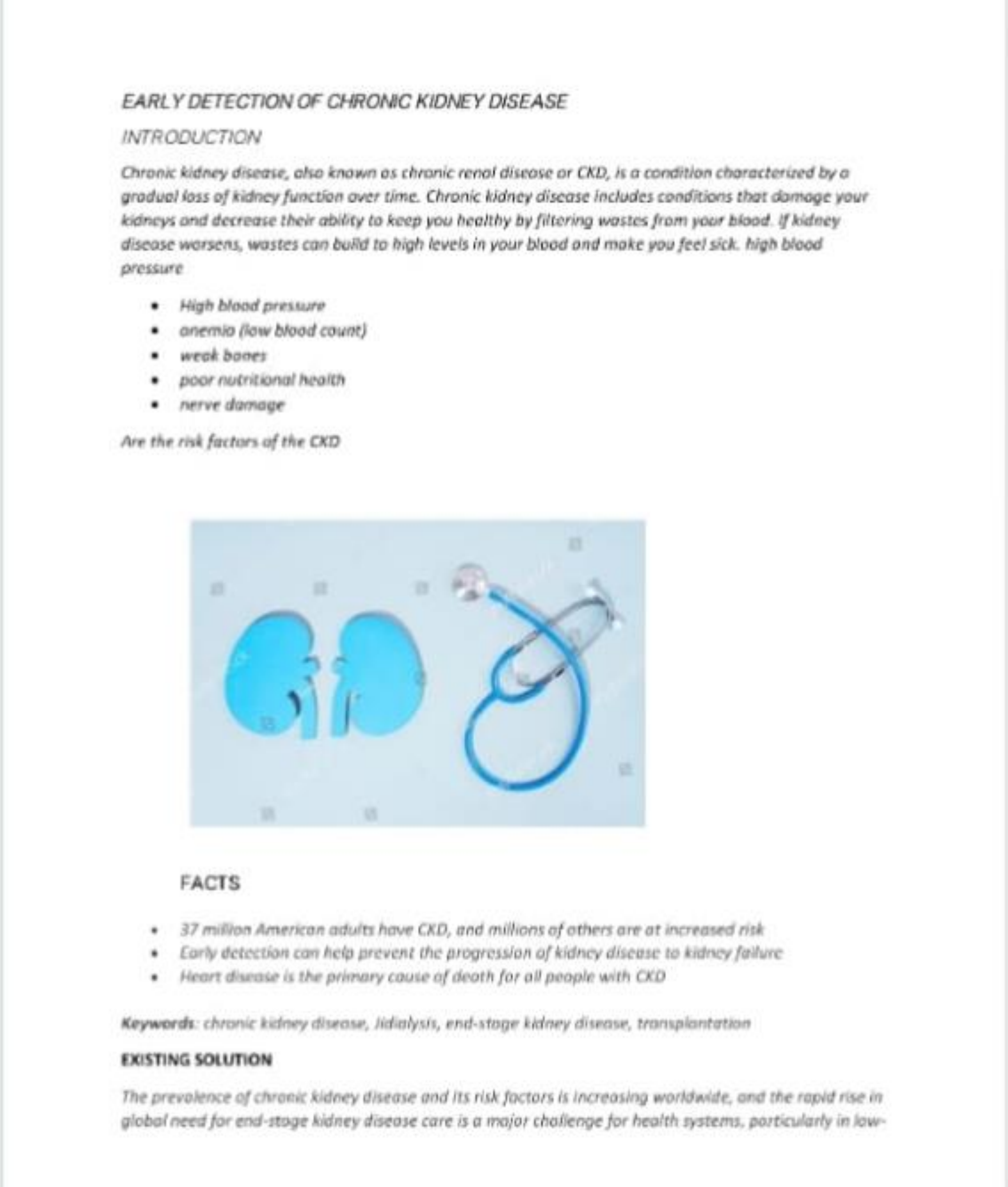
EARLY DETECTION OF CHRONIC KIDNEY DISEASE

1. Ideation phase

• Literature survey



EARLY DETECTION OF CHRONIC KIDNEY DISEASE

INTRODUCTION

Chronic kidney disease, also known as chronic renal disease or CKD, is a condition characterized by a gradual loss of kidney function over time. Chronic kidney disease includes conditions that damage your kidneys and decrease their ability to keep you healthy by filtering wastes from your blood. If kidney disease worsens, wastes can build to high levels in your blood and make you feel sick. high blood pressure

- *High blood pressure*
- *anemia (low blood count)*
- *weak bones*
- *poor nutritional health*
- *nerve damage*

Are the risk factors of the CKD

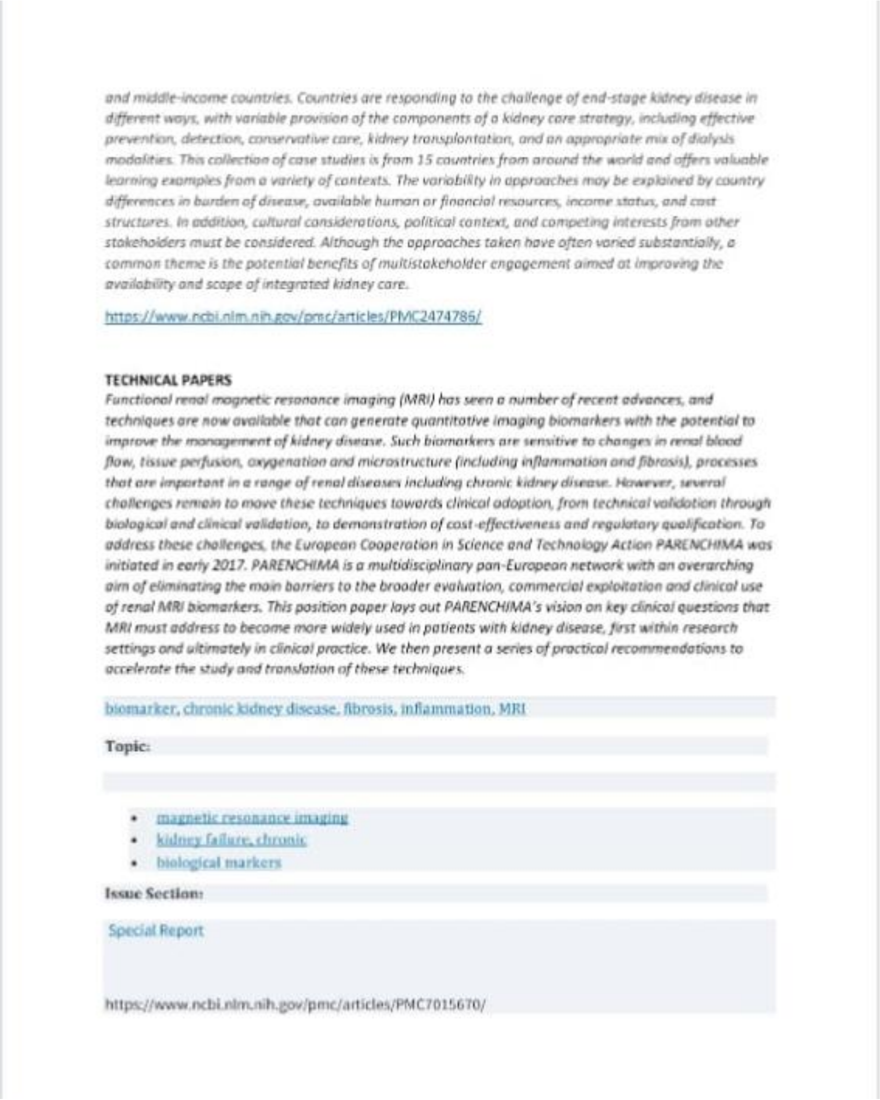
FACTS

- *37 million American adults have CKD, and millions of others are at increased risk*
- *Early detection can help prevent the progression of kidney disease to kidney failure*
- *Heart disease is the primary cause of death for all people with CKD*

Keywords: *chronic kidney disease, Jidialysis, end-stage kidney disease, transplantation*

EXISTING SOLUTION

The prevalence of chronic kidney disease and its risk factors is increasing worldwide, and the rapid rise in global need for end-stage kidney disease care is a major challenge for health systems, particularly in low-



and middle-income countries. Countries are responding to the challenge of end-stage kidney disease in different ways, with variable provision of the components of a kidney care strategy, including effective prevention, detection, conservative care, kidney transplantation, and an appropriate mix of dialysis modalities. This collection of case studies is from 15 countries from around the world and offers valuable learning examples from a variety of contexts. The variability in approaches may be explained by country differences in burden of disease, available human or financial resources, income status, and cost structures. In addition, cultural considerations, political context, and competing interests from other stakeholders must be considered. Although the approaches taken have often varied substantially, a common theme is the potential benefits of multistakeholder engagement aimed at improving the availability and scope of integrated kidney care.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2474786/

TECHNICAL PAPERS

Functional renal magnetic resonance imaging (MRI) has seen a number of recent advances, and techniques are now available that can generate quantitative imaging biomarkers with the potential to improve the management of kidney disease. Such biomarkers are sensitive to changes in renal blood flow, tissue perfusion, oxygenation and microstructure (including inflammation and fibrosis), processes that are important in a range of renal diseases including chronic kidney disease. However, several challenges remain to move these techniques towards clinical adoption, from technical validation through biological and clinical validation, to demonstration of cost-effectiveness and regulatory qualification. To address these challenges, the European Cooperation in Science and Technology Action PARENCHIMA was initiated in early 2017. PARENCHIMA is a multidisciplinary pan-European network with an overarching aim of eliminating the main barriers to the broader evaluation, commercial exploitation and clinical use of renal MRI biomarkers. This position paper lays out PARENCHIMA's vision on key clinical questions that MRI must address to become more widely used in patients with kidney disease, first within research settings and ultimately in clinical practice. We then present a series of practical recommendations to accelerate the study and translation of these techniques.

biomarker, chronic kidney disease, fibrosis, inflammation, MRI

Topic:

- magnetic resonance imaging
- kidney failure, chronic
- biological markers

Issue Section:

Special Report

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7015670/

RESEARCH PAPER

Testing for kidney disease is routine in clinical practice. This review focuses on advances in clinical evaluation of the glomerular filtration rate and albuminuria and their use in detecting acute and chronic kidney disease, designing trials of disease progression, and predicting risk in clinical practice

