

CHIKKANNA GOVERNMENT ARTS COLLEGE

TIRUPUR-641602

(AFFILIATED TO BHARATHIAR UNIVERSITY)



TEAM MEMBERS NAME AND REGISTER NUMBER:

SANJAYKUMAR.R[2022K0047]

RAMANATHAN.G[2022K0042]

GOWTHAM.C[2022K0021]

MOHAN.S[2022K0034]

SATHISKUMAR.G[2022K0052]

Github Link: <https://github.com/sanjaykumar-47/Thyroid-Disease-Classification-Using-ML>

DEPARTMENT OF COMPUTER SCIENCE

CHIKKANNA GOVERNMENT ARTS COLLEGE

NAAN MUDHALVAN PROJECT WORK

(AFFILIATED TO BHARATHIAR UNIVERSITY)

TIRUPUR-641602

TITLE : Thyroid Disease Classification Using ML

This is to certify that this is a bonafide record of work done by the above students
of III B.Sc (CS) Degree **NAAN MUDHALVAN PROJECT** during the year

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Submitted for the Naan Mudhalvan project work held

on.....20

CLASS TUTOR

**HEAD OF THE
DEPARTMENT**

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INTRODUCTION

1.1 OVERVIEW

Thyroid disease a very common problem in India, more than one crore people are suffering with the disease every year. Especially it is more common in female. Hyperthyroidism and hypothyroidism are the most two common diseases caused by irregular function of thyroid gland.

Thyroid disorder can speed up or slow down the metabolism of the body. In the world of rising new technology and innovation, healthcare industry is advancing with the role of Artificial Intelligence. Machine learning algorithms can help to early detection of the disease and to improve the quality of the life. This study demonstrates the how different classification algorithms can forecasts the presence of the disease.

Different classification algorithms such as Logistic regression, Random Forest, Decision Tree, Naïve Bayes, Support Vector Machine have been tested and compared to predict the better outcome of the model.

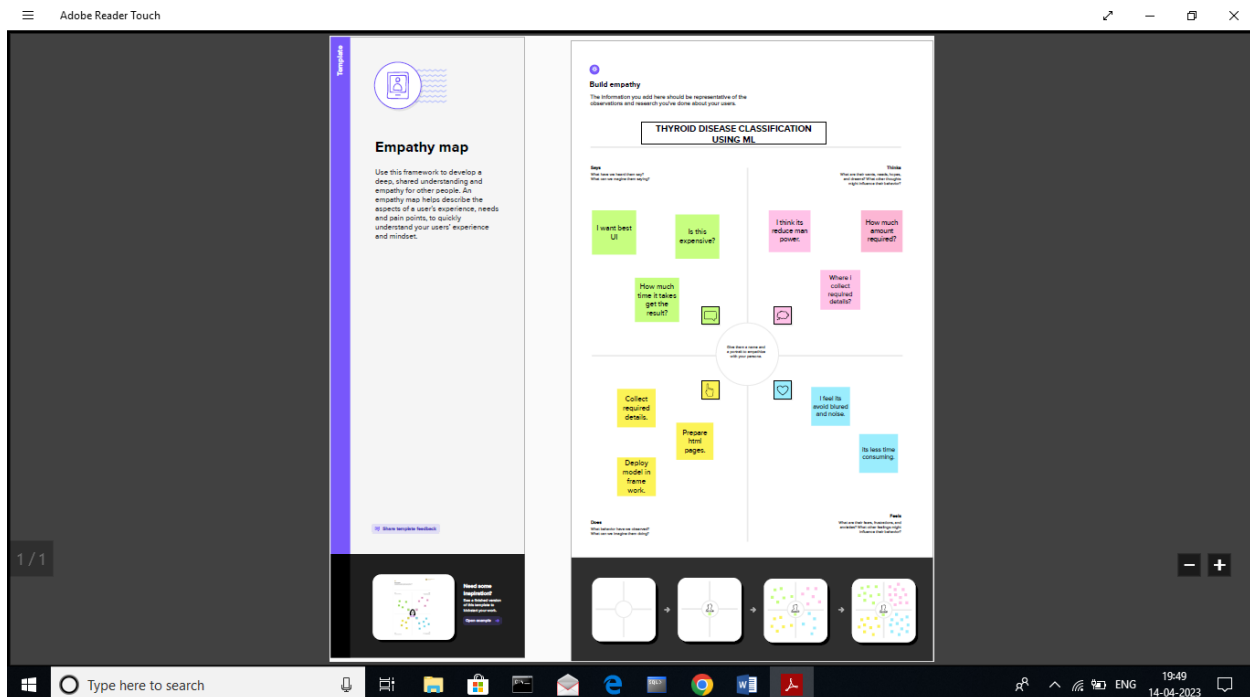
1.2 PURPOSE

The main goal of this project is to predict the risk of hyperthyroid and hypothyroid based on various factors of individuals. Thyroid disease is a common cause of medical diagnosis and prediction, with an onset that is difficult to forecast in medical research. It will play a decisive role in order to early detection, accurate identification of the disease and helps the doctors to make proper decisions and better treatment.

