

Project Report

1. INTRODUCTION

Chronic kidney disease (CKD) is a significant public health problem worldwide, especially for low and medium-income countries. Chronic kidney disease (CKD) means that the kidney does not work as expected and cannot correctly filter blood. About 10% of the population worldwide suffers from (CKD), and millions die each year because they cannot get affordable treatment, with the number increasing in the elderly

Chronic Kidney Disease (CKD) is a major medical problem and can be cured if treated in the early stages. Usually, people are not aware that medical tests we take for different purposes could contain valuable information concerning kidney diseases. Consequently, attributes of various medical tests are investigated to distinguish which attributes may contain helpful information about the disease. The information says that it helps us to measure the severity of the problem and we make use of such information to build a machine learning model that predicts Chronic Kidney Disease

2. LITERATURE SURVEY

2.1 Existing problem

1. Very few systems use clinical data for classification purposes and even if they do they are restricted by the large number of association rules that apply
2. Diagnosis of the condition solely depends upon the doctor intuition and patients record

DISADVANTAGE OF EXISTING SOLUTION

1. detection is not possible at earlier stage
2. in the existing system practical use of various collected data is time consuming

2.2 References

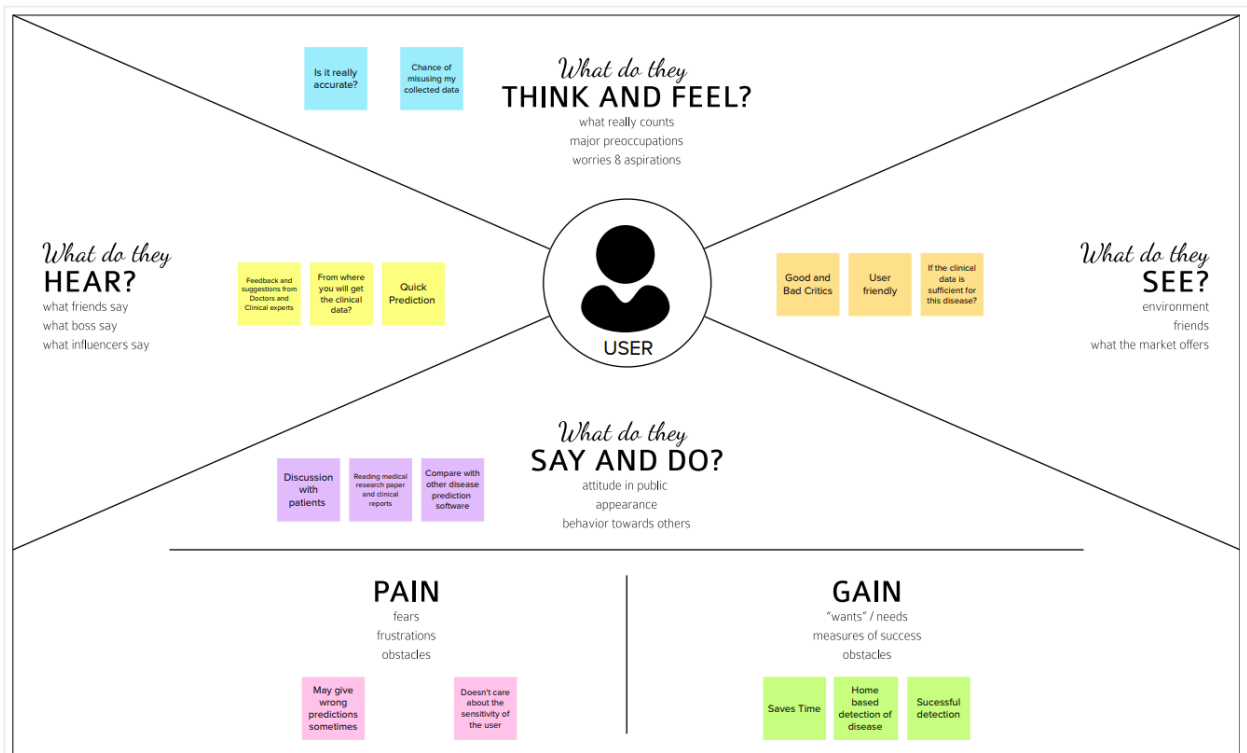
1. https://www.researchgate.net/publication/363163833_Chronic_Kidney_Disease_Prediction_Using_Machine_Learning_Techniques
2. <https://www.ijert.org/chronic-kidney-disease-prediction-using-machine-learning>

2.3 Problem Statement Definition

Chronic Kidney Disease (CKD) is a major medical problem and can be cured if treated in the early stages. Usually, people are not aware that medical tests we take for different purposes could contain valuable information concerning kidney diseases. Consequently, attributes of various medical tests are investigated to distinguish which attributes may contain helpful information about the disease. The information says that it helps us to measure the severity of the problem and we make use of such information to build a machine learning model that predicts Chronic Kidney Disease .

