Software Design Document

for

AROGYAM : The Disease Prediction App

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1 Introduction

1.1 Purpose

The purpose of this document is to delineate the design of our project titled - 'AROGYAM : The Disease Prediction App' in different Design Viewpoints..

1.2 Scope

'AROGYAM' is a disease prediction system consisting of two mobile applications(Primarily focusing on the android platform), web applications and a machine learning model that improves the prediction by pre-collected data. The system will be designed to :

- Collect data from the user.

- Collect data by the Asha workers.

- Monitor data for the admin.

- Predict the disease.

  The product allows the user to check their health condition and admin to monitor the users.

1.3 Definitions, Acronyms and Abbreviations

1.3.1 Definition

- **Product / Software** :- Product and software is used interchangeably to denote the 'AROGYAM' application.

- **Admin** :- Admins are the doctors, health inspectors, the district medical officers of Wayanad.

- **Asha Workers** :- Asha Workers are the ones who use the Survey app.

- **Disease** :- Tuberculosis

- **Patient / Subject**:- A person diagnosed with Tuberculosis.

- **User**:- A person who checks his/her health condition.

- **Data** :- The health conditions of a user.

1.4 Abbreviations

- **DBMS** :- Database Management System

- **DFD** :- Data Flow Diagram

- **ML** :- Machine Learning

2 References

- ASCVD Risk Estimator Plus -
  https://play.google.com/store/apps/details?id=org.acc.cvrisk&hl=en_IN
  http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/

3   Architectural Description

The Architecture comprises of admin , user, survey and machine learning model to classify the given data. It gives a view of the entire system highlighting the important features and ignoring unnecessary details.
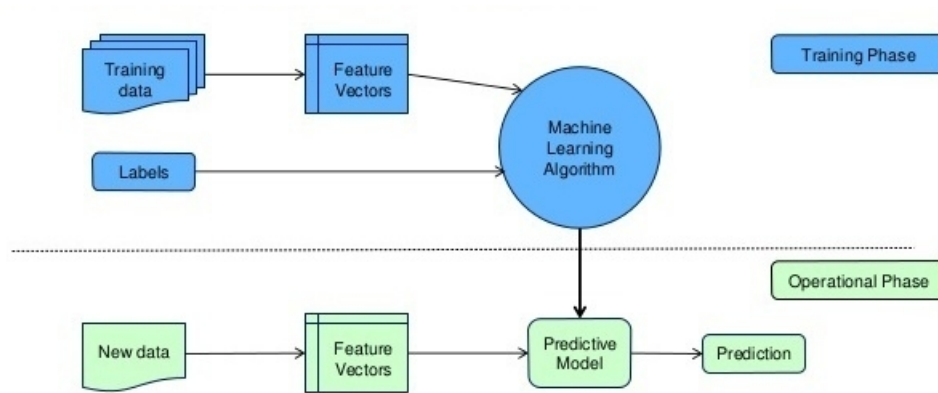

Figure 1: Machine Learning Workflow

4   Decomposition Description

The System is divided into 5 modules/app based on the functionality of the system, that is it is divided into modules for each of the functionality the system would provide. The Modules are :-

- **User App** - The user app is specifically designed only for naive users. The functions of it are:-

    1. User Registration
    2. User Login
    3. Health Checkup - Data Entry
    4. Prediction

- **Survey App** -

    1. Survey Login
    2. Survey - Data Collection

- **Web App** -

    1. Admin Login
    2. Asha Worker registration
    3. Data Statistics

- **Machine Learning Model** - Based on the user's data, the ML model predicts the health condition of the person and sends the information to health department for further action. The user is referred to the nearby hospital.

- **DBMS** - Relational database management system is used in this application to store the data.

