

# StatisticalMachine Learning Approaches to Liver DiseasePrediction

TEAM ID: PNT2022TMID14570

## 1. INTRODUCTION

### Project Overview

It is essential to diagnose liver disease early in order to save lives and take the necessary steps to control the condition. The ensemble approach has been successfully used in a number of sectors, particularly in the field of medical science. This study examines the early diagnosis of liver illness using a variety of ensemble-methodologies.

### Purpose

Our project's objective is to analyse data from liver patients with a focus on the correlations between a vital list of liver enzymes, proteins, age and gender using them to try and predict the likeliness of liver disease. We are creating a model in thisinstance by utilizing different machine learning algorithms to identify the most accurate model. and incorporate into web applications built with flask. By entering certain parameters into the web application, users can predict the disease.

## 2. LITERATURE SURVEY

### a. Existing problem

The liver related diseases are identified by analysing liver function blood test reports and scan reports. This paper while employing different data mining algorithms to ease this process,it is possible to reduce the time for diagnosing the liver disease. But it doesn't assisting making effective decisions and some accuracy Issues.

### b. References

1. **TITLE:** "A Comparative Analysis of Unsupervised Machine Techniques for Liver Disease Prediction"

**AUTHOR:** Varun Vats

**YEAR:** 2018

He considered three different ML (Machine Learning) algorithms. A comparison of these algorithms had been carried out for evaluating their forecasting accuracy and computing intricacy. These algorithms included AP (Affinity Propagation), K means and DBSCAN. This work was dedicated to the

medical dataset based on liver disorders. This work made use of the Silhouette coefficient to measure the comparative efficiency of the considered algorithmic approaches.

2. **TITLE :** "Prognosis of Liver Disease using Machine Learning Algorithms"

**AUTHOR:** Vyshali J Gogi

**YEAR :** 2018

He stated that the healthcare sector had a lot of data but this data was of no use [17]. This ample data required a leading analytic tool so that the hidden relationship and the valuable knowledge could be determined. The liver disease referred to the medical condition of the human liver-related to the human liver. The liver diseases led to sudden changes in health conditions that governed the functioning of the liver affecting other internal body organs. This work made use of several classification algorithms based on data mining. These algorithms included DT (Decision Tree), LD (Linear Discriminant), SVM Fine Gaussian, and LR (Logistic Regression). This work made use of Lab-based metrics of patients in the form of a liver dataset.

3. **TITLE:** "Accuracy Prediction Using Machine Learning Techniques for Indian Patient Liver Disease"

**AUTHOR:** Auxilia

**YEAR:** 2018

She stated that the use of medical datasets had attracted the medical experts globally [18]. The use of ML (Machine Learning) algorithms was quite common as a branch of making selection expressively helpful networks for the prediction of diseases by arranging therapy-based datasets. Grouping schemes had been generally employed as a segment of the curative domain for extracting order more efficiently as compared to a signal classification model. The disorders of

the Liver malady could be described as liver damage or sickness. Liver disorder can be categorized into several categories. This work made use of standard Indian liver illness patient records as a database for providing support to the researcher

4. **TITLE:** “New Fuzzy-ANWKNN algorithm for the successful prediction of liverdisorder”

**AUTHOR:** Pushpendra Kumar

**YEAR:** 2019

He stated that it was a very difficult task for the doctors to detect the consequences of liver disorders on a person . In general, researchers used datasets based on LFT (Liver Function Test) for implementing classification algorithms so that the predictions about liver disorders could be generated. The dataset based on ground truth had several problems such as a class imbalance in the liver disorder data. With regard to the majority classes, the classic algorithms of classification generated influenced outcomes. This work presented a new Fuzzy-ANWKNN algorithm for the successful prediction of liver disorder.

5. **TITLE:** “To accurately predict liver disorder by means of several data mining algorithms”

**AUTHOR:** Sanjay Kumar

**YEAR:** 2018

He described different classification approaches by implementing them on the dataset of patients suffering from liver diseases . The main objective herewas to accurately predict liver disorder by means of several data mining algorithms. This work performed the analysis using the dataset of real-time patients to build classification paradigms for the prediction of liver diseases. This work implemented five classification algorithms on the used dataset. This work analysed different metrics such as precision, recall, and accuracyfor determining the efficiency of the implemented classification models.

