



DOMS: Disease Outbreak Monitoring System

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Abstract: Disease Outbreak Monitoring System (DOMS) is a real-time epidemic outbreak monitoring system. It can track various disease outbreaks by collecting health status of people. An android application is used for collecting the data. A location-based representation is also provided about the outbreaks. According to the data collected from all people from different locations, it can create a relation with the dataset in the server. The dataset contains previously observed values. If a location is affected by an outbreak of a disease, the proposed application will enquire more about the detailed health status of the people in that location. If the symptoms do not match with any disease in the database, then it will be a new or a not popular disease which need to be seriously considered. If the disease is already covered in the dataset then required actions are taken according to the severity of the disease. If a person is planning a trip to a particular location, the application will provide advise according to his/her health status and the condition of the location.

I. INTRODUCTION

Disease outbreak is a situation where a disease is said to spread over a particular location. The spreading of the disease is by the physical contact with the affected people or through air and water. Most of the time a disease outbreak is confirmed after its noticeable impact on the society. So, there is a need to take care of the situation.

The disease outbreak monitoring system can alert the society as well as the health authorities about a chance for a disease outbreak. The medical condition and the location of the people can be collected using an android application. The collected data is stored in the server. During the primary stages of the implementation of our application we can monitor the peoples on the basis of naturally occurred diseases. If a special case occurs then we can sort out new set of symptoms for a new disease. And also, we can monitor other peoples with the same set of symptoms. Hence, we can calculate the spreading of the disease and vulnerability of a locality. The main aim of the system is to collect data from the people and create an efficient dataset which is continuously updating by identifying new diseases. So, we can provide a very futuristic disease monitoring method and this can be applied worldwide for a wide variety of symptoms and different type of disease.

II. LITERATURE SURVEY

Farag Azzedin, Jaweed Yazdani and Mustafa Ghaleb King Fahd describe the survey of major Disease Outbreak Notification System (DONS). Which is based on specific criteria, that the design process for the planned deployment for Saudi Arabia. The DONS which works for potential outbreaks. The taxonomy outlines completed and partial DONS implementations across North America, Europe and Australia and which makes a significant contribution for identifying the technical parameters for the proposed system and its major features.

P. Sิริyasatien, S. Chadsuthi and K. Jampachaisri, K. Kesorn describes dengue infection is a mosquito-borne disease which spreads through the dengue viruses by several species of mosquitos such as Aedes, aegypti, etc... This disease was endemic in tropical and subtropical regions and mainly in urban and suburban areas. This disease which included in the top 10 diseases causing the deadliest in the world. According to the World Health Organization (WHO), dengue infection has increased 3013-fold globally over the past five decades. Around 50 to 100 million new infections occur annually in more than 80 countries. There are many running types of research for controlling this disease, the research objective is to develop a model that enhance, forecasting of outbreaks. Which gives opportunities to develop plans for handling the outbreak. The development of methods of predictive modelling by using statistical and mathematical analysis and machine learning.

Richard John M Buendia in his paper on 'Online System To Public Health Workers' described that disease outbreak is an immensely beneficial yet a very delicate process. The main issue discussed in the paper was gathering information, so they proposed an online system specially developed to aid public health workers as they resolve this problem. The proposed system can perform the required feature with the help of a software which performs computations on Time Series Analysis using Autoregressive Moving Averages (ARMA) model to generate values based on the present condition of the outbreak.

Selvyna Theresia School of Information Systems describes Infectious diseases are among the most serious health issues in the world. And this disease affected by many factors like multiple human, biological, climate and ecological determinacy. The world has witnessed the global outbreaks of infectious diseases, because of this situation an early warning disease detection system is needed. That would be able to detect, identify and contain pathogens with epidemic potentials. This article describes how the Early Warning System (EWS) could be proactive. And that would be able to predict infectious disease outbreaks and detects the increase of any livestock disease.

Wu-Jeng Li, Chiaming Yen and You-Sheng Lin, Shu-Chu Tung has given a detailed account in words in their papers, as the four main parts of Internet Of Things (IoT) i.e., back-end Google Firebase real-time Database, Front-end single page application web monitoring program, an intelligent server that supports MQTT connection and condition control and controller software-hardware. For remote controlling systems and also for remote monitoring of the system, the IoT receives data so that users can perform these actions. For basic or high-end

purposes and also for business purposes users can build an application to serve the individuals or patrons. Angular front-end technology-based web page management is linked to the Firebase real-time database. Triggering of Angular's two-way data binding to get the Three-way data binding effect to set up the server-less architecture quickly can occur, due to the occurrence of data modification of Firebase. The information sets are read and written by the front-end devices like web apps, mobile apps and controllers in the Firebase database directly. Relatively weak embedded controllers such as the Arduino controller connections are supported by the intelligence server which is an MQTT server. The negotiator which acts between the Firebase real-time database and weak controllers are the intelligent server, which does the remote instructions and sending and receiving of data. The condition control is performed by the intelligent servers which are also the intelligent computing centre of Just IoT.

