

# A Review of liver Patient Analysis Methods using Machine Learning



Submitted by

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# **Project Report Template**

## **1. INTRODUCTION**

### **1.1. Overview**

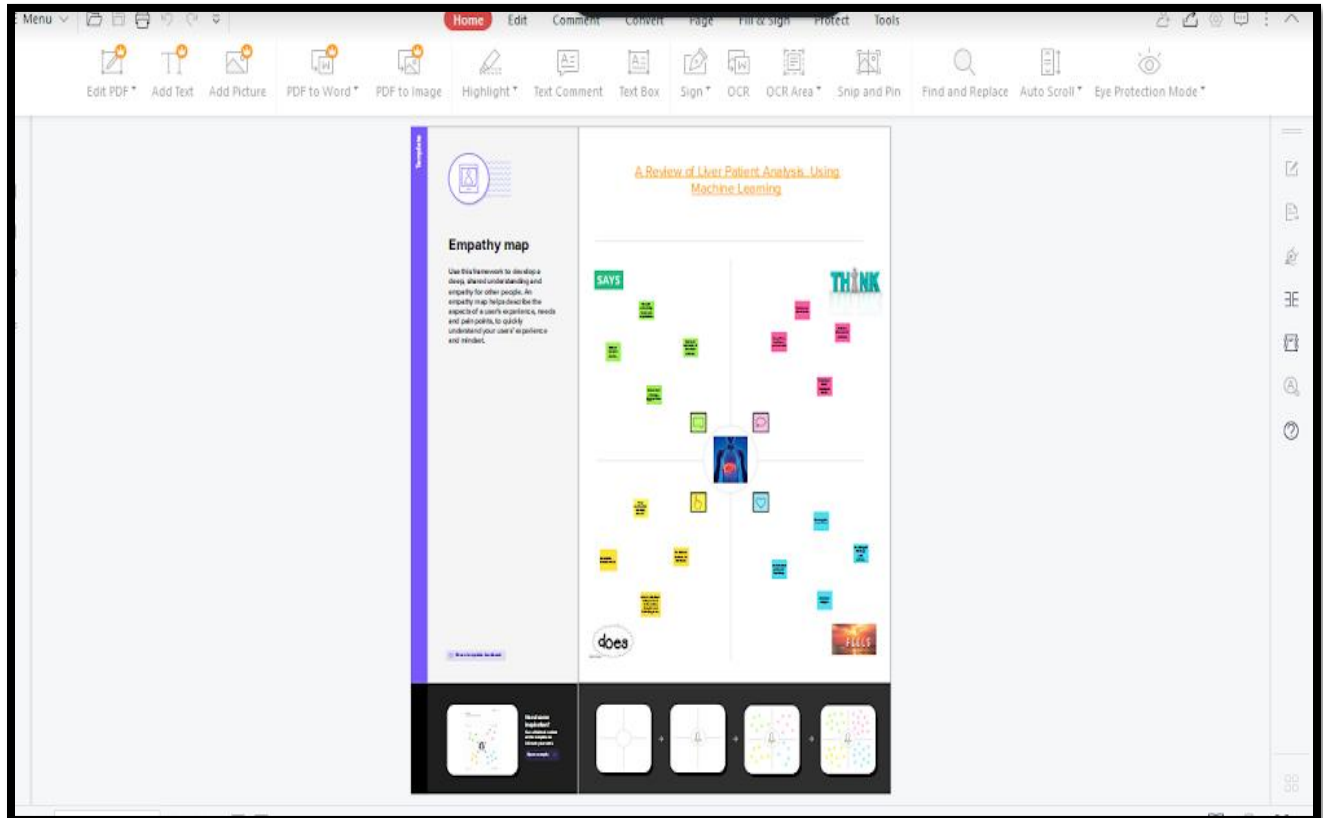
Liver disease averts the normal function of the liver. This disease is caused by an assortment of elements that harm the liver. Diagnosis of liver infection at the preliminary stage is important for better treatment. In today's scenario devices like sensors are used for detection of infections. Accurate classification techniques are required for automatic identification of disease samples. This disease diagnosis is very costly and complicated. Therefore, the goal of this work is to evaluate the performance of different Machine Learning algorithms in order to reduce the high cost of liver disease diagnosis. Early prediction of liver disease using classification algorithms is an efficacious task that can help the doctors to diagnose the disease within a short duration of time. In this project we will 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. This project compares various classification algorithms such as Random Forest, Logistic Regression, KNN and ANN Algorithm with an aim to identify the best technique. Based on this study, Random Forest with the highest accuracy outperformed the other algorithms and can be further utilized in the prediction of liver disease and can be recommended to the user.