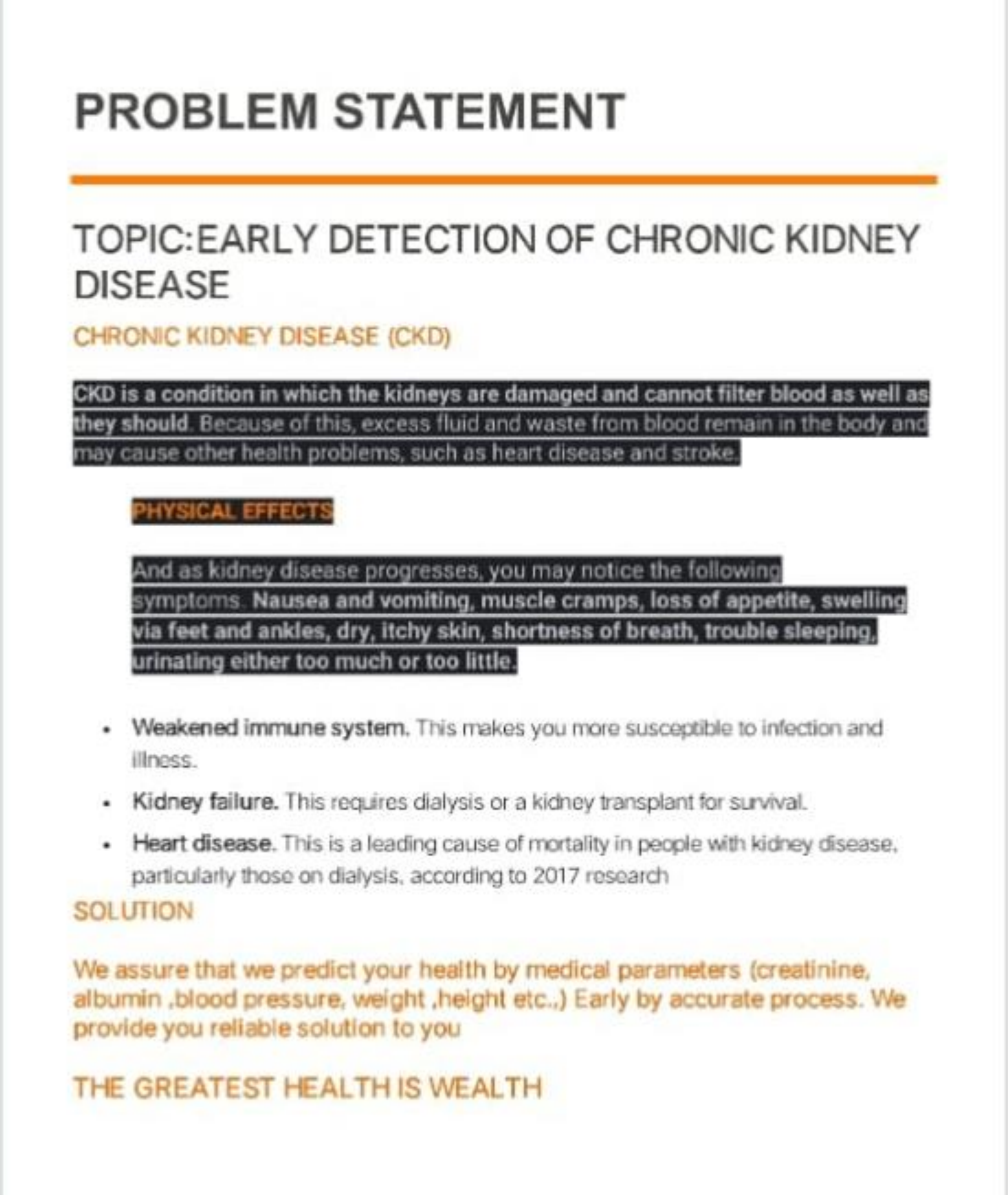
A.S. Levey, M.E. Grams, and L.A. Inker

N Engl J Med 2022; 386:2120-2128

- **Empathy map**

What do they
THINK AND FEEL?
What do they
HEAR?
What do they
SEE?
What do they
SAY AND DO?
PAIN
GAIN

- **Problem statement**



PROBLEM STATEMENT

TOPIC:EARLY DETECTION OF CHRONIC KIDNEY DISEASE

CHRONIC KIDNEY DISEASE (CKD)

CKD is a condition in which the kidneys are damaged and cannot filter blood as well as they should. Because of this, excess fluid and waste from blood remain in the body and may cause other health problems, such as heart disease and stroke.

PHYSICAL EFFECTS

And as kidney disease progresses, you may notice the following symptoms. **Nausea and vomiting, muscle cramps, loss of appetite, swelling via feet and ankles, dry, itchy skin, shortness of breath, trouble sleeping, urinating either too much or too little.**

- **Weakened immune system.** This makes you more susceptible to infection and illness.
- **Kidney failure.** This requires dialysis or a kidney transplant for survival.
- **Heart disease.** This is a leading cause of mortality in people with kidney disease, particularly those on dialysis, according to 2017 research

SOLUTION

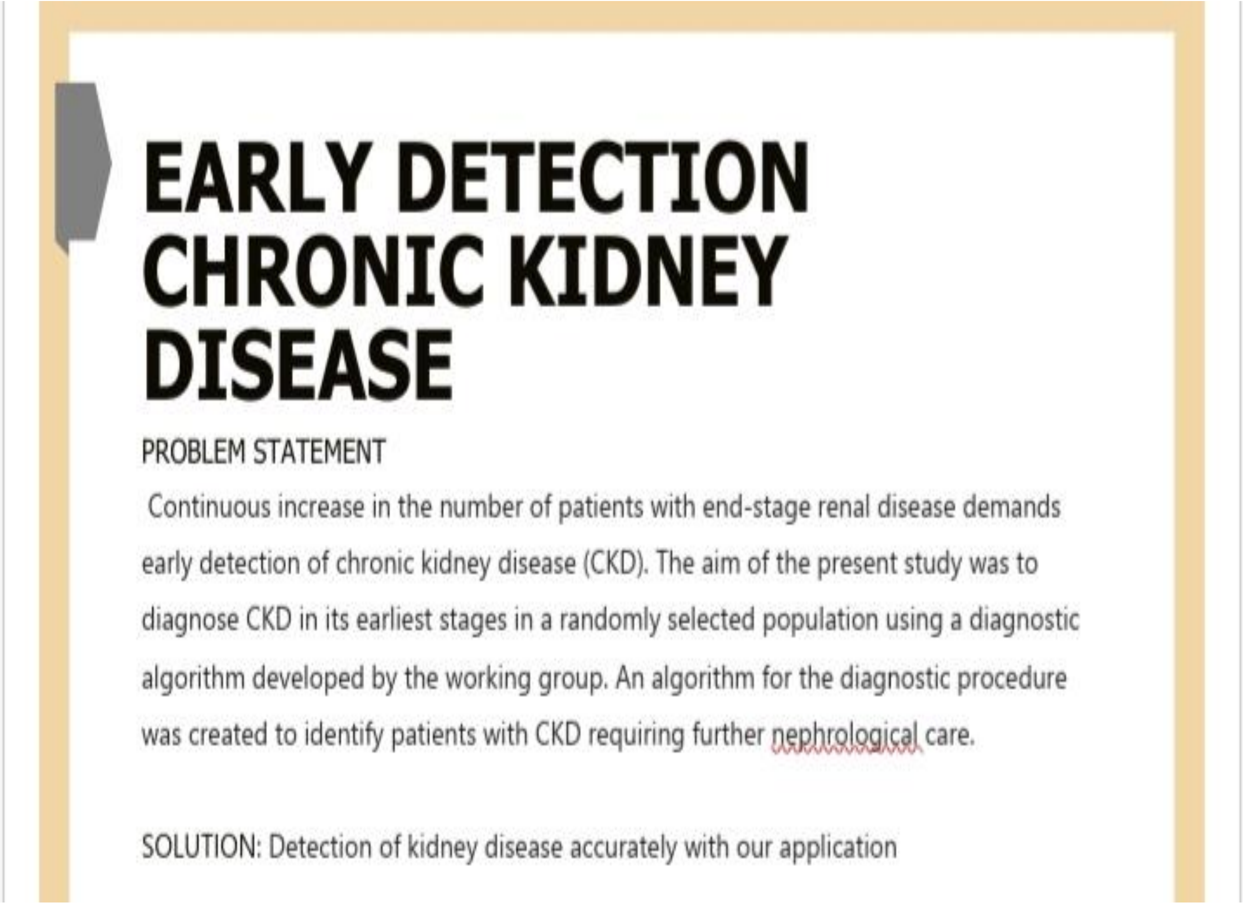
We assure that we predict your health by medical parameters (creatinine, albumin ,blood pressure, weight ,height etc.,) Early by accurate process. We provide you reliable solution to you

THE GREATEST HEALTH IS WEALTH

- **Brainstorming**

2. Project design phase -1

- **Proposed solution**



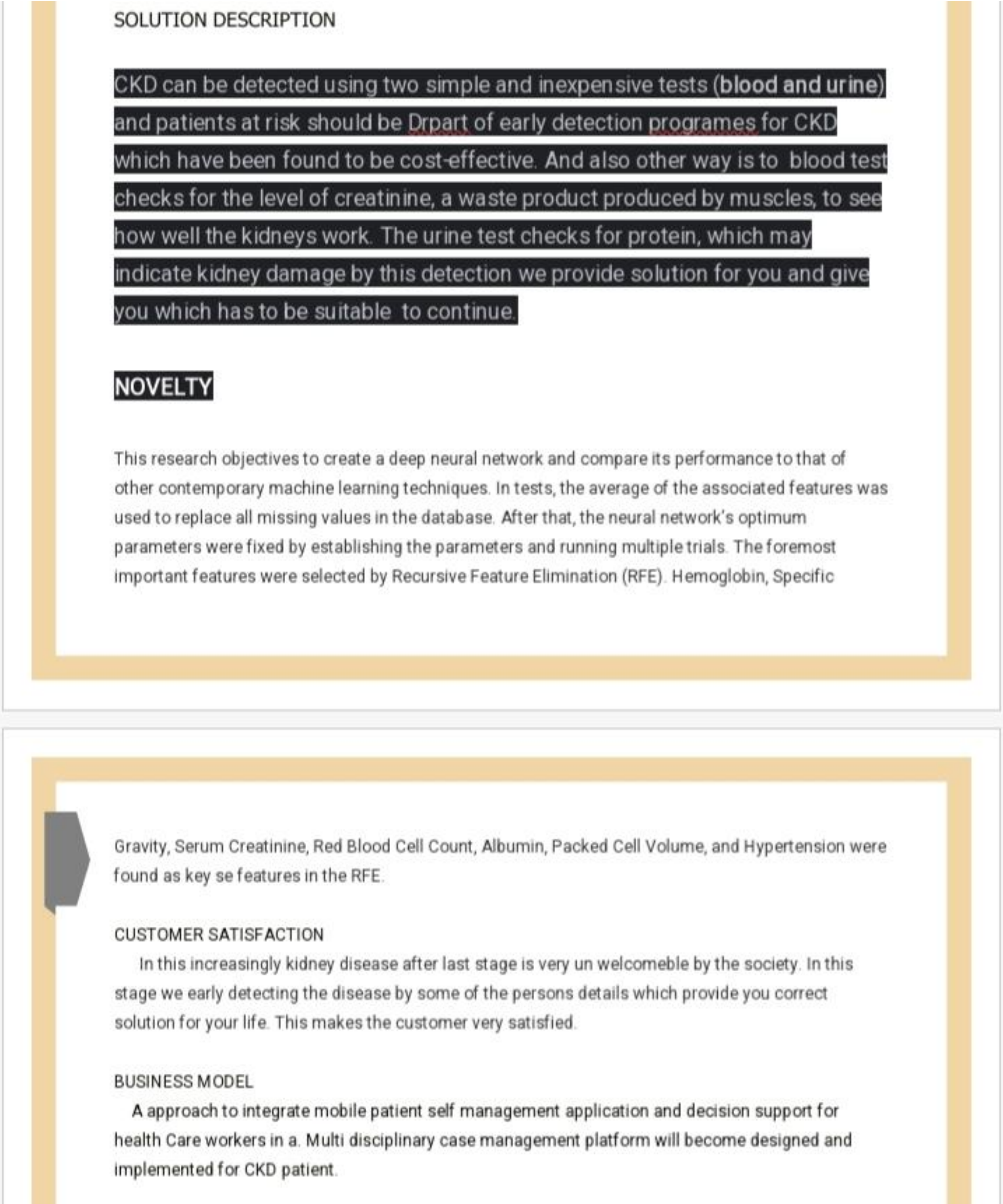
EARLY DETECTION CHRONIC KIDNEY DISEASE

PROBLEM STATEMENT

Continuous increase in the number of patients with end-stage renal disease demands early detection of chronic kidney disease (CKD). The aim of the present study was to diagnose CKD in its earliest stages in a randomly selected population using a diagnostic algorithm developed by the working group. An algorithm for the diagnostic procedure was created to identify patients with CKD requiring further nephrological care.

