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Cloud Based Stroke Prediction System

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Abstract- A preliminary concept for a cloud-based stroke prediction system had been put out in this project to use machine learning methods to identify oncoming strokes. An effective machine learning strategy that was produced through a distinctive analysis among multiple machine learning algorithms should be applied for the precise detection of strokes. The performance of the suggested algorithm's stroke detection was examined using 10-fold cross-validation, which was validated using two popular open-access datasets. The ML algorithm identified a level of accuracy of 97.53%, as well as sensitivity and specificity of 97.50% and 94.94%, respectively. Additionally, a real-time patient monitoring system utilizing Arduino was created and shown, capable of sensing several real-time data such as body temperature, blood pressure, blood flow, heartbeat, and oxygen level. This allows the caregiver or doctor to monitor the stroke patient around- the-clock. Decisions may be made quickly and simply with the aid of various decision-making algorithms, and anyone can access the database in accordance with their needs. The primary benefit of our technology is that it automatically creates the necessary prescription based on a person's vital signs.

I. INTRODUCTION

The most frequent cause of death worldwide is ischemic stroke. The severity of alterations in the vascular territory of the blocked blood artery in stroke may be precisely determined utilizing diffused magnetic resonance imaging (MRI) data that analyzes the symptoms of stroke in the acute phase. MRI scanners are very helpful in displaying early stroke infarcts since they are sensitive to the early detection of small infarcts in the brain stem and deep structures inside the cerebral hemispheres. The most often utilized MRI technique is called diffusion weighted imaging (DWI), This may detect even minute changes in water diffusion in the event of acute cerebral ischemia. The conventional approach for identifying lesions involves the manual delineation of aberrant brain tissue. however, this method is mostly labor-intensive and operator dependent. In the procedures of illness diagnosis and therapy, an accurate delineation and time of process in lesions identification are crucial. As a result, completely automated methods for identifying diseased brain regions and studying huge MRI datasets have been suggested to remove inter subject variability. Edge detection, thresholding, clustering, wavelet, watershed transformation (WT), and graph cut theory-based manual, semi-automatic, and automated techniques have been developed during the past two decades to identify stroke lesions. Pre-processing of Image, segmentation of Image, feature extraction in Image, and categorization of Stroke Image are some of these techniques.

II. EASE OF USE

A. PROBLEM DEFINITION

A frequent medical emergency is a stroke. In many lower- and middle-income nations, the prevalence is growing in conjunction with less healthy lifestyles and increases sharply with age. Acute stroke patients typically have a one month mortality rate of around one-fifth, and at least half of those who survive have some form of physical handicap.

B. AIM OF THE PROJECT

Stroke is a common condition that can have long-term effects on the sufferer and their family. It is one of the main causes of adult disability worldwide, particularly prevalent in developing nations. Understanding what a stroke is becomes a crucial first step. Having a stroke essentially means experiencing a "brain attack," and it can affect anyone at any moment.

C. HOW STROKE PREDICTION SYSTEM WORKS

In our investigation of patient monitoring systems through a case study, we observed a plethora of products available in the market. However, it became apparent that only a limited subset integrates active network technology and mobile interfaces for their alert mechanisms. A standout example is a Patient

Monitoring System (PMS) utilizing a handheld device that closely resembles a palm-top. This system continuously monitors health metrics and employs active network technology for real-time alerts to service providers in the event of ambulatory issues.

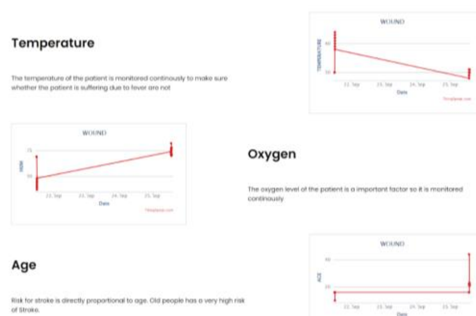
Functioning as a point-to-point network, this approach raises efficiency in monitoring. A noteworthy consideration is the cost-effectiveness of implementing such systems in hospitals with multiple patients. Managing individual systems for each patient can be financially burdensome. Instead, a proposed system has been suggested that can assess various physical characteristics across different patients. Crucially, it leverages internet connectivity to relay patient status to relevant authorities. The primary emphasis lies on the software components, focusing on developing a robust system capable of accessing a comprehensive database housing diverse patient health characteristics. This strategic integration of technology not only enhances monitoring capabilities but also addresses the economic feasibility of widespread implementation in healthcare settings.