5   Dependency Description

5.1   Intermodule Dependency

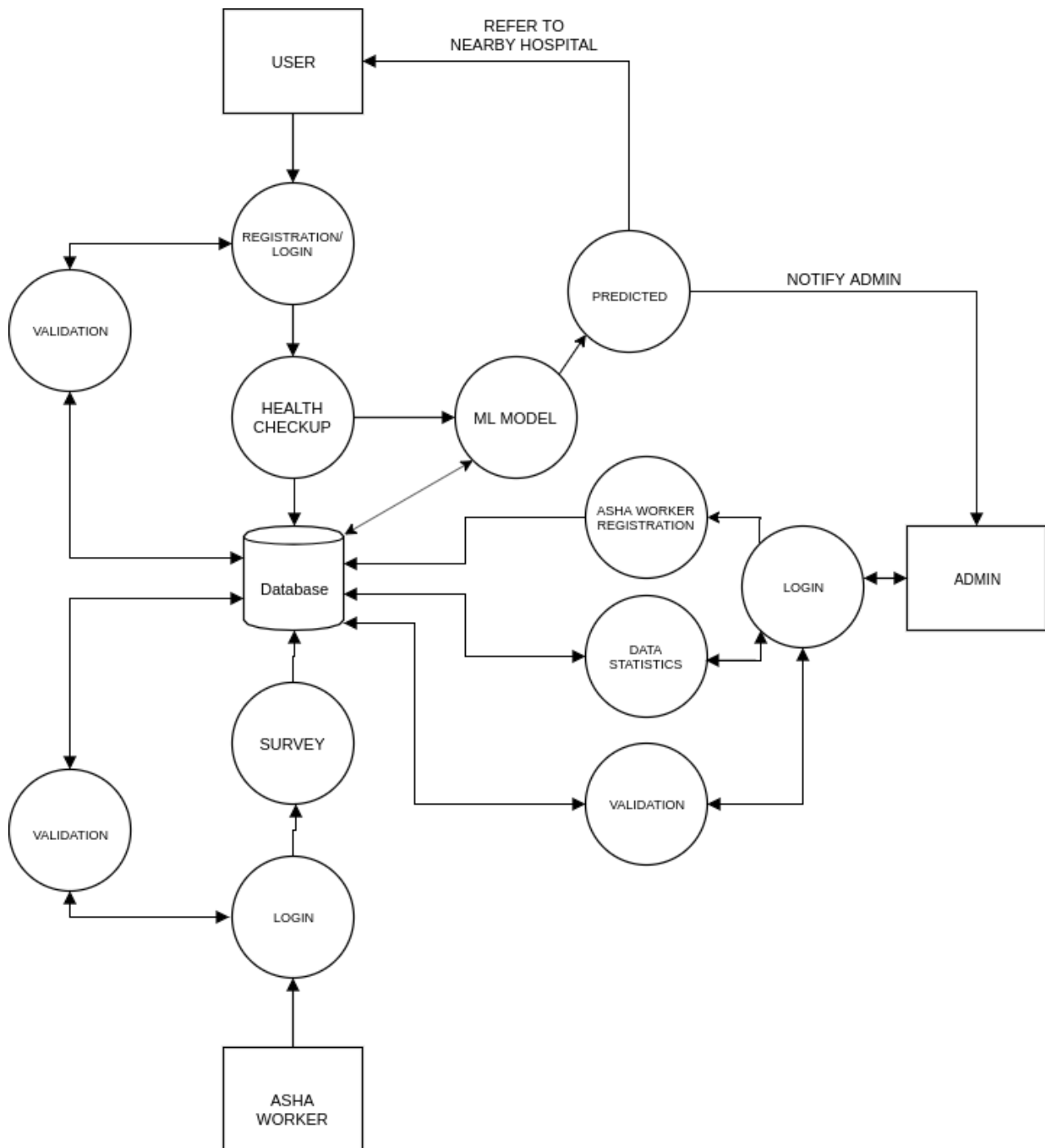The Dependencies between the modules is expressed as the DFD diagram shown below :

Figure 2: Data Flow Diagram Lvl 1

6   User Interface Description

6.1   Awareness Notification

The user is notified with latest notifications and awareness posters from health department in the opening screen of user app as a floating panel.
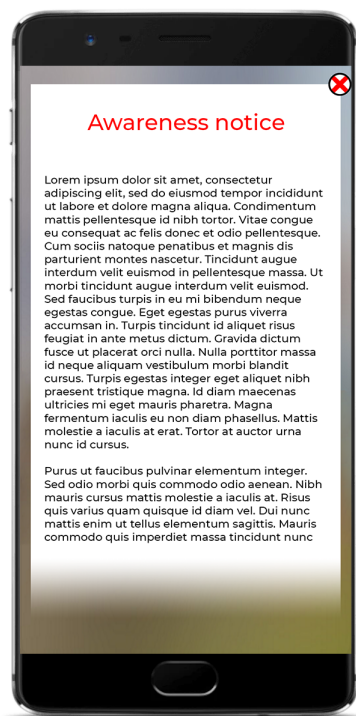

Figure 3: Awareness Notification

6.2   User Registration Interface

The user need to register first, to use the application.

