Machine Learning based Patient Face Recognition and Medicine Dispensing System using Raspberry Pi

Mohammed Abdul Azher¹, K. Jeevana Jyothi ²

¹PG Scholar, Department of ECE, Siddartha Institute of Technology and Sciences, Hyderabad, Telangana, India
²Assistant Professor, Department of ECE, Siddartha Institute of Technology and Sciences, Hyderabad, Telangana, India

Abstract. Machine Learning in healthcare connecting physical devices by exchanging information, Observation and monitoring patient progress and needs. These devices senses collect data and sends symptoms of patient in local database. Proposed system provides patient pills dispenser using raspberry pi. If patient is authorized then dispense medicine if not buzzer alerts. Our project is to make Raspberry pi based Smart medicine dispensing box which uses Machine Learning based patient face recognition. The upcoming feature in our system is that it can monitor the patients ID, depends on ID it recognize patient disease as per previous data base of patient then automatically this dispensing system medicine accordingly. This is reducing the traffic in hospitals and saves patient and doctor time.

Keywords: Raspberry Pi, Patient Face recognition, machine learning, Medicine dispenser.

1. Introduction

Machine Learning is a major generation via which we are able to produce various useful internet packages. Basically, Machine Learning is a community wherein all objects are linked to internet via [1] or routers and change facts. MACHINE LEARNING also allows physical objects to be controlled remotely across network infrastructure. Machine Learning is an excellent and smart method which reduces human effort in addition to easy access to bodily gadgets. This technique additionally has self-sustaining manage feature by using which any tool can manage with none human interplay. These devices acquire useful information with the assist of various present technology and percentage that facts between other devices. Examples consist of Home Automation System which makes use of Wi-Fi [2] or Bluetooth for exchange statistics among diverse gadgets of home. When we examine nowadays state of technology, we get a clear indication of ways MACHINE LEARNING may be implemented on an international stage in near destiny. Use of the net is increasing day-via-day. Commute and connectivity became simpler in the present state of affairs. In close to future, the number of internet linked devices could increase exponentially. During the previous couple of years we've got [7] witnessed an increasing hobby in wearable/cell health tracking [4] gadgets, each in studies and industry. These gadgets are particularly essential to the arena's an increasing number of getting old populace, whose health must be monitored constantly in daily life. Chronic [8] diseases are leading causes of disability for almost three quarters of all deaths. With an increase inside the length of the aged populace as well as the emergence of persistent ailment, because of changes in lifestyle, there is a great want to reveal individuals' health-popularity during their daily recurring to prevent fatal disorders. Mobile fitness-care era affords promising destiny for boosting the great of lifestyles for patients with chronic [9] disorder sufferers and the elderly. Recently, the general public of human beings is soliciting for the delivery of high high-quality offerings from anywhere on time regardless of their geographical locations. Such necessities are not simplest constrained to multimedia content together with motion pictures on demand, but also have accelerated to fitness matters which include e-health and Tele-health systems. Internet of Things in healthcare having a community connecting bodily gadgets through exchanging information, Observation and tracking patient development. When related to internet these devices senses, accumulate records and sends signs of affected person. Alzheimer sickness has no cure and can't completely curable. By tracking affected person with MACHINE LEARNING we will reduce.
2. Literature Survey

Mainly used to take daily medicines [1] and reduce stress on caretakers or concern person or nearest person. This project helps patient health condition [2] with Zigbee communication within range of 10 to 100 meters. It contains medicine box connected with functional materials. The proposed devices in healthcare services to improve experience and efficiency. Alert sign is used to indicate patient with pill have taken or not through message by monitoring condition through Wi-Fi. An Mobile application in the health platform which involves sensors for reading speed of heart rate sends in digital format and medicine box[4] with a light sensor which indicate the different variations in the medicine slots like count the number of pills a patient is taking, if patient had taken wrong medicine and alarm and audio indicator signals. Without going daily to doctor, bringing hospital facilities in to our home. In this generation, people are busy with their work even they don’t think of their home persons like elder people suffering with memory loss and forgetting their daily life. So, here I uses Machine Learning platform connecting patient, doctor through mobile [3] application by web. To reduce this problem healthcare monitoring which improves the condition of patient by using right time to wear a medicine and sends or updating the information to caretaker. The proposed device [5] is a health care app in collaboration with an MACHINE LEARNING primarily based remedy field for human beings laid low with neurological defects inclusive of Alzheimer’s, Dementia, Parkinson’s in addition to different age related problems. It is an initiative made to target the maximum commonplace symptom this is forgetfulness. The remedy field is an integration of sensing hardware gadget and an android software that generates notifications based totally on diverse sufferers sports [6] and [7]. This app additionally includes affected person’s information and remedy schedule. In the modern healthcare system, this medicinal drug field can act as a great tool to help the patients prepare their medicine time table and cling to it as prescribed by using their doctor thus enhancing their exceptional of lives.

