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Health Monitoring System Using Machine Learning Techniques Algorithm

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Abstract

A person's health is one of the most important factors in his or her ability to move forward in life. The goal of the health-care system is to improve the population in the most efficient way possible, given society's available resources and needs. Death rates are rising in the majority of countries due to a lack of timely medical instruments and treatments. By providing standard health care services, these health risks can be avoided. Our Health Monitoring System is a Web Application built with the Flask framework. We used Decision Tree Classification (Supervised Machine Learning technique) in this Health Monitoring System to predict results accurately. To train and evaluate our model, we used our own dataset. We would be able to predict the patient's health level and area of risk based on that evaluation.

Keywords— Health Monitoring System, Decision tree algorithm, Flask, Risk level. etc.

1. Introduction

Today's major issue is proper health monitoring. Patients suffer from serious health problems due to a lack of proper health monitoring systems. There are numerous devices available today that can monitor a patient's health via the internet. Health professionals are making full use of these devices to monitor the health of their patients. Machine learning is reshaping the healthcare industry, with hundreds of new healthcare technology companies springing up. In this paper, we will create a Health Monitoring System that records the patient's BMI, age, gender, body temperature, body pressure, pulse rate, whether or not they drink alcohol, and whether or not they smoke. With early risk predictions and appropriate individualised recommendations, this system can help people manage a healthy lifestyle. To develop a system which is intelligent, automated, personalized, contextual, and behavioral recommendations to achieve personal wellness goals, which also addresses health related problems as a study case, we propose to (a) identify health risk factors, (b) perform data collection from controlled trials, (c) data analyses, and (d) perform a predictive analysis with machine learning algorithms for future health risk predictions and behavioral interventions. This system uses Decision tree classification algorithm which helps in achieving good accuracy and prediction of the patient's health risk level.

Proper monitoring of health is the major problem today. Due to absence of proper health monitoring systems, patient suffer from serious health related issues. Nowadays, there are lots of devices to monitor the patient's health over internet. Experts on health are taking full advantage of these devices to keep an eye on their patient's health. With hundreds of new healthcare technology companies, machine learning is revolutionizing the healthcare industry. In this paper, we will make Health Monitoring System which records the patient's BMI, age, gender, body temperature, body pressure, pulse rate, alcohol consumer or not and smoker or not. This system can empower people to manage a healthy lifestyle with early risk predictions and appropriate individualized recommendations.

2. Literature Review

- ***Kartikee Uplenchwar et al*** developed IOT based health monitoring system using Raspberry Pi and Arduino. This system is mainly divided into three stages viz., the transmitting section, the processing unit and the receiver section. The transmitting end mainly consists of biological sensors which are used to pick up the bio potential signals from the patient's body [5]. A set of five parameters has been identified i.e. electro-cardiogram (ECG), Pulse rate, Weight, Temperature and Position detection by using wearable sensors. These sensors are connected to an Arduino and Raspberry Pi. Once the Raspberry Pi is connected to internet, it acts as a server and sends data on a specific URL. The vital parameters can be visualized and monitored on any mobile device including laptops or smart phones which are connected under same network. But this system has no live monitoring and data storing facility.

- ***Stephanie B. Baker et al*** presented a paper on Internet of Things for Smart Healthcare: Technologies, Challenges, and Opportunities.The special-purpose sensors such as blood-glucose, fall detection, and joint angle sensors could also be implemented for systems targeting a specific condition. The central node receives data from the sensor nodes attached to it. It processes the information that helps to implement some decision making, and then forwards the information to an

external location. Machine learning algorithms offers the potential to identify trends in medical data that were previously unknown, provide treatment plans and diagnostics, and give recommendations to health care professionals that are specification individual patients. As such, cloud storage architectures should be designed to support the implementation of machine learning on big data sets [6].