#### c. :ProblemStatement Definition

The main objective of this project is to analyse the parameters of various classification algorithms and compare their predictive accuracies so as to find out the best classifier for determining the liver disease. Here we are building a modelby

applying various machine learning algorithms to find the best accurate model and integrate it to a flask-based web application. User can predict the disease by entering parameters in the web application. ML algorithms are new techniques to handle many hidden problems in medical data sets. This approach can help healthcare management and professionals to explore better results in numerous clinical applications, such as medical image processing, language processing, and tumor or cancer cell detection, by finding appropriate features.

### 3. IDEATION & PROPOSEDSOLUTION

#### Empathy Map Canvas



#### Ideation & Brainstorming



#### a. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement	Statistical Machine Learning Approaches to Liver Disease Prediction
2.	Solution description	Analyze the parameters of various classification algorithms and compare their predictive accuracies so as to find out the best classifier for determining the liver disease.
3.	Performance	Effective development of application
4.	Social Impact / Customer Satisfaction	With the help of this analysis patients can detect liver disease an early stage and evaluate the condition of the disease
5.	Availability	24/7 service
6.	Precision of Disease	Based on accuracy and better performance of implemented classifiers, the development of application to predict liver disease of the patient.

### b. Problem Solution fit

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns

#### Purpose:

Solve complex problems in a way that fits the state of your customers. Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior. Sharpen your communication and marketing strategy with the right triggers and messaging. Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.

## 4. REQUIREMENT ANALYSIS

### Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement	Sub Requirement
FR-1	User Registration	Registration through Form
FR-2	User Confirmation	Confirmation via Email
FR-3	User Profile	Filling the profile page after logging in
FR-4	Uploading dataset	Patient data needed to upload
FR-5	Requesting solution	Patient data is compared with pre-defined data and solution is generated
FR-6	Solution display	The predicted solution is displayed on the screen

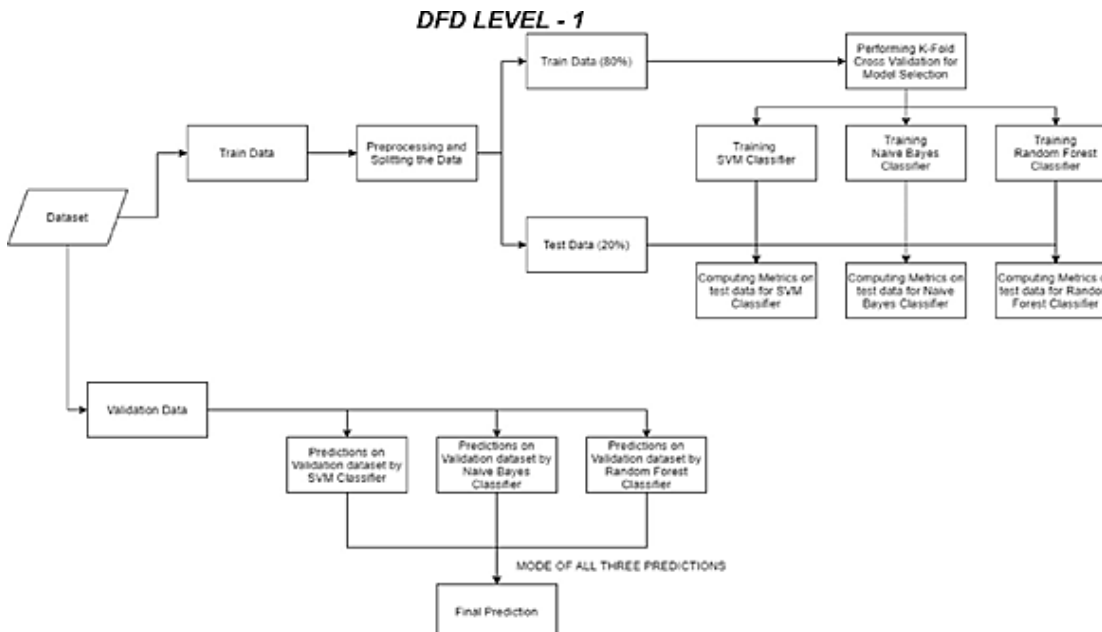
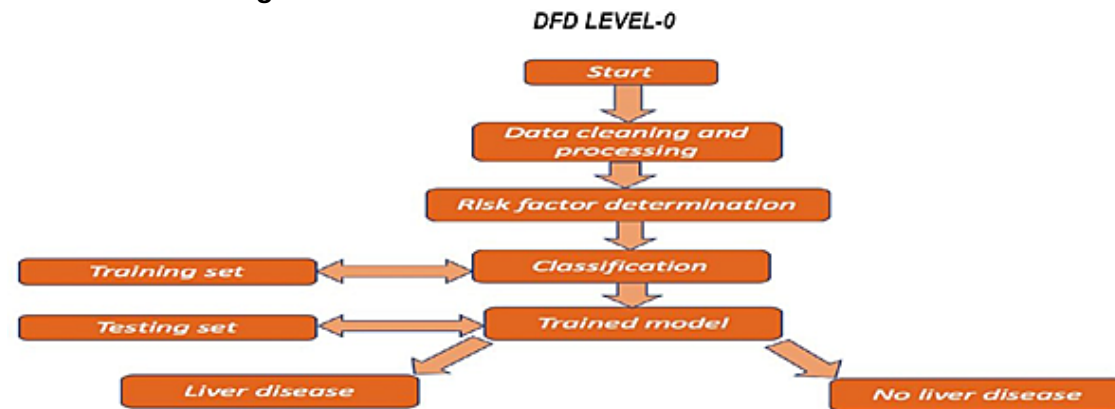
### Non-Functional requirement