SOLUTION: Detection of kidney disease accurately with our application

- ## Problem solution fit



SOLUTION DESCRIPTION

CKD can be detected using two simple and inexpensive tests (**blood and urine**) and patients at risk should be Drpart of early detection programes for CKD which have been found to be cost-effective. And also other way is to blood test checks for the level of creatinine, a waste product produced by muscles, to see how well the kidneys work. The urine test checks for protein, which may indicate kidney damage by this detection we provide solution for you and give you which has to be suitable to continue.

NOVELTY

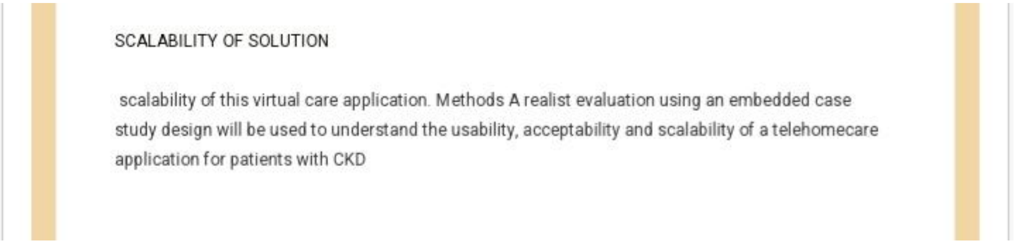
This research objectives to create a deep neural network and compare its performance to that of other contemporary machine learning techniques. In tests, the average of the associated features was used to replace all missing values in the database. After that, the neural network's optimum parameters were fixed by establishing the parameters and running multiple trials. The foremost important features were selected by Recursive Feature Elimination (RFE). Hemoglobin, Specific Gravity, Serum Creatinine, Red Blood Cell Count, Albumin, Packed Cell Volume, and Hypertension were found as key se features in the RFE.

CUSTOMER SATISFACTION

In this increasingly kidney disease after last stage is very un welcomeble by the society. In this stage we early detecting the disease by some of the persons details which provide you correct solution for your life. This makes the customer very satisfied.

BUSINESS MODEL

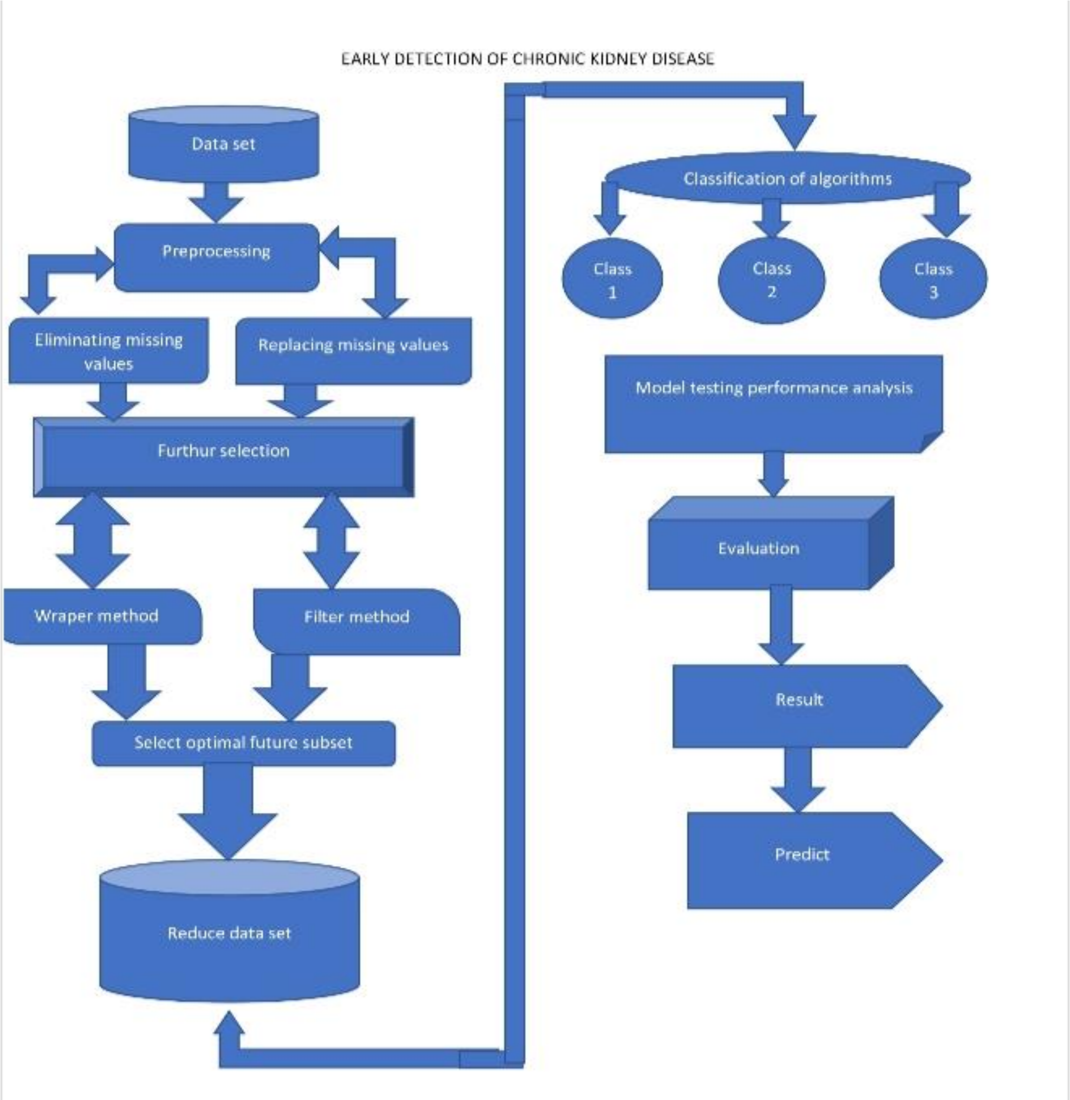
A approach to integrate mobile patient self management application and decision support for health Care workers in a. Multi disciplinary case management platform will become designed and implemented for CKD patient.



SCALABILITY OF SOLUTION

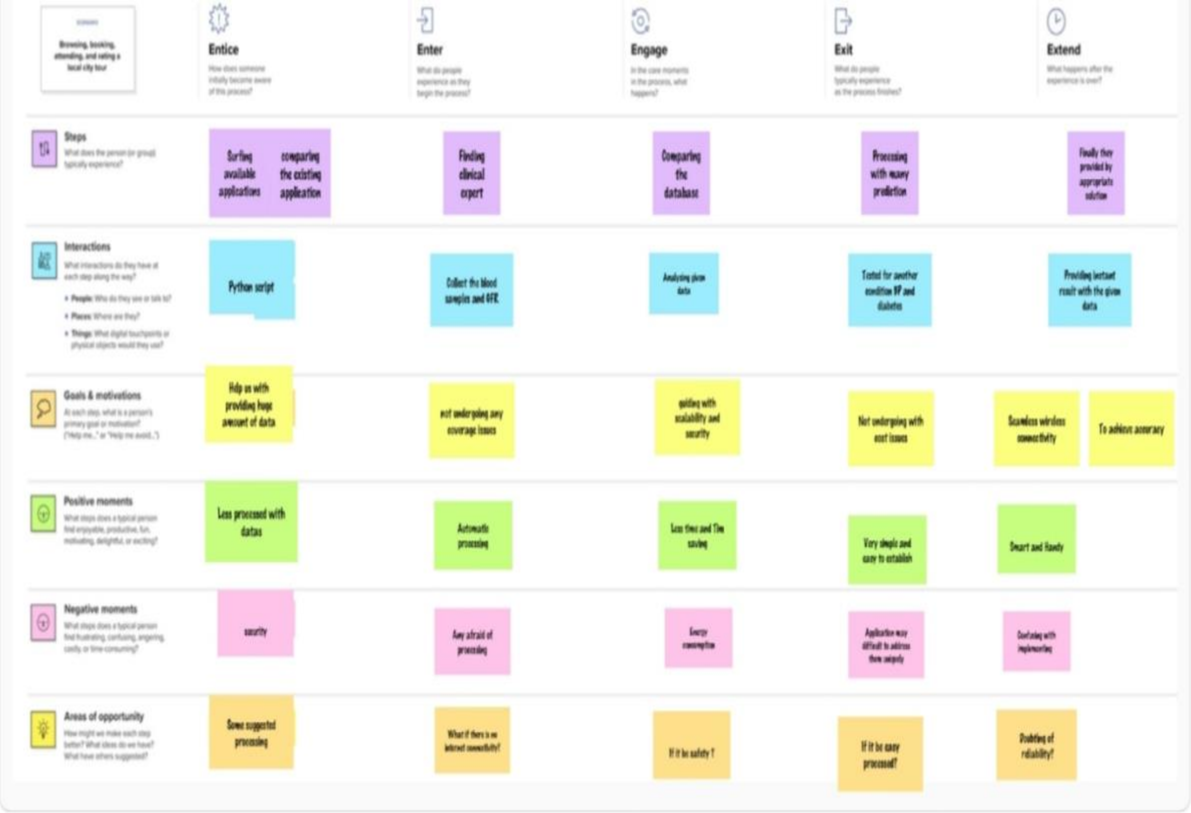
scalability of this virtual care application. Methods A realist evaluation using an embedded case study design will be used to understand the usability, acceptability and scalability of a telehomecare application for patients with CKD