PROBLEM DEFINITION & DESIGN THINKING.

2.1 EMPATHY MAP

An empathy map is a collaborative visualization used to articulate what we know about a particular type of user. It externalizes knowledge about users in order to 1) create a shared understanding of user needs, and 2) aid in decision making.



2.2 IDEATION AND BRAINSTROMING

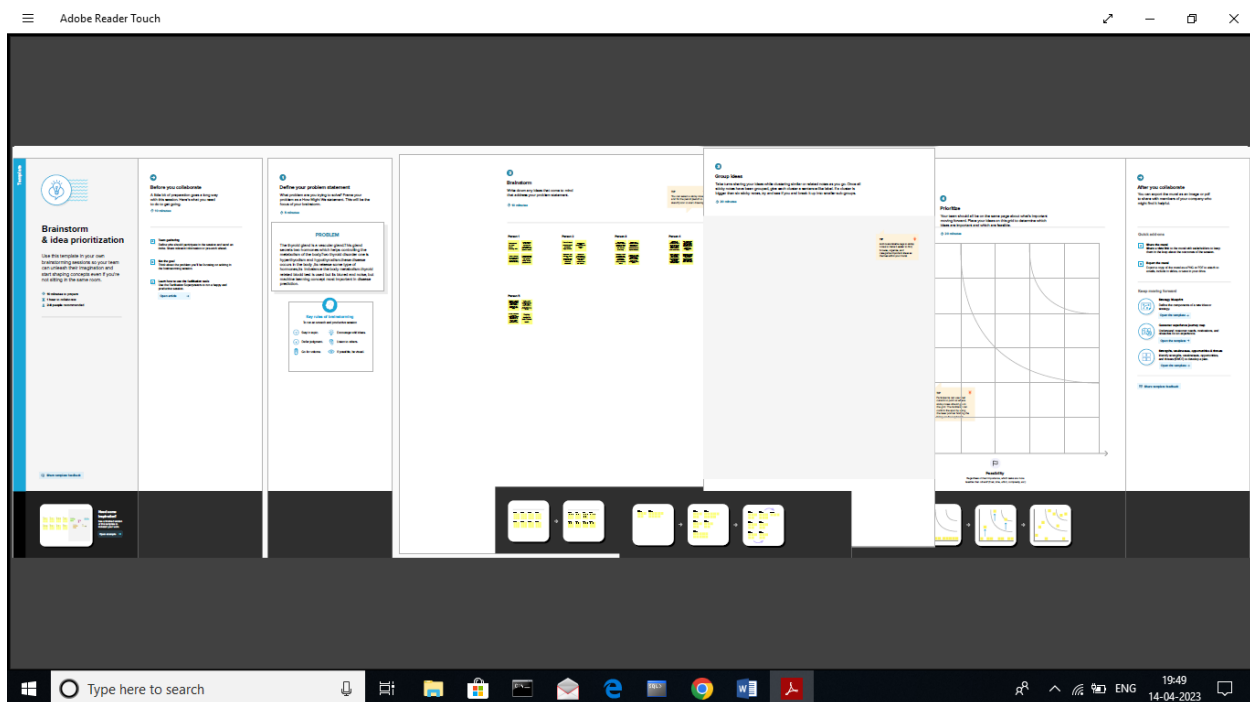
Identify pricing patterns: Analyze the pricing patterns such as the time of booking, the day of the week, the seasonality, and the route popularity. Use machine learning algorithms such as regression or decision trees to identify the key factors that influence flight prices.