Following are the non-functional requirements of the proposed solution.

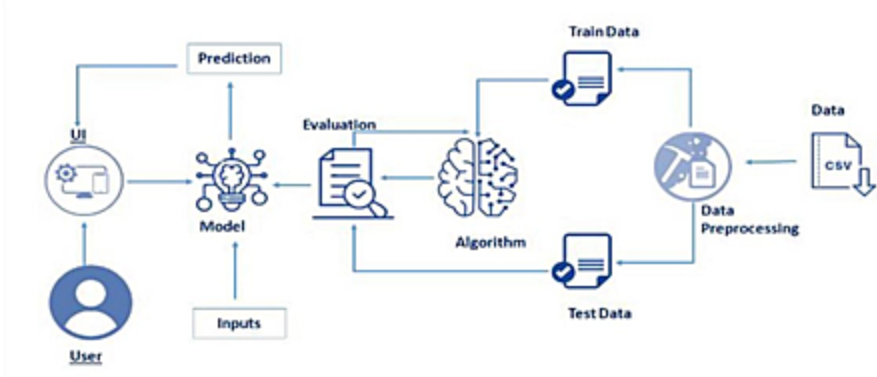
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The system allows the user to perform the tasks easily, effectively and efficiently.
NFR-2	Security	Assuring all data inside the system or its parts to be protected against malware attacks or unauthorized access.
NFR-3	Reliability	The website does not recover from failure quickly as it is running on a single server.
NFR-4	Performance	Response time and net processing time is fast.
NFR-5	Availability	The system will be available upto 95% of time
NFR-6	Scalability	The website is scalable

## 5. PROJECT DESIGN

### 5.1: Data Flow Diagrams



Solution & Technical Architecture



User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
	Login	USN-2	As a user, I can log into the application by entering email & password	I can login using my Email ID accounts or user credentials	High	Sprint-1
	Dashboard	USN-3	As a user, I can view the page of the application where I can upload my data and the result is predicted	I can access my account/ dashboard	High	Sprint-2
Customer (Web user)	Registration	USN-4	As a user, I can login to web dashboard just Like website dashboard	I can register using my username and password	Medium	Sprint-3
	Login	USN-5	As a user, I can login to my web dashboard with the login credentials	I can login using my User credentials	High	Sprint-3
	Dashboard	USN-6	As a user, I can view the web application where I can upload my data and the result is predicted	I can access my account/ dashboard	High	Sprint-4
		USN-7	As a user, the result predicted to me should be of higher accuracy	I can access my account/ dashboard	High	Sprint-4
Care Executive	Login	USN-8	As a care executive, I can login to the website using my login credentials	I can login to the website using my login credentials	High	Sprint-5
	Dashboard	USN-9	As a care executive, I can view the dashboard of application	I can access my dashboard	High	Sprint-5