3. Proposed System

This project is designed using the Raspberry pi module in python for image processing; one of the most acclaimed OpenCV modules has been used. The main objective of this project was to atomize the process of patient face recognition and medicine management using the modern face recognition systems. The images of patients are first taken by admin for training the model, and then the model identifies the patients and dispenses medicine and store data in the database. The main objective of the project is achieved by using two different systems for both Admin and patient. The patient must first register his credentials and also create his Face ID, which will later be used to identify the patient and also help him/her logging into the application. The Admin has his own privileges on the database.

![Block diagram](image-url)
In this project first we training of patient image and store into the local data base of the hospital. When patient came to the medicine take then this proposed system recognize the patient face. If the patient is authorized system displays patient ID and current status of his disease according that medicine will be display. If un authorized patient detected it alerts the admin using buzzer. The hardware modules used in this system explained in below.

A. Regulated Power Supply

In this section of RPS we need 5v dc to work RPI processor. This RPS module is getting the required voltages from higher voltages with the help of filters and voltage regulators. 12v alternating current received by 230 v alternating current step-down by transformer, Bridge rectifier used to converts AC voltage to DC voltage. 1000 micro farad Capacitor for filtering the noise and voltage regulator 7805 used to provide 5v DC for operating the RPI processor.

![Fig.2. Regulated Power Supply](image)

B. Raspberry Pi

Raspberry pi processor used to integrate the all input and output peripherals, process the input data and control the output modules. This processor having 4 USB ports for integrating output modules. 1GB RAM which is high speed process the data. 3.5mm audio socket for output voice, CSI camera port for interface camera, micro SD card for operating system storage, 1.2GHz speed 64 bit Broadcom processor. This processor having 40 GPIO pins. All input sensors and output modules are interfaced to processor. Python programming used to implement RPI based applications.

![Fig.3. Raspberry Pi](image)

C. Camera

The Pi Camera module is a lightweight camera which exclusively supports Rasp-berry Pi Models. It communicates with Raspberry Pi boards using MIPI camera serial interface protocol. This USB camera directly interfaced to RPI foe easy accessing the images.
D. DC Motor

The DC Motor is a compact size; coreless DC motor used disbursing the medicine, once it is accessed by face recognition authorization. This dc motor is helped to move the trolley belt for medicine distribution process to authorized patients.

E. Buzzer

Peizo electric buzzer is used for intimating the changes in this system. Buzzer is the output module used to generate alarm. This module which converts the voltage to sound signal. We directly connected to RPI processor.

F. Software

In embedded system software module plays important role for any electronic automation. This proposed article we use Python IDE for programming development, debugging and compilation process. Python is effective scripting language for real time applications. Rasberian Operating System is used in Raspberry pi modules.
G. Results

![Fig.7. face recognition Hardware output](image)

We designed the hardware model of the face recognition based medical dispenser system which automatically recognize the patients face then allow for dispense the medicine for easy access of medicine to patients. This system is input section we used USB camera for detection the patients face automatically. And DC motor setup used to arrange the dispense system of the medicine. All the integrated to the Raspberry pi micro processor.

![Fig.8. Face training popup](image)

Before face recognition we need to store the store the training images. For that we double click on face training then face image snapshots will store in RPI local data base and compare with current images with stored mages. This is the one of the output of the screen. Once we training the images the starting popup box are used to capture the faces of the patients for registering in this advanced medicine dispenser system.
Fig.9. Authorized popup output

After compare with present image with stored image, Rpi will compare that and give the authorized and UN authorized popup data will display in monitor and patient data also displays in monitor also. This is the output screen and final conformation pop massage that weathers the patient is authorized or not. If not authorized it automatically buzzer will alerts as well as data will be displayed on the screen. If patient matches it show that patient is authorized and displays the disease and dispensing system will dispense the medicine.

4. Conclusion

The prepared system by using raspberry pi provides low power control, cost effective, efficient and easy to use. It is easy to handle compare with an existing system. This system satisfies the requirements of the different levels of the people. The additional feature of this system is making alarm sound when the unknown person enters. In this paper we also see how facial recognition can provide more security in hospitals. In this project first we training of patient image and store into the local data base of the hospital. When patient came to the medicine take then this proposed system recognize the patient face. If the patient is authorized system displays patient ID and current status of his disease according that medicine will be display. If un authorized patient detected it alerts the admin using buzzer. It saved time.

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