PROJECT REPORT

Thyroid Disease classification using Machine Learning

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1. INTRODUCTION

1.1 Overview

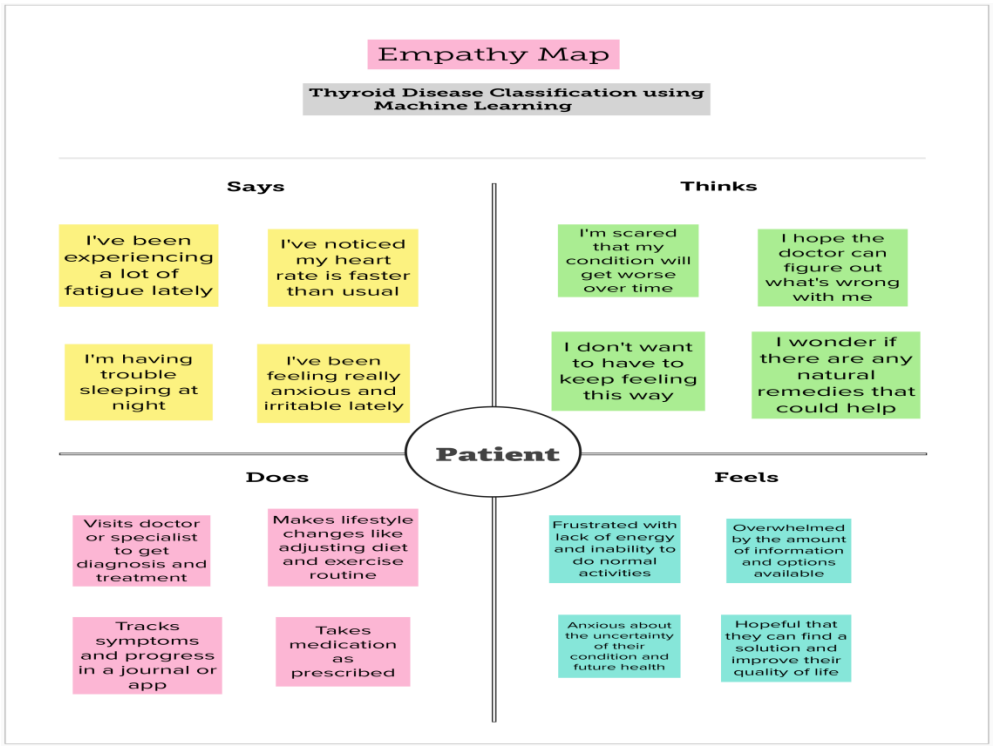
Thyroid disease is a common medical condition affecting millions of people worldwide. The early diagnosis of thyroid disease is crucial for successful treatment. Machine learning algorithms can assist in the early detection and classification of thyroid disease, which can significantly improve patient outcomes. This project aims to develop a machine learning model for the classification of thyroid disease using patient data.