6 . PROJECT PLANNING & SCHEDULING

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	10	5 Days	22 Oct 2022	26 Oct 2022	10	30 Oct 2022
Sprint-2	15	10 Days	26 Oct 2022	04 Nov 2022	15	06 Nov 2022
Sprint-3	15	10 Days	04 Nov 2022	13 Nov 2022	15	13 Nov 2022
Sprint-4	10	7 Days	13 Nov 2022	19 Nov 2022	10	20 Nov 2022

## 7.Coding and Solutioning

### 7.1 Featuring

```
Flask app > api_model.py > ...
1  #-*- coding: utf-8 -*-
2  """
3  Created on Tue Nov 15 10:13:21 2022
4
5  @author: HP
6  """
7
8
9  from flask import Flask, render_template, request
10 import pickle
11 import numpy as np
12 app = Flask(__name__)
13 model = pickle.load(open('RF.sav', 'rb'))
14
15 @app.route('/')
16 def home():
17     return render_template('Home.html')
18
19
20 @app.route('/predict', methods=['GET', 'POST'])
21 def index():
22     return render_template('Prediction.html')
23
24 @app.route('/data_predict', methods=['POST'])
25
26 def predict():
27
28     form_values = request.form.to_dict()
29     columns = ["age", "gender", "tb", "db", "ap", "aa1", "aa2", "tp", "a", "agr"]
30     data = np.asarray([float(form_values[i].strip()) for i in columns]).reshape(1,-1)
31
32
33     prediction = model.predict(data)[0]
34
35     if(prediction == 1):
36         return render_template('Output.html', prediction = 'You have a liver disease and you must take treatment')
37     else :
38
39
40
41
42     return render_template('Output.html', prediction = 'You do not have liver disease')
43
44 if __name__ == '__main__':
45     app.run(debug=True)
```

```
Flask app > api_scoring_ibm_cloud.py > ...
1  import requests
2
3  import flask
4  from flask import render_template, request
5  from flask_cors import CORS
6
7  # NOTE: you must manually set API_KEY below using information retrieved from your IBM Cloud account.
8  API_KEY = "mEN1R-IypecvD80J3TmLAuEF69C53dealliqClu7Qg-m"
9  token_response = requests.post('https://iam.cloud.ibm.com/identity/token', data={"apikey":
10 API_KEY, "grant_type": 'urn:ibm:params:oauth:grant-type:apikey'})
11 mltoken = token_response.json()["access_token"]
12
13 header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' + mltoken}
14
15 app = flask.Flask(__name__, static_url_path='')
16 CORS(app)
17
18 @app.route('/', methods=['GET', 'POST'])
19 def home():
20     return render_template('Home.html')
21
22
23 @app.route('/predict', methods=['GET', 'POST'])
24 def index():
25     return render_template('Prediction.html')
26
27 @app.route('/data_predict', methods=['POST'])
28
29 def predict():
30     age = float(request.form['age'])
31     gender = float(request.form['gender'])
32     tb = float(request.form['tb'])
33     db = float(request.form['db'])
34     ap = float(request.form['ap'])
35     aa1 = float(request.form['aa1'])
36     aa2 = float(request.form['aa2'])
37     tp = float(request.form['tp'])
```



```

38 | a =float(request.form['a'])
39 | agr =float(request.form['agr'])
40 |
41 | X=[[age,gender,tb,db,ap,aa1,aa2,tp,a,agr]]
42 |
43 | # NOTE: manually define and pass the array(s) of values to be scored in the next line
44 | payload_scoring = {"input_data": [{"field": [['age','gender','tb','db','ap','aa1','aa2','tp','a','agr']], "values": X}]}
45 |
46 | response_scoring = requests.post('https://us-south.ml.cloud.ibm.com/ml/v4/deployments/58fa0711-e9d9-4847-adca-ce45c5a43f93/predictions?version=2022-11-18', json=payload_scoring, headers={'Authorization': 'Bearer ' + mltoken})
47 | predictions = response_scoring.json()
48 | predict = predictions['predictions'][0]['values'][0][0]
49 | if(predict == 1):
50 |     return render_template('Output.html',prediction = 'You have a liver disease and you must take treatment')
51 | else :
52 |     return render_template('Output.html',prediction = 'You have dont have liver')
53 |
54 |
55 |
56 | if __name__ == '__main__':
57 |     app.run(debug=True)

