Empowering Hair Health with Intelligent Hair Disease Detection Systems

HAIR DISEASE
DETECTION

TMP-23-154

HAIR DISEASE DETECTION

- **Supervisor – Ms. Lokesha Weerasinghe**
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Group Details

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Introduction

HAIR DISEASE DETECTION

This research topic explores the use of intelligent hair disease management systems to empower hair health. These systems utilize machine learning to accurately diagnose hair diseases and develop personalized treatment plans for patients. The main objectives of this research include identifying common hair diseases, developing intelligent systems for diagnosis, creating personalized treatment plans, monitoring treatment outcomes, and improving patient education. The ultimate goal is to improve the accuracy and effectiveness of hair disease diagnosis and treatment, reduce the healthcare burden, and enhance patients' quality of life.

HAIR DISEASE DETECTION

Research Problem

- High cost of full hair diseases analysis.
- Lack of awareness of hair diseases information
- Inability to identify what hair disease is due to the inherent characteristics of different hair diseases.
- Not being able to identify the necessary treatment in a way that does not damage the hair.

HAIR DISEASE
DETECTION

Main Objectives

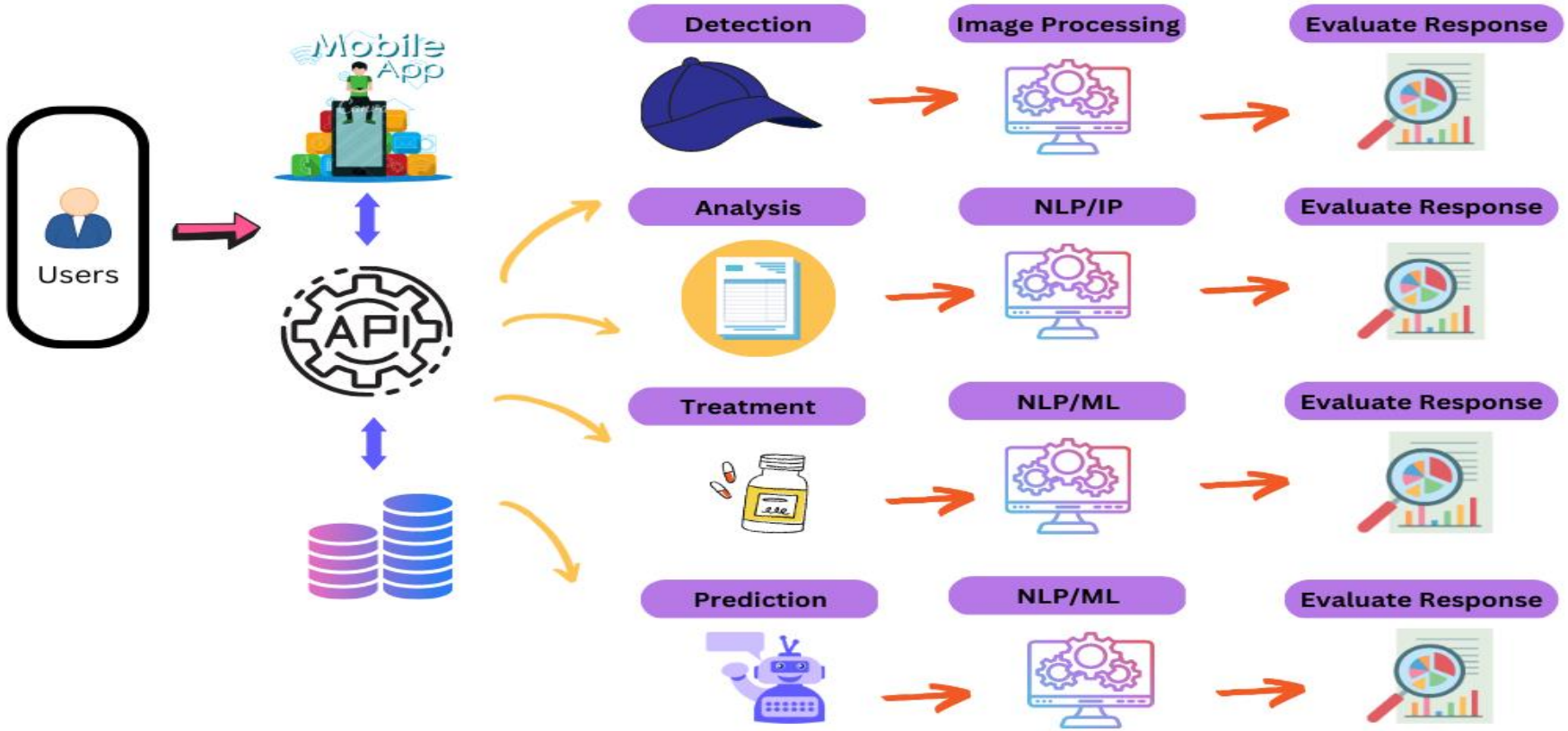
The main objective of "Empowering Hair Health with Intelligent Hair Disease Management Systems" research is to identify, understand, and develop effective treatments for various hair and scalp disorders that affect human beings. All are doing in mobile application through.

Sub Objectives

- Analyzing the patient's report using NLP suggests the information to the patient, monitoring patient stress level and suggests the treatment, advisors using ML.
- Hair Disease Treatment Recommendations for using Machine Learning-based Model
- Predicting Hair Diseases through Patient History and Symptom-Based Predictive Modeling and recommend doctor.
- Automatic hair scratch and hair losing detection using IOT device with machine learning.

