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IOT Powered Wearable to Assist Individuals Facing Depressive Disorders using Machine Learning

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Abstract: Depression is a common and crucial public health concern in India expanding at a very fast pace. It is affecting people of all age groups, male or female, urban or rural, educated or uneducated and even employed or unemployed. In India, a large number of people are com-mitting suicides due to depression each year. With the advancement of technology, sensors become an extensive part of everyday life. Various researchers are trying to detect and treat depression with the use of sensors, IOT and other technology. The main aim to Integrate a wearable sensor with mobile technology is to remotely monitor the individual. In this proposed solution a mobile application is developed which is automated to display the detail of the health band information of the individual.

Keywords: Internet of Things, Depressive Disorders, Depression detection, Real life, Wrist device, wearable sensors, Machine learning.

I. INTRODUCTION

Daily life depression is an important problem of our modern society. It is a growing issue and it has become an unavoidable part of our daily lives. Depression is the unwavering feeling of sadness, exhaustion and anxiety along with various physical complaints. Depression is a non-communicable disease and can be cured with the correct dosage of medicines and sometimes lifestyle changes.
Internet of Medical Things (IoMT) is becoming a common paradigm with so many advancements in the medical industry. This has increased the life expectancy of people especially in the developed country . The Internet of Health Things or Internet of Medical Things or Smart Healthcare as it being called is combining the reliability and safety of conventional medical devices used for the treatment of chronic illnesses with the dynamicity and generality of Internet of Things. IoMT is providing solutions for addressing the requirements of both the ageing population as well as patients with chronic diseases and providing patients mobility in contrast to the telemedicine systems .The paper is structured into four sections. Section I contains entire introduction of what is depression? And how the depression is detected. Section II provides the technological advancements executed by various researchers in detecting depression or treating it. The major works have been depicted in this section. Section III provides the overall architecture of the proposed system along with the detailed description of the sensors used in the proposed system. The conclusion of the survey has been summarized in Section IV.

II. PROBLEM STATEMENT

To develop a system " IOT Powered Wearable Health Band " which is automatically displays the detail of the health information of the individual. The mobile app sends the notification to the caretaker of the individual on emergency situations. signification changes in patient status.

III. LITERATURE SURVEY

The survey is carried out on different techniques used by the researcher are as follows:
In the period 2005 and 2016, various studies were conducted to implement depression detection using a combination of signal processing and machine learning (ML). Most of them used data from a sensors like, ECG sensor, heart rate(HR) sensor, acceleration (ACC) sensor, electro dermal activity (EDA) sensor, blood volume pulse (BVP)sensor and electromyogram (EMG) sensor. Some are more constrained, either physically (e.g., brain activity analysis) or with respect to privacy.

A. Wrist-worn EDA Sensor

Adams et al. collected data from seven participants as they carried out their everyday activities over a ten-day period. They used smartphone audio-sensing and a wrist-worn EDA sensor. They analyse correlations between stress self-reports and smart-phone audio-sensing. They did not use machine learning to detect stress. They concluded that context information is needed to distinguish between pleasant and negative experiences. Our proposed machine-learning method exploits context information to detect stress.

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B. Wearable IOT (WIOT)

Wearable IOT (WIOT) can be described as the infrastructure that connects various sensors for tracking human factors such as behaviour, health, wellbeing and other data. With the help of various tiny wearable body area sensors (WBAS) and internet connected gateways, medical information can reach to physicians where data is collected, managed and monitored. The authors in have extended the concept of WIOT and identified its architectural components along with the support of cloud and big data. WIOT has the power to transform the healthcare by early detection of diseases, lower cost of treatment and efficient means to monitor the treatment and the patient remotely. In authors have proposed a layout to monitor a depressed patient's health using three tri-axial accelerometers, a barometric pressure sensor for sensing in the foot and a smart phone in a remote health care system. The nodes are mobile and communication is reliable. The location of the patient will be extracted in the form of coordinates from the android application (to be developed) installed on the patients phone. An alarm is triggered as soon as the patient is found to be in the danger zone for more than a stipulated threshold time.

C. Apriori Algorithm and Association Rule Mining

Predicting depression accurately is a major concern till date and hence in the authors propose a model for depression prediction considering Apriori algorithm and association rule mining and 500 individuals with diverse factors of depression.