```

## 7.2 Feature 2

```

Flask app > templates > Home.html > ...
1 | <!DOCTYPE html>
2 | <html lang="en">
3 |
4 | <head>
5 |     <!-- Required meta tags always come first -->
6 |     <meta charset="utf-8">
7 |     <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
8 |     <meta http-equiv="x-ua-compatible" content="ie=edge">
9 |
10 |     <!-- Bootstrap CSS -->
11 |     <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/bootstrap/dist/css/bootstrap.min.css') }}">
12 |     <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/font-awesome/css/font-awesome.min.css') }}">
13 |     <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/bootstrap-social/bootstrap-social.css') }}">
14 |     <link rel="stylesheet" href="{{ url_for('Static',filename='Static/css/ibmcss.css') }}">
15 |
16 |     <title>Liver disease prediction</title>
17 |
18 | </head>
19 | <body>
20 |     <nav class="navbar navbar-dark navbar-expand-sm fixed-top" style="background-color: #9575CD;">
21 |         <div class="container">
22 |             <h1 style="color: #floralwhite">Liver Disease Prediction</h1>
23 |             <button class="navbar-toggler" type="button" data-toggle="collapse" data-target="#Navbar">
24 |                 <span class="navbar-toggler-icon"></span>
25 |             </button>
26 |
27 |             <div class="collapse navbar-collapse" id="Navbar">
28 |
29 |                 <ul class="navbar-nav ml-auto">
30 |                     <li class="nav-item"><a class="nav-link" href="#"><span class="fa fa-home fa-lg"></span>Home</a></li>
31 |                     <li class="nav-item active"><a class="nav-link" href="/predict"><span class="fa fa-info fa-lg"></span>Goto predict</a> </li>
32 |                 </ul>
33 |
34 |             </div>
35 |
36 |         </div>
37 |     </nav>

```

```

38 |
39 | </nav>
40 | <header class="jumbotron" >
41 |   <div class="container">
42 |     <div class="row row-header" style="padding-top: 60px;">
43 |       <div class="col-12 col-sm-8">
44 |         <h1>Liver Disease</h1>
45 |         <p>There are many types of liver disease, which can be caused by infections, inherited conditions, obesity and misuse of alcohol. Over time, liver disease
46 |         </div>
47 |         <div class="ml-auto">
48 |           
49 |         </div>
50 |       </div>
51 |     </div>
52 |   </header>
53 |
54 |
55 |
56 |   <div class="container">
57 |
58 |
59 |
60 |     <div class="row row-content">
61 |       <div class="col-sm-8">
62 |         <h2>What is Liver Disease?</h2>
63 |         <p>Your liver is your body's second-largest organ (after the skin). It sits just under your ribcage on the right side and is about the size of a footba
64 |         <h2>What causes different type of liver disease ?</h2>
65 |         <p>Different types of liver disease result from different causes. Liver disease may result from:</p>
66 |         <ul>
67 |           <li><p>Viral infections: Hepatitis A, hepatitis B and hepatitis C are diseases caused by a viral infection.</p></li>
68 |           <li><p>Problems with your immune system: When your immune system mistakenly attacks your liver, it can cause autoimmune liver diseases. These include p
69 |           <li><p>Inherited diseases: Some liver problems develop because of a genetic condition (one you inherit from your parents). Inherited liver diseases inc
70 |           <li><p>Cancer: When abnormal cells multiply in your liver, you may develop tumors. These tumors may be benign (noncancerous) or malignant (liver cancer
71 |           <li><p>Consuming too many toxins: Alcohol-related fatty liver disease is the result of alcohol use. Non-alcohol related fatty liver disease (NAFLD) res
72 |         <h2>What are the symptoms of liver disease?</h2>
73 |         <p>Some types of liver disease (including non-alcohol fatty liver disease) rarely cause symptoms. For other conditions, the most common symptom is jaun
74 |         <p>Other signs of liver disease may include:</p>