- **Solution architecture**


EARLY DETECTION OF CHRONIC KIDNEY DISEASE
Data set
Preprocessing
Eliminating missing values
Replacing missing values
Furthur selection
Wraper method
Filter method
Select optimal future subset
Reduce data set
Classification of algorithms
Class 1
Class 2
Class 3
Model testing performance analysis
Evaluation
Result
Predict

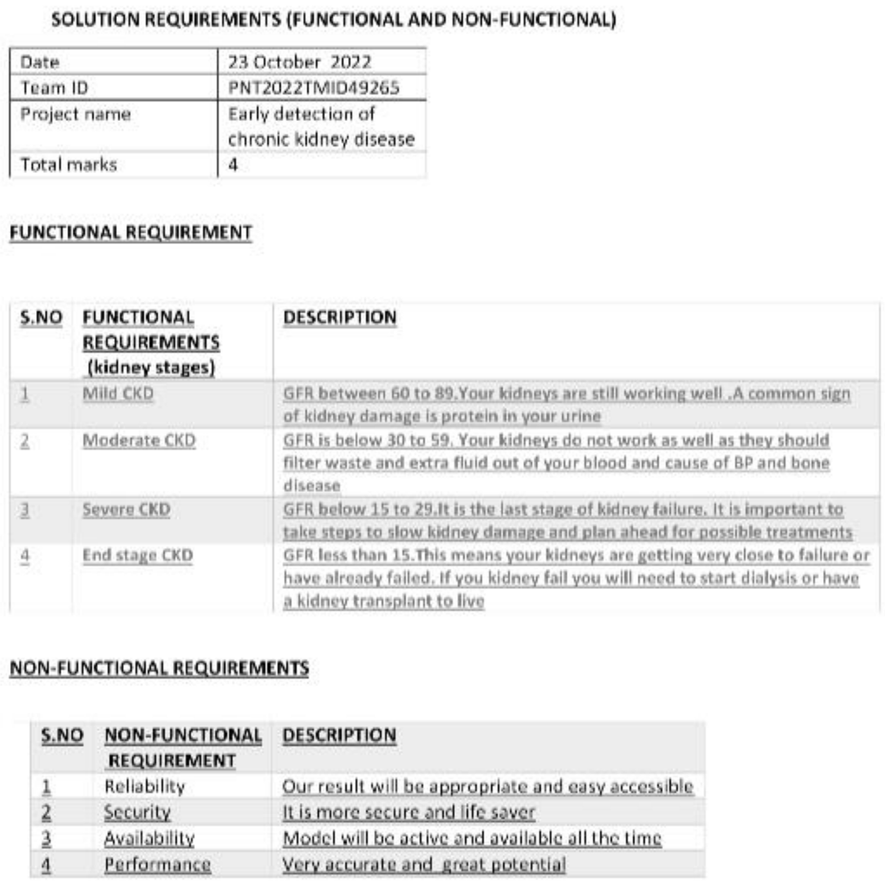
3. Project design phase -2

- **Customer journey**



Browsing, booking, attending, and rating a local city tour	Entice How does someone initially become aware of this process?	Enter What do people experience as they begin the process?	Engage In the core moments in the process, what happens?	Exit What do people typically experience as the process finishes?	Extend What happens after the experience is over?
Steps What does the person (or group) typically experience?	Surfing available applications comparing the existing application	Finding clinical expert	Comparing the database	Processing with many prediction	Finally they provided by appropriate solution
Interactions What interactions do they have at each step along the way? • People: Who do they see or talk to? • Places: Where are they? • Things: What digital touchpoints or physical objects would they use?	Python script	Collect the blood samples and GFR	Analysing given data	Tested for another condition BP and diabetes	Providing instant result with the given data
Goals & motivations At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")	Help us with providing huge amount of data	not undergoing any coverage issues	guiding with scalability and security	Not undergoing with cost issues	Seamless wireless connectivity To achieve accuracy
Positive moments What steps does a typical person find enjoyable, productive, fun, motivating, delightful, or exciting?	Less processed with datas	Automatic processing	Less time and Time saving	Very simple and easy to establish	Smart and Handy
Negative moments What steps does a typical person find frustrating, confusing, angering, costly, or time-consuming?	security	Any afraid of processing	Energy consumption	Application may difficult to address them uniquely	Confusing with implementing
Areas of opportunity How might we make each step better? What ideas do we have? What have others suggested?	Some suggested processing	What if there is no internet connectivity?	If it be safety ?	If it be easy processed?	Doubting of reliability?

- ## Functional requirements



SOLUTION REQUIREMENTS (FUNCTIONAL AND NON-FUNCTIONAL)

Date	23 October 2022
Team ID	PNT2022TMID49265
Project name	Early detection of chronic kidney disease
Total marks	4

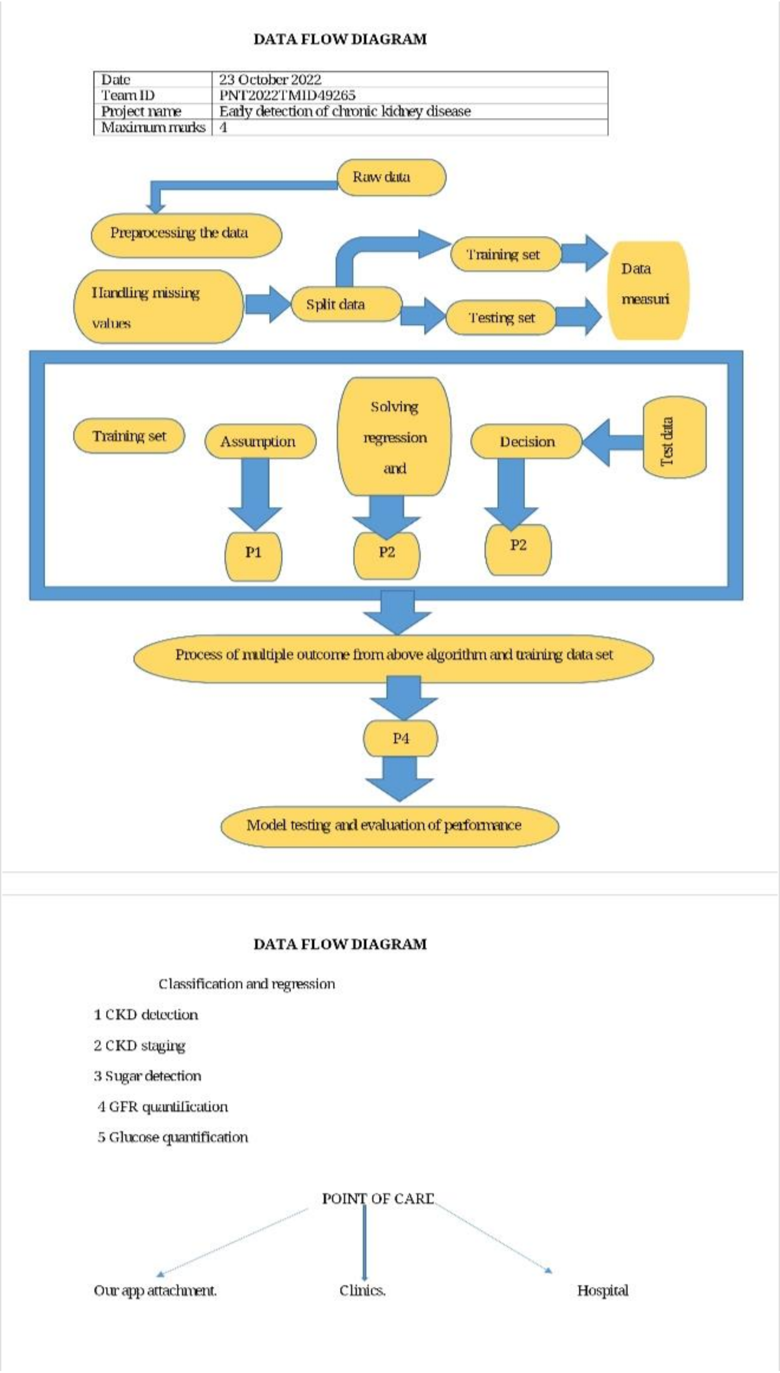
FUNCTIONAL REQUIREMENT

S.NO	FUNCTIONAL REQUIREMENTS (kidney stages)	DESCRIPTION
1	Mild CKD	GFR between 60 to 89.Your kidneys are still working well .A common sign of kidney damage is protein in your urine
2	Moderate CKD	GFR is below 30 to 59. Your kidneys do not work as well as they should filter waste and extra fluid out of your blood and cause of BP and bone disease
3	Severe CKD	GFR below 15 to 29.It is the last stage of kidney failure. It is important to take steps to slow kidney damage and plan ahead for possible treatments
4	End stage CKD	GFR less than 15.This means your kidneys are getting very close to failure or have already failed. If you kidney fail you will need to start dialysis or have a kidney transplant to live

NON-FUNCTIONAL REQUIREMENTS

S.NO	NON-FUNCTIONAL REQUIREMENT	DESCRIPTION
1	Reliability	Our result will be appropriate and easy accessible
2	Security	It is more secure and life saver
3	Availability	Model will be active and available all the time
4	Performance	Very accurate and great potential

- **Data flow diagram**



DATA FLOW DIAGRAM

Date	23 October 2022
Team ID	PNT2022TMID49265
Project name	Early detection of chronic kidney disease
Maximum marks	4

