like RFID, Record Files has been proposed. The results of having a Universal Medical Face Identification for every patient have been properly showcased that take several factors into consideration like reducing the inefficiency, amount of time taken at reception and efforts of medical staff in recognising a patient and drawing out subtleties of the patient's medical history, previous visits to the specialist, and prescriptions. A

database linked to the patient's face image can be deployed on a secure platform that can be updated from time to time and will be universally considered as the basis of the identity of patients available to the doctors at all certified medical centres for studying and taking immediate action. Facial recognition can be utilized in hospitals for staff and patient tracking efficiently and practically faster than the current record-based approach. Finally, the comparison of wait time and technical challenges of current methods, implementation and privacy are highlighted.

5.5 Facial-Expression Monitoring System for Improved Healthcare in Smart cities

Human facial expressions change with different states of health; therefore, a facial expression recognition system can be beneficial to a healthcare framework. In this paper, a facial-expression recognition system is proposed to improve the service of the healthcare in a smart city. The proposed system applies a bandlet transform to a face image to extract sub-bands. Then, a weighted, centre-symmetric local binary pattern (CS-LBP) is applied to each sub-band block-by-block. The CS-LBP histograms of the blocks are concatenated to produce a feature vector of the face image. An optional feature-selection technique selects the most dominant features, which are then fed into two classifiers: a Gaussian mixture model (GMM) and a support vector machine (SVM). The scores of these classifiers are fused by weight to produce a confidence score (CS), which is used to make decisions about the facial expression's type. Several experiments are performed using a large set of data to validate the proposed system. Experimental results show that the proposed system can recognize facial expressions with 99.95

communicate with each other effortlessly and without any third-party hindrance. As a result, patients experienced a significant ease in carrying their medical records, especially the patients with long and chronical medical history. As for the medical staff, they got a huge amount of burden lifted off of their shoulders as all the paperwork is reduced with help of this application. The application facilitates seamless interactions between patients and health workers. In addition, the facial recognition technique helps the medical staff to check and verify the patient's identity more accurately within less time.

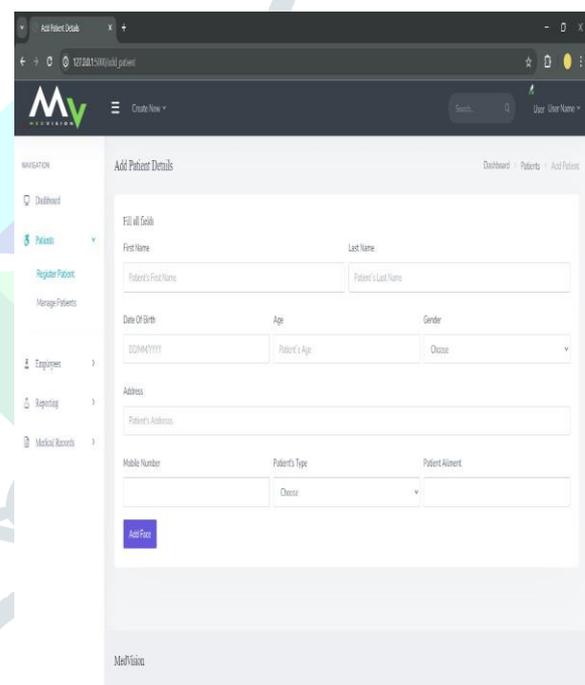Implementation images as in-application snapshots are provided below:

