A MINOR PROJECT SYNOPSIS

ON

HOSPITAL MANAGEMENT USING FACE RECOGNITION AND IMAGE SEGMENTATION

SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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JANUARY, 2022

CERTIFICATE

This is to certify that the minor project topic "**Hospital Management System Using Face Recognition and Image Segmentation** " submitted by Manasi Thakur, Ajitesh Mishra and Yash Gupta is new, appropriate and not repeated/copied from the previous submitted project works.

Signature of Supervisor:

Name of the Supervisor: Dr. ABHISHEK KASHYAP

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Dated: 30-01-2023

DECLARATION

We hereby declare that the project **Hospital Management Using Face Recognition and Image Segmentation** of Minor Project-2, ODD 2022 is not repeated/copied from the previous submitted project works and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission.

Place: JAYPEE INSTITUTE OF INFORMATION AND TECHNOLOGY

Date:30-01-2023

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PROBLEM STATEMENT

For hassle free working of hospital, we'll be designing a machine learning model deployed to a website that will be using face recognition technology to identify the patients and once detected the software will show entire medical history of that patient with an option of updating the medical record and more.

Basic Problems:

1. Lack of Immediate Retrievals:

The information is very difficult to retrieve and to find particular information like: to find patients history, the user has to go through various registers. This results in incontinence and wastage of time and resources.

2. Lack of immediate information storage:

The information generated will be completely computerised so no immediate issues.

3. Lack of prompt updating

Various changes to information like patients details or immunization details of child are difficult to make as paper work is involved.

4.Error prone manual calculation

Manual calculation is error prone and take a lot of time this may result in incorrect information. For example, calculation of patient’s bill based on various treatments.

OBJECTIVES

The present invention relates to a system and a management method for managing a hospital by identifying a hospitalized patient without collecting and using personal information (such as a social security number) using face recognition technology.

Face recognition technology aims to identify a person based on their unique facial landmarks and skin texture. Then the algorithm checks it against the database on a number of matches

Basic objectives:

1. To computerize all details regarding patients details and hospital details.
2. The information of the patients should be kept up to date and their record should be kept in the system for historical purpose.
3. Easy to use and to extract information anytime.
4. user friendly and responsive.

Advantages:

- ✓ Security of data
- ✓ Ensure data accuracy
- ✓ Administrator controls using face recognition
- ✓ Minimize manual data entry
- ✓ Greater efficiency
- ✓ User friendly and interactive

INTRODUCTION

Machine learning is a field of computer science that gives computers the ability to learn without being explicitly programmed.

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use

it learn for themselves.**[5]**

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human intervention or assistance and adjust actions accordingly.

Arthur Samuel, an American pioneer in the field of computer gaming and artificial intelligence, coined the term "Machine Learning" in 1959 while at IBM.[4]

Machine learning tasks are typically classified into two broad categories, depending on whether there is a learning "signal" or "feedback" available to a learning system, namely supervised, unsupervised and reinforcement system.

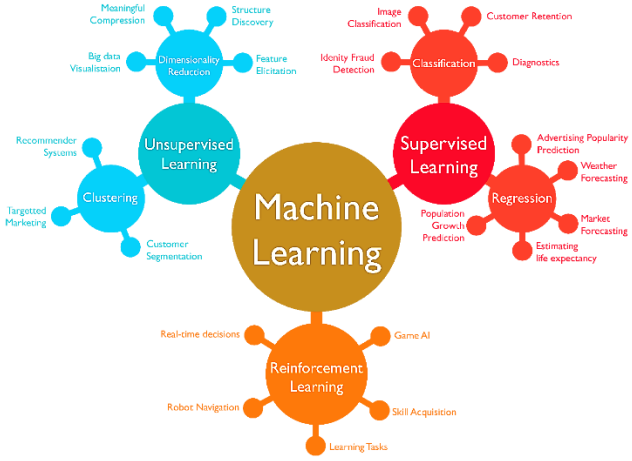

Fig 1. Machine learning model **[7]**

Image processing is a way to convert an image to a digital aspect and perform certain functions on it, in order to get an enhanced image or extract other useful information from it. It is a type of signal time when the input is an image, such as a video frame or image and output can be an image or features associated with that image. Usually, the AWS Image Processing system includes treating images as two equal symbols while using the set methods used.
It is one of the fastest growing technologies today, with its use in various business sectors. Graphic Design forms the core of the research space within the engineering and computer science industry as well**. [1]**

Image processing basically involves the following three steps.
Importing an image with an optical scanner or digital photography.
Analysis and image management including data compression and image enhancement and visual detection patterns such as satellite imagery.
It produces the final stage where the result can be changed to an image or report based on image analysis.
Image processing is a way by which an individual can enhance the quality of an image or gather alerting insights from an image and feed it to an algorithm to predict the later things

This is one of the many reasons why image processing is so important in any computer vision application.

-> Image improvement for human perception.

Goal – to improve subjective image quality.

-> Image improvement for machine perception

Goal – to simplify the subsequent image analysis and recognition.

–> Image transformation for technical purposes

e.g., change of image resolutions and aspect ratio for display on mobile devices.

-> Pure entertainment (visual effects))

.Goal- to get the artistic impression from the cool visual effect.

Importance of Facial Recognition Solution in Modern Times

In the current scenario, when identity theft is widespread, face recognition technology can play a significant role in preventing identity fraud.

According to a report of 2019, 3.2 million fraud cases were reported to the FTC (Federal Trade Commission), out of which, 20.33% of cases were identity-related.

Modern AI-enabled facial recognition technology offers a high level of accuracy and can match even the unique characteristics of a human face. Businesses and organizations of different types can leverage this technology to minimize the risk of identity theft to a great extent.

