THYROID DISEASE DETECTION

PRESENTED BY:

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INTRODUCTION

01

Introduction to Thyroid Diseases:

- Thyroid disorders are common endocrine conditions affecting the thyroid gland, a crucial organ for regulating metabolism.
- Types of thyroid disorders include hypothyroidism (underactive thyroid), hyperthyroidism (overactive thyroid), and thyroid nodules.

02

Global Health Impact:

- Thyroid diseases have a significant global health impact, contributing to a range of health issues.
- The World Health Organization (WHO) estimates that over 750 million people worldwide are affected by thyroid disorders.

PROBLEM STATEMENT

1

Challenges in Thyroid Disease Diagnosis

Existing methods for diagnosing thyroid diseases face limitations in terms of accuracy and timeliness.

2

Subtle and Overlapping Symptoms:

Thyroid disorders often present with subtle symptoms that can be easily overlooked.

May lead to misdiagnosis

3

Need for Automated and Objective Solutions:

There is a growing need for automated systems that can provide objective and consistent results in thyroid disease diagnosis.

PROPOSED SOLUTION

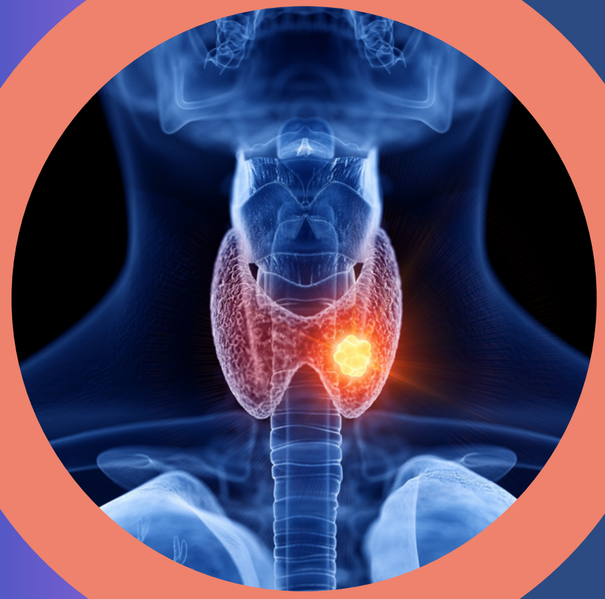
Automated Thyroid Detection System

Accept input data, including patient history, thyroid function test results, and relevant imaging data.

Integrate a neural network model for thyroid disease detection.

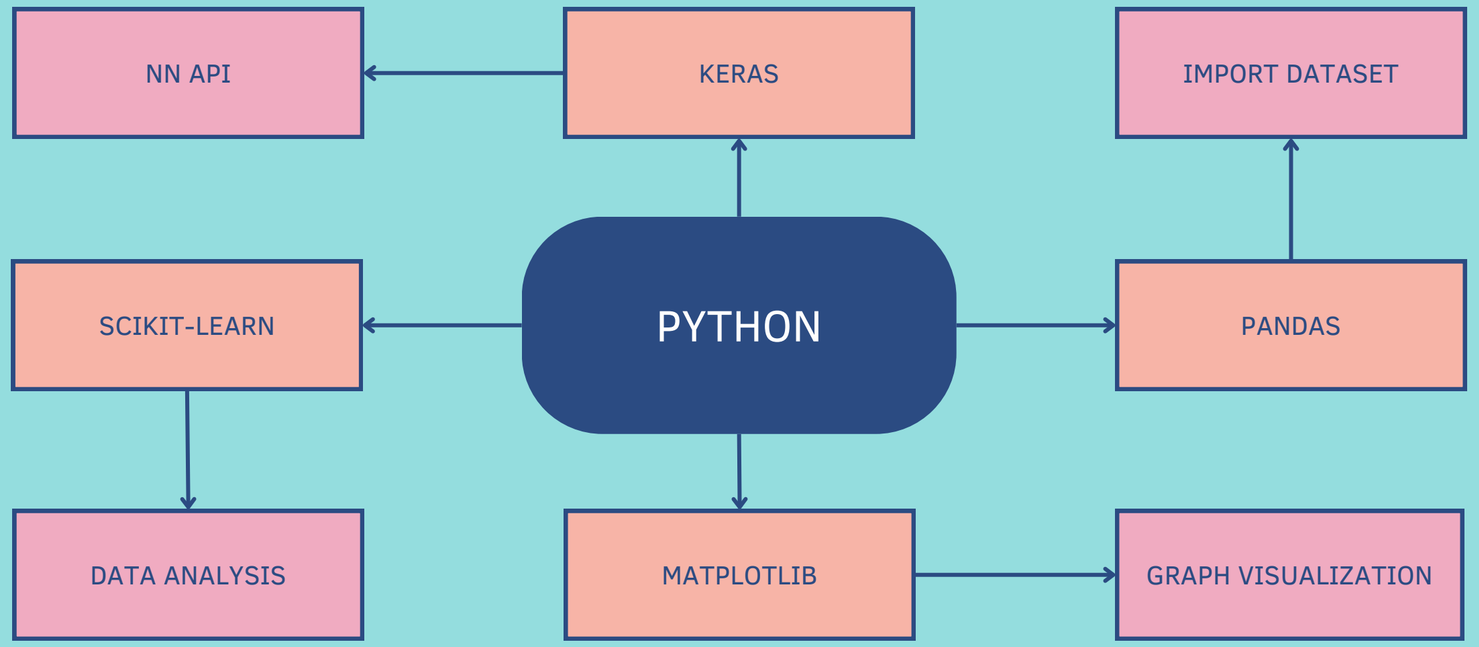
Generate an objective and interpretable diagnostic output indicating the likelihood and type of thyroid disorder detected.