```

```

75 |         <ul>
76 |           <li><p>Abdominal (belly) pain (especially on the right side).</p></li>
77 |           <li><p>Bruising easily.</p></li>
78 |           <li><p>Changes in the color of your urine or stool.</p></li>
79 |           <li><p>Fatigue.</p></li>
80 |           <li><p>Nausea or vomiting.</p></li>
81 |           <li><p>Swelling in your arms or legs (edema).</p></li>
82 |         </ul>
83 |         <h2>What are the complications of liver disease?</h2>
84 |         <p>Some types of liver disease can increase your risk of developing liver cancer. Others, if left untreated, continue to damage your liver. Cirrhosis (
85 |         <p>Over time, a damaged liver won't have enough healthy tissue to function. Liver disease that isn't treated can eventually lead to liver failure</p>
86 |       </div>
87 |       <div class="col-sm-4">
88 |         <div class="card">
89 |           <div class="card-body">
90 |             <div>
91 |               <div>
92 |                 <div>
93 |                   
94 |                 </div>
95 |               </div>
96 |             </div>
97 |           </div>
98 |         </div>
99 |       </div>
100 |     <div class="col-12">
101 |       <div class="card card-body bg-light">
102 |         <blockquote class="blockquote">
103 |           <p class="mb-0" style="font-size:15px;">"Your liver is your vital detoxification organ, and if it becomes overloaded with toxins from the food, dri
104 |           </p>
105 |           <div class="blockquote-footer">Suzanne Somers
106 |         </div>
107 |       </div>
108 |     </div>
109 |   </div>
110 | </div>
111 |

```

```

112 | <!-- jQuery first, then Popper.js, then Bootstrap JS. -->
113 | <script src="{url for('Static',filename='node_modules/jquery/dist/jquery.slim.min.js')}"></script>
114 | <script src="{url for('Static',filename='node_modules/popper.js/dist/umd/popper.min.js')}"></script>
115 | <script src="{url for('Static',filename='node_modules/bootstrap/dist/js/bootstrap.min.js')}"></script>
116 |
117 | </body>
118 |
119 | </html>

```

```

1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <!-- Required meta tags always come first -->
5   <meta charset="utf-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
7   <meta http-equiv="x-ua-compatible" content="ie=edge">
8
9   <!-- Bootstrap CSS -->
10  <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/bootstrap/dist/css/bootstrap.min.css') }}">
11  <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/font-awesome/css/font-awesome.min.css') }}">
12  <link rel="stylesheet" href="{{ url_for('Static',filename='node_modules/bootstrap-social/bootstrap-social.css') }}">
13  <link rel="stylesheet" href="{{ url_for('Static',filename='Static/css/ibmcss.css') }}">
14  <title>liver disease predication</title>
15
16 </head>
17
18 <body>
19   <nav class="navbar navbar-dark navbar-expand-sm fixed-top" style="background: #9575CD;">
20     <div class="container">
21       <h1 style="color: floralwhite">liver disease prediction</h1>
22       <button class="navbar-toggler" type="button" data-toggle="collapse" data-target="#Navbar">
23         <span class="navbar-toggler-icon"></span>
24       </button>
25       <a class="navbar-brand mr-auto" href="/index.html"></a>
26       <div class="collapse navbar-collapse" id="Navbar">
27         <ul class="navbar-nav ml-auto">
28           <li class="nav-item active"><a class="nav-link" href="/"><span class="fa fa-home fa-lg"></span>Home</a></li>
29           <li class="nav-item"><a class="nav-link" href="#"><span class="fa fa-info fa-lg"></span>Goto predict</a></li>
30         </ul>
31       </div>
32     </div>
33   </nav>
34
35   <div class="form action='/data_predict' method="post">
36     <div class="offset-sm-1 col-sm-10 align-self-center" style="padding-top:100px">
37       <div class="card">