System Diagram

HAIR DISEASE DETECTION



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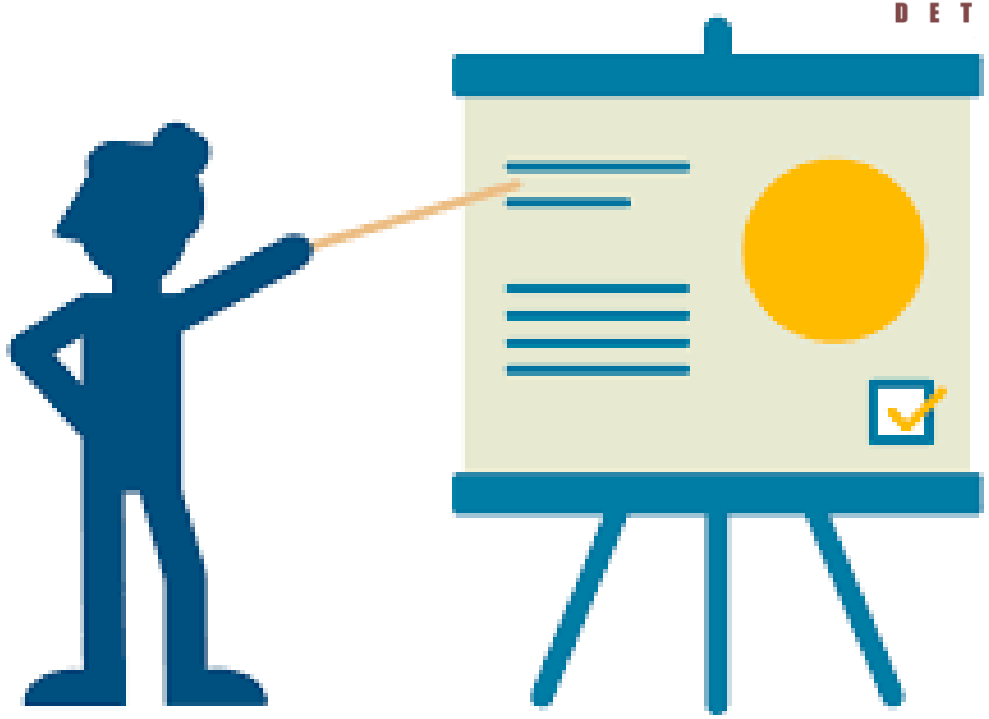
HAIR DISEASE DETECTION

Identify the stress levels and causes of hair diseases and provide treatment and advice corresponding to those diseases and stress levels.

Introduction

HAIR DISEASE DETECTION

- Background
- Research Problem
- Research Gap
- Main Objective
- Sub Objectives



Background

HAIR DISEASE DETECTION

- How to detecting the causes of hair disease and stress levels in the patient?

- How to suggest hair disease information and stress reduce treatments and advice ?

- Why is it important to identify hair disease and stress levels in the patient?

- Why is it important to manage the hair patient after the diagnosis ?

Research Problem

HAIR DISEASE DETECTION

How do early detection of causes of hair diseases and stress levels? Accordingly, How do appropriate treatment recommendations using machine learning, identify the patient's progress as per recommended treatment?

Research Gap

HAIR DISEASE DETECTION

Features	Proposed System	Research 01	Research 02	Research 03	Research 04
Detecting hair disease and stress level using IUP	✓	✓	✗	✗	✗
Analys the report using NLP	✓	✗	✗	✗	✗
Treatment recommendation using ML	✓	✗	✗	✓	✗
Identify patient progress	✓	✗	✗	✗	✓
User Attractive Interface	✓	✓	✓	✗	✓

Main Objective

HAIR DISEASE DETECTION

- Analyzing the patient's report using NLP and according to that suggesting the information to the patient.

- Monitoring the patient's stress level using blood report and suggesting treatments and advisors using machine learning.

Sub Objective

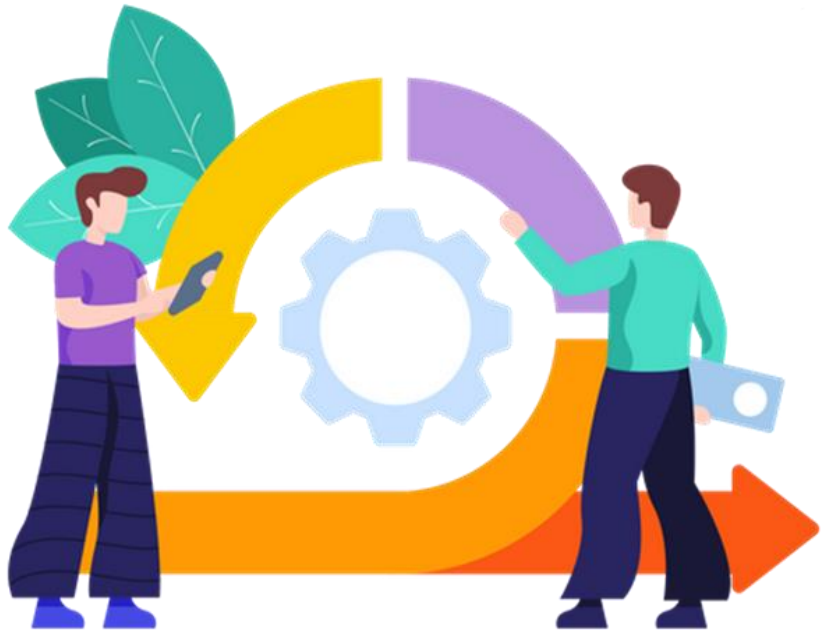
HAIR DISEASE DETECTION

- The patient automatically schedule patient time and reminders.
- save medical history on the mobile device through NLP integrated mobile app.
- Identify the patient's stress reduce progress using machine learning.

