AUTOMATED USER IDENTIFICATION AND MEDICAL RECORD SYSTEM BASED ON FACIAL RECOGNITION

1 INTRODUCTION

The technology era has boomed from a decade in the whole world, and one of the major emerging technologies is artificial intelligence and machine learning. One of the most prominent parts of machine learning is the face recognition system which is basically a collaboration of computers and artificial intelligence. it has its roots across various sectors like education, agriculture , healthcare etc.

The healthcare sector is a subtle field where the risks of life of patients are involved. The doctors are designated as gods at the time of some major accidents and injuries. But the hospitals are also dependent on some of the advanced technologies which they want should assist them for better treatments.

One of the main requisites of all the analysis and prediction is the DATA . As we all know DATA IS THE NEW OIL . So in the context of healthcare , accurate data is required which should be specific and relevant. The purpose of collecting and analysing data is to improve the quality of patient’s care , advance medical research and optimum healthcare delivery. Healthcare data is also required for public health purposes , be it detecting the major outbreaks like covid-19 pandemic or monitor population trends , in addition to this , it can also be used in collecting patient’s previous disease history and medical insurances purchased or claimed.

With this report , we are going to explain about how facial recognition technology can be utilised in healthcare to access the details of the patient which will indeed save a lot of time, money, environment and at times life.

We have worked on the idea which includes three entities- a user, a hospital, and police. At first the user opens the website and fills the suitable details including scanning of the facial images and enter the medical details including the report in the link format. Then it is the hospital which has to login with the specific credentials which are provided to them, by opening the hospital page, they have the provision to detect the face of the patient, if the patient is already registered, then the details are displayed in no time. These details might include name, email, contact number, emergency contact number, prior diseases, allergies and reports including prescription.

Then at last there is a police login where a police official with valid ID proof and designation can register and get information of the patient if any police case has to be registered or not.

2 PROBLEM STATEMENT

Let us assume there is a patient with some serious injury or some serious disease complication , it can be referred to as an emergency situation. So what should the hospital do ? should they proceed with the treatment of the victim or they should first collect all the information about the patient. We all will agree with the latter one for obvious reasons but we have to understand the doctor’s perspective that without some information, the treatment cannot begin.

But it is also not possible for the patient to enter the details or wait for the long lines in the queue to fill the form before the treatment .

Moreover, filling of the forms consists of a lot of paperwork which is not at all safe for the environment. People also face the problem of carrying bulky files every time they visit the hospital or clinic.

Finally if there is some accident or any other mishappening where a police case has to be filed, a lot of work has to be done by the officials to get the details of the case to get registered.

All these problems are a serious concern, but with the help of appropriate tools and technologies, we came up with the solution to this problem.

We tried to make the best of our knowledge of facial recognition technology and the existing problem and came up with a realistic idea so that we could make our way and contribute to mankind.

3 METHODOLOGY

This section explains the complete process of our project, including face recognition.

3.1 INTERFACES

As mentioned before, there are basically three types of interfaces included- the user or the patient interface, the hospital interface and the police interface.

3.1.1 PATIENT INTERFACE-

The patient interface includes the login page where the patient has to login by entering the correct credentials and if it's a new user, then he/she has to register first by entering the basic details like name, address, email, contact number, emergency contact details.

After entering the details, a new page will appear where a person has to scan and upload the images. There will be around 50 images that are captured and stored in a folder.

At last, a patient has to enter the medical details like disease name, symptoms, allergies, vaccinations and the link of the medical report which includes previous prescriptions and consultations.

3.1.2 HOSPITAL INTERFACE-

The hospital interface includes the hospital login page and the registration page for the new hospital. The login page includes the hospital name and the password which is unique and confidential for every hospital.

After login the details, a page will open where a person has to enter the email of the patient and scan the face of the patient.

After the scanning, the details of the user gets displayed on the system including the report link.

3.1.3 POLICE INTERFACE

The police login to some extent is similar to the hospital interface , the only difference is about the data that is situated there. In police login the medical data is not shared, instead it contains the date, time and place of the incident and the loss suffered, eye witnesses, suspicious people etc. all these details make it easy for the police officials to gather data for the First Information Report (FIR) purpose.

After the interfaces, we move forward to the most important part- that is the face model

3.2 THE FACE MODEL

The face model is the inevitable part of this project, the model we have used of the face model is the haar-cascade model.

3.2.1 HAAR CASCADE MODEL

The haar cascade model is used extensively in facial recognition and object detection. It works by analysing an image at different scales and identifying features that are common in the object being detected. These features can be lines, angles or other visual patterns.

It is treated on a large set of data containing the images, there , it visualises different features such as eyes, nose, mouth .

It is a technology which is widely used in mobiles phones, security devices where object identification is necessary.

The model is trained in the python language and flask framework is used.

Flask is basically a framework which is used to develop web applications using python language. It includes various libraries which in combination work together to give desired features in the webpage.

3.3 THE DATABASE

The database is basically used to collect, store and retrieve data in a cinch and effective manner. In our database, there are basically 4 tables present

User register, hospital register, police register and medical records.

3.3.1 USER REGISTER

The user register table consists of all the data which user has entered at the time of registration. It includes name, phone number, email, password, emergency contact number and name and images that have to be uploaded by the user.

3.3.2 HOSPITAL REGISTER

The hospital register table consists of the data including hospital name, password and address. On the way of commercialising the project , the model works in such a way that the hospital has to purchase the subscription on yearly or quarterly basis, after that hospital is provided with a unique licence number for security purposes.

3.3.3 POLICE LOGIN

The police login table consists of data of basic information of the user like name, email , password, phone number, it also includes date, time and place of the incident.

3.3.4 MEDICAL RECORDS

The medical records table includes the medical information of the user including the disease name, symptoms, allergies, vaccinations done, doctor’s name, and the medical report link which should include previous prescriptions and consults from the doctor regarding that disease.

3.4 DEPLOYMENT

The deployment is the crucial part of the project building. It is the final step in software development life cycle where software is released for the end user and all the necessary configurations and integrations are put in place for the system to function properly. In our project, we have deployed it in google cloud platform(GCP) using the AMD instances.

3.4.1 GOOGLE CLOUD PLATFORM

The google cloud is the most widely used platform used for cloud computing services. It provides infrastructure, platform and software as a service for individuals, organisations and businesses for hosting, managing and deploying their applications, data and services on the cloud.

GCP offers AMD instances as a part of compute engine service. These instances are powered by advanced micro device processors providing an alternative of basic intel based instances that gcp offer.

It is cost-effective, high performance, reliable, flexible and easy to migrate.

4 CONCLUSION

Research in the areas of AI and face recognition is one of the most important topics. With this report we tried to use face recognition technology to solve a healthcare problem which is quite relevant and prevailing all over the world.

An automated user identification and medical record system based on facial recognition is developed which displays the patient’s details using a face recognition model. The system is cost effective and easy to use and access.

The major advantages of this project is-

1. The user did not need to carry physical reports to the hospital every time for the checkup purposes . all he/she has to do is to upload the latest report immediately after the checkup.
2. The hospital need not have to worry about how to gather the patient’s information at the time of some emergency situations.
3. The information provided by the user is a softcopy report which saves paper so it is an eco-friendly option.
4. The police officials need not to worry about how to gather the information from the victim as they can easily take it by face recognition so that they can make the FIR as soon as possible.

So face recognition will continue to expand in the future and it is of great value to mankind.