**Low Level Design**

**Thyroid Disease Detection**

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# **Document Version Control**

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| --- | --- | --- | --- |
| Version | Date Issued | Author | Comment |
| 0.1 | 01/02/2022 | Sai Subhasish | Initial LLD |
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|  |  |  |  |

**Abstract**

There are types of thyroids and we need to identify if the patient has thyroid or not. If it is a positive case then what type of thyroid the person is suffering from. We need to build a model which will be used by hospitals. In the first case of spatialization the model will predict if the person is suffering from thyroid or not. If the result will come positive, then the treatment will be on fast-track. The doctors will start treating the patients and identify the patient is suffering from hypo-thyroid or hyper-thyroid. If the result will come negative then the patient will be sent to a junior doctor and the junior doctors by using their own expertise they will decide that if the model has done correct prediction or not. Based the prediction comes true then the doctor release the patient. By seeing the readings if doctor analysed that there may be a chance of thyroid then patient sent to the senior doctors

# **Introduction**

## **What is Low-Level design document?**

The purpose of this document is to present a detailed description of the Deep EHR System and how it will be helpful for medicals for disease detection. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system and will be proposed to the higher management for its approval.

The main objective of the project is to predict if a person is having thyroid disease or not based on EHR. EHR stands for Electronic Health Record, EHR is nothing but a dataset of medical history of the patients.

EHRs are a vital part of health IT and can:

* Contain a patient’s medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory and test results
* Allow access to evidence-based tools that providers can use to make decisions about a patient’s care
* Automate and streamline provider workflow

An [electronic health record](https://www.healthit.gov/providers-professionals/learn-ehr-basics) (EHR) contains patient health information, such as:

* Patient demographics
* Progress notes
* Vital signs
* Medical histories
* Diagnoses
* Medications
* Immunization dates
* Allergies
* Radiology images
* Lab and test results

This project shall be delivered in two phases:

Phase 1: All the functionalities for batch prediction where HER will be helpful.

Phase2: Integration of UI to all the functionalities for real-time prediction.

## **Scope**

This software system will be a Web application This system will be designed to detect the diseases at earliest for better disease management, improved interventions, and more efficient health-care resource allocation using previous EHR records available. More specifically, Early detection of thyroid disease is important for better disease management. This system is designed to predict the thyroid from patient information such as demographics, disease history, lab results, procedures, and medications.

# **2. Technical specifications**

## **2.1 Thyroid dataset overview**

Thyroid table consists of the patient's personal information and most importantly we have the historic data of a patient.

There are a total of 3000 patients in the training set and 700 patients in the test set.

* Thyroid Table

Graphical user interface, table

Description automatically generated

## **2.2 Input schema**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature name** | **Datatype** | **Size** | **Null/Required** |
| Age | int | NA | Required |
|  |  |  |  |
|  |  |  |  |

## **2.3 Predicting Disease**

* The system displays the if patient has thyroid.
* The system presents the set of inputs required from the user.
* The user gives required information.

## **2.4 Database**

System needs to store every request into the database and we need to store it in such a way that it is easy to retrain the model as well.

1. The User chooses the disease.

2. The User gives required information.

3. The system stores each and every data given by the user or received on request to the database. Database you can choose your own choice whether MongoDB.

**2.5 Deployment**

1. AWS

Logo

Description automatically generated

# Technology stack

|  |  |
| --- | --- |
| **Front End** | HTML/CSS |
| **Backend** | Python flask |
| **Database** | MongoDB |
| **Deployment** | AWS |

1. **Proposed solution**

We need to build a ML model which will be used by hospitals and help the hospital authority to identify if the patient has thyroid or not. If it is a positive case then medical will do further test to know what type of thyroid the person is suffering from and according to that the treatment will be on fast-track. The doctors will start treating the patients. If the result will come negative then the patient will be sent to a junior doctor and the junior doctors by using their own expertise they will decide that if the model has done correct prediction or not. If analysis comes true then the doctor release the patient. By seeing the readings if doctor analysed that there may be a chance of thyroid then patient sent to the senior doctors.

# **Test cases**

|  |  |  |  |
| --- | --- | --- | --- |
| Test case | Steps to perform test case | Module | Pass/Fail |
|  |  |  |  |