Methodology

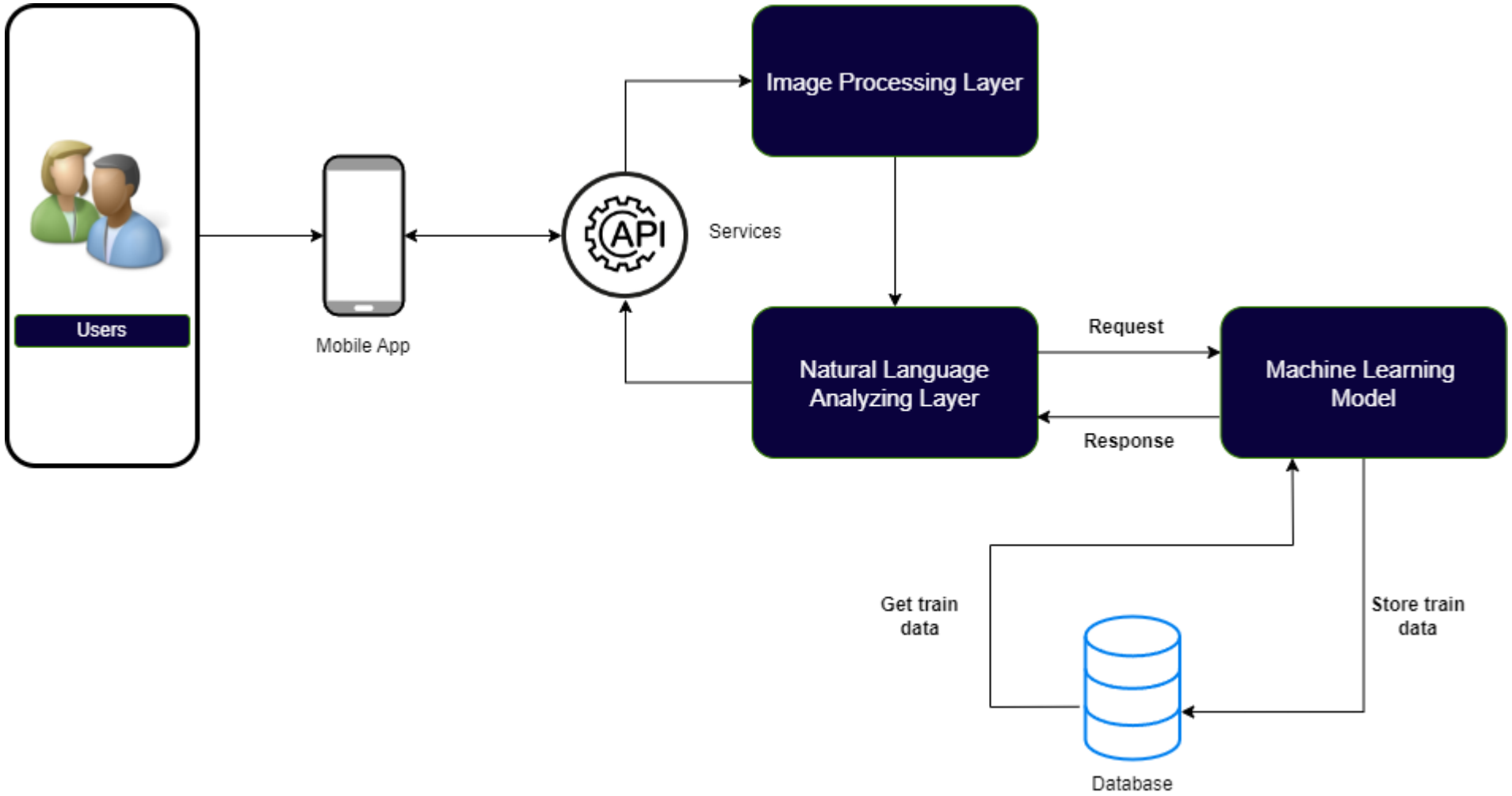
HAIR DISEASE DETECTION

- System Diagram
- Requirements
- Tools and Technologies
- Work Breakdown Structure