6.3   User Login Interface

After registration, the user need to login with the registered Email id / Mobile Number and Pin.

6.4   Health Checkup Menu

The user is taken straight to a Health Checkup Menu after login.

Figure 4: User Registration Interface
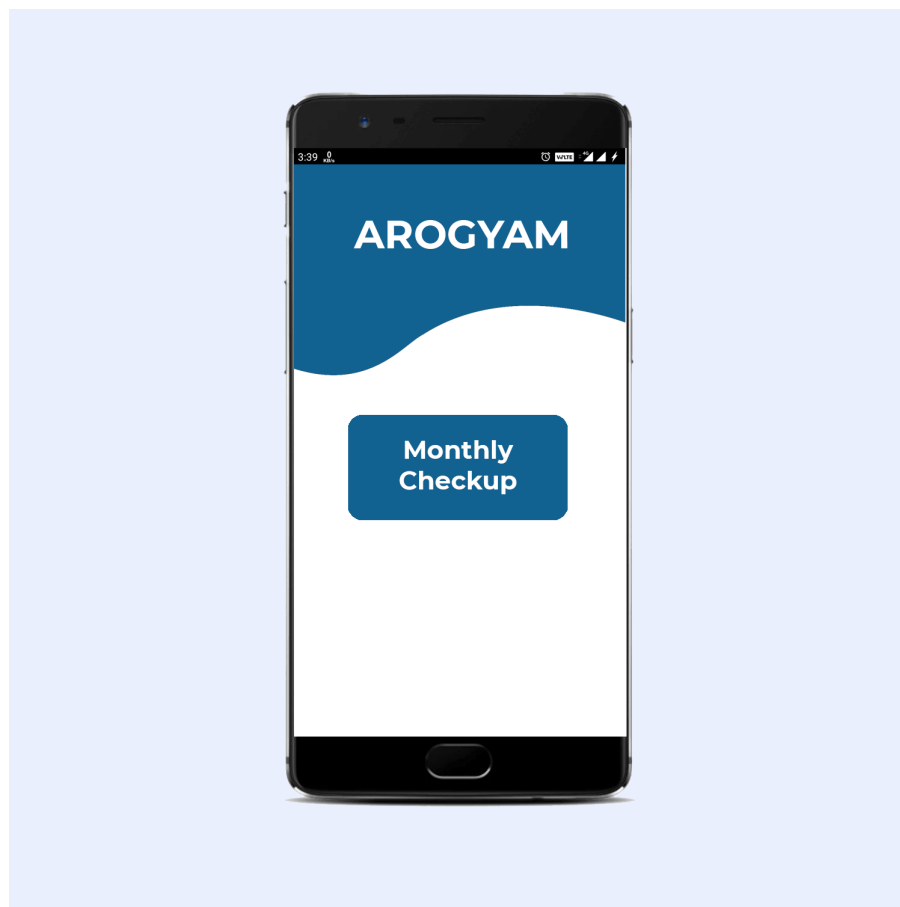

Figure 5: User Login Interface

Figure 6: Health Checkup Menu

7   Detailed Design

7.1   Module Detailed Design

1. **User App**
   The user app has the following functions:-

   1.1. User Registration
   To obtain basic details of the user and to ensure the validity of the user,the user must register first, to use the application.

   1.2. User Login
   Registered users can log in with their Mobile no./Email and pin to the app.

   1.3. Health Checkup - Data Entry
   The user feeds data to the applications to check the health. The user data is saved permanently in a database so that it can be used to run the scoring or the machine learning algorithm for predicting the health conditions of the user. The data can be updated later by the user himself or the Asha workers.

   1.4. Prediction
   Based on the user's data, the ML model predicts the health condition of the person and sends the information to the health department for further action. The user is referred to the nearby hospital.

2. **Survey App**
   The survey app is specifically designed for Asha Workers who conducts survey. The survey app has the following functions:-

   2.1. Survey Login
   The preregistered Asha workers can log in to the survey app.

   2.2. Survey - Data Collection
   Asha workers can use the survey app to collect survey data.

3. **Web App**
   A web app is specifically designed for admins. The web app has the following functions:-

   3.1. Admin Login
   The admin can log in to their web apps using their username and password.

   3.2. Asha Worker registration
   The admins can register an account for each Asha worker for the survey app. The Asha workers will receive their credentials to login to the system

   3.3. Data Statistics
   The admin can monitor both the user data and survey data statistically.