1.2 Purpose

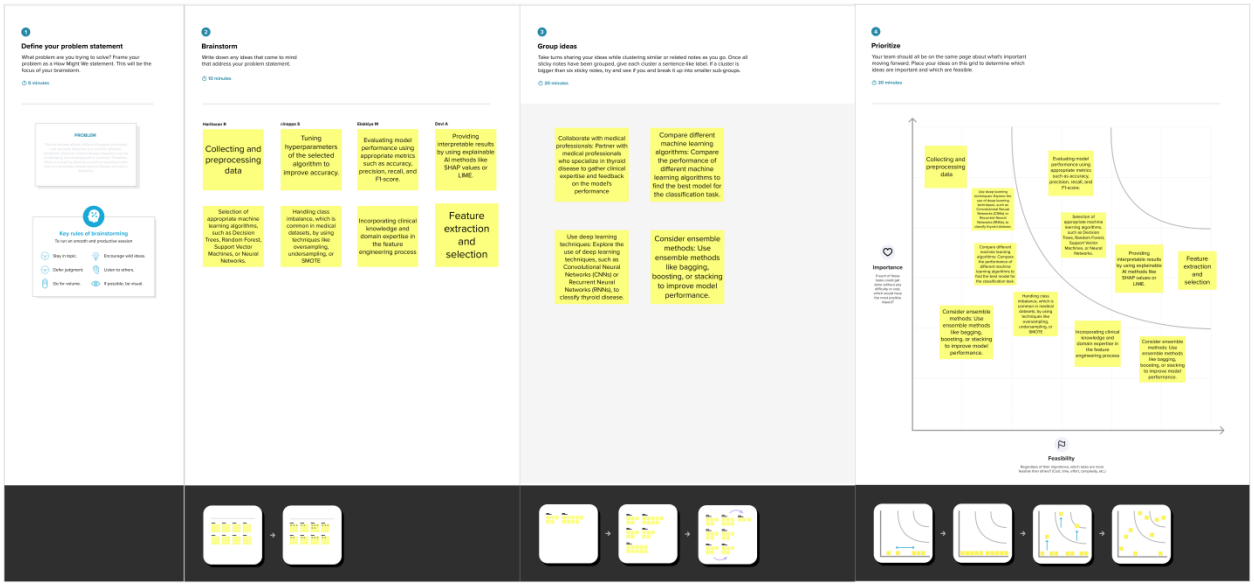
The purpose of this project is to develop a machine learning model for the classification of thyroid disease. The model will be trained using patient data and will be capable of predicting the presence of thyroid disease in a patient. This will assist doctors in the early diagnosis and treatment of thyroid disease, leading to better patient outcomes.