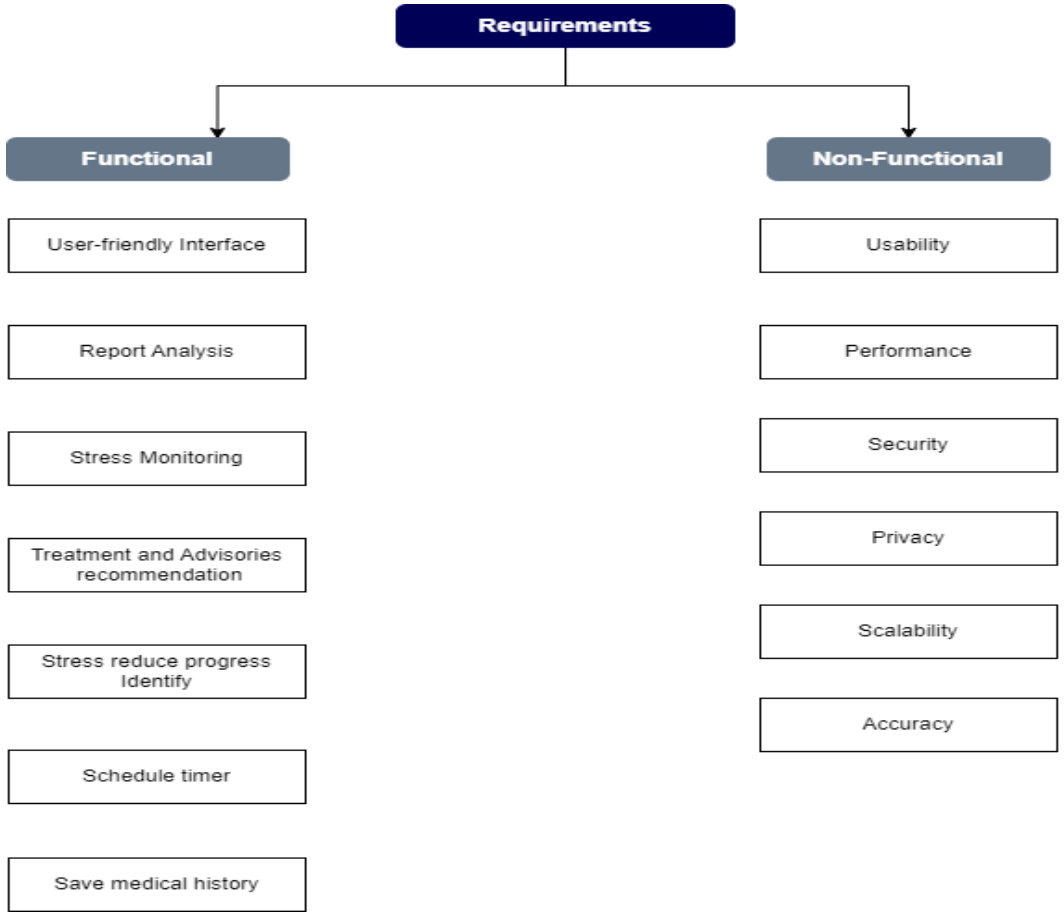
System Diagram

HAIR DISEASE DETECTION



Requirements

- Functional and Non-Requirements



Tools and Technologies

HAIR DISEASE DETECTION

Mobile Application

- Android

Database

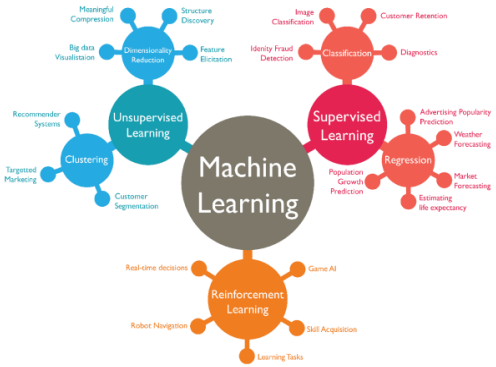
- Firebase

Middle Ware Technologies

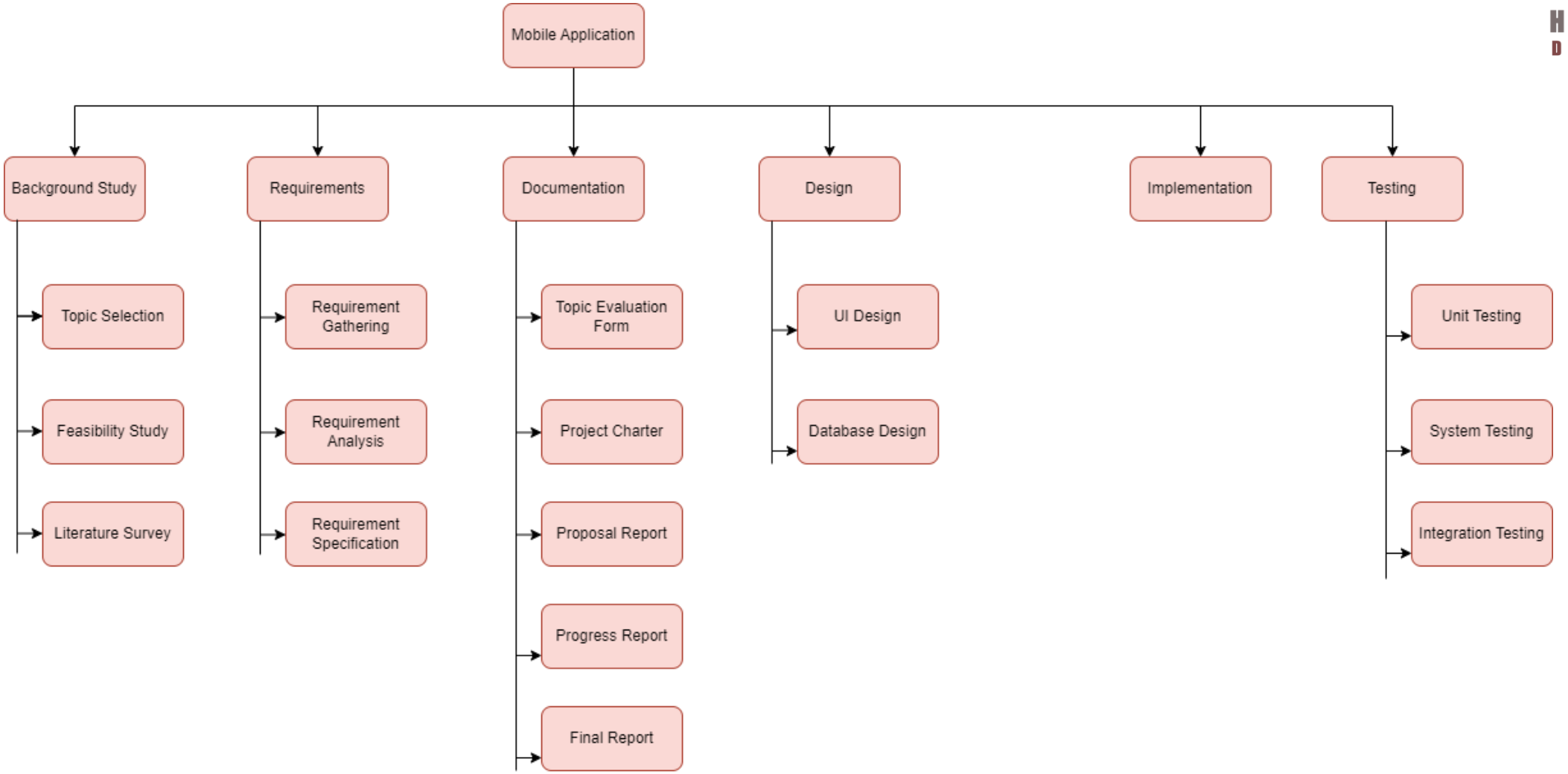
- Python
- Tensorflow
- Rest API

Technical Concepts

- Convolution Neural Network (CNN)
- Machine Learning



Work Breakdown Structure



Gantt Chart

HAIR DISEASE DETECTION

REFERENCES

HAIR DISEASE DETECTION

- Xiong, Y., Cai, Y., Li, Y., Li, W., Li, X., Li, Y., & Wu, J. (2021). An intelligent hair loss diagnosis and treatment system based on machine learning and knowledge graph. BMC medical informatics and decision making, 21(1), 1-13.
- Chiang, P. C., Wu, T. Y., Huang, P. Y., Wu, M. T., & Hsu, C. Y. (2018). Design and implementation of a smart hair care system. International Journal of Human-Computer Studies, 110, 18-28.
- Al-Taee, M. A., & Al-Yasiri, A. (2021). Intelligent health-care system for hair disease detection using machine learning techniques. Applied Soft Computing, 101, 107113.
- Lai, W. L., Tsai, Y. F., Huang, C. H., & Chen, W. H. (2018). Smart hair care system using fuzzy logic and neural network technologies. Applied Soft Computing, 70, 298-309.