### **1.2. Purpose**

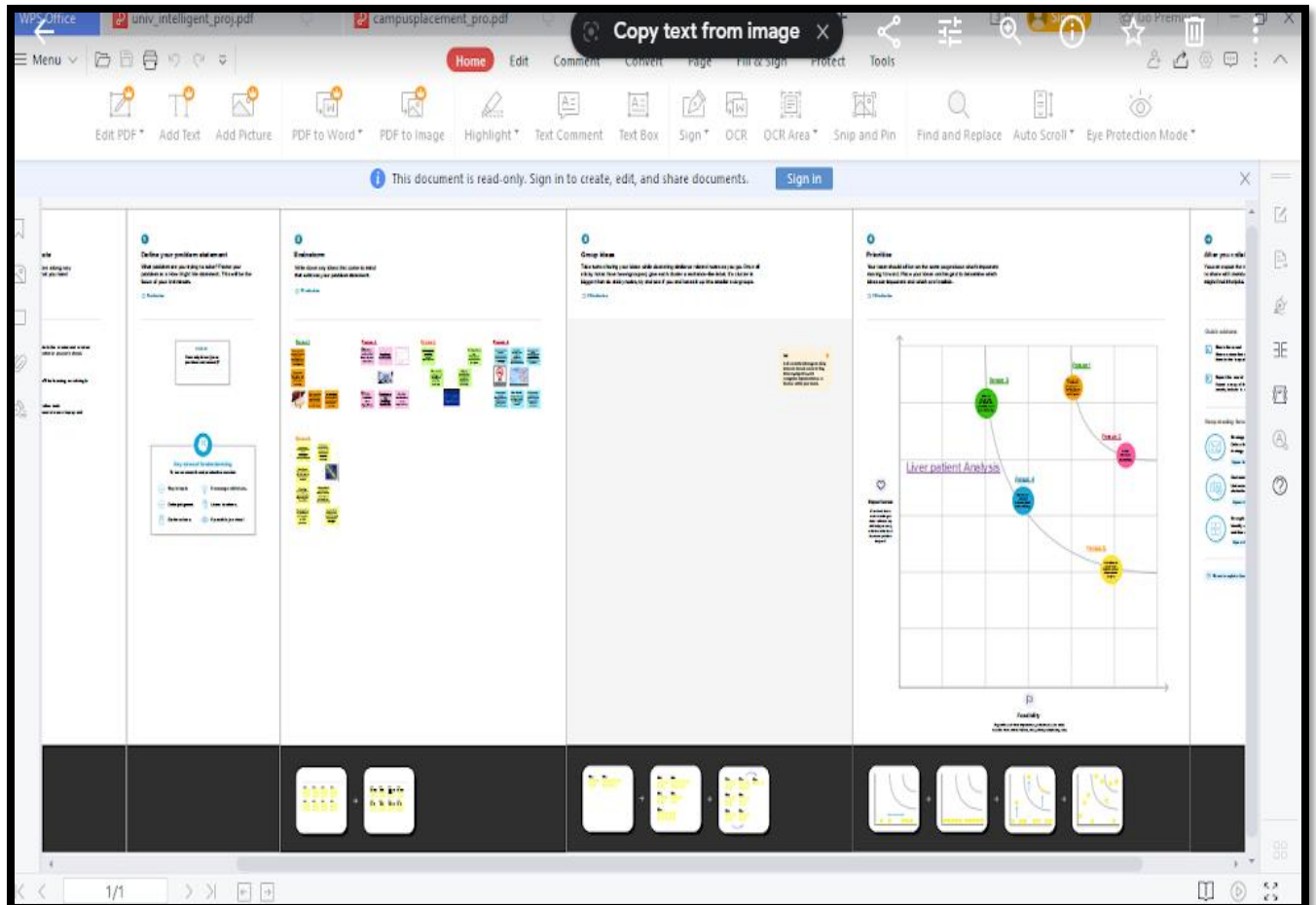
With a growing trend of sedentary and lack of physical activities, diseases related to liver have become a common encounter nowadays. In rural areas the intensity is still manageable, but in urban areas, and especially metropolitan areas the liver disease is a very common sighting nowadays. Problems with liver patients are not easily discovered in an early stage as it will be functioning normally even when it is partially damaged. An early diagnosis of liver problems will increase patient survival rate. There are various algorithms that have been used with varying levels of success. Logistic Regression, Decision Tree, Random Forest, and Neural networks have all been used and have been able to accurately predict liver disease.