Fig. 1.Patient Details

VI. IMPLEMENTATION & RESULTS

The implementation of this application for Health industry has a significant results and positive feedbacks from the users. The application successfully streamlined the operations of the medical staff and that of the patients, by providing them both a common platform that allows them to
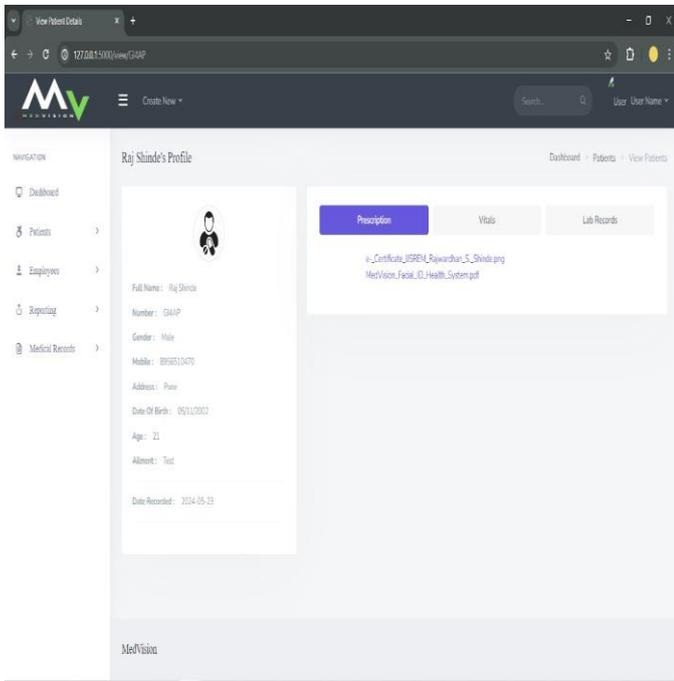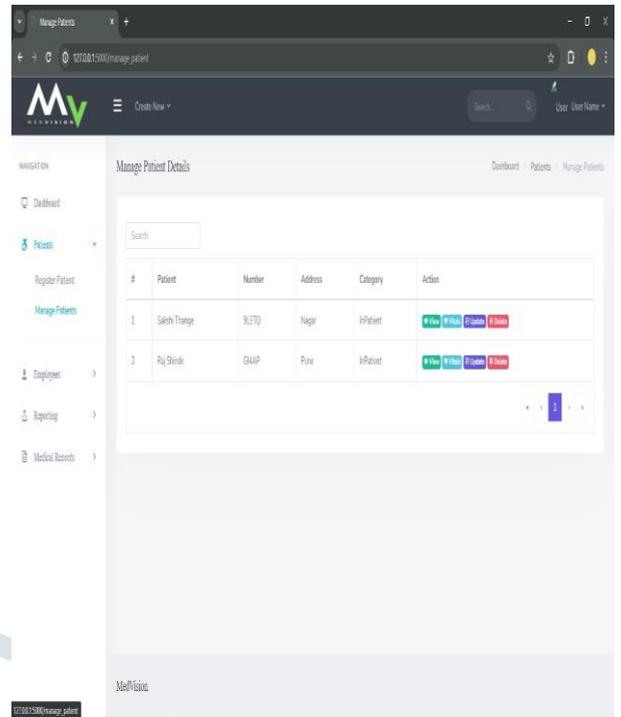
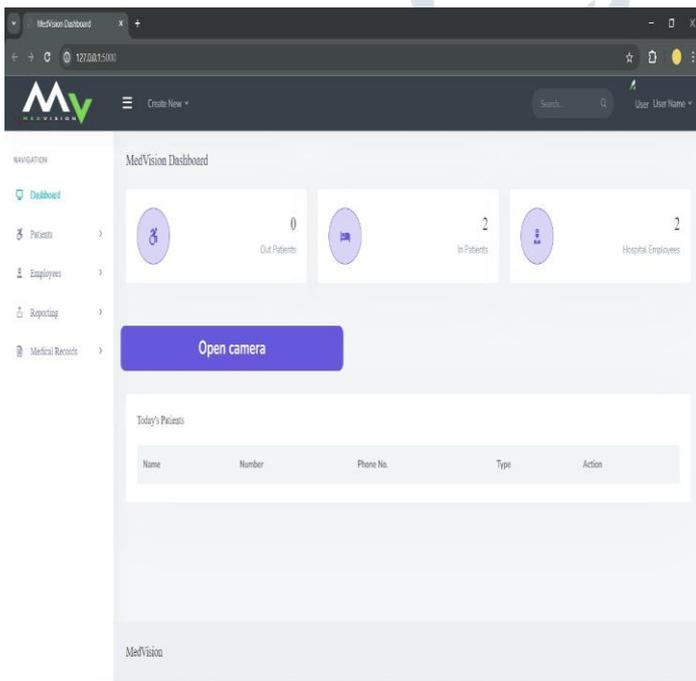Fig. 2. Patient Profile

Fig. 4. Manage Patient

Fig. 3. Dashboard

VII. CONCLUSION

In this paper, we have presented MedVision: Facial ID Health System, a novel technology that uses facial recognition and health assessment to provide a non-invasive and quick method for health screening. We have discussed how this system works, what it does, and why it is different from other solutions. We have also highlighted the benefits and limitations of this system, as well as the ethical and privacy issues that need to be addressed. We have concluded that this system has the potential to transform health screening and monitoring, making it more accessible and convenient for users, but also requires careful attention to ethical and privacy considerations in its development and implementation. We have suggested some possible directions for future research and development, such as improving the accuracy and reliability of the system, expanding the range of health conditions that can be detected, and exploring the user acceptance and satisfaction of the system. We hope that this paper has provided a comprehensive overview of MedVision: Facial ID Health System, and has stimulated further interest and discussion on this topic.

VIII. ACKNOWLEDGMENT

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