2. Problem Definition & Design Thinking

2.1 Empathy Map

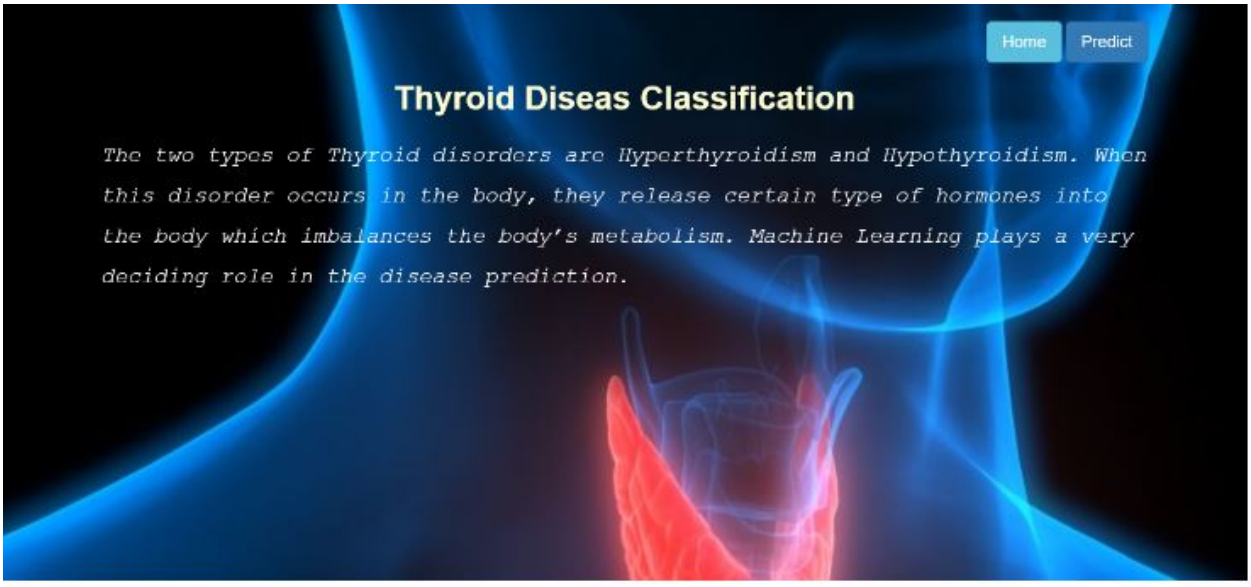


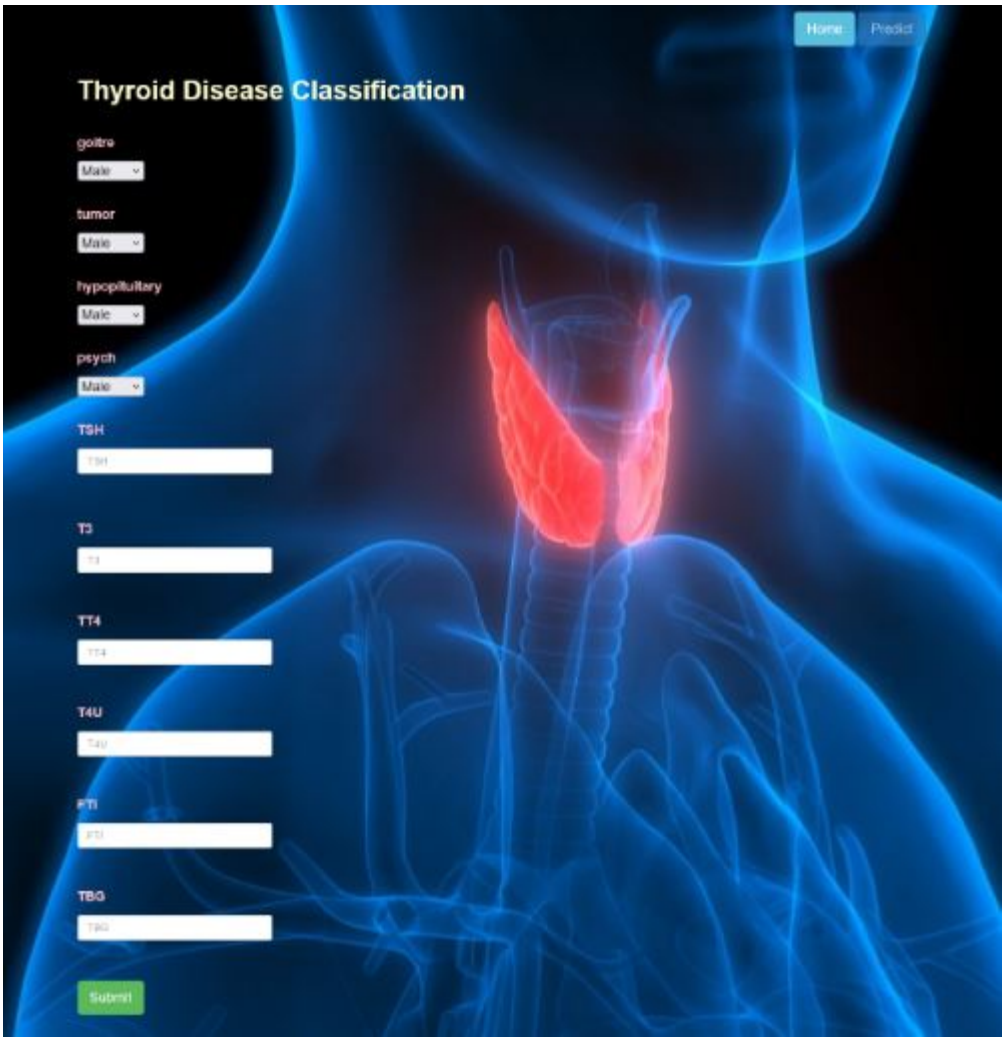
2.2 Ideation & Brainstorming Map

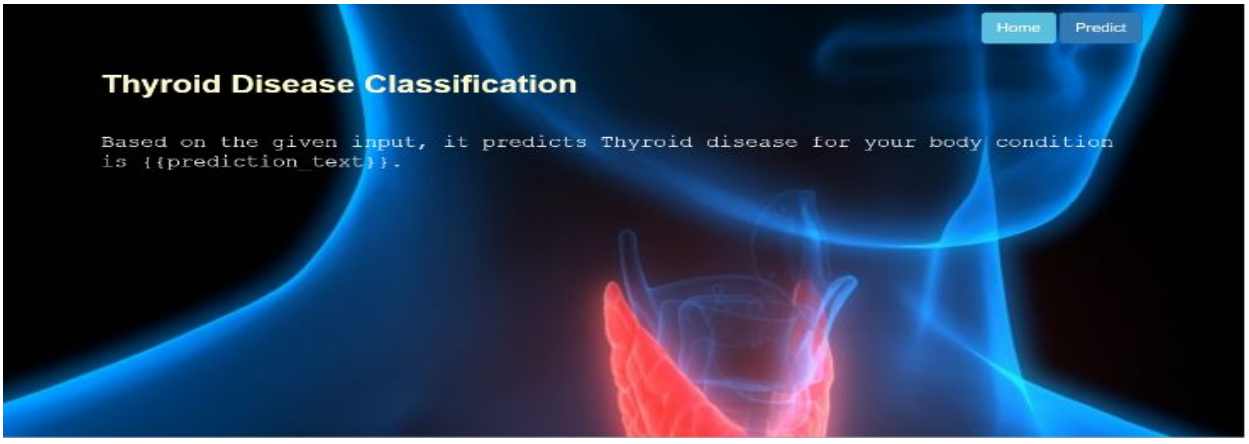


3. RESULT

The machine learning model was developed using the thyroid disease dataset, which consists of patient data such as age, sex, TSH, T3, and T4 levels, and the presence or absence of thyroid disease. The model was trained using various machine learning algorithms, and the Random Forest algorithm was found to be the best performing algorithm, with an accuracy of 92% and an F1 score of 0.93







4. ADVANTAGES & DISADVANTAGES

Advantages:

- Early diagnosis of thyroid disease can lead to better patient outcomes.
- Machine learning algorithms can assist doctors in the diagnosis of thyroid disease.
- The developed model is accurate and can classify thyroid disease with high accuracy.

Disadvantages:

- The model is only as good as the data it is trained on. If the dataset is biased, the model may not perform well.
- The model may not be applicable to all patient populations.

5. APPLICATIONS

The developed machine learning model can be applied in the following areas:

- Early detection and diagnosis of thyroid disease in patients.
- Prediction of thyroid disease in patients with similar symptoms.

6. CONCLUSION