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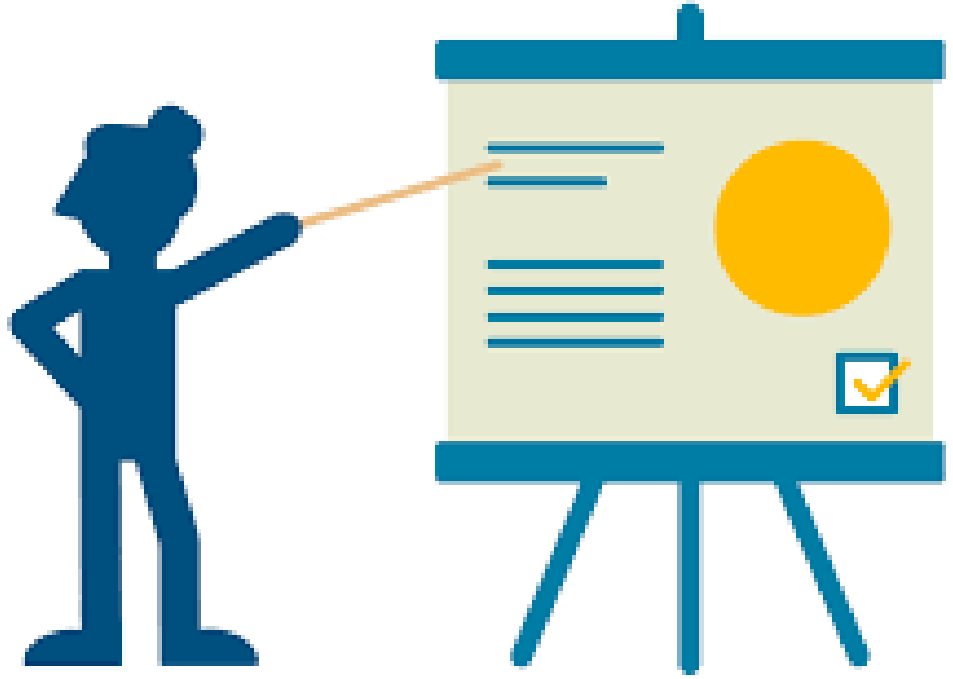
Hair Disease Treatment and Medicine Recommendations using Machine Learning and NLP Technologies.

HAIR DISEASE DETECTION

Introduction

HAIR DISEASE DETECTION

- Background
- Research Problem
- Research Gap
- Main Objective
- Sub Objectives



Background

- How to effectively gather and analyze data to train ML algorithms for hair disease treatment recommendations?

- How can successful chatbot implementations in healthcare inform and improve patient outcomes for hair disease treatment?

Research Problem

HAIR DISEASE DETECTION

- How to overcome patient discomfort or embarrassment in discussing head rashes with healthcare providers?

- Why this app provide western and ayurvedic medicine recommendation?

- How to overcome language barriers when providing medical recommendations for head rashes to patients?

Research Gap

HAIR DISEASE DETECTION

Features	Proposed System	Research 01	Research 02	Research 03	Research 04
Diseases Medicine Recommendation Using Chatbot.	✓	✗	✗	✗	✓
Identify the user language	✓	✓	✗	✓	✗
Choose Western or Ayurvedic Medicine.	✓	✗	✗	✗	✗
Integration with Electronic Health Records (EHRs)	✓	✗	✓	✓	✓
User Attractive Interface	✓	✗	✓	✗	✓

Main Objective

HAIR DISEASE DETECTION

- **Develop a machine learning-based model that can provide accurate medical recommendations for head rashes, while considering cultural differences, Language barriers and patient preferences, to improve treatment options and empower patients to manage their own health.**

Sub Objective

HAIR DISEASE DETECTION

- Develop a machine learning-based model for reliable and accurate hair disease treatment recommendations.
- Consider cultural differences, languages differences, and patient preferences in the recommendations provided.
- Collect and analyze data effectively to train the machine learning algorithms.
- Explore successful implementation of chatbot technology in healthcare for guidance.
- Evaluate the effectiveness of Western and Ayurvedic treatments for hair diseases.

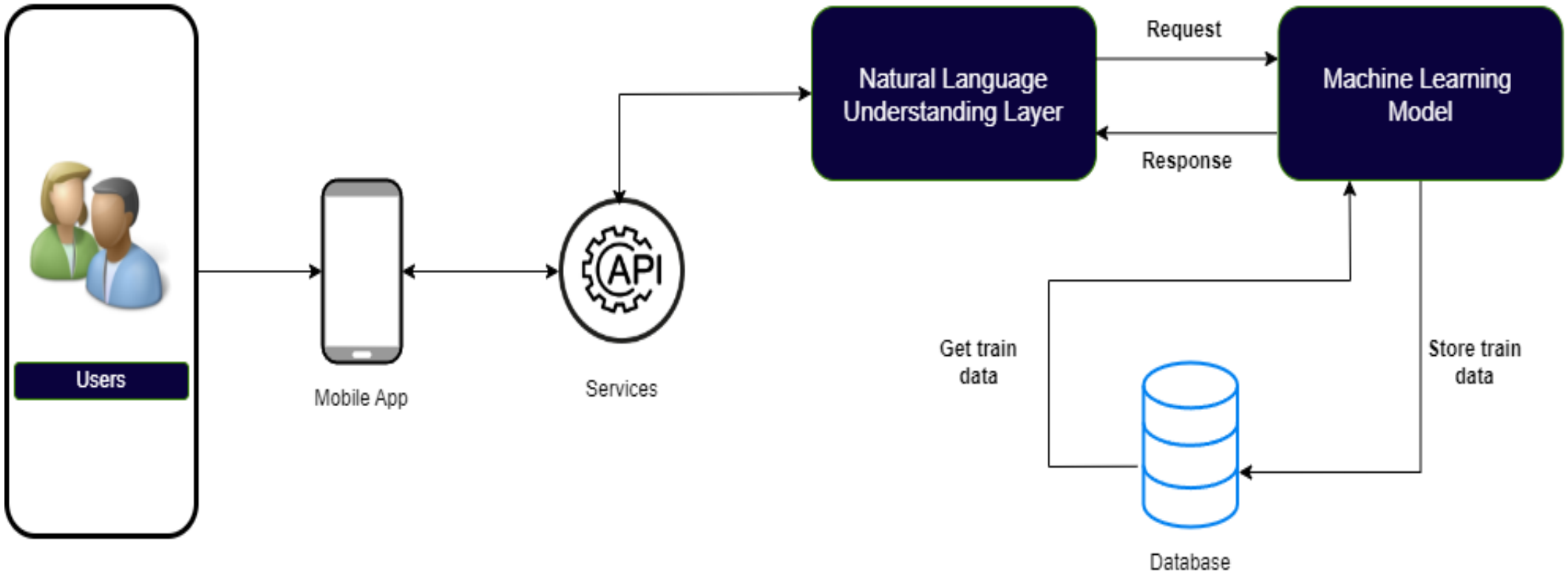
Methodology

HAIR DISEASE DETECTION

- System Diagram
- Requirements
- Tools & Technologies
- Work Breakdown Structure