Ashid Gloria pepita & Tutun Juhana already evaluated the use of mobile technology in helping the elderly population worldwide. They proposed an 'Ambient Assisted Living System' that provides methods for automatic recording and retrieval of elderly's health information to google firebase, consisting users heart rate, fall state and heart abnormality data. The proposed system gave us an idea about the google firebase capability of storing and retrieving data at enormous speed. Their paper also discussed alerting the users through an SMS notification whenever their health condition goes wrong, this helped us to do a push notification alert to the user through our app

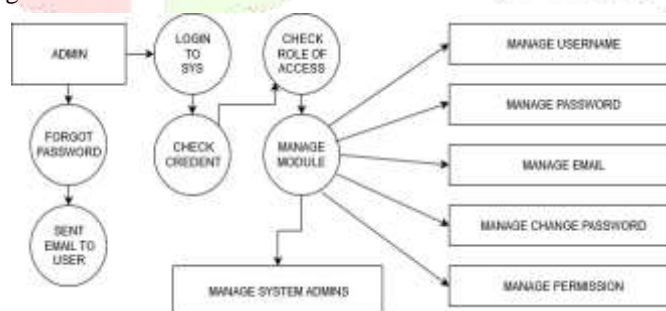
III. PROPOSED METHODOLOGY

Firstly, mobile number and email id are used for signing into the application. We use the mobile number and email for identifying a user, it is to manage unknown users to provide fake data. Now each user is identified by the server by signing up. Then the user is redirected to an initial data collection form. In that form, we collect the basic details like age, gender, locality, etc... We can provide some add-on functions like fitness tips, diet schedule, regular check-up schedule, etc... these enables the users to spend time providing their details. The collected data is given to the firebase server for storing and processing the data. Then the user is identified and details are collected from the user according to disease-specific symptoms. During the processing of data, if the system needs any more information with the user it directly asked the user via notification in android app. Also, if a person is suffering from an unknown set of symptoms then the self-checking steps are sent to other users in the same locality. As a user enters highly fatal disease symptoms then DOMS will alert nearby hospitals and also nearby other DOMS users who have the same symptoms reported the fatal disease symptoms this will help in the faster survey and data collection.

IV. IMPLEMENTATION

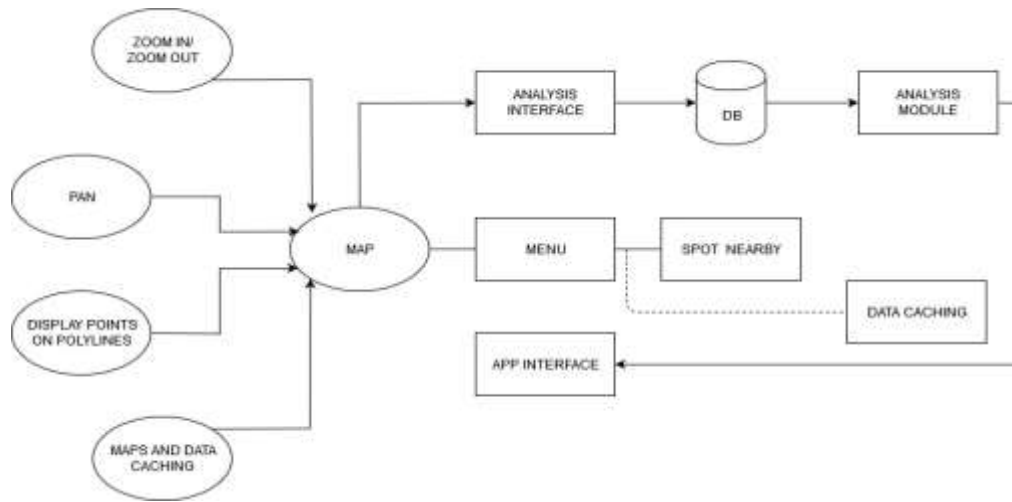
(1) Login and Registration phase In this phase new users can create their accounts in the app/website and then they can login to this account.