- ***Kirankumar et al*** implemented Low Cost Web Based Human Health Monitoring System Using Raspberry Pi 2. In this the patient's health parameters such as temperature, heart beat rate, blood pressure rate, alcohol sensor to determine whether the patient consumed alcohol or not, ECG sensor, sound sensor, EMG sensor to determine the patients stress level and the video camera to collect the patients live streaming video [7].All these parameters are collected with the help of the Raspberry Pi 2 microcontroller and displayed via Putty SSL Client in PC. Wi-Fi module which is connected to the raspberry pi connects the module to the internet through the available Wi-Fi in the area. This enables the monitoring of the patient or an infant all across the internet through the exclusively designed webpage for it. The limitation of the system is that Cloud cannot identify specific doctor for consultation from the sensor data.

- ***Rohan Bhardwaj et al*** provided a healthcare system in which a large amount of data has become available. This includes EMRs that contain data that can be either structured or unstructured. Structured health data is the information that is easy to categorize in a database; they can include a series of statistics and categories including but not limited to patient weights, temperatures, and even generic symptoms like headache, stomach pain etc. Machine learning, when applied effectively, can help physicians make near perfect diagnoses, choose the best medications for their patients, determine patients at high-risk for poor outcomes to medication, and improve patients' general health while reducing cost [8].

- ***Gurjar et al*** developed a system for heart attack detection by heartbeat sensing using Internet of Things: IOT. This system can detect pulse and temperature regularly with the help of sensor. Doctor can set the threshold for all parameters. If these parameters cross the maximum limit, System send notification on server through WiFi .The main advantages of the system are Portable system, save risk of heart attack as you can check it in home, affordable, temperature and heart beat monitoring by single device. The Patient monitored by single person seating in Server room. This system also helps for Hospital monitoring system. The limitation of the system include medical records cannot be stored in the web, live monitoring is not possible, noise issues in data received [9].

- ***Pradnyavant Kalamkar et al*** provided Human Health monitoring System using IOT and Raspberry pi3. Many sensors are connected to Raspberry pi 3 which records from sensors this entirely information relocate wirelessly to IOT website. And this will be habitually transferred to hospital's web server continuously .If any crisis in the functioning of serene subsequently an SMS will be sent to doctor of medicine. The main advantages of this system are, It gives immediate information to the belonging one , Speed up and extended the communication coverage to increase the freedom for enhance patient quality of life, Easy to monitor in the case of emergency, It reduced the death percentage in accident, Message top hospital means immediate aid can be provided. The disadvantage of the system is no provisions for data storage and no live video streaming facility [10].

3. Problem Definition

Health is one of the essential elements of human life. Health is a blessing that is considered the lack of illness and better physical and mental state conditions. In every society, health and healthcare systems are getting more attention and adopting technology. In recent times, COVID-19 has severely affected the economy of every country resulting in the adaptation of smart healthcare systems. In smart healthcare systems, the persons are monitored remotely to stop the spread of diseases and provide quick and cost-effective treatment. The integration of IoT-enabled healthcare systems and machine learning is considered an ideal solution in this context. IoT and machine learning-based solutions are efficient due to the advancements in sensing, processing, spectrum utilization, and machine intelligence.

These solutions are possible due to the advancement in microelectronics that has provided tiny and cheap medical sensing devices, which has revolutionized medical services. As a result, healthcare systems classify these solutions as symptomatic treatment and preventive treatment. Nowadays, people pay significant attention to preventing and early detection of diseases and the best medication for various chronic diseases. Therefore, the development of national healthcare monitoring systems has become an inevitable trend these days.

4. Objectives

- The major objective is to incorporate such a system that is able to monitoring health care system remotely for any critical patient.
- The system incorporates such a design, as a tool that helps out patient in time of need by detecting current health on time and henceforth informing the doctor of the same through messages etc.
- The main focus is to monitoring health of patient remotely by using advanced machine Learning Algorithms

- The key objective of each learning algorithms is to build models with good generalization capability.
- Using the machine learning algorithms, the dataset for health monitoring is trained and analysis is done based on the training.