DATA FLOW DIAGRAM

Classification and regression

1 CKD detection

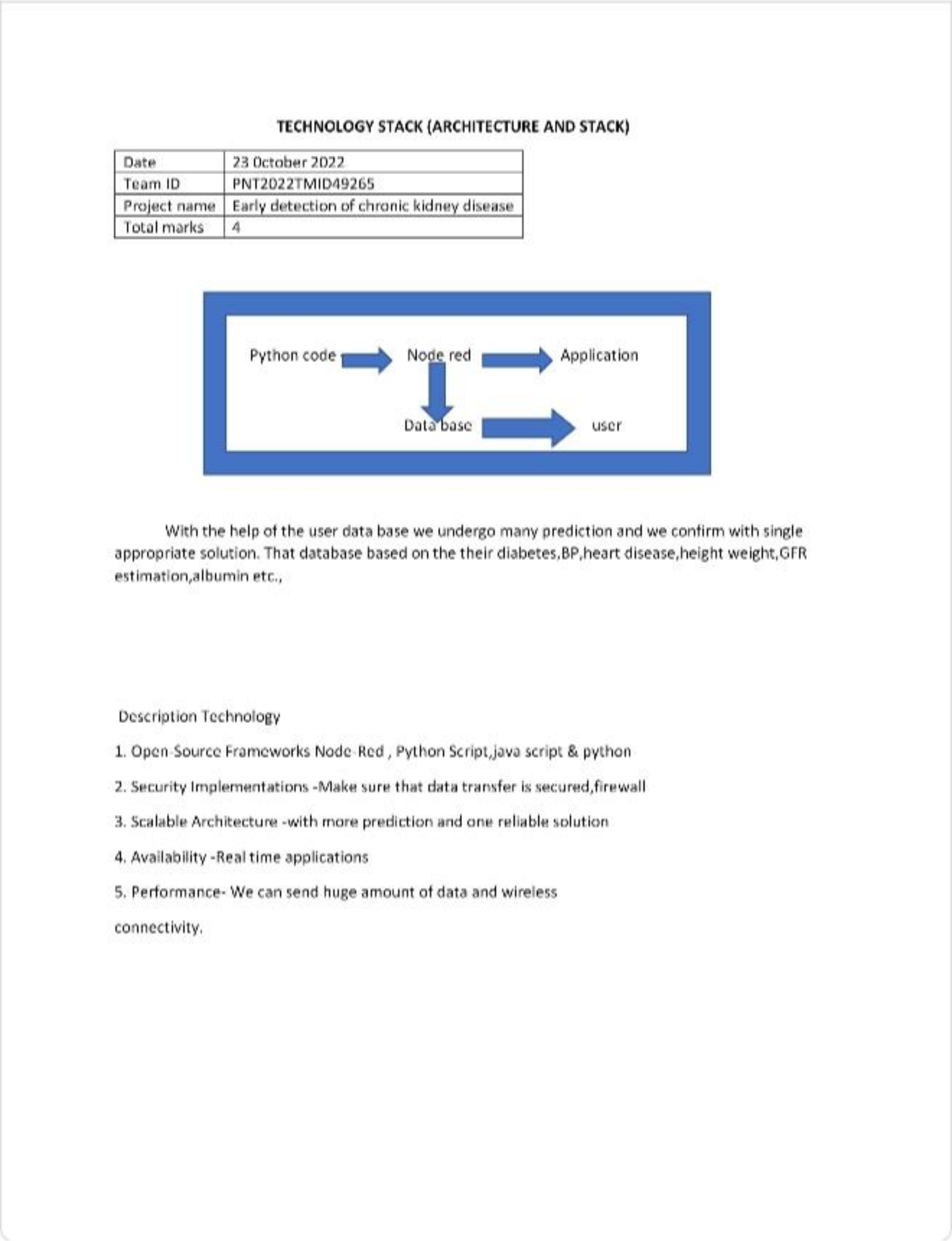
2 CKD staging

3 Sugar detection

4 GFR quantification

5 Glucose quantification

- ## Technology architecture



TECHNOLOGY STACK (ARCHITECTURE AND STACK)

Date	23 October 2022
Team ID	PNT2022TMID49265
Project name	Early detection of chronic kidney disease
Total marks	4

Python code
Node red
Application
Data base
user

With the help of the user data base we undergo many prediction and we confirm with single appropriate solution. That database based on the their diabetes,BP,heart disease,height weight,GFR estimation,albumin etc.,

Description Technology

1. Open-Source Frameworks Node-Red , Python Script,java script & python

2. Security Implementations -Make sure that data transfer is secured,firewall

3. Scalable Architecture -with more prediction and one reliable solution

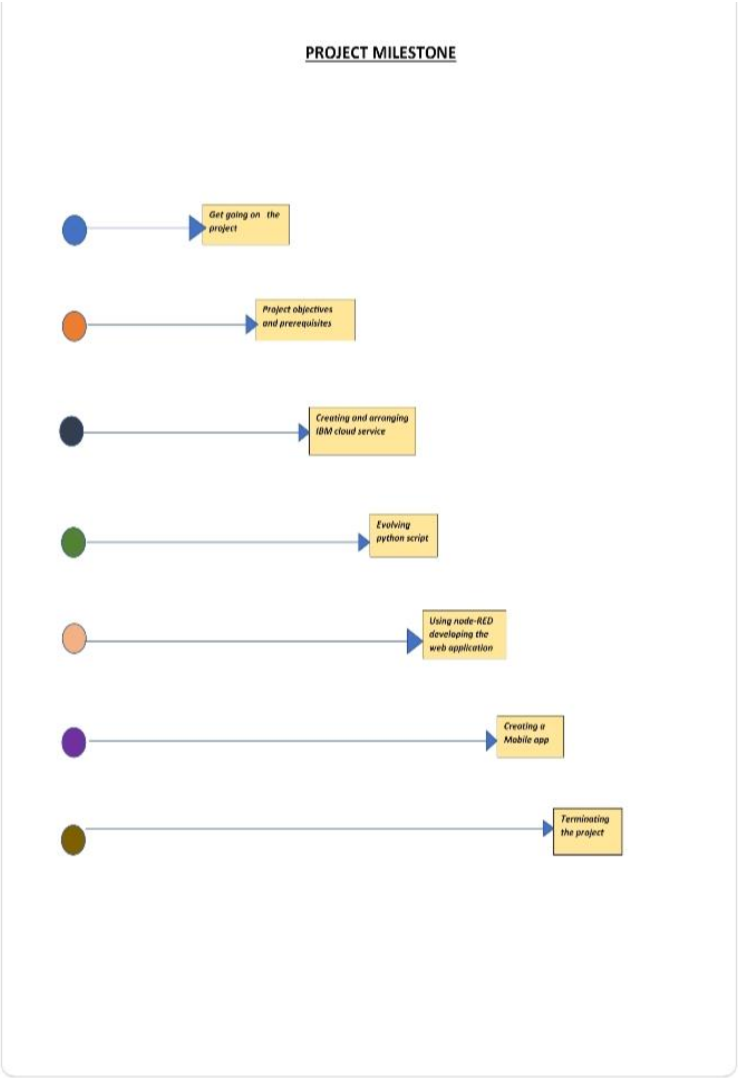
4. Availability -Real time applications

5. Performance- We can send huge amount of data and wireless

connectivity.

4. Project planning phase

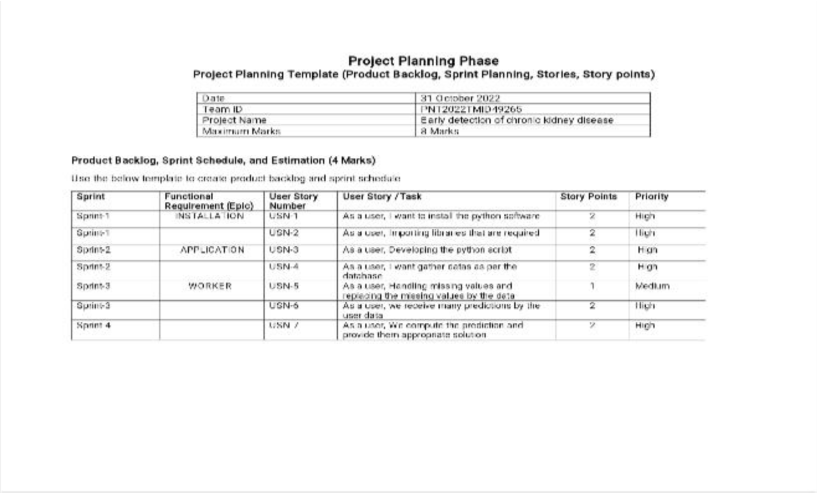
- **Prepare milestone and Activity list**



PROJECT MILESTONE

Get going on the project
Project objectives and prerequisites
Creating and arranging IBM cloud service
Evolving python script
Using node-RED developing the web application
Creating a Mobile app
Terminating the project

- ## Sprint delivery plan



Project Planning Phase

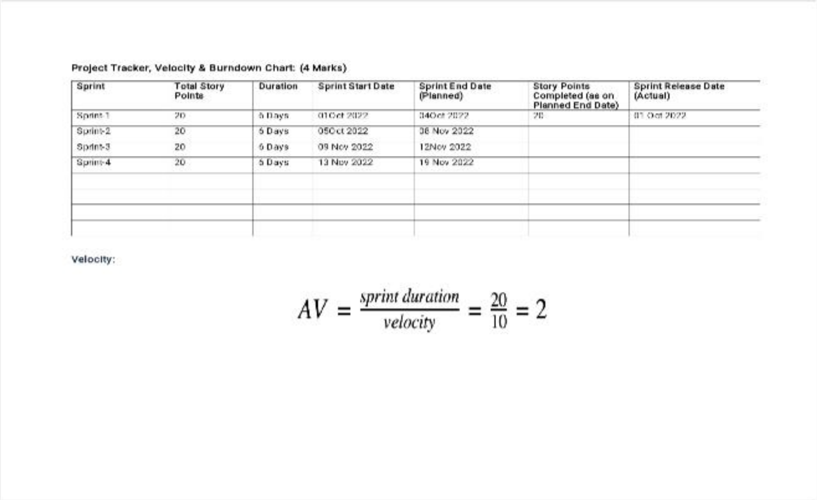
Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	31 October 2022
Team ID	PNT2022TMID49265
Project Name	Early detection of chronic kidney disease
Maximum Marks	8 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	INSTALLATION	USN-1	As a user, I want to install the python software	2	High
Sprint-1		USN-2	As a user, Importing libraries that are required	2	High
Sprint-2	APPLICATION	USN-3	As a user, Developing the python script	2	High
Sprint-2		USN-4	As a user, I want gather datas as per the database	2	High
Sprint-3	WORKER	USN-5	As a user, Handling missing values and replacing the missing values by the data	1	Medium
Sprint-3		USN-6	As a user, we receive many predictions by the user data	2	High
Sprint 4		USN 7	As a user, We compute the prediction and provide them appropriate solution	2	High



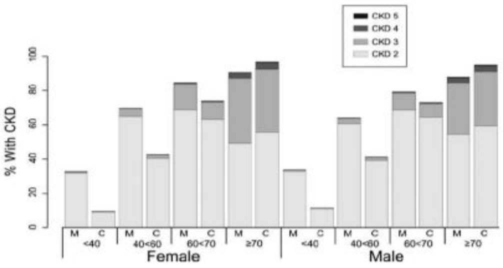
Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	5 Days	01Oct 2022	04Oct 2022	20	01 Oct 2022
Sprint-2	20	5 Days	05Oct 2022	08 Nov 2022		
Sprint-3	20	6 Days	09 Nov 2022	12Nov 2022		
Sprint-4	20	5 Days	13 Nov 2022	19 Nov 2022		