OBJECTIVES



- Enhance accuracy of thyroid diagnosis by utilizing neural network skills, which are excellent at pattern recognition and classification activities.
- Reduce the time needed for diagnosis by developing an automated system that can quickly process diagnostic data.
- Provide medical professionals with a sophisticated tool designed to enhance overall effectiveness of thyroid screening and diagnosis.

AI SOFTWARE & TOOLS



BUDGET & COSTING

Project Management

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
WBS Items					
1.Project Management				106000	20
Project Manager Salary	12	7500	90000		
Project Management Software	2	3500	7000		
Contingency			9000		

BUDGET & COSTING

Project Hardware

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
2.Hardware				275000	10
Medical Imaging Equipment	30	5000	150000		
Servers & Storage	10	8000	80000		
Networking Infrastructure	5	4000	20000		
Contingency			25000		

BUDGET & COSTING

Project Software

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
3.Software				88000	15
Development of Detection Algorithm	3	10000	30000		
Integration with Existing Health System	5	10000	50000		
Contingency			8000		

BUDGET & COSTING

Project Testing

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
4.Testing				88000	15
Data Collection & Annotation	3	10000	30000		
Clinical Testing & Validation	5	10000	50000		
Contingency			6500		

BUDGET & COSTING

Project Training & Support

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
5.Training & Support				61500	20
Healthcare Professionals Training	3	5000	15000		
Technical Support Staff	4	10000	40000		
Contingency			6500		

BUDGET & COSTING

Project Reserves & Total

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
6.Reserves				50000	15
Risk Management	5	10000	50000		
Total Estimate				94900	

BUDGET & COSTING

Project Reserves & Total

	#Units/Hrs.	Cost/Unit/Hrs.	Subtotal	WBS Level 1 Totals (RM)	% of Total
6.Reserves				50000	15
Risk Management	5	10000	50000		
Total Estimate				94900	

EXECUTING PROCESS

01

Data collection and preparation:

- A dataset comprising pertinent data on thyroid illnesses, such as patient symptoms, medical history, and test results, would have been gathered and created.

02

Training:

- Using the prepared dataset, the dataset would be trained. In order for the network to understand the underlying patterns and correlations, it must be fed input data and target outputs

EXECUTING PROCESS

03

Testing and Validation:

- Following training, the effectiveness would have been assessed using a different set of data. This procedure aids in evaluating the network's classification of thyroid disorders for accuracy and dependability.