5. Existing system

- In the traditional system, the patient needs a particular treatment to get him cured or his state will be more in danger and he can even die. Unfortunately, there are many false reports triggered by the current monitoring systems.
- In fact, the monitoring system can trigger an alarm that does not indicate a real critical state. But in some cases, they are due to a wrong setting of parameters, or a bad setting of monitoring devices.
- Besides, the monitoring systems do not consider the relation between the measured parameters. It separately measures each parameter which can lead to false reports. Hence, false reports present a real danger for the patient life.
- They do not report the real state of patients which can make the monitoring task more complicate. Furthermore, the working condition of the medical staff become more difficult and make patients under more pressure.

6. Proposed Method

Proper monitoring of health is the major problem today. Due to absence of proper health monitoring systems, patient suffer from serious health related issues. Nowadays, there are lots of devices to monitor the patient's health over internet. Experts on health are taking full advantage of these devices to keep an eye on their patient's health. With hundreds of new healthcare technology companies, machine learning is revolutionizing the healthcare industry. In this paper, we will make Health Monitoring System which records the patient's BMI, age, gender, body temperature, body pressure, pulse rate, alcohol consumer or not and smoker or not. This system can empower people to manage a healthy lifestyle with early risk predictions and appropriate individualized recommendations.

To develop a system which is intelligent, automated, personalized, contextual, and behavioral recommendations to achieve personal wellness goals, which also addresses health related problems as a study case, we propose to (a) identify health risk factors, (b) perform data collection from controlled trials, (c) data analyses, and (d) perform a predictive analysis with machine learning algorithms for future health risk predictions and behavioral interventions. This system uses Decision tree classification algorithm which helps in achieving good accuracy and prediction of the patient's health risk level.

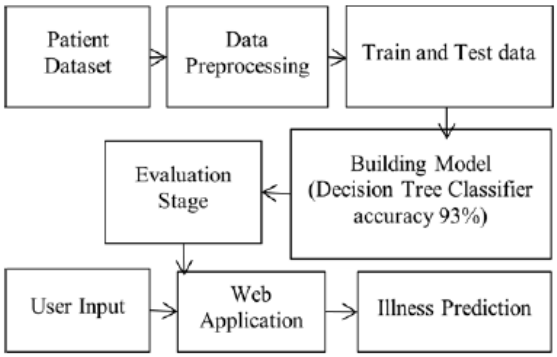

Fig. 1. Health Monitoring System

7. Project Life Cycle

The waterfall model is a classical model used in system development life cycle to create a system with a linear and sequential approach. It is termed as waterfall because the model develops systematically from one phase to another in downward fashion. The waterfall approach does not define the process to go back to the previous phase to handle changes in requirement. The waterfall approach is the earliest approach that was used for software development

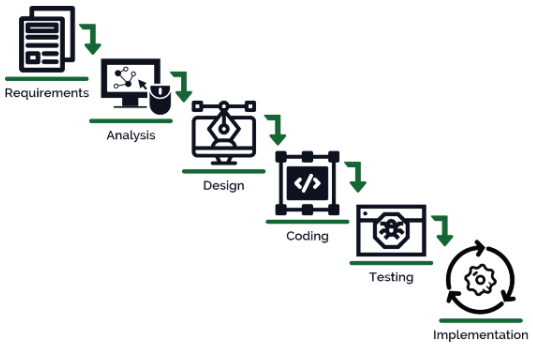

Fig.2..Project Life Cycle

8. Application

Early detection of cardiovascular diseases and chronic diseases, as well as Clinical Decision Support System (CDSS) that can assist physicians, nurses, patients, and other caregivers in making better decisions, are applications of health monitoring using machine learning. Ordinary people can also use this system to determine whether they have a serious health problem and seek treatment by contacting nearby hospitals. Machine learning is reshaping the healthcare industry, with hundreds of new healthcare technology companies .

9. Conclusions

In this project, this presents a method to prevent the disease with early intervention rather than go for treatment after diagnosis. Using this proposed system, it is possible to get more accurate results for disease prediction and enables healthcare professionals in better decision-making, identifying trends and innovations, and improving the efficiency of research and clinical trials. It improves the delivery system of healthcare services, cutting down costs, and handling patient data very precisely.

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