Fig (1.1): Login and Registration



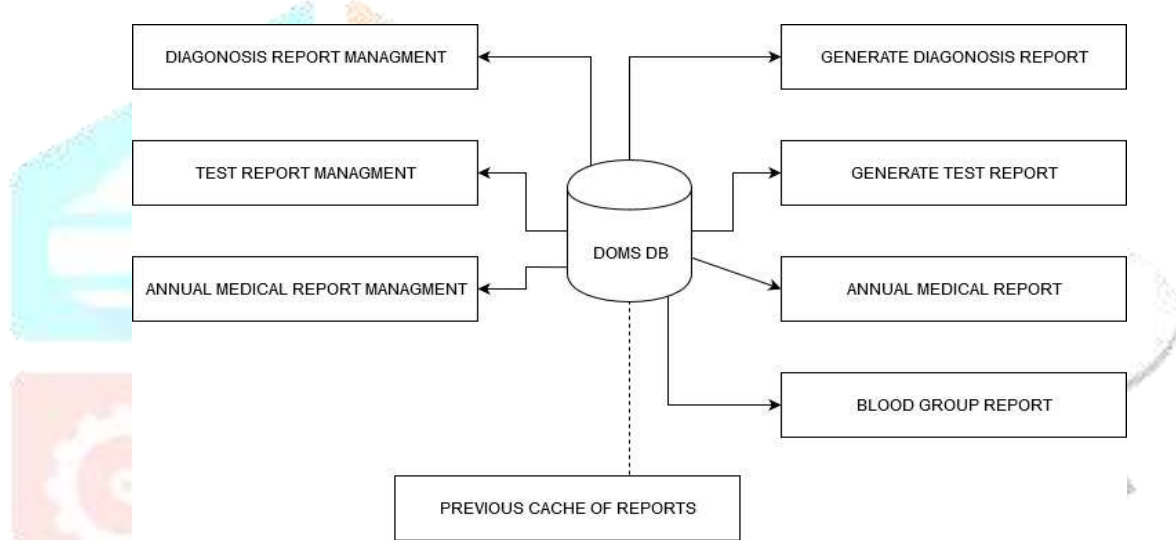
(2) Mapping phase

Fig (1.2): Mapping



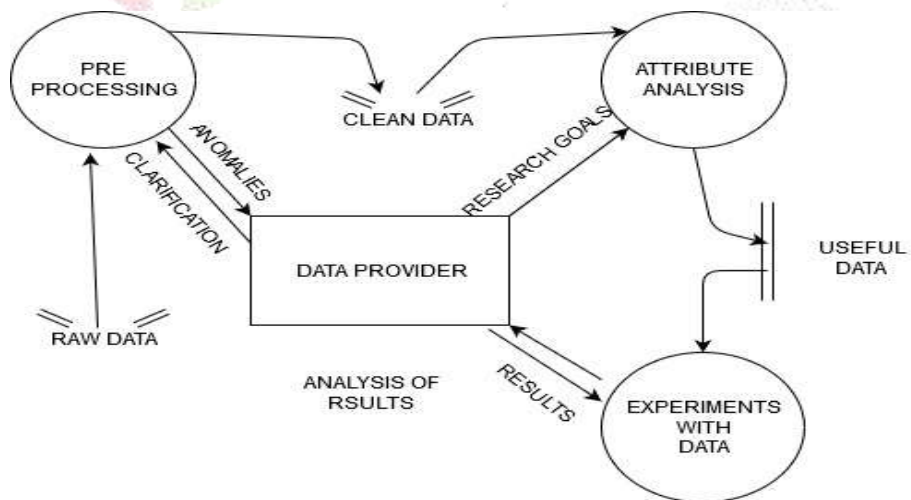
(3) DOMS Database and processing phase

Fig (1.3): Processing



(4) Machine Learning phase.

Fig (1.4): Analysis



IV.I. CONCLUSION

Our proposed system initially collects data about the illness and wellness of all people in society. The collected data is captured by the server database and process them with the dataset in the server for disease prediction. Then the dataset is eventually updated with new set of symptoms and corresponding diseases. The users can obtain an idea about whether they have any problem with their health using our system. Even though the system may not be much useful in the normal conditions, the system will prove to be useful when a disease outbreak occurs. And also, if a person is planning for a trip, then he/she can check the status of the locality where he/ she needs to pass through or to stay. Our proposed system collect data by asking questions as like the google maps ask about some locations we visit. The willingness of the people can be increased by adding something useful for them like providing health tips, diet management, routine management etc.

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