## 2. Problem Definition & Design Thinking

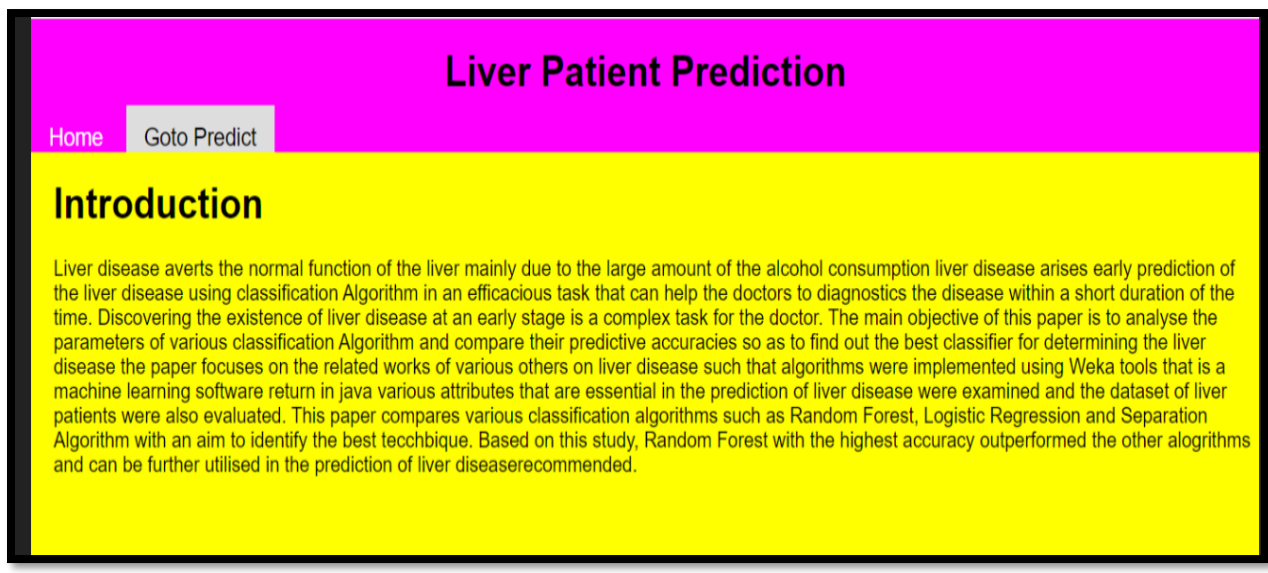
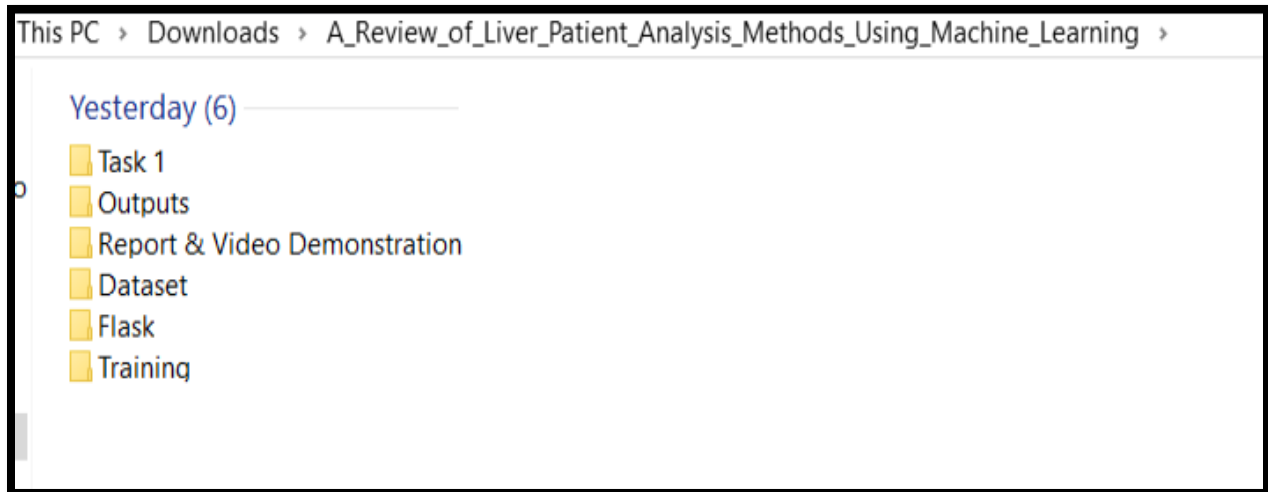
### 2.1 Empathy Map