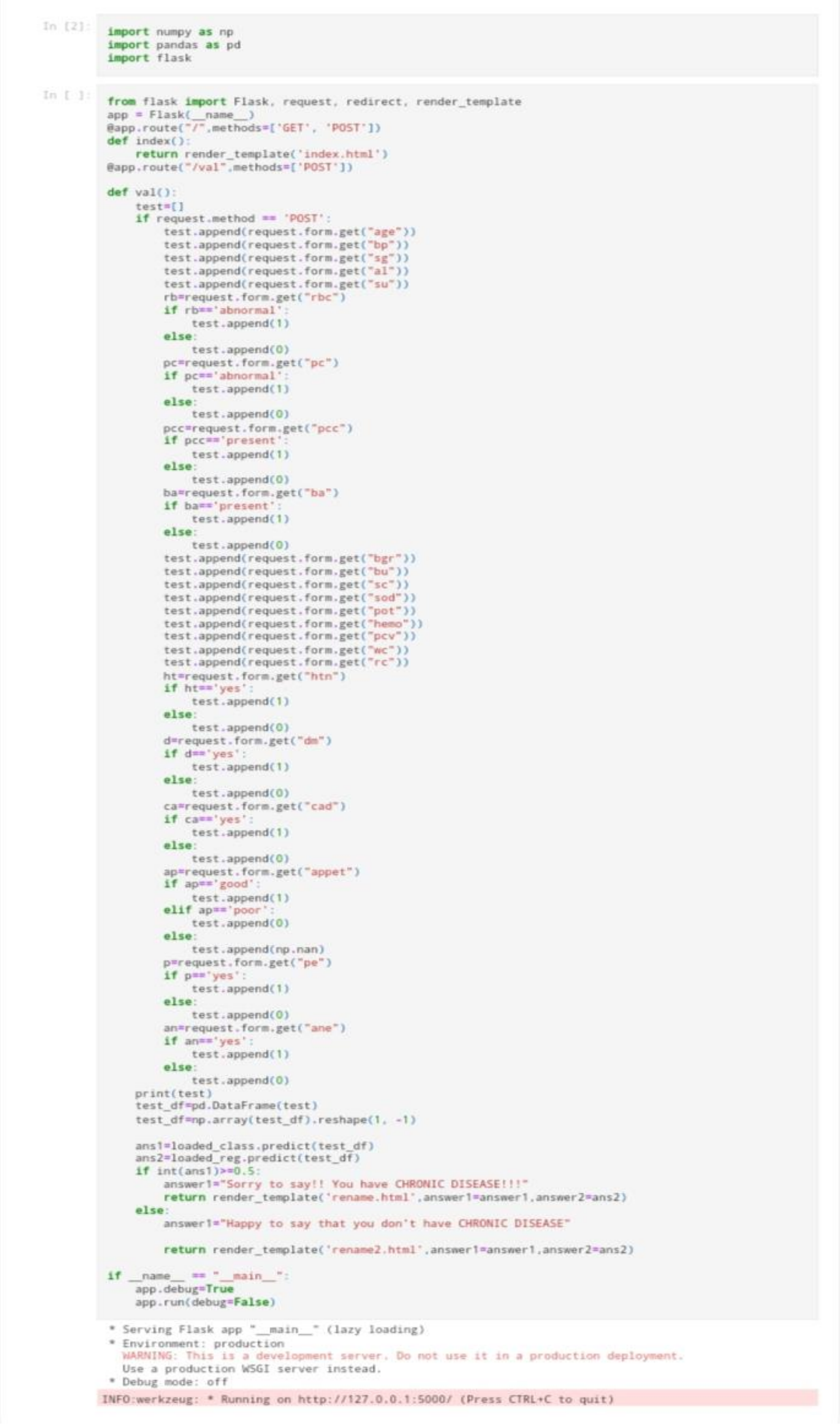
Velocity:

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burn down Chart:



5. Python code



```
In [2]:

import numpy as np
import pandas as pd
import flask
```

```
In [ ]:

from flask import Flask, request, redirect, render_template
app = Flask(__name__)
@app.route("/",methods=['GET', 'POST'])
def index():
    return render_template('index.html')
@app.route("/val",methods=['POST'])

def val():
    test=[]
    if request.method == 'POST':
        test.append(request.form.get("age"))
        test.append(request.form.get("bp"))
        test.append(request.form.get("sg"))
        test.append(request.form.get("al"))
        test.append(request.form.get("su"))
        rb=request.form.get("rbc")
        if rb=='abnormal':
            test.append(1)
        else:
            test.append(0)
        pc=request.form.get("pc")
        if pc=='abnormal':
            test.append(1)
        else:
            test.append(0)
        pcc=request.form.get("pcc")
        if pcc=='present':
            test.append(1)
        else:
            test.append(0)
        ba=request.form.get("ba")
        if ba=='present':
            test.append(1)
        else:
            test.append(0)
        test.append(request.form.get("bgr"))
        test.append(request.form.get("bu"))
        test.append(request.form.get("sc"))
        test.append(request.form.get("sod"))
        test.append(request.form.get("pot"))
        test.append(request.form.get("hemo"))
        test.append(request.form.get("pcv"))
        test.append(request.form.get("wc"))
        test.append(request.form.get("rc"))
        ht=request.form.get("htn")
        if ht=='yes':
            test.append(1)
        else:
            test.append(0)
        d=request.form.get("dm")
        if d=='yes':
            test.append(1)
        else:
            test.append(0)
        ca=request.form.get("cad")
        if ca=='yes':
            test.append(1)
        else:
            test.append(0)
        ap=request.form.get("appet")
        if ap=='good':
            test.append(1)
        elif ap=='poor':
            test.append(0)
        else:
            test.append(np.nan)
        p=request.form.get("pe")
        if p=='yes':
            test.append(1)
        else:
            test.append(0)
        an=request.form.get("ane")
        if an=='yes':
            test.append(1)
        else:
            test.append(0)
    print(test)
    test_df=pd.DataFrame(test)
    test_df=np.array(test_df).reshape(1, -1)

    ans1=loaded_class.predict(test_df)
    ans2=loaded_reg.predict(test_df)
    if int(ans1)>=0.5:
        answer1="Sorry to say!! You have CHRONIC DISEASE!!!"
        return render_template('rename.html',answer1=answer1,answer2=ans2)
    else:
        answer1="Happy to say that you don't have CHRONIC DISEASE"

        return render_template('rename2.html',answer1=answer1,answer2=ans2)

if __name__ == "__main__":
    app.debug=True
    app.run(debug=False)
```

```
 * Serving Flask app "__main__" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
INFO:werkzeug: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

6. HTML code

- **Indexnew**

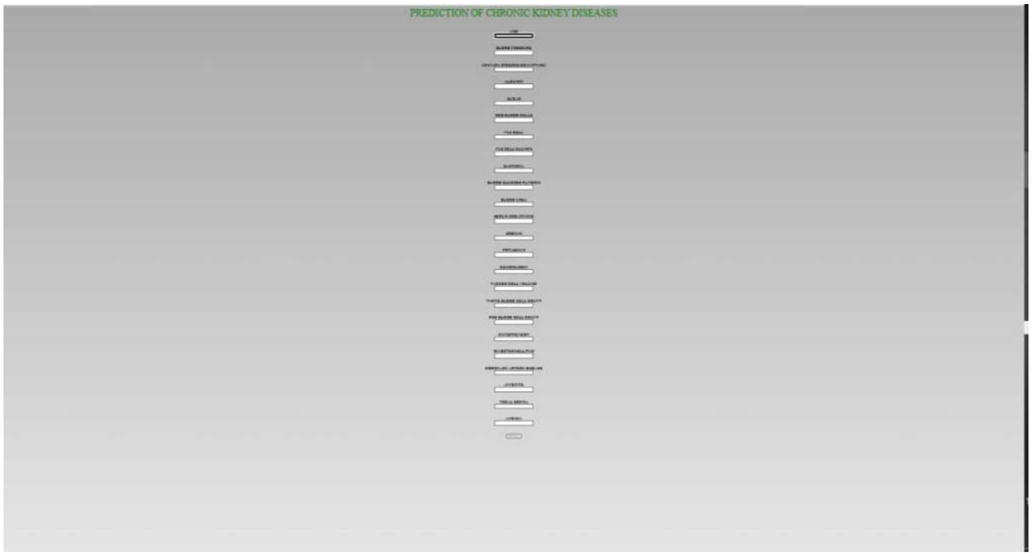
```
<html>
<head>
<meta http-equiv=”Content-Type”
content=”text/html;charset=UTF-8”>
<title>CKD</title>
<style>
Body {

Background: linear-gradient(
          Rgba(10,10,10, .35),
          Rgba(10,10,10, .105)),
          url(https://www.shutterstock.com/image-
photo/concept-world-kidney-day-handcraft-paper-1923158732);
  background-position: center;
 background-repeat: no-repeat;
 background-size: cover;


container {
 border: 2px solid #ccc;
 padding: 10px;
 width: 20em;
height:21em;
background-color:white
;
}


.hello{
Opacity: 0.5;
}
</style>
</head>

<body>

<center><p style=”font-size:50px;color:GREEN;”>PREDICTION OF
CHRONIC KIDNEY DISEASES</p></center>
<form action=”/val” method=”post”><center>
  <label for=”age”><p style=”font-
size:20px;color:black;”><strong>AGE</strong></label><br>
  <input type=”text” id=”age” name=”age”><br><br><br>


    <label for=”bp”><strong>BLOOD
PRESSURE</strong></label><br>
  <input type=”text” id=”bp” name=”bp”>
<br>
<br>
<br>
  <label for=”sg”><strong>URINARY SPECIFIC
GRAVITY(SG)</strong></label><br>
  <input type=”text” id=”sg” name=”sg”>
<br>
```

```
<br>
<br>
  <label for=”al”><strong>ALBUMIN</strong></label><br>
  <input type=”text” id=”al” name=”al”>
<br>
<br>
<br>
  <label for=”su”><strong>SUGAR</strong></label><br>
  <input type=”text” id=”su” name=”su”>
<br>
<br>
<br>
  <label for=”rbc”><strong>RED BLOOD
CELLS</strong></label><br>
  <input type=”text” id=”rbc” name=”rbc”>
<br>
<br>
<br>
  <label for=”pc”><strong>PUS CELL</strong></label><br>
  <input type=”text” id=”pc” name=”pc”>
<br>
<br>
<br>
  <label for=”pcc”><strong>PUS CELL
CLUMPS</strong></label><br>
  <input type=”text” id=”pcc” name=”pcc”>
<br>
<br>
<br>
  <label for=”ba”><strong>BACTERIA</strong></label><br>
  <input type=”text” id=”ba” name=”ba”>
<br>
<br>
<br>
  <label for=”bgr”><strong>BLOOD GLUCOSE
RANDOM</strong></label><br>
  <input type=”text” id=”bgr” name=”bgr”>
<br>
<br>
<br>
  <label for=”bu”><strong>BLOOD UREA</strong></label><br>
  <input type=”text” id=”bu” name=”bu”>
<br>
<br>
<br>
  <label for=”sc”><strong>SERUM
CREATININE</strong></label><br>
  <input type=”text” id=”sc” name=”sc”>
<br>
<br><br>
  <label for=”sod”><strong>SODIUM</strong></label><br>
  <input type=”text” id=”sod” name=”sod”>
<br>
<br>
<br>ni
  <label for=”pot”><strong>POTASSIUM</strong></label><br>
  <input type=”text” id=”pot” name=”pot”>
<br>
<br>
<br>
```