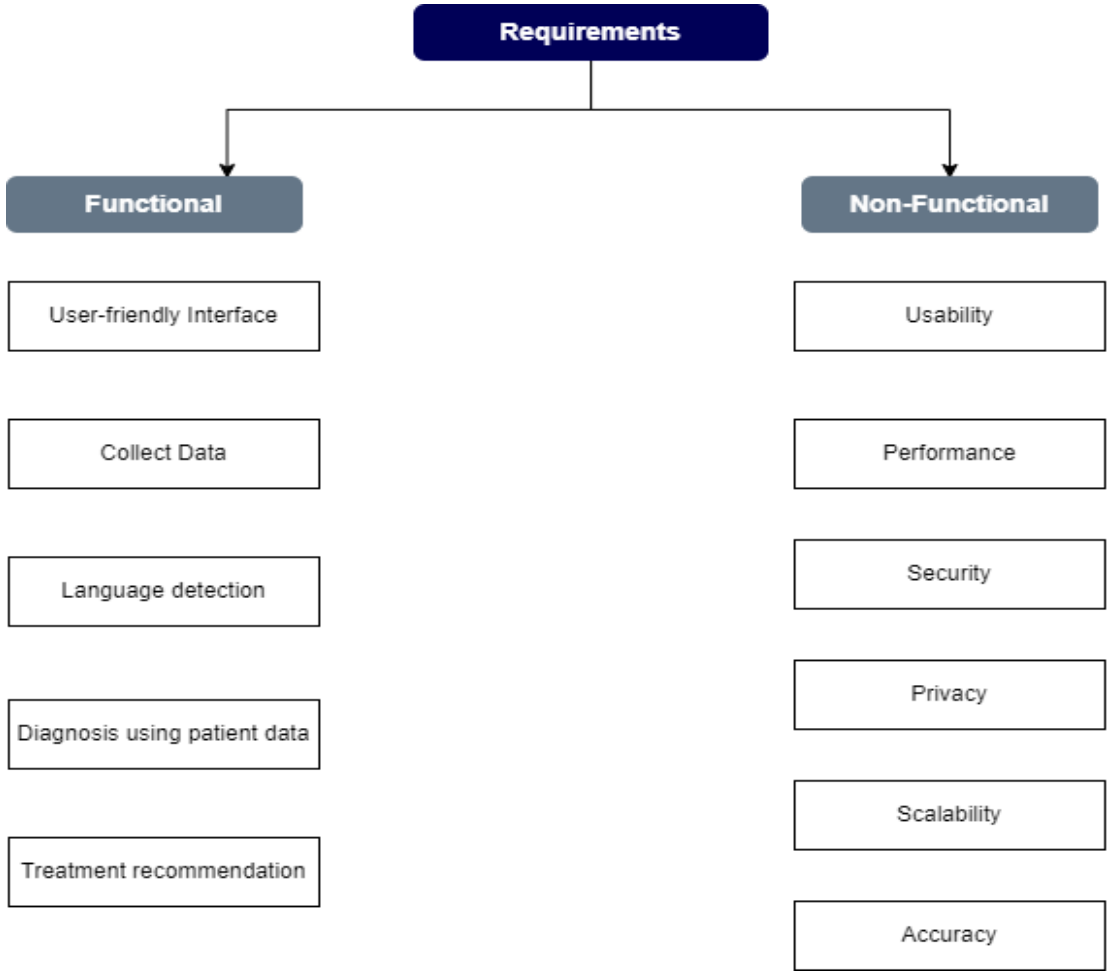
System Diagram

HAIR DISEASE DETECTION



Requirements

- Functional and Non-Functional Requirements



Tools and Technologies

HAIR DISEASE DETECTION

Mobile Application

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Database

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Middle Ware Technologies

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Technical Concepts

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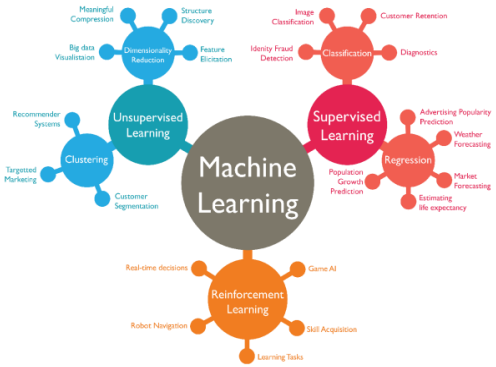
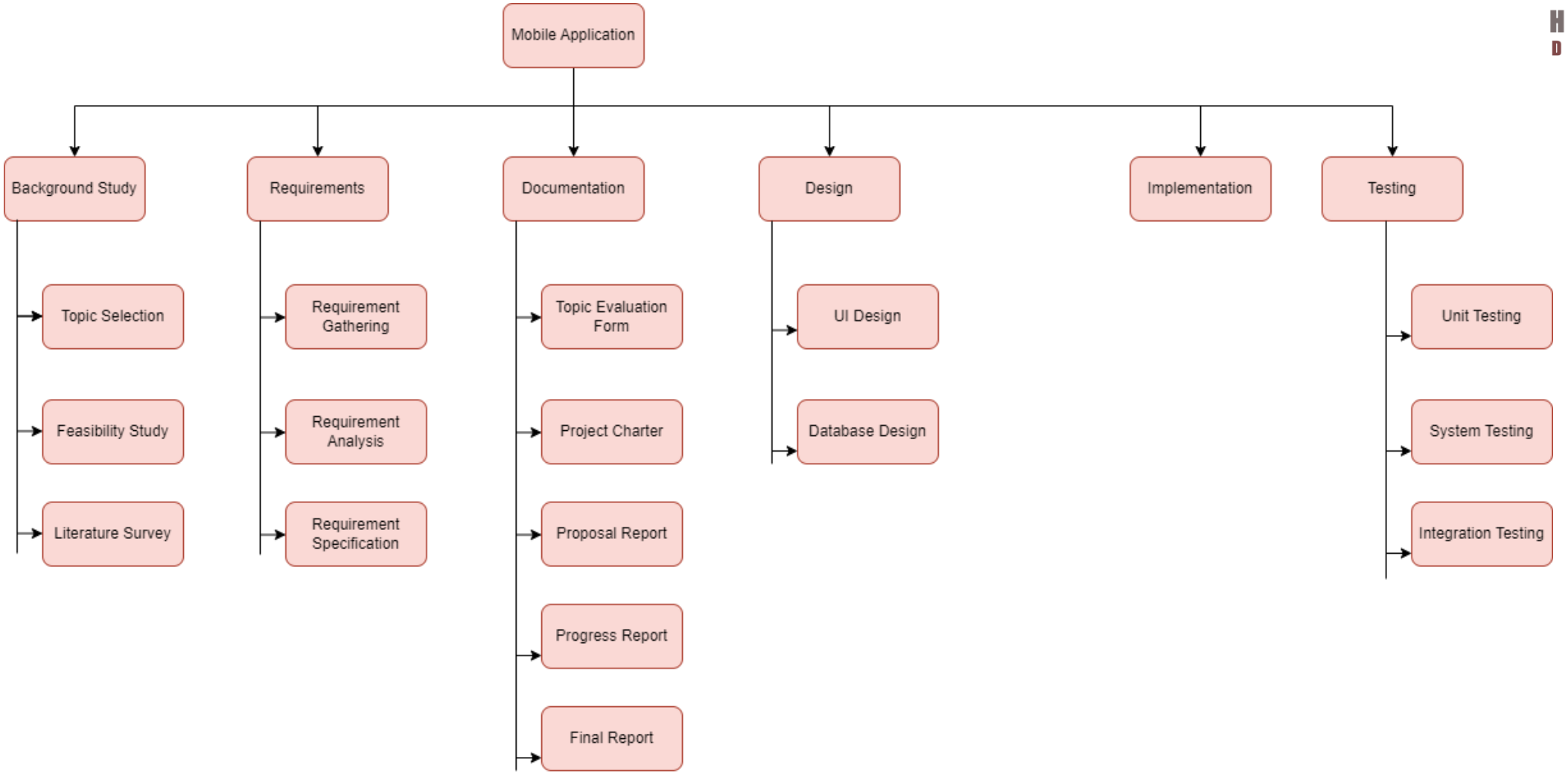