D. EEG Signal Processing

Authors in used EEG signal processing for depression level prediction. They used the links between sleep and depression to process a model. Insomnia is extremely common in de-pressed people. Three quarters of depressed patients have sleep disorders, including insom-nia and hypersomnia. The symptoms of sleep disorders and alcoholism cause a major impact on quality of life, thus increasing the risk of suicides. The results they acquired through AN-FIS were slightly better than the results of classifier.

IV. METHODOLOGY

This platform is rapidly growing with user's need which overcomes the issues of Identification of people which lead to the poor efficiency. Software project estimation is form of problem solving. The complex software is hard to estimate hence it is divided into smaller pieces. The estimation of project will be correct only when the estimation of size of the project is correct. In the context of project planning size refers to quant able outcome of project. Here, the direct approach is selected and hence, the size is estimated in Line of Codes. The feasibility study comprise of an initial investigation into personnel will be re-quired. Feasibility study will enable us to make informed and straightforward choice at crucial points while developing phase. All projects are feasible given unlimited times and resources. But, the development of computer based system is more likely to be plagued to scarcity of resources .It is both essential and prudent to evaluate the feasibility of project at earliest possible time.

We are developing an efficient method to predict Depressive disorders in the individual using IOT.

V. ARCHITECTURE

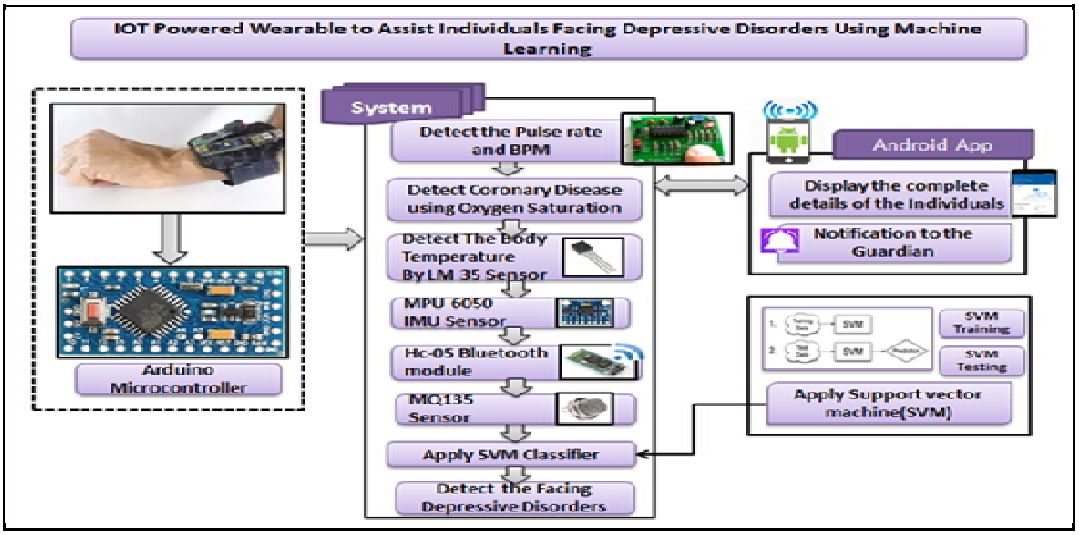


Fig.1. Architecture Diagram

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VI. CONCLUSION

In this paper we have analyze the different techniques used by the different researchers till now. Based on this analysis, some technologies and sensors can be combined together to detect depression. Sensors with android applications are more of the new IOT can be utilized for creating a model that could help the people to detect depression and can hence visit the doctors and psychiatrists respectively. Initially user will wear the health band and connect it to the android phone. The input in the form of signal data is obtained from the wearable (Health-Band) device. This inputted data is then sent to the smart phone using hc-05 Bluetooth module. The wearable device contains some sensors, like Temperature Sensor, BPM sensor, MPU 6050 Sensor and etc. The user can view the sensor data received from the wearable device through the system.