III. WORK AND IMPLEMENTATION

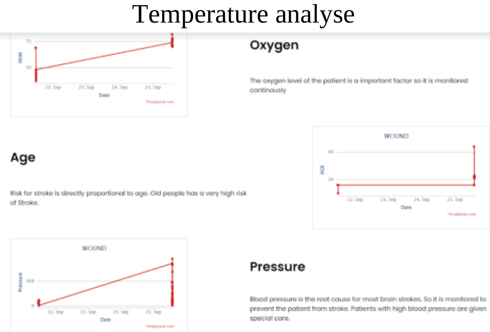
The primary goal of the healthcare sector is to offer superior medical treatment to everyone, anywhere in the world, always. This should be carried out more affordably and with consideration for the patients. Therefore, it is necessary to upgrade the patient monitoring equipment to increase the efficiency of patient care. Because technology has made life simpler, it has the potential to lessen patient strain. One of the crucial technologies in modern healthcare IoT systems is Body Sensor Network (BSN) technology. It primarily consists of a group of wireless sensor nodes that are light and low-power and are used to track the activities of the human body and the surroundings. BSN nodes require robust security measures to prevent unauthorized access to the system, given that they are utilized to collect sensitive (life-critical) information and may operate in hostile environments.

Wearable technology is poised to revolutionize continuous health monitoring, with data on heartbeat, blood pressure, and temperature seamlessly transmitted to the cloud for analysis through machine learning. The primary role of machine learning is to categorize sensor data from hardware as normal or anomalous. The potential to save lives is significant when medical datasets, including various features, are compared with real-time hardware data using machine learning algorithms. This method, leveraging diverse independent factors and regular pulse monitoring due to its inherent fluctuations, holds promise for stroke prediction. Multiple regression is employed for forecasting stroke attacks, and the integration of IoT devices and cloud platforms enables real-time connection with individuals, providing timely reminders related to their stroke-related health status. This integrated approach harnesses the power of wearable technology, machine learning, and IoT to enhance health monitoring and proactively address potential health risks.

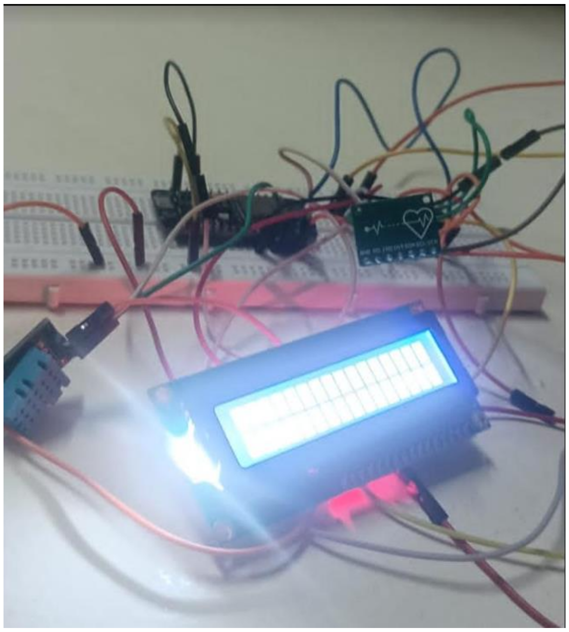
IV. RESULT AND DISCUSSION



Temperature analyse



Analyses of Age, Oxygen, Pressure



Hardware setup

APPLICATIONS:

- The enhanced monitoring system significantly improved key clinical aspects, including a 28% reduction in the average time for vital sign data collection, increased patient monitoring time, and enhanced availability and accuracy of patient data.
- Clinical alarms exhibited inconsistent effects, with no discernible increase in clinical alerts per monitored hour.
- This study underscores the positive impact of advanced monitoring systems on clinical efficiency and patient care without a disproportionate rise in clinical alerts.

ADVANTAGES/DISADVANTAGES:

ADVANTAGES:

- The s security and capability to use the internet to relay sensor data and conduct machine learning are its key advantages.
- Doctors may use the database server to retrieve the s medical history and compare it to the;s current condition, while the machine learning process continuously monitors the sensor data.
- Permits plug-and-play of many off-the-shelf hardware devices from different vendors to avoid proprietary standards.

DISADVANTAGES:

- Prescription was not sent to the patient by doctor. Wired network-restriction between the body movement.
- Takes time to analyze the manual reading.
- Interference of the multi device that shares the channel.

CONCLUSION

As a result, all the patient parameters are supplied, machine learning is applied, and the status and prescription are then visible on the mobile application. Patient monitoring systems based on machine learning are particularly helpful since they allow patients to enjoy their lives while providing ongoing medical care.

Only instances that truly deserve it should be pressed to attend a clinic or doctor. Patients are generally less skilled and confident in utilizing this system, even though many are familiar with in-hospital medical treatment. So, it's crucial to encourage patients to participate actively and voluntarily. Patients with chronic diseases should communicate with one another in addition to with medical professionals.

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