04

Iteration and Improvement:

- The dataset design may have been improved, parameters might have been changed, or other strategies might have been investigated based on the testing and validation findings

EXPECTED OUTCOME

Testing Data:

A	B	C	D	E	F	K	L	M	N	O	P	Q	R	S	T	U	V
AGE	SEX	ON_THYRO	QUERY_ON_T	ON_ANTITH	SICK	QUERY_HYPERTH	LITHIUM	GOITRE	TUMOUR	HYPOPITUITA	PSYCH	TSH	T3	TT4	T4U	FTI	Class
0.29	0	0	0	0	0	0	0	0	0	0	0	0.0061	0.028	0.111	0.131	0.085	2
0.32	0	0	0	0	0	0	0	0	0	0	0	0.0013	0.019	0.084	0.078	0.107	3
0.35	0	0	0	0	0	0	0	0	0	0	0	0	0.031	0.239	0.1	0.239	3
0.21	0	0	0	0	0	0	0	0	0	0	0	0.001	0.018	0.087	0.088	0.099	3
0.22	0	0	0	0	1	0	0	0	0	0	0	0.0004	0.022	0.134	0.135	0.099	3
0.22	0	0	0	0	0	0	0	0	0	0	0	0.0016	0.02	0.123	0.113	0.109	3
0.39	0	0	0	0	0	1	0	0	0	0	0	0.0016	0.036	0.133	0.144	0.093	3
0.77	1	0	0	0	0	0	0	0	0	0	0	0.0008	0.02	0.08	0.096	0.0832	3
0.23	0	0	0	0	0	0	0	0	0	0	0	0.0003	0.014	0.113	0.096	0.1175	3
0.23	0	0	0	0	0	0	0	0	0	0	0	0.0026	0.011	0.104	0.104	0.099	3
0.45	1	0	0	0	0	0	0	0	0	0	0	0.061	0.006	0.023	0.087	0.026	1
0.65	0	1	0	0	0	0	0	0	0	0	0	3E-05	0.023	0.154	0.09	0.17	3
0.53	0	0	0	0	0	1	0	0	0	0	0	4E-05	0.022	0.115	0.093	0.124	3
0.79	0	0	0	0	0	1	0	0	0	0	0	0.0042	0.011	0.078	0.097	0.081	3

Training Data:

1	AGE	SEX	ON_THYRI	QUERY_OI	ON_ANTIT	SICK	PREGNAN	THYROID S	I131 TREA	QUERY_OI	QUERY_H	LITHIUM	GOITRE	TUMOUR	HYPOPITU	PSYCH	TSH	T3	TT4	T4U	FTI	Class
2	0.73	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.0006	0.015	0.12	0.082	0.146	3
3	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00025	0.03	0.143	0.133	0.108	3
4	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0019	0.024	0.102	0.131	0.078	3
5	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0009	0.017	0.077	0.09	0.085	3
6	0.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00025	0.026	0.139	0.09	0.153	3
7	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00025	0.016	0.086	0.07	0.123	3
8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00025	0.023	0.128	0.104	0.121	3
9	0.48	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00208	0.02	0.086	0.078	0.11	3
10	0.67	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0013	0.024	0.087	0.109	0.08	3
11	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0001	0.029	0.124	0.128	0.097	3
12	0.62	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.011	0.008	0.073	0.074	0.098	2
13	0.18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0001	0.023	0.098	0.085	0.115	3
14	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0008	0.023	0.094	0.099	0.09475	3
15	0.49	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0006	0.023	0.113	0.102	0.111	3

MONITORING AND CONTROLLING PROCESS

01

Data Quality Monitoring:

- Have a regular checking for defects or inconsistent of the thyroid disease data to ensure that it aligns to the specified format and ranges.
- Implement data validation tools and work with medical professionals to deal with any data problems.

02

User Feedback Analysis:

- Gather feedback from healthcare professionals on the thyroid disease system usability, interpretability, and overall effectiveness.
- Continuously update the system's features and user interface based on suggestions from users..

MONITORING AND CONTROLLING PROCESS

03

Model Performance Monitoring:

- Continuously analyse the thyroid disease detection model's accuracy, sensitivity, and specificity on both training and testing datasets.
- Retrain the model with updated data, adjust model architecture or try ensemble methods.

04

Training and Testing Set Evaluation:

- Analyse frequently the arrangement of thyroid disease cases in the training and testing sets to maintain representativeness.
- If there found imbalances dataset, reevaluate the dataset splitting approach and collect more information as needed.

CONCLUSION

In conclusion, the deployment of a multiclass multilayer neural network for thyroid disease detection marks a significant stride in the application of artificial intelligence to healthcare project management. The successful development and implementation of this model showcase the potential to streamline diagnostic processes, allowing for efficient and less cost categorization of thyroid health states.