```
  <label
for=”hemo”><strong>HEMOGLOBIN</strong></label><br>
  <input type=”text” id=”hemo” name=”hemo”>
<br>
<br>
<br>
  <label for=”pcv”><strong>PACKED CELL
VOLUME</strong></label><br>
  <input type=”text” id=”pcv” name=”pcv”>
<br>
<br>
<br>
  <label for=”wc”><strong>WHITE BLOOD CELL
COUNT</strong></label><br>
  <input type=”text” id=”wc” name=”wc”>
<br>
<br>
<br>
  <label for=”rc”><strong>RED BLOOD CELL
COUNT</strong></label><br>
  <input type=”text” id=”rc” name=”rc”>
<br>
<br>
<br>
  <label for=”htn”><strong>HYPERTENSION</strong></label><br>
  <input type=”text” id=”htn” name=”htn”>
<br>
<br>
<br>
```

```
  <label
for=”dm”><strong>DIABETESMELLITUS</strong></label><br>
  <input type=”text” id=”dm” name=”dm”>
<br>
<br>
<br>
  <label for=”cad”><strong>CORONARY ARTERY
DISEASE</strong></label><br>
  <input type=”text” id=”cad” name=”cad”>
<br>
<br>
<br>
  <label for=”appet”><strong>APPETITE</strong></label><br>
  <input type=”text” id=”appet” name=”appet”>
<br>
<br>
<br>
  <label for=”pe”><strong>PEDAL EDEMA</strong></label><br>
  <input type=”text” id=”pe” name=”pe”>
<br>
<br>
<br>
  <label for=”ane”><strong>ANEMIA</strong></label><br>
  <input type=”text” id=”ane” name=”ane”>
<br>
<br></center>
  <center><strong><button
type=”submit”>PREDICT</button></center></strong>
</form>
</body>
```

```
        </html>
```

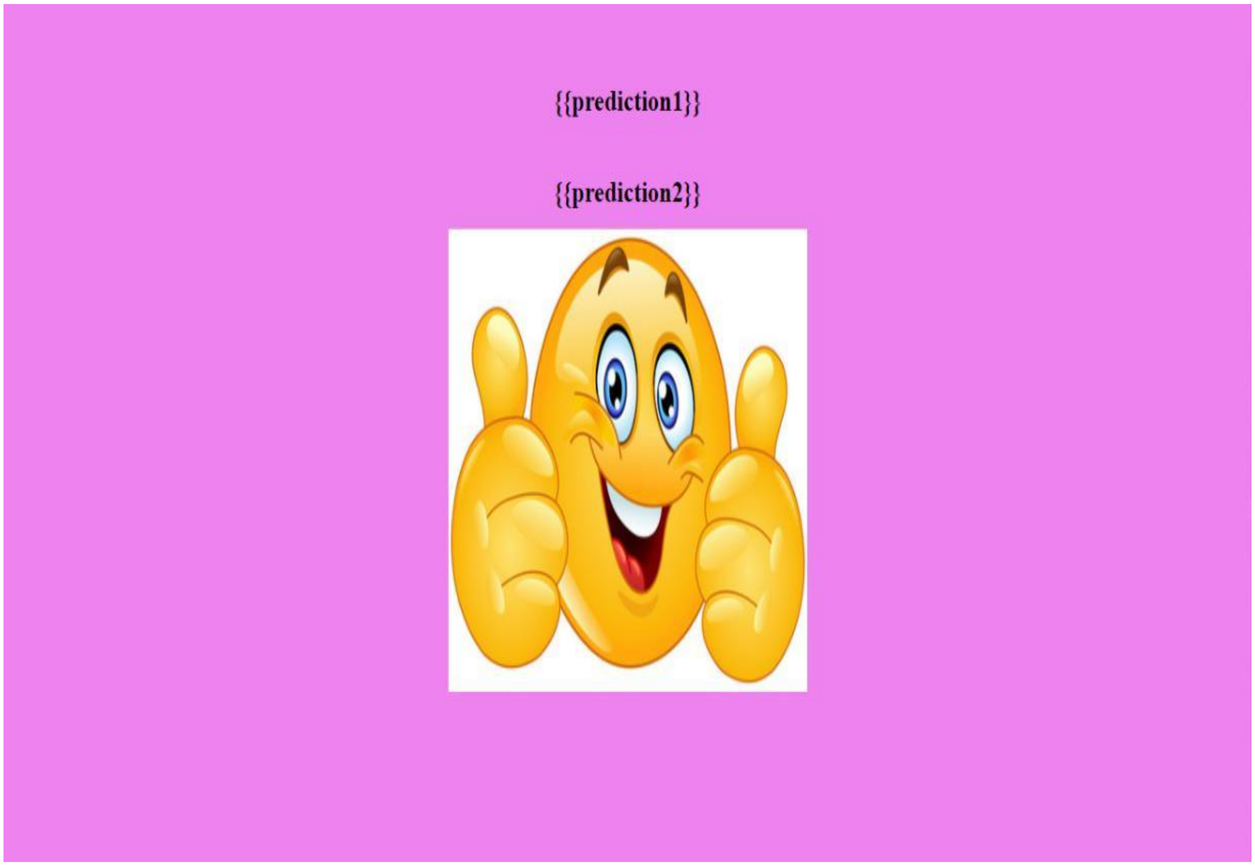


PREDICTION OF CHRONIC KIDNEY DISEASES

- **Result 1**

```
<html>

<head>

<style>

body {

  background-color:violet;

}

</style>

</head>

<body >

<br>

<br>

<br>
```

```
<center><h1>{{prediction1}} </h1></center>

<br>

<center><h1>{{prediction2}} </h1></center>


<center><img  alt="Qries"  src="https://cdn.vectorstock.com/i/preview-1x/08/77/double-thumbs-up-emoticon-vector-41910877.jpg"

width="500" height="500"></center>

        </body>
        </html>
```



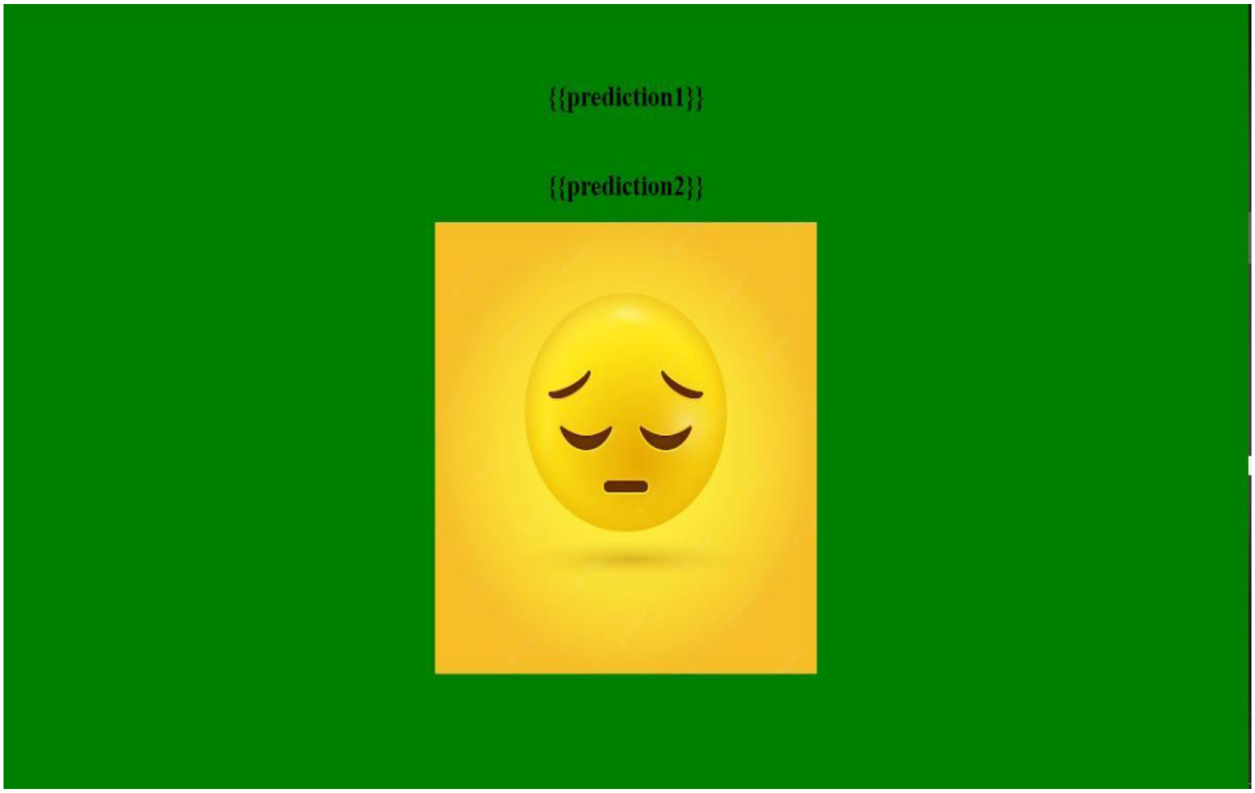
{{prediction1}}

{{prediction2}}

- **Result 2**

```
<html>
<head>
<style>
body {
  background-color:green;
}
</style>
</head>
<body >
<br>
<br>
<br>
<center><h1>{{prediction1}} </h1></center>
<br>
<center><h1>{{prediction2}} </h1></center>

<center><img  alt="Qries" src="https://img.freepik.com/premium-vector/pensive-sad-emoji-face-3d-disappointed-emoticon_248162-149.jpg?w=740"
              width="500"  height="500"></center>