Develop predictive models: Build predictive models that can forecast flight prices based on the historical data and the identified pricing patterns. Use machine

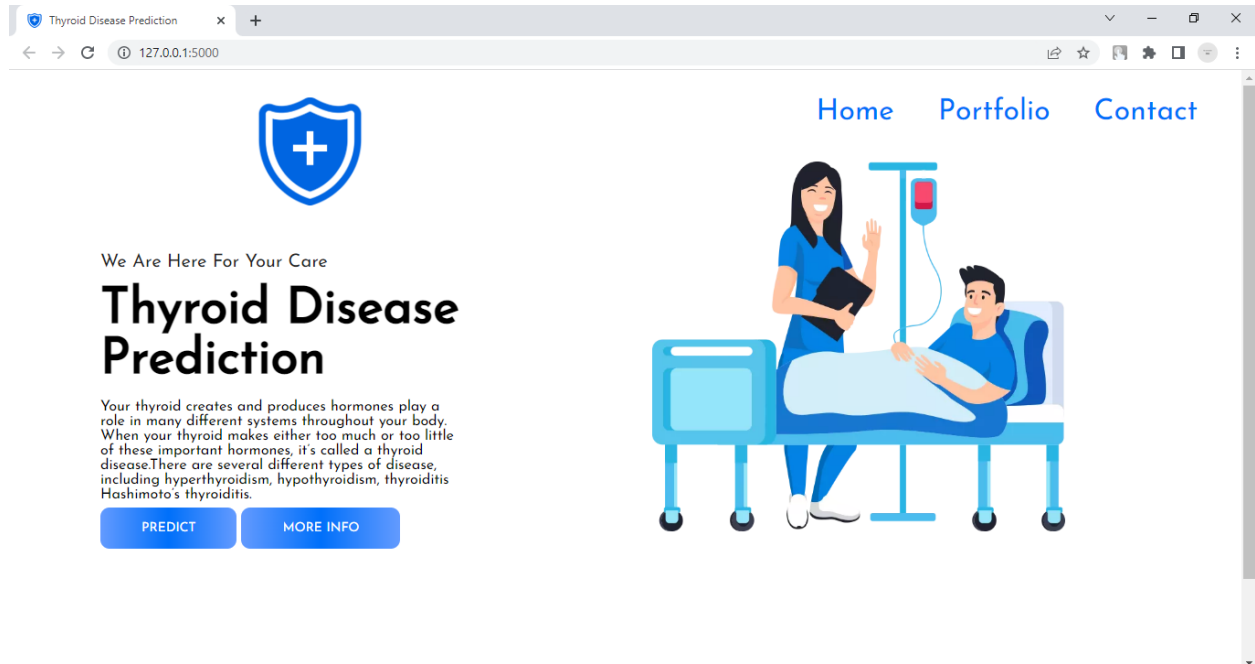
learning techniques such as linear regression, random forest regression, or neural networks to develop accurate and reliable models

Optimize pricing strategies: Use the predictive models to optimize pricing strategies by adjusting the prices based on the forecasted demand, competition, and other factors. Use optimization techniques such as linear programming or dynamic pricing to develop effective pricing strategies

Implement real-time pricing: Implement real-time pricing that can adjust the prices in real-time based on the demand and other factors. Use reinforcement learning or other optimization techniques to develop a pricing algorithm that can maximize the revenue while meeting the customer demand.



RESULT

A screenshot of the 'PREDICTION FORM' on the website. The browser's address bar shows '127.0.0.1:5000/predict'. The form is titled 'PREDICTION FORM' and is set against a purple and blue gradient background. It contains several input fields: 'Age' (text input), 'Sex' (dropdown menu showing 'Male'), 'Thyroid stimulating hormone level' (range input showing '0.4 to 24.0 mIU/L'), 'Total Thyroxine TT4' (text input showing '20-150'), 'Free Thyroxine Index' (text input showing '20-160'), and 'On Thyroxine Medication' (dropdown menu showing 'True').

Predict

127.0.0.1:5000/predict

On Thyroxine Medication True

On Antithyroid Medication True

Goitre True

Hypopituitary True

Psychological Symptoms True

T3 Measured True

PREDICT

Result

127.0.0.1:5000/predictresult

Patient has No Thyroid

Home PREDICT MORE INFO

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File Edit Selection View Go Run Terminal Help

home.html - Thyroid-Disease-Detection-main - Visual Studio Code

EXPLORER

- main.py
- home.html
- moreinfo.html
- predict.html
- predictresult.html
- main.py
- Profile
- README.md
- requirements.txt

home.html

```

1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta http-equiv="X-UA-Compatible" content="IE=edge">
7   <meta name="viewport" content="width=device-width, initial-scale=1.0">
8   <title>Thyroid Disease Prediction</title>
9   <link rel="stylesheet" type="text/css" href="static/css/style.css">
10  <link href="https://fonts.googleapis.com/css?family=Josefin+Sans&display=swap" rel="stylesheet">
11  <link rel="shortcut icon" type="image/jpg" href="static/images/banner_1.png"/>
12  <link href="//maxcdn.bootstrapcdn.com/font-awesome/4.1.0/css/font-awesome.min.css" rel="stylesheet">
13 </head>
14
15 <body>
16   <header>
17     <div class="mainheader">
18
19       <nav class="nav">
20         <div class="container">
21           <div class="logo">
22             
23           </div>
24           <div id="mainListDiv" class="main_list">
25             <ul class="navlinks">
26               <li><a href="/">Home</a></li>
27               <li><a href="https://ganeshthorat.herokuapp.com" target="_blank">Portfolio</a></li>
28               <li><a href="mailto: thorat.ganeshscoe@gmail.com" target="_blank">Contact</a></li>
29             </ul>
30           </div>
31           <span class="navTrigger">
32             <i></i>
33             <i></i>