```

```

38
39   <div class="card-header bg-warning text-white">
40     <a name="Prediction">Details for Prediction</a>
41   </div>
42   <div class="card-body">
43     <div class="row">
44       <div class="col-sm-3">Age</div>
45       <div class="col-sm-2">
46         <input type="text" id="age" name="age" required></input>
47       </div>
48       <div class="col-sm-3">Gender</div>
49       <div class="col-sm-1">
50         <input type="text" id="gender" name="gender" placeholder="For male 1 female 0"required ></input>
51       </div>
52     </div>
53     <div class="row">
54       <div class="col-sm-3">Total_Bilirubin</div>
55       <div class="col-sm-2">
56         <input type="text" id="tb" name="tb" required></input>
57       </div>
58       <div class="col-sm-3">Direct_Bilirubin</div>
59       <div class="col-sm-1">
60         <input type="text" id="db" name="db" required></input>
61       </div>
62     </div>
63   </div>
64   </div>
65
66   </div>
67
68   </div>
69
70   </div>
71
72   </div>
73

```

## 8. TESTING

### 8.1 TestCases

- The home page and the result page is tested .It is working well without issues.
- The app was tested for functionality.
- The scoring end point application is slower than the normal flask app.

### 8.2 User AcceptanceTesting

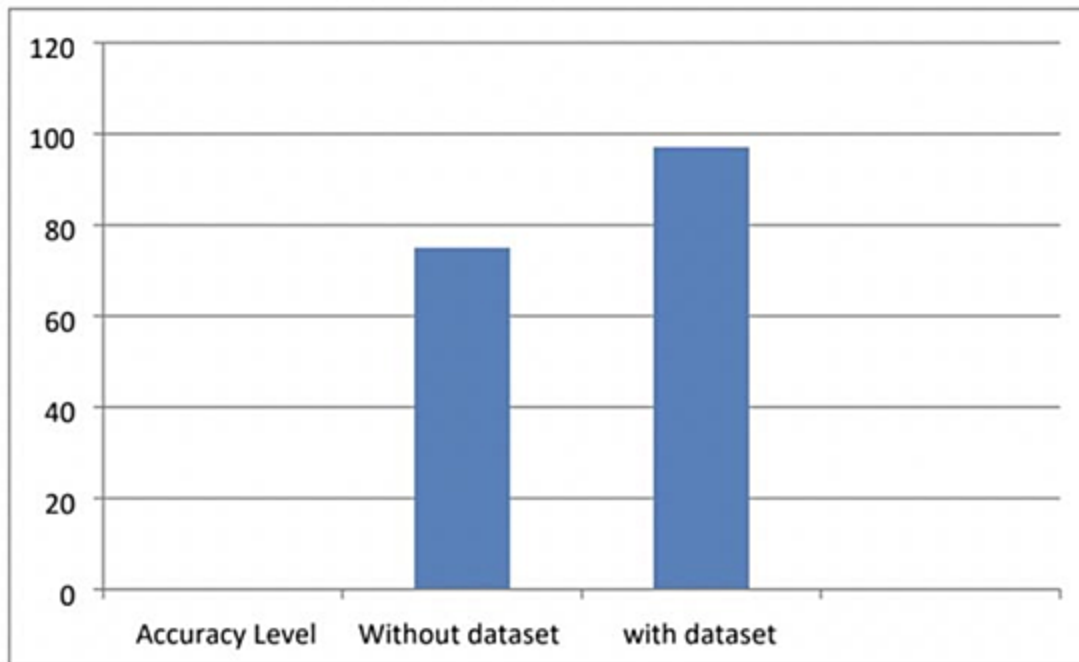
This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	8	0	0	8
Client Application	48	0	0	48
Security	2	0	0	2

Outsource Shipping	3	0	0	3
Exception Reporting	7	0	0	7
Final Report Output	4	0	0	4
Version Control	3	0	0	3