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Template

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 🕒 10 minutes to prepare
- 👥 1 hour to collaborate
- 👤 2-8 people recommended

📄 Share template feedback

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

Team gathering

Define who should participate in the session and send an invite. Share relevant information as pre-work ahead.

Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

📄 Open article

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

Key rules of brainstorming

To run an smooth and productive session

Stay in topic.

Encourage wild ideas.

Defers judgment.

Listen to others.

Go for volume.

If possible, be visual.

Step-2: Brainstorm, Idea Listing, and Grouping

[illegible]

Step-3: Idea Prioritization



Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes

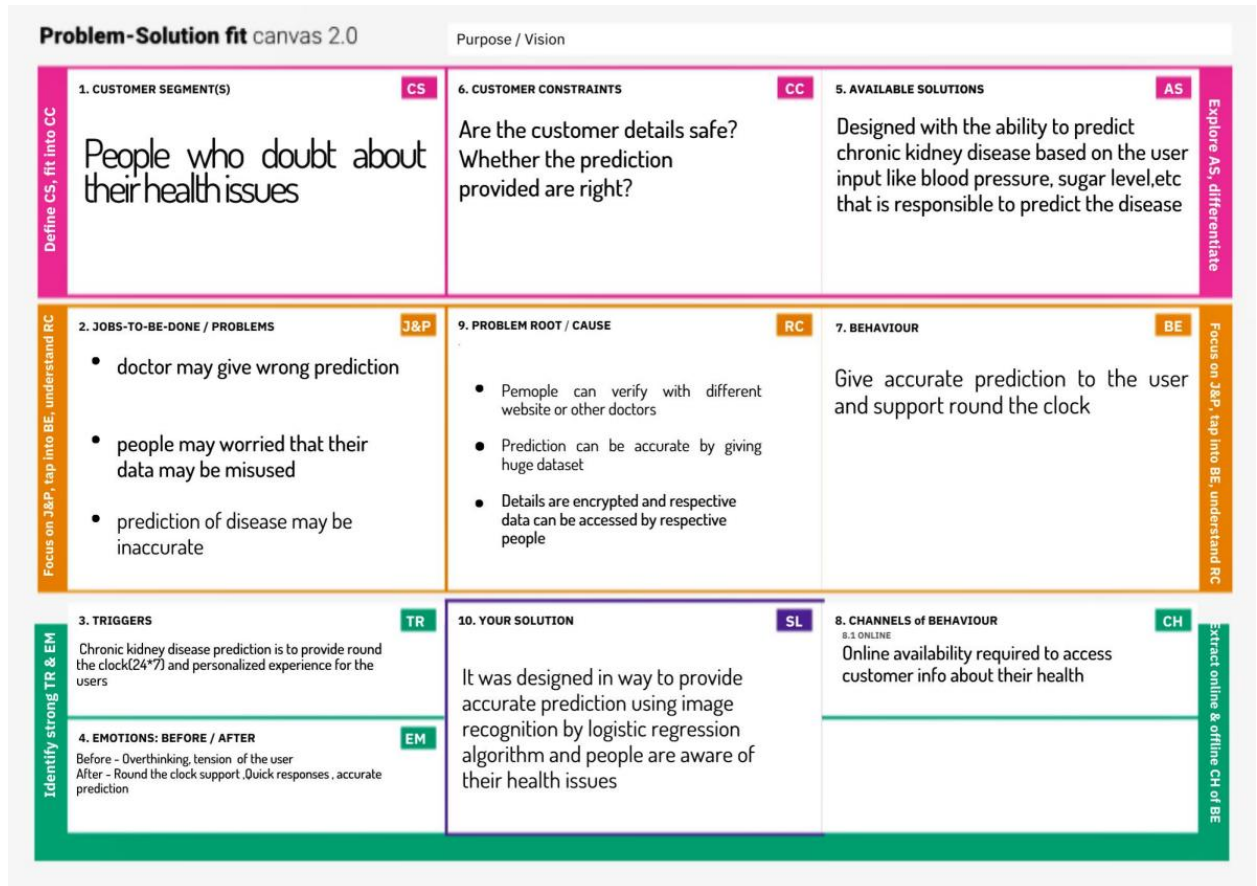


3.3 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	As people may worried about misinformation in the report given by doctors.