## 2.2. Ideation & Brainstorming Map



### 3. RESULT



## Liver Patient Prediction

Age

Gender

Total Bilirubin

Direct Bilirubin

Alkaline Phosphotase

Alamine Aminotransferase

Aspartate Aminotransferase

Total Protiens

Albumin

Albumin and Globulin Ratio

## Liver Patient Prediction

Age

50

Gender

0

Total Bilirubin

1.2

Direct Bilirubin

0.8

Alkaline Phosphatase

Alkaline Phosphatase

150

Alamine Aminotransferase

70

Aspartate Aminotransferase

80

Total Protiens

7.2

Albumin

3.4

Albumin and Globulin Ratio

Total Protiens

7.2

Albumin

3.4

Albumin and Globulin Ratio

0.8

Predict

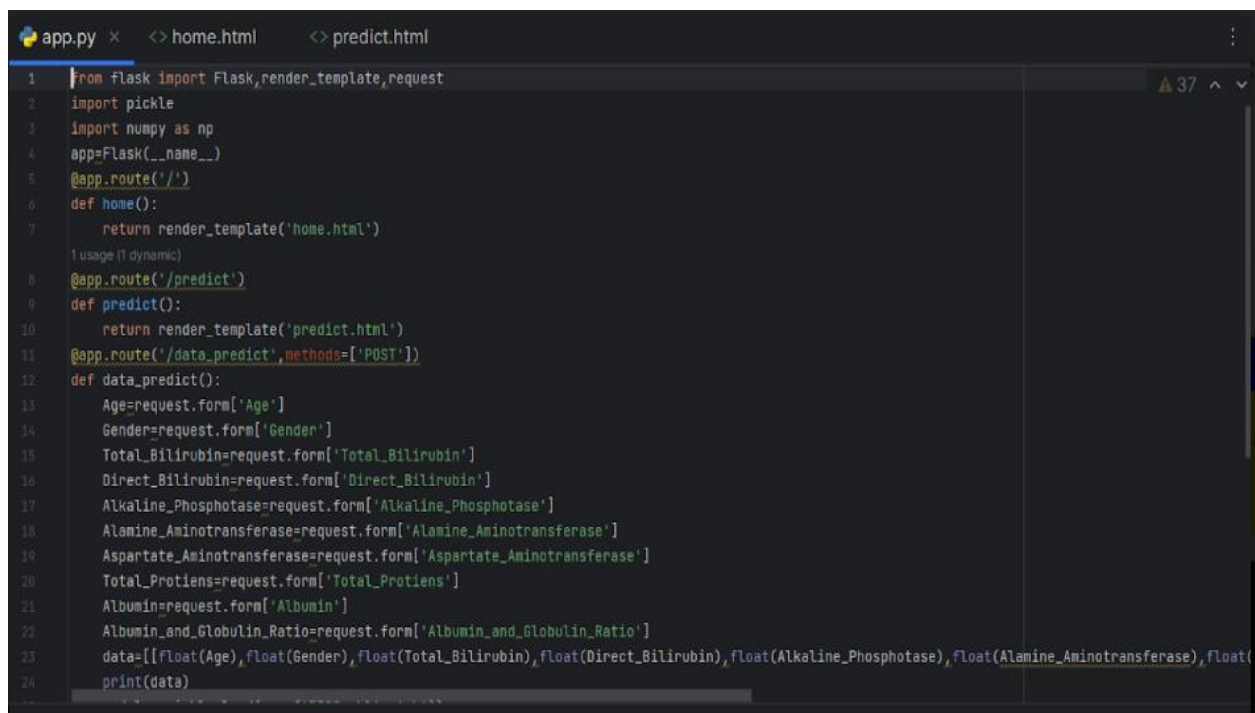
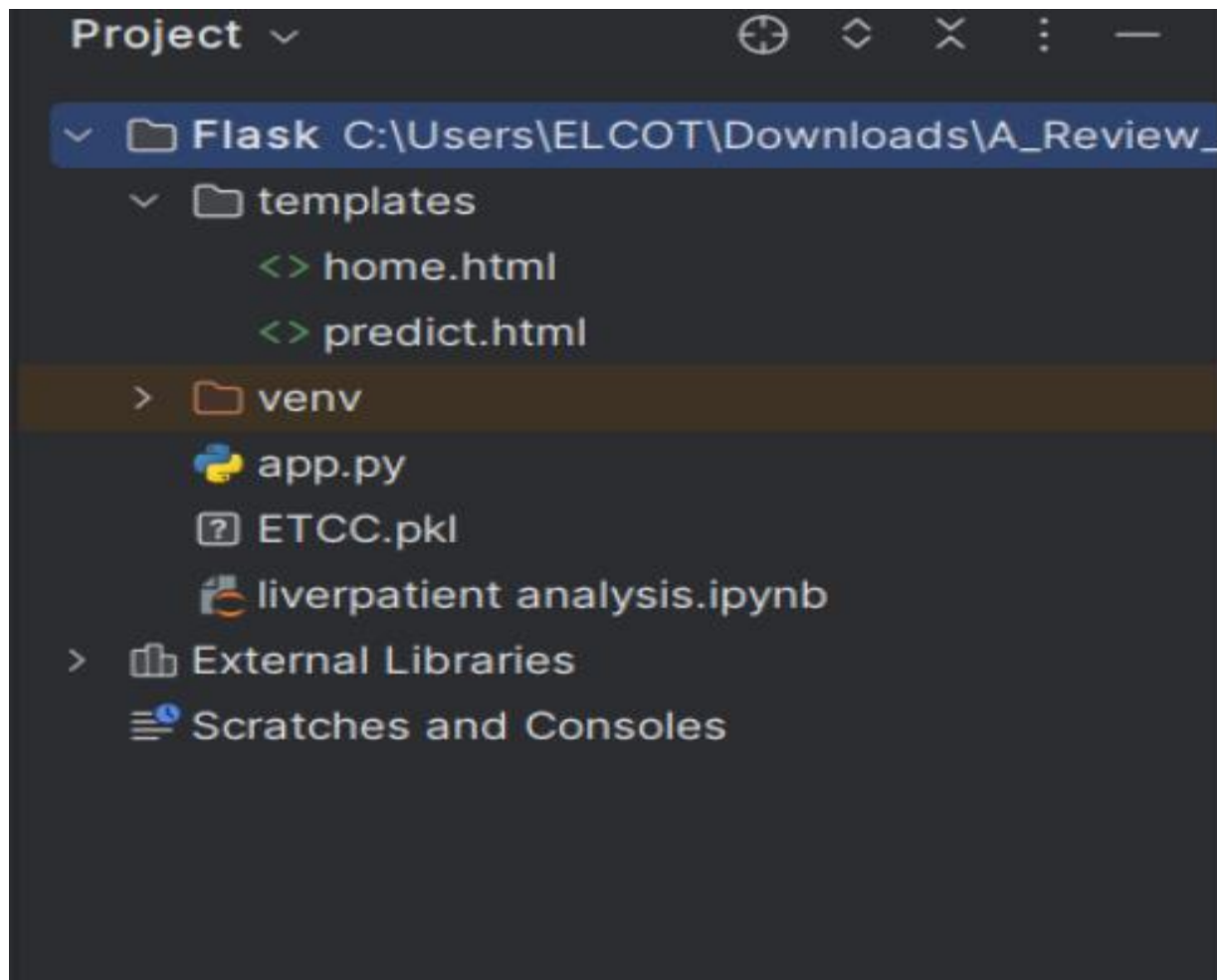
**Liver Patient Prediction**