Below are some benefits of biometric face recognition solutions to businesses include:

- **Better Security**

A biometric facial recognition solution can help businesses identify burglars, trespassers, and other criminals. Businesses can use it as a security tool to minimize identity theft.

- **Quicker Processing**

It takes a facial recognition system second or less to recognize a face. In the era of cyber-attacks and hacking, the businesses need this type of rapid technology to keep their systems secure.

- **Seamless Integration**

Most facial recognition solutions are compatible with the existing software, which means companies won't need to spend additional money on integration.

What is Flask?

Flask is a small framework by most standards, small enough to be called a "microframework."

It is small enough that once you become familiar with it, you will likely be able to read and

understand all of its source code. But being small does not mean that it does less than other

frameworks. Flask was de- signed as an extensible framework from the ground up; it provides a solid core with the basic services, while extensions provide the rest. Because you can pick and choose the extension packages that you want, you end up with a lean stack that has no bloat and does exactly what you need. Flask has two main dependencies. The routing, debugging, and Web Server Gateway Interface (WSGI) subsystems come from Werkzeug, while template support is provided by Jinja2. Werkzeug and Jinja2 are authored by the core developer of Flask. There is no native support in Flask for accessing databases, validating web forms, authenticating users, or other high-level tasks. These and many other key services most web applications need are available through extensions that integrate with the core packages. As a developer, you have the power to cherry-pick the extensions that work best for your project or even write your own if you feel inclined to. This is in contrast with a larger framework, where most choices have been made for you and are hard or sometimes impossible to change.

METHODOLOGY

The Hospital Management Project will be built using the following :

Languages and Library :

PYTHON : The entire project uses Python and its various libraries for implementation of various functionalities. 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.

OpenCV : OpenCV is an open-source image recognition library. It is used for machine learning, computer vision and image processing. You can extract the most out of OpenCV when integrated with powerful libraries like NumPy and Pandas.

Flask: Flask is a small framework by most standards, small enough to be called a "microframework." It is small enough that once you become familiar with it, you will likely be able to read and understand all of its source code.

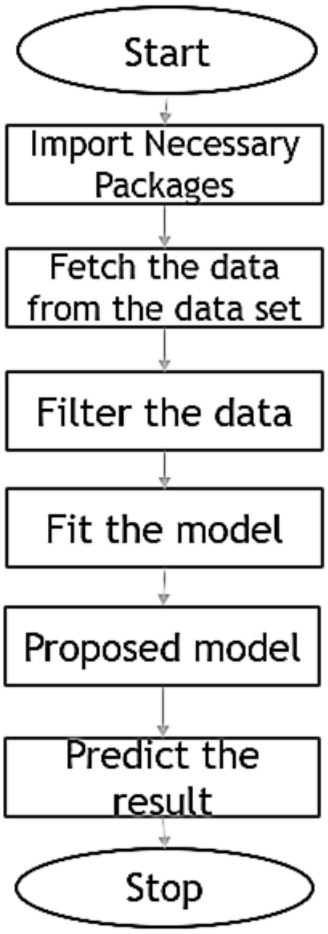

Fig 2. Flowchart[8] 1

IMAGE CAPTURING AND DETECTION:

USING HAAR CASCADES : Object Detection is done by working on various classifiers from the image detected .In this project we will be using Haar feature-based cascade classifiers which is an effective object detection method proposed by Paul Viola and Michael Jones . It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images.

IMAGE RECOGNITION

PCA Algorithm – The project will be implementing Face Recognition using a Face Recognition model using PCA (Principal Component Algorithm).

The main idea of using PCA for face recognition is to express the large 1-D vector of pixels constructed from 2-D facial image into the compact principal components of the feature space. This can be called eigenspace projection.

IMPORTANCE OF THE PROJECT IN CONTEXT OF CURRENT SCENERIO

Since the hospital is enlarged and specialized, it is required to develop a system for efficiently managing while keeping the security and safety of large-scale high-density personnel such as visiting patients and employees with the strengthening of the Personal Information Protection Act, both patients and hospitals are experiencing inconveniences and the risk of medical accidents is increasing due to the restriction on the use of the existing social security number, which was used for pre-scheduling visits and medical treatments and examinations. Since hospitals are additionally deploying personnel to existing patient management systems or developing their own individual authentication systems, there is an urgent need to establish an efficient and unified personal authentication system

Goals of our system:

1. The system should be easy to operate.
2. The working on the model will be well planned and organised.
3. The level of accuracy in the proposed system will be high due to proper storage of information.
4. Provide quick and efficient retrieval of information via our website.
5. The reliability of the model will be high.

TIME SCHEDULE OF ACTIVITIES

Work will be done by Mid Viva: Give details of the work which will be done by Mid Viva (preferably point wise)

Following Tasks are expected to be accomplished by Mid Viva

- Learning and getting familiarized with the technologies being used .
- Getting deep knowledge of Python and how to use deploy OpenCV library and further using it for image detection.
- Learn how HAAR Cascades functions to detect face from a captured image .
- By this time the project will be expected to successfully detect presence of any face from the captured image
- After the project successfully detects the face we shall be building a complete Face Recognition model using PCA algorithm.

Work will be done by End Viva: Give details of the work which will be done by End Viva (preferably point wise)

- Once the face recognition part of the project is completed, we shall be further hosting the project through a website.
- Making of a website using web technologies HTML,CSS,JavaScript to host this project and generating a database which will be linked to each face recognized for the smooth management of the Hospital .
- After this the project is expected to have achieved all of its objectives and be ready for managing the operations of any hospital.

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