VII. ACKNOWLEDGMENT

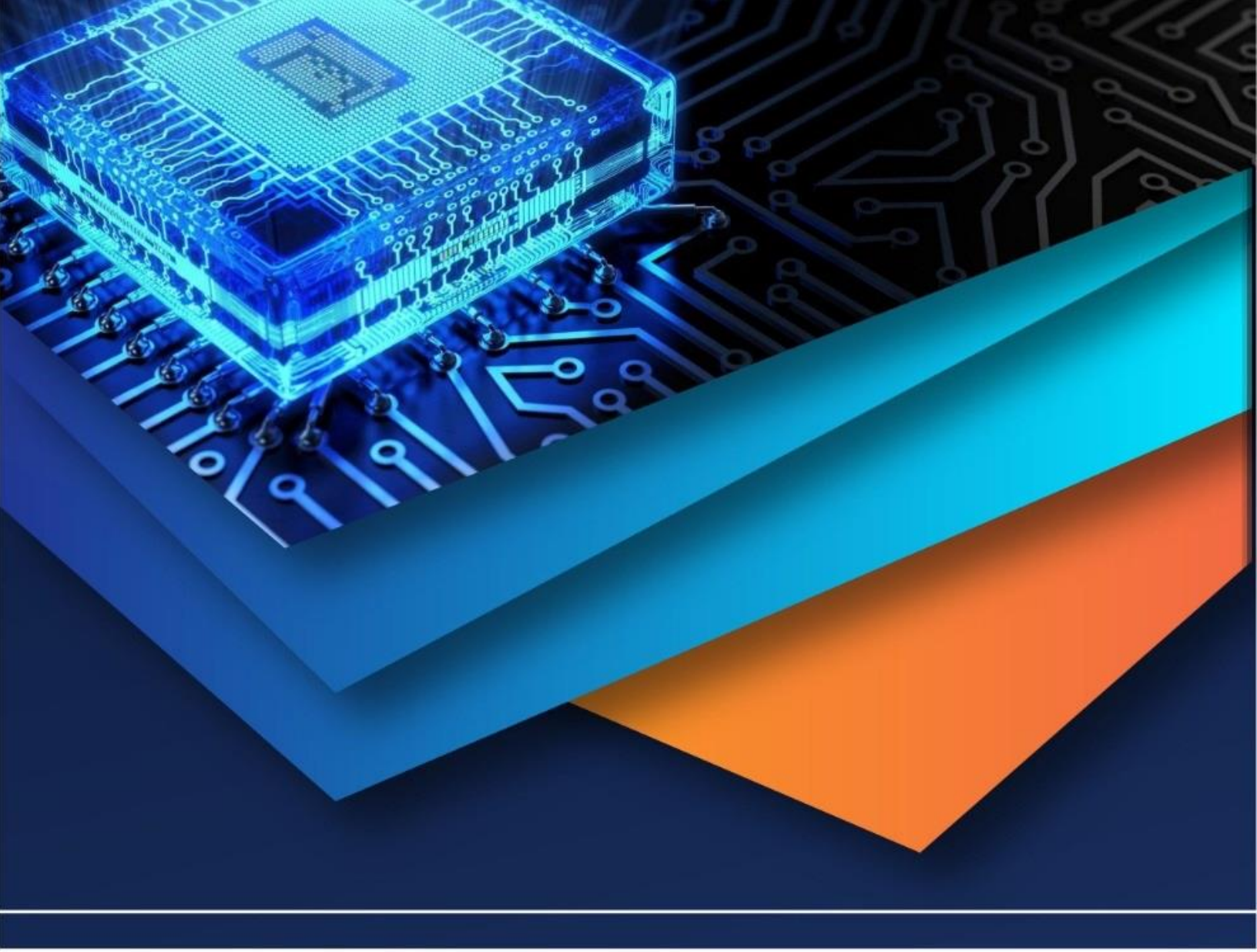
I have great pleasure in presenting report on IOT Powered Wearable to Assist Individuals Facing Depressive Disorders Using Machine Learning. Completing a task is never a one-man effort. It is often a result of invaluable contribution of a number of individuals in direct or indirect manner. I would like to express deepest appreciation towards Dr. D. S.Bormane, Principal A.I.S.S.M.S.C.O.E, Pune and Dr. D. P. Gaikwad, HOD Computer Department, whose invaluable guidance supported me in completing this report.

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