2.	Idea / Solution description	A Novel method to recognize image of kidney using Conventional Neural Networks (CNN).
3.	Novelty / Uniqueness	Accurately recognize the image and give precision result
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> • Reduce stress of the people • People may use it for verification purpose • More accurate
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> • This can be used as a mobile application to predict the cause and prior diagnosis of CKD. • This can be integrated with the medical consultancy service to provide assistance to the users.
6.	Scalability of the Solution	<ul style="list-style-type: none"> • Ability to detect the kidney structure based on the images and datasets provided and can expand this to detect more internal structure and complications of kidney including every single nephron. • Ability to recognize more than a single data at a time we can expand this system to detect and compare the kidneys of two users at a time.

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

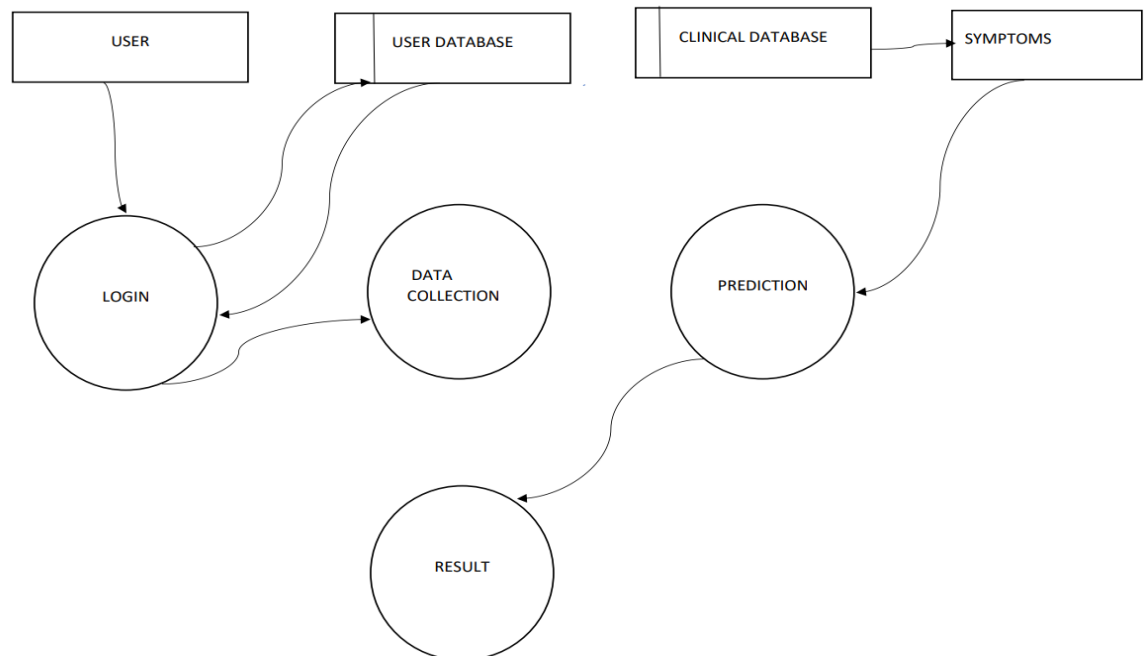
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	The user must login to the system using username and password to access it. For this purpose he has to register his account before logging in.
FR-2	User Confirmation	The confirmation to the user is providers by Confirmation via Email. Confirmation via SMS. Confirmation via call.
FR-3	User Requirements	The user must have a valid user name and password to access the content in the software. The software needs the user to have some knowledge about CKD.
FR-4	Business Requirements	A System allowing patients to identify CKD in around time of 15 minutes with proper network connection and basic clinical records without consulting doctors.
FR-5	User Authentication	Challenges the user to validate Credentials (Ex: Username and password)
FR-6	User Authorization	Once the server receives the request with correct authorization. It will grant you access to the resources