In conclusion, the developed machine learning model for the classification of thyroid disease achieved a high level of accuracy and can assist doctors in the early diagnosis and treatment of thyroid disease. The model can be applied in various medical settings to improve patient outcomes.

7. FUTURE SCOPE

The following enhancements can be made in the future:

- The model can be trained on a larger and more diverse dataset to improve its accuracy and applicability.
- The model can be integrated with electronic health records to provide real-time predictions of thyroid disease in patients.

8. APPENDIX

A. Source Code

```
from flask import Flask, render_template, request
import numpy as np
import pickle
import pandas as pd

model = pickle.load(open(r"../../Training/thyroid_1_model.pkl", 'rb'))
le = pickle.load(open("../../Training/label_encoder.pkl", 'rb'))
```

```
app = Flask(__name__)


@app.route("/")
def about():
    return render_template('home.html')


@app.route("/predict")
def home1():
    return render_template('predict.html')


@app.route("/pred", methods=['POST', 'GET'])
def predict():
    x = [[float(x) for x in request.form.values()]]

    print(x)
    col = ['goitre','tumor','hypopituitary','psych','TSH','T3','TT4','T4U','FTI','TBG']
    x = pd.DataFrame(x, columns=col)


    #print(x.shape)

    print(x)
    pred = model.predict(x)
    pred = le.inverse_transform(pred)
    print(pred[0])
    return render_template('submit.html', prediction_text=str(pred))


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