</body>
```

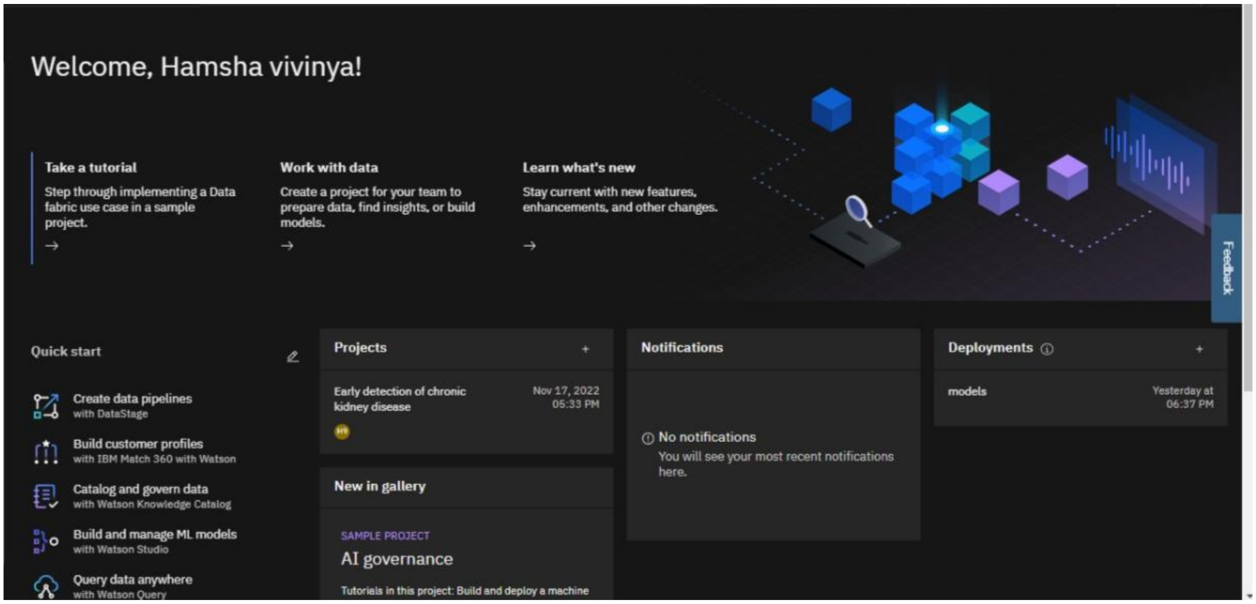
```
</html>
```



{{prediction1}}

{{prediction2}}

7. Deployment machine learning



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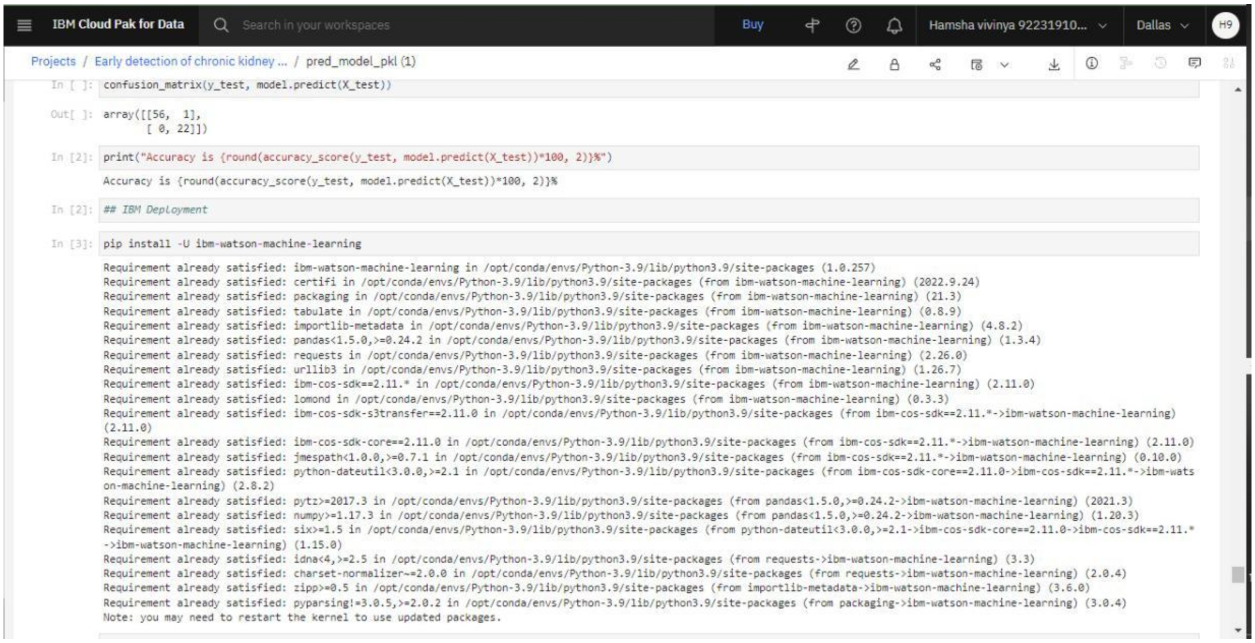
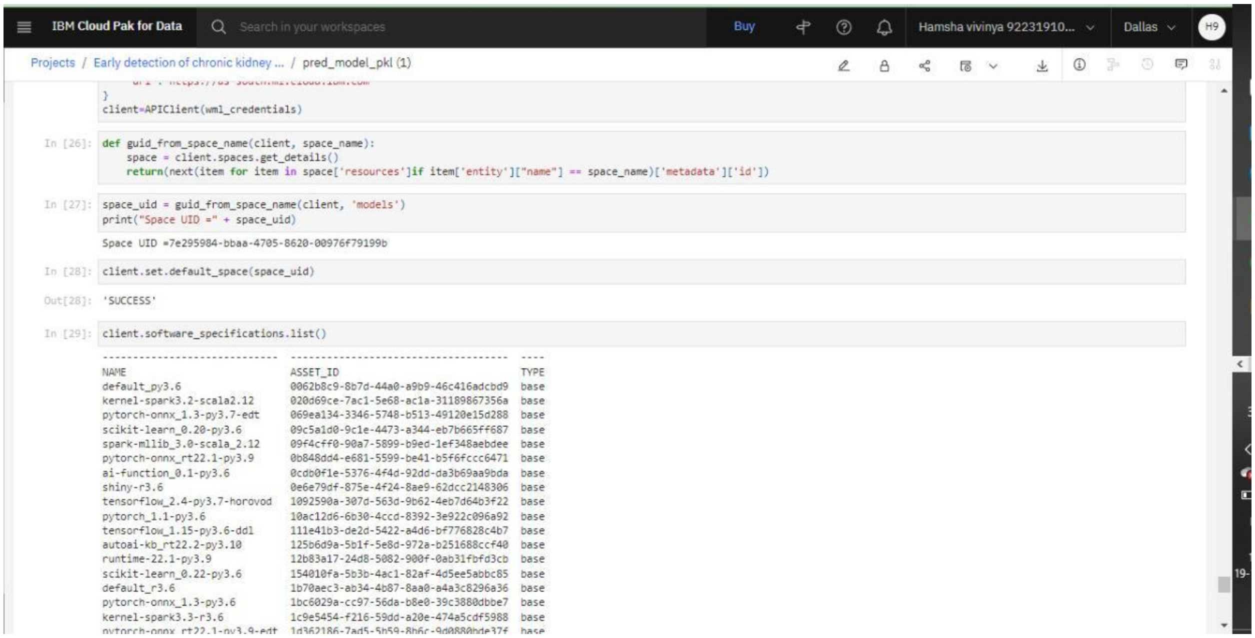


Projects / Early detection of chronic kidney ... / pred_model_pkl (1)

```
In [ ]: confusion_matrix(y_test, model.predict(X_test))

Out[ ]: array([[56,  1],
               [ 0, 22]])

In [2]: print("Accuracy is {round(accuracy_score(y_test, model.predict(X_test))*100, 2)}%")

        Accuracy is {round(accuracy_score(y_test, model.predict(X_test))*100, 2)}%

In [2]: ## IBM Deployment

In [3]: pip install -U ibm-watson-machine-learning

        Requirement already satisfied: ibm-watson-machine-learning in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (1.0.257)
        Requirement already satisfied: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (2022.9.24)
        Requirement already satisfied: packaging in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (21.3)
        Requirement already satisfied: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (0.8.9)
        Requirement already satisfied: importlib-metadata in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (4.8.2)
        Requirement already satisfied: pandas<1.5.0,>=0.24.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (1.3.4)
        Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (2.26.0)
        Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (1.26.7)
        Requirement already satisfied: ibm-cos-sdk==2.11.* in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (2.11.0)
        Requirement already satisfied: lomond in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (0.3.3)
        Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk==2.11.*->ibm-watson-machine-learning)
        (2.11.0)
        Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk==2.11.*->ibm-watson-machine-learning) (2.11.0)
        Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk==2.11.*->ibm-watson-machine-learning) (0.10.0)
        Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk-core==2.11.0->ibm-cos-sdk==2.11.*->ibm-wats
        on-machine-learning) (2.8.2)
        Requirement already satisfied: pytz>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm-watson-machine-learning) (2021.3)
        Requirement already satisfied: numpy>=1.17.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm-watson-machine-learning) (1.20.3)
        Requirement already satisfied: six>=1.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from python-dateutil<3.0.0,>=2.1->ibm-cos-sdk-core==2.11.0->ibm-cos-sdk==2.11.*
        ->ibm-watson-machine-learning) (1.15.0)
        Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->ibm-watson-machine-learning) (3.3)
        Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->ibm-watson-machine-learning) (2.0.4)
        Requirement already satisfied: zipp>=0.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from importlib-metadata->ibm-watson-machine-learning) (3.6.0)
        Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from packaging->ibm-watson-machine-learning) (3.0.4)
        Note: you may need to restart the kernel to use updated packages.
```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Projects / Early detection of chronic kidney ... / pred_model_pkl (1)

```
    'url': 'https://us-south.ml.cloud.ibm.com'
}
client=APIClient(wml_credentials)
```

```
In [26]: def guid_from_space_name(client, space_name):
             space = client.spaces.get_details()
             return(next(item for item in space['resources']if item['entity']["name"] == space_name)['metadata']['id'])
```

```
In [27]: space_uid = guid_from_space_name(client, 'models')
         print("Space UID =" + space_uid)

         Space UID =7e295984-bbaa-4705-8620-00976f79199b
```

```
In [28]: client.set.default_space(space_uid)

Out[28]: 'SUCCESS'
```

```
In [29]: client.software_specifications.list()

         ----------------------------  ------------------------------------  ----
         NAME                          ASSET_ID                              TYPE
         default_py3.6                 0062b8c9-8b7d-44a0-a9b9-46c416adcbd9  base
         kernel-spark3.2-scala2.12     020d69ce-7ac1-5e68-ac1a-31189867356a  base
         pytorch-onnx_1.3-py3.7-edt    069ea134-3346-5748-b513-49120e15d288  base
         scikit-learn_0.20-py3.6       09c5a1d0-9c1e-4473-a344-eb7b665ff687  base
         spark-mllib_3.0-scala_2.12    09f4cff0-90a7-5899-b9ed-1ef348aebdee  base
         pytorch-onnx_rt22.1-py3.9     0b848dd4-e681-5599-be41-b5f6fccc6471  base
         ai-function_0.1-py3.6         0cdb0f1e-5376-4f4d-92dd-da3b69aa9bda  base
         shiny-r3.6                    0e6e79df-875e-4f24-8ae9-62dcc2148306  base
         tensorflow_2.4-py3.7-horovod  1092590a-307d-563d-9b62-4eb7d64b3f22  base
         pytorch_1.1-py3.6             10ac12d6-6b30-4ccd-8392-3e922c096a92  base
         tensorflow_1.15-py3.6-ddl     111e41b3-de2d-5422-a4d6-bf776828c4b7  base
         autoai-kb_rt22.2-py3.10       125b6d9a-5b1f-5e8d-972a-b251688ccf40  base
         runtime-22.1-py3.9            12b83a17-24d8-5082-900f-0ab31fbfd3cb  base
         scikit-learn_0.22-py3.6       154010fa-5b3b-4ac1-82af-4d5ee5abbc85  base
         default_r3.6                  1b70aec3-ab34-4b87-8aa0-a4a3c8296a36  base
         pytorch-onnx_1.3-py3.6        1bc6029a-cc97-56da-b8e0-39c3880dbbe7  base
         kernel-spark3.3-r3.6          1c9e5454-f216-59dd-a20e-474a5cdf5988  base
         pytorch-onnx_rt22.1-py3.9-edt 1d362186-7ad5-5b59-8b6c-9d0880bde37f  base
```