4.2 Non-Functional requirements

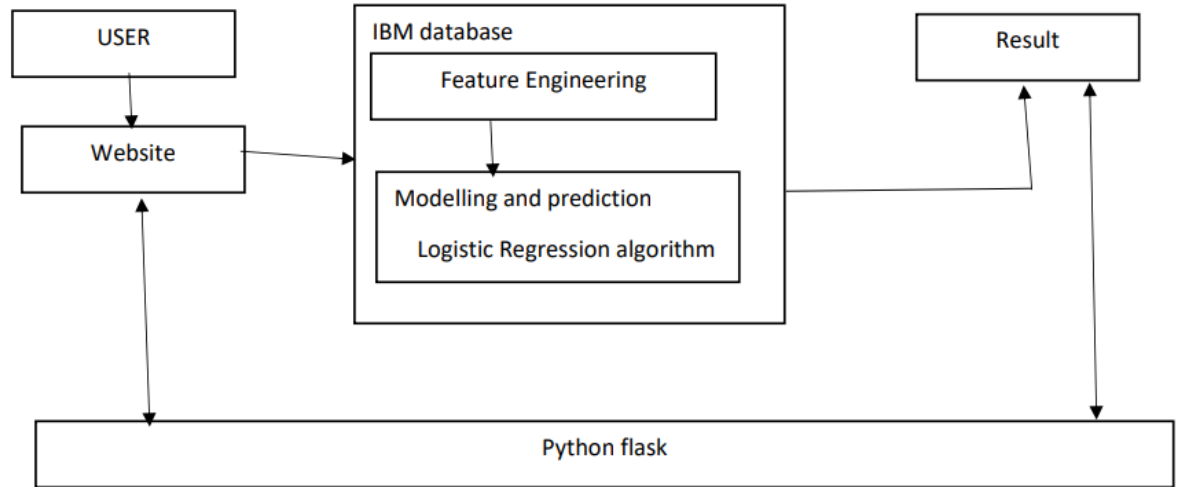
FR No.	Non-Functional Requirement	Description
NFR-1	User satisfaction	The system must stand up to the user expectation.
NFR-2	Security	During login the system checks the user ID for Authentication and authorization checking and scanning the user ID in the database therefore any authorized user can access it
NFR-3	Reliability	You can check the percentage of accuracy and probability of failure rate to determine the reliability of System.
NFR-4	Performance	The response time of operations such as prediction, storage etc. should be faster.
NFR-5	Availability	It is available during 24*7 .
NFR-6	Scalability	It can handle large amount of workload while maintaining optimal performance
NFR-7	Safety	The system should contain databases that include necessary information such as UserID , Clinical records, PhoneNumber etc. These databases should be maintained and backedup. Incase of any failure these backup comes in handy.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



6. PROJECT PLANNING & SCHEDULING

Sprint Planning & Estimation & Sprint Delivery Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data processing	USN-1	Download and cleaning the dataset	7	High	Siva Sudhan M, Varoon M, Akash R, S,Kavin B
Sprint-2	Web page	USN-2	Web page is created and is integrated with flask.	6	High	Siva Sudhan M, Varoon M, Akash R, S,Kavin B
Sprint-3	Adding Data	USN-3	As a user, I can feed my data as the input into the application for it to predict the possibility of kidney disease.	6	Low	Siva Sudhan M, Varoon M, Akash R, S,Kavin B
Sprint-3	Checking accuracy	USN-4	As a user, I can check the ability and accuracy of the model in obtaining the required information	6	High	Siva Sudhan M, Varoon M, Akash R, S,Kavin B
Sprint-3	Data extraction	USN-5	As a user, I can get the result data from the application through email.	6	High	Siva Sudhan M, Varoon M, Akash R, S,Kavin B
Sprint-4	Deployment	USN-6	IBM Cloud Deployment	6	High	Siva Sudhan M, Varoon M, Akash R, S,Kavin B

7. ADVANTAGES

1. High performance and accuracy rate
2. Classification is very flexible and is widely in various domains with high rate of success

8. FUTURE SCOPE

This data helps to serve a big tressure for pharmaceutical industries to produce medicine at faster rate and helps diagnosis easy when it is incorporated with AI

9. APPENDIX

GitHub & Source Code : <https://github.com/IBM-EPBL/IBM-Project-3933-1658672622.git>

Project Demo Link : https://drive.google.com/file/d/1KKcssZpS_rstwnK5a1hHjDS-bQv7b3b6/view?usp=share_link