## 9. RESULTS

### 9.1 Performance Metrics



### 9.2 OUTPUT


The screenshot shows a web browser window with the title 'Liver disease prediction'. The address bar shows the URL '127.0.0.1:5000'. The browser's tab bar shows several open tabs, including 'Gmail', '2. Java - Google Dri...', 'RMK Placements', 'Socket Programmin...', '1. Operating syste...', 'Watch The Good D...', 'Linux Kernel Develo...', and '7. Interrupt'. The web application has a purple header with the title 'Liver Disease Prediction' and a navigation menu with links to 'Home' and 'Goto predict'. Below the header, there is a section titled 'Liver Disease' with a paragraph of text: 'There are many types of liver disease, which can be caused by infections, inherited conditions, obesity and misuse of alcohol. Over time, liver disease may lead to scarring and more serious complications. Early treatment can help heal the damage and prevent liver failure.' Below the text is an image of a human torso with the liver highlighted in red. At the bottom of the page, there is a section titled 'What is Liver Disease?'.

**Liver Disease Prediction**

- [Home](#)
- [Goto predict](#)

### Liver Disease

There are many types of liver disease, which can be caused by infections, inherited conditions, obesity and misuse of alcohol. Over time, liver disease may lead to scarring and more serious complications. Early treatment can help heal the damage and prevent liver failure.



### What is Liver Disease?

Liver disease predication x New Tab x +

127.0.0.1:5000/predict

Gmail 2. Java - Google Dri... RMK Placements Socket Programmin... 1. Operating syste... Watch The Good D... Linux Kernel Develo... 7. Internup DHANDAPANI SURESH NITHESH KUMAR

### Details for Prediction

Age  
85

Gender  
0

Total\_Bilirubin  
0.7

Direct\_Bilirubin  
0.1

AlkalinePhosphatase  
187

AlamineAminotransferase  
16

AspartateAminotransferase  
18

Total\_Proteins  
6.8

Albumin  
3.3

AlbuminGlobulin\_Ratio  
0.9

28°C Mostly clear

Search

ENG IN 20:26 25-11-2022

Liver disease predication x New Tab x +

127.0.0.1:5000/data\_predict

Gmail 2. Java - Google Dri... RMK Placements Socket Programmin... 1. Operating syste... Watch The Good D... Linux Kernel Develo... 7. Internup DHANDAPANI SURESH NITHESH KUMAR

## Liver disease prediction

- [Home](#)
- [Goto\\_predict](#)

### PREDICTION RESULT

You have a liver disease and you must take treatment

28°C Mostly clear

Search

ENG IN 20:26 25-11-2022

## 10.Conclusion

This project this will,

1. Help healthcare management and professionals to explore better results in numerous clinical applications, such as medical image processing, language processing, and tumor or cancer cell detection, by finding appropriate features.
2. Several statistical and machine learning approaches (e.g., simulation modeling, classification, and inference) have been used by researchers and lab technicians for better prediction. The clinical results are more data-driven than model-dependent

## 1. ADVANTAGES AND DISADVANTAGES

### Advantages :

1. This helps in early diagnosis of liver disease.
2. It makes the process simple and easier.
3. We are able to monitor the patient in an effective manner.
4. We can also help patients who are not in a condition to directly consult a doctor.

### Disadvantages:

5. There are inaccuracies which cannot be avoided.
6. For people who have difficulty in accessing internet or those who do not have electronic

gadgets , this is not a feasible solution.

## 2. FUTURE SCOPE

1. In biomedical science, accuracy and speed are two important factors that should be considered chiefly in dealing with any disease.
1. In this regard, Machine Learning techniques can be of great help to physicians. With advances, several machines have entered in our lives.

2. One of the most famous areas where computers as the mostly used machines can be helpful is knowledge extraction with the help of a machine (machine learning).

## **13. Appendix**

### **13.1 Github and Project Demo Link**

**<https://github.com/IBM-EPBL/IBM-Project-31056-1660195526>**

#### **Project Demo Link**

**<https://github.com/IBM-EPBL/IBM-Project-31056-1660195526/blob/main/Output%20video.mp4>**