```

Ln 1, Col 1 Spaces: 4 UTF-8 LF HTML 16:02 12-04-2023

The screenshot displays the Visual Studio Code interface for a Python project named 'main.py - Thyroid-Disease-Detection-main'. The Explorer sidebar on the left shows the project structure, including files like 'home.html', 'moreinfo.html', 'predict.html', and 'predictresult.html'. The main editor window shows the 'main.py' file, which is a Flask application. The code imports necessary libraries (Flask, requests, pickle, numpy) and defines a Flask app. It sets up routes for the index, moreinfo, predict, and predictresult endpoints, each rendering a corresponding HTML template. The predictresult endpoint also handles POST requests and processes form data to calculate thyroid-related metrics. The bottom status bar indicates the current cursor position at line 33, column 1, and the file encoding as UTF-8.

ADVANTAGES

Early Detection:

Machine learning models can analyze large amounts of data and identify patterns that may not be easily recognizable to human experts. With this capability, machine learning algorithms can identify patterns that may indicate the presence of thyroid disease at an early stage, allowing for earlier intervention and treatment.

High Accuracy:

Machine learning algorithms can be trained using a vast amount of data, which can lead to higher accuracy in predicting thyroid disease compared to traditional diagnostic methods. Moreover, machine learning algorithms can learn from experience and adapt to new data, further improving the accuracy of predictions over time.

Personalized Treatment:

Machine learning models can identify patient-specific factors that may influence the development of thyroid disease, such as age, gender, lifestyle, and medical history. This information can be used to develop personalized treatment plans that address the specific needs of each patient.

Improved Patient Outcomes:

Early detection and personalized treatment can lead to improved patient outcomes, such as a reduction in the severity of symptoms, better quality of life, and a lower risk of complications.

Cost-Effective:

Machine learning algorithms can reduce the need for costly and invasive diagnostic procedures, such as biopsies or surgeries. By accurately predicting thyroid disease, machine learning models can help healthcare providers prioritize

which patients need further testing and which can be monitored with less invasive methods, thus reducing overall healthcare costs.

Overall, the use of machine learning techniques for thyroid disease prediction can lead to better patient outcomes, more personalized treatment plans, and more efficient use of healthcare resources.

DISADVANTAGES

Data quality:

Machine learning models require high-quality data to make accurate predictions. If the data used to train the model is incomplete, incorrect, or biased, it can negatively impact the accuracy of the predictions.

Limited scope:

Machine learning models can only make predictions based on the data they have been trained on. If the model is not trained on a diverse range of data, it may not be able to accurately predict thyroid disease in certain populations or with certain symptoms.

Overfitting:

Overfitting occurs when a model is trained too closely on a particular dataset, making it less able to generalize to new, unseen data. This can result in misleading predictions.

Interpretability:

Machine learning models can be difficult to interpret, meaning it may be hard to understand why the model made a particular prediction. This can be problematic for clinicians who need to make informed decisions about patient care.

CONCLUSION

- In conclusion, machine learning can be a useful tool in predicting thyroid disease. By utilizing various algorithms and techniques, machine learning models can effectively analyze large amounts of patient data and identify patterns and risk factors associated with thyroid disease.
- However, it is important to note that machine learning models are not a replacement for medical professionals and should be used as a supportive tool in the diagnostic process. Additionally, the accuracy and effectiveness of the model will depend on the quality and completeness of the data used to train it.
- Further research and development are needed to improve the accuracy and reliability of machine learning models in predicting thyroid disease. Nevertheless, the use of machine learning in healthcare shows great potential for improving patient outcomes and advancing medical research.

FUTURE SCOPE

- In conclusion, machine learning can be a useful tool in predicting thyroid disease. By utilizing various algorithms and techniques, machine learning models can effectively analyze large amounts of patient data and identify patterns and risk factors associated with thyroid disease.
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APPENDIX

Thyroid Disease Classification Using ML

VIDEO LINK ABOUT THIS PROJECT

<https://youtu.be/Rd3PbBRir6g>