Work Breakdown Structure



Gantt Chart


Task Name
Q1
Q2
Q3
Q4
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Project Initiation
Project Ideas evalution
Literature Review
Project Charter Document
Project Proposal
RRD Document
Project Planning
System Planning and Design
Gathering and Identifying Resources
System Implementation
Dataset collecting
Dataset Traning
Algorithem Implementation
Configure the smartphone camera
Cloud server configaration
Implement the Mobile Application
Testing
Testing Algorithem
Testing Mobile Application
Finalizing
Testing and Finalizing the implemented System
Final Report

References

- "Machine Learning-Based Automated Diagnosis of Alopecia Areata using Dermoscopy Images" by S. Hassanpour, S. Ahmadi, and F. Sadri

- "Machine learning approaches to diagnose scalp and hair disorders using dermoscopy and clinical images: A systematic review" by S. Lee and J. Lee

- "Alopecia areata prediction using machine learning" by D. Singh and D. Singh

- "Machine Learning for Scalp Diseases: a Systematic Review" by N. M. R. Alves, G. de Moraes, M. Y. Fujita, and L. E. B. Santos

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Predicting Hair Diseases through Patient History and Symptom Based Predictive Modeling and recommend doctor.

HAIR DISEASE DETECTION

Introduction

HAIR DISEASE DETECTION

- Background
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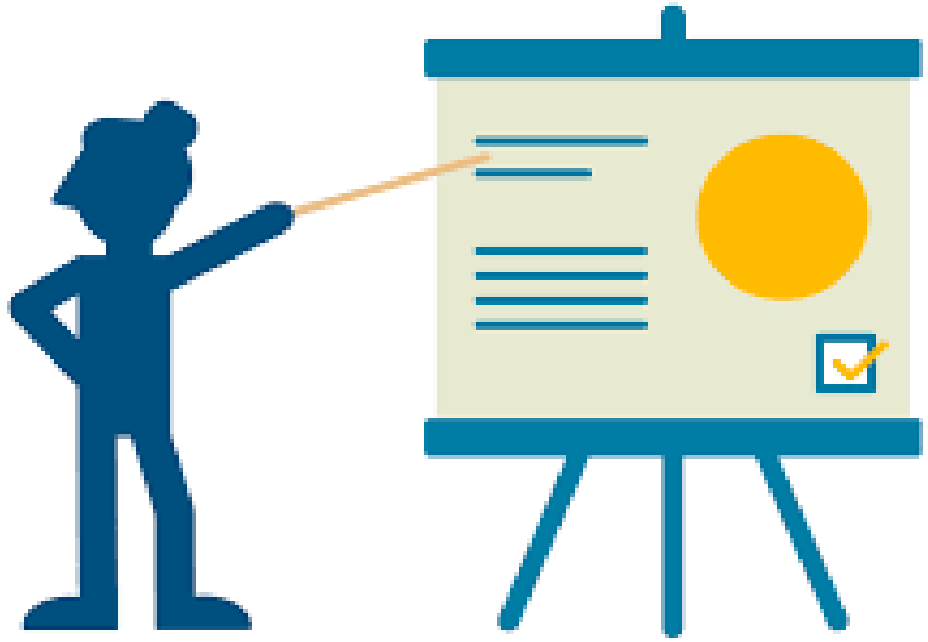
- Main Objective
- Sub Objectives



Background

- Hair diseases symptom prediction.
- Doctor Recommendation.
- Shown the doctor location using Google map.

Research Problem

HAIR DISEASE DETECTION

How machine-learning-based mobile systems take place the prediction of hair diseases using symptoms?

After the symptom analysis using machine learning algorithms is complete, the mobile system outputs a prediction of the hair disease, along with relevant information.

Research Gap

HAIR DISEASE DETECTION

Features	Proposed System	Research 01	Research 02	Research 03	Research 04
Diseases Symptoms Identification Using Chatbot	✓	✗	✗	✗	✗
Use ML algorithm	✓	✓	✓	✓	✗
Predict the future symptoms of that disease.	✓	✗	✗	✗	✗
Automated Model Upgrade with time to time.	✓	✗	✗	✗	✓
User Attractive Interface	✓	✗	✓	✗	✓

Main Objective

HAIR DISEASE DETECTION

Using machine learning to deduce what hair disease is caused by unique symptoms and predict what symptoms of this disease may appear in the future.

Sub Objective

HAIR DISEASE DETECTION

- Build various ML model to predict to hair diseases symptom.

- Predict the status of the patient.

- Shown the Doctor location using google map.

- Build various ML model to recommend doctors for hair disease.

Methodology

HAIR DISEASE DETECTION

- System Diagram
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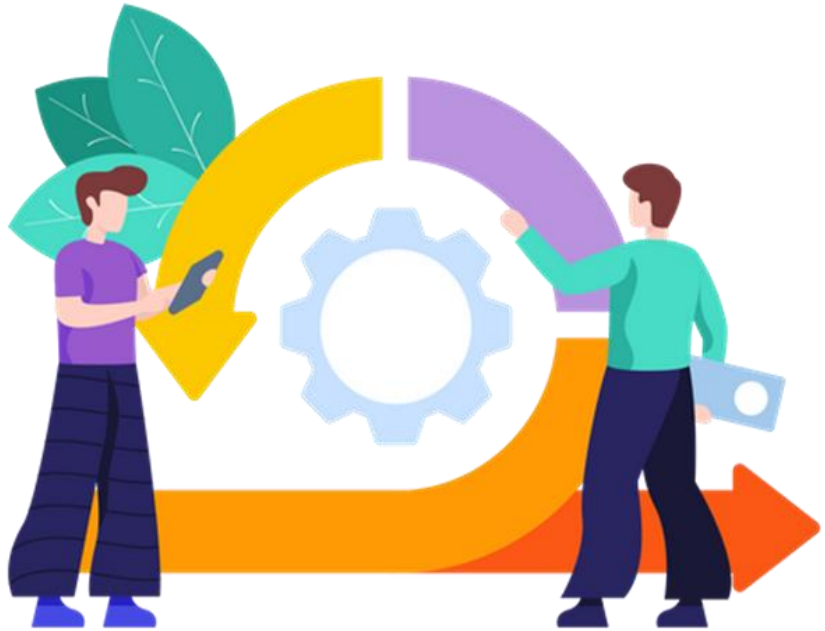
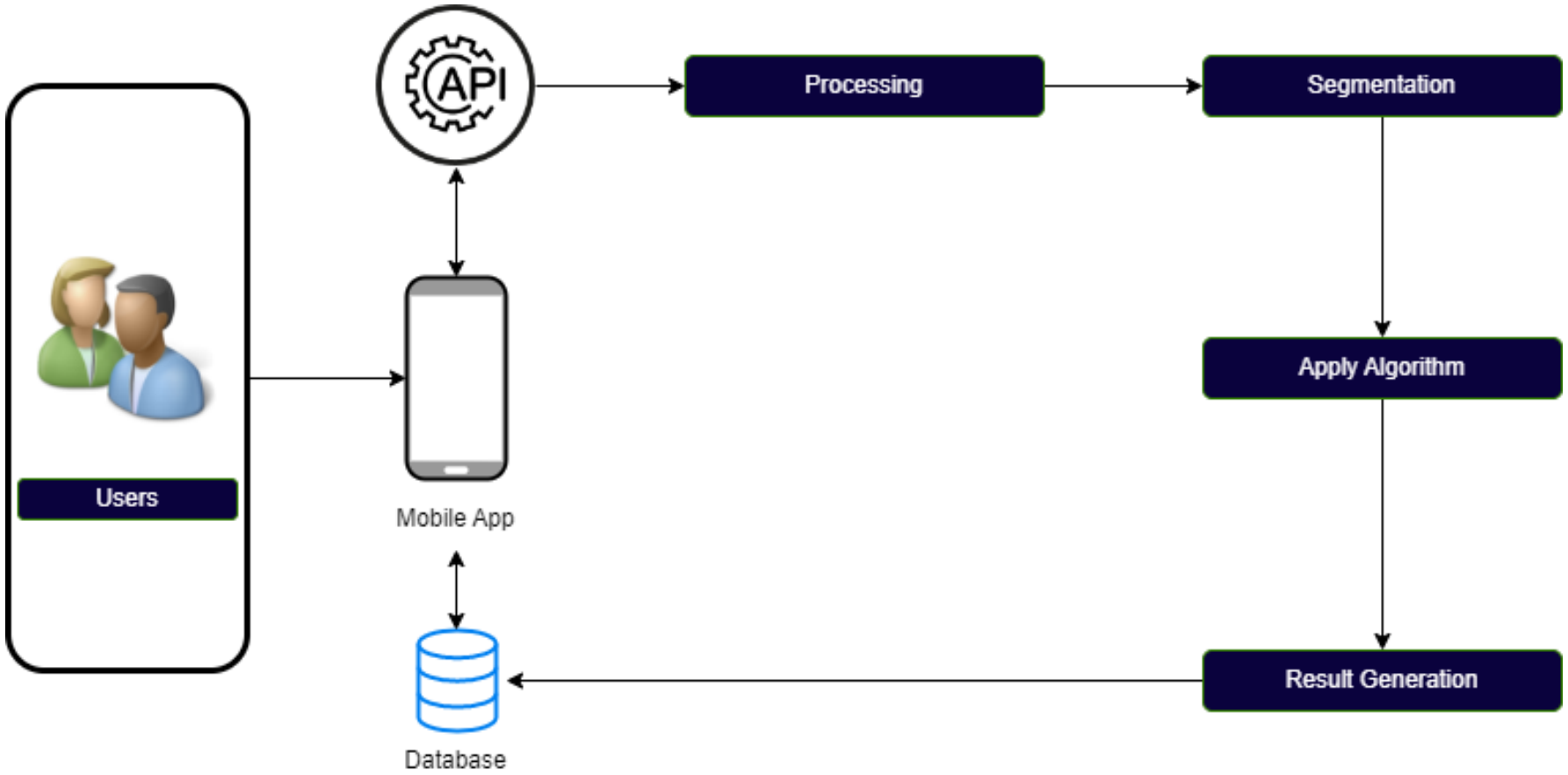
- Tools and Technologies
- Work Breakdown Structure