**You have a liver disease problem,You must and should consult a doctor.Take care**

**Liver Patient Prediction**

**You dont have a liver disease problem**





```
app.py x  home.html  predict.html
11 @app.route('/data_predict', methods=['POST'])
12 def data_predict():
13     Age=request.form['Age']
14     Gender=request.form['Gender']
15     Total_Bilirubin=request.form['Total_Bilirubin']
16     Direct_Bilirubin=request.form['Direct_Bilirubin']
17     Alkaline_Phosphotase=request.form['Alkaline_Phosphotase']
18     Alamine_Aminotransferase=request.form['Alamine_Aminotransferase']
19     Aspartate_Aminotransferase=request.form['Aspartate_Aminotransferase']
20     Total_Protiens=request.form['Total_Protiens']
21     Albumin=request.form['Albumin']
22     Albumin_and_Globulin_Ratio=request.form['Albumin_and_Globulin_Ratio']
23     data=[[float(Age),float(Gender),float(Total_Bilirubin),float(Direct_Bilirubin),float(Alkaline_Phosphotase),float(Alamine_Aminotransferase),fl
24     print(data)
25     model = pickle.load(open('ETCC.pkl', 'rb'))
26     prediction=model.predict(data)
27     print(prediction)
28     if prediction[0]==0:
29         prediction='You dont have a liver disease'
30     else:
31         prediction='You have a liver disease problem,You must and should consult a doctor.Take care'
32     return render_template('predict.html',output=prediction)
33 if __name__ == '__main__':
34     app.run()
```

```
(base) C:\Users\ELCOT>cd C:\Users\ELCOT\PycharmProjects\pythonProject\liver
(base) C:\Users\ELCOT\PycharmProjects\pythonProject\liver>python app.py
* Serving Flask app "app" (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
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

#### **4. ADVANTAGES & DISADVANTAGES**

##### **ADVANTAGES:**

- ❖ It can provide important insights to doctors who adapt their diagnosis and treatment per patient basis.
- ❖ No medical expertise required: You don't need to have any knowledge of medical science and liver diseases to predict liver disease using this application.
- ❖ Immediate result: The results predicted within second of entering details. You don't need to wait for doctor to come, unlike traditional method.

##### **DISADVANTAGES:**

- ❖ The development of the technologies needs a lot of funding.
- ❖ A small error in algorithm may result in manufacturing of faulty products.

#### **5. APPLICATIONS**

- ❖ Fraud detection.
- ❖ Medical Diagnosis.
- ❖ Virtual assistants.
- ❖ Equipment Maintenance.
- ❖ Five algorithms namely, Logistic Regression, Decision Tree, Random Forest, KNN and ANN were implemented for classification of Indian Liver Patient Dataset.
- ❖ Based on accuracy of prediction it is observed that Random Forest classifier achieved accuracy of 70.94%.

#### **6. CONCLUSION**

In this, we developed and compared the classification models to predict liver disease accurately. However, the random forest model showed higher performance than other models. Through this project we have increased the efficiency of the prediction. Implementation of random forest model in clinical setting could help physicians to stratify liver patients for prevention, surveillance, early treatment and management.

## **7. FUTURE SCOPE**

In the future it would help the doctors to easily detect the disease in a patient body and it could be developed further by using different datasets and also by using different algorithms. Through this project we have increased the efficiency of the prediction. We have increased the accuracy of the prediction algorithms where we have used different algorithms to predict the accuracy of the disease at different accuracy levels. This project can also be developed to detect which kind of a liver disease a patient has and if it is conformed it can also be told at which percentage it is in the patient's body. This can be take further by using various algorithms and also lot of datasets. This can also be done using artificial intelligence techniques using different tools.

## **8. APPENDIX**

### **A.Source Code**

#### **app.py**

```
from flask import Flask,render_template,request
import pickle
import numpy as np
app=Flask(__name__)
@app.route('/')
def home():
    return render_template('home.html')
@app.route('/predict')
def predict():
    return render_template('predict.html')
@app.route('/data_predict',methods=['POST'])
def data_predict():
```

```

Age=request.form['Age']
Gender=request.form['Gender']
Total_Bilirubin=request.form['Total_Bilirubin']
Direct_Bilirubin=request.form['Direct_Bilirubin']
Alkaline_Phosphotase=request.form['Alkaline_Phosphotase']
Alamine_Aminotransferase=request.form['Alamine_Aminotransferase']
Aspartate_Aminotransferase=request.form['Aspartate_Aminotransferase']
Total_Protiens=request.form['Total_Protiens']
Albumin=request.form[Albumin']
Albumin_and_Globulin_Ratio=request.form['Albumin_and_Globulin_Ratio']

data=[[float(Age),float(Gender),float(Total_Bilirubin),float(Direct_Bilirubin),float(Alkaline_Phosphotase),float(Alamine_Aminotransferase),float(Aspartate_Aminotransferase),float(Total_Protiens),float(Albumin),float(Albumin_and_Globulin_Ratio)]]

print(data)

model=pickle.load(open('ETCC.pkl','rb'))

prediction=model.predict(data)

print(prediction)

if prediction[0]== 0:

    prediction='You dont have a Liver disease'

else:

    prediction='You hava a Liver disease problem, You must and should consult a doctor. Take care'

return render_template('predict.html',output=prediction)

if __name__=='__main__':

    app.run()

```