PREDICTIS

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***Abstract*—**
***Index Terms*—**

I. Introduction

Heart attack is called as myocardial infarction in medical terminology. Heart is supplied by right and left coronary arteries. Whenever these arteries are blocked, blood supply to heart stops and wall of heart damages, resulting in heart attack.

Coronary heart disease is epidemic in Bangladesh and one of the major causes of disease burden and deaths. Data from registrar general of Bangladesh shows that heart attacks are major cause of death in Bangladesh. World health organization in the year 2019 reported that 29.2% of total global deaths are due to Cardio Vascular Disease (CVD). Cardio vascular disease is expected to be leading cause of deaths in developing countries due to change in life style, work culture and food habits. Hence more careful and efficient methods of cardiac diseases and periodic examination are of high importance. According to the latest WHO data published in 2019 Coronary Heart Disease Deaths in Bangladesh reached 118,287 or 15.23% of total deaths. The age adjusted Death Rate is 109.32 per 100,000 of population ranks Bangladesh 115 in the world. In our days the health industry has collected vast amounts of patient data. Which, unfortunately, is not "produced" in order to give some hidden information. Thus to make effective decisions, which are connected with the base of the patient's data and are subject to data mining and data analytics.

Predictis is an Application which enables its users to foresee their risks of having Cardio-vascular diseases. In our country people usually don't get a medical check-up until they face some major health-issues. Most of the people don't have regular heart-checkups, because the manual ways to get these checkups are time-consuming and inconvenient. The aftermath of not knowing their present heart-condition causes serious health injuries and in worst case accidental deaths. Using this application user can get acquainted with their heart-condition on time and will be able to improve their heart-conditions both conveniently and efficiently.

This Application is mainly developed for aged and obese people. Because people aged over 40 and obese people have higher risk of suffering from clinical heart diseases. Doctors and family members can be helpful to get some important insights about patient's heart-condition through this Application. Health-conscious people who want to check their heart condition can also use this.

This product is for people who have high risk of ischemic heart disease and health-conscious people who want to have a better cardiac health. It will predict the present heart-condition of user rather than detecting. This product will target ischemic heart disease only, other cardiac diseases will not be included. It will have an application version for android and will not have web version for browsers. It will not be suitable for people who has already faced Myocardial infarction (MI), also known as heart attack.

II. Literature Review

There is ample related work in the fields directly related to this paper. There is a heart attack self-test application for a mobile phone that allows potential victims, without the intervention of a medical specialist, to quickly assess whether they are having a heart attack. Heart attacks can occur anytime and anywhere. Using pervasive technology such as a mobile phone and a small wearable ECG sensor it is possible to collect the user's symptoms and to detect the onset of a heart attack by analysing the ECG recordings. If the application assesses that the user is at risk, it will urge the user to call the emergency services immediately. If the user has a cardiac arrest the application will automatically determine the current location of the user and alert the ambulance services and others to the person's location [1].

These also Focuses on Analyzing Medical Data using Association Rule mining for Heart Attack Prediction. Association rule mining is one of the fundamental research topics in data mining and knowledge discovery that finds interesting association or correlation relation ship among a large set of data items and predicts the associative and correlative behaviors for new data. The Association rule mining algorithms must perform efficiently. In this paper we suggest a new approach for association rule mining based on sequence number and clustering the transactional data base for heart attack prediction. Experimental results shows effectiveness of our proposed algorithm [2].

Use of information and communication technology such as smart phone, smart watch, smart glass and portable health monitoring devices for healthcare services has made Mobile Health (mHealth) an emerging research area. Coronary Heart Disease (CHD) is considered as a leading cause of death world wide and an increasing number of people die prematurely due to CHD. Under such circumstances, there is a growing demand for a reliable cardiac monitoring system to catch the intermittent abnormalities and detect critical cardiac behaviors which lead to sudden death. Use of mobile devices to collect

Electrocardiography (ECG), Seismocardiography (SCG) data and efficient analysis of those data can monitor a patient's cardiac activities for early warning. This paper presents a novel cardiac data acquisition method and combined analysis of Electrocardiography (ECG) and multi channel Seismocardiography (SCG) data. An early warning system is implemented to monitor the cardiac activities of a person and accuracy assessment of the early warning system is conducted for the ECG data only. The assessment shows 88% accuracy and effectiveness of our proposed analysis, which implies the viability and applicability of the proposed early warning system [3].

Machine learning algorithms that are both interpretable and accurate are essential in applications such as medicine where errors can have a dire consequence. Unfortunately, there is currently a tradeoff between accuracy and interpretability among state-of-the-art methods. Decision trees are interpretable and are therefore used extensively throughout medicine for stratifying patients. Current decision tree algorithms, however, are consistently outperformed in accuracy by other, less-interpretable machine learning models, such as ensemble methods [4].

III. Concept Design and Architecture

This proposed system is android application based health prediction system. It takes profile data from the user and real time data from ECG, pulse and blood pressure sensors.

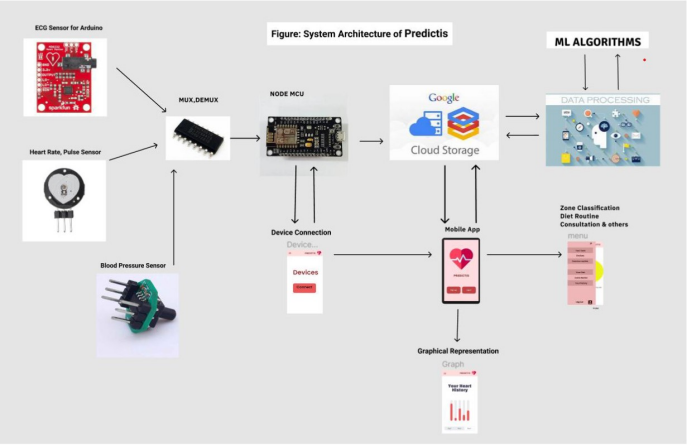

Fig. 1. System Architecture of Predictis

The overview of the proposed system's architecture is presented in 1that shows the link between the physical level and logical level. The required equipment is also given in architecture. This system has a pulse rate sensor, ECG sensor, and a blood pressure monitor sensor. The hardware constructions are by processing data byESP8266. After processing in the microcontroller all data gets stored in Firebase. This data can be retrieved from the user dashboards. Admin can also enter data in the Firebase real-time database system.

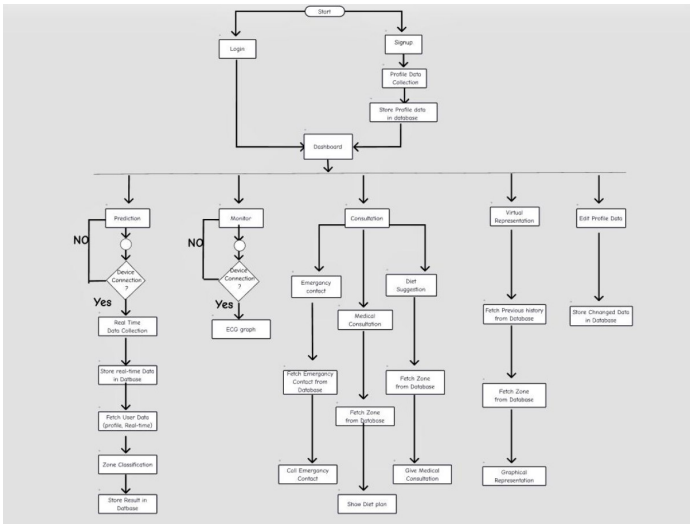

Fig. 2. System Flow Diagram of Predictis

The flow diagram in 2shows the process of the whole system. User can be new or existing, if user is new user, they have to sign up and give profile data. This data will be stored in the database. Then they can see the dashboard. If the user is an existing user, they can log in by providing email and password, then whey can see the dashboard. Dashboard has following options – prediction, monitor, consultation, visual representation, edit profile data. If the user chooses prediction option then they will be asked to connect the devices. If the devices are detected by the system, the real-time data starts to collect and it stores in the real- time database. After the system will fetch the real time user profile data and real time data which will be used to predict the zone classification (green for healthy heart, yellow for moderate risk, red for high risk of heart disease) The zone classification result will be stored in the database. If the user choses monitor option, it will also require the user to connect device and after detecting device, ECG graph will be shown to the user via application. The user will be also given medical consul and diet suggestion upon their risk zone. In addition, the user will able to give emergency contact which will enable the system to ask the user if he wants to contact anyone if any abnormality is detected during monitoring. By choosing the visual representation option, the user will be able see his health history through graphical representation. User will be also able to edit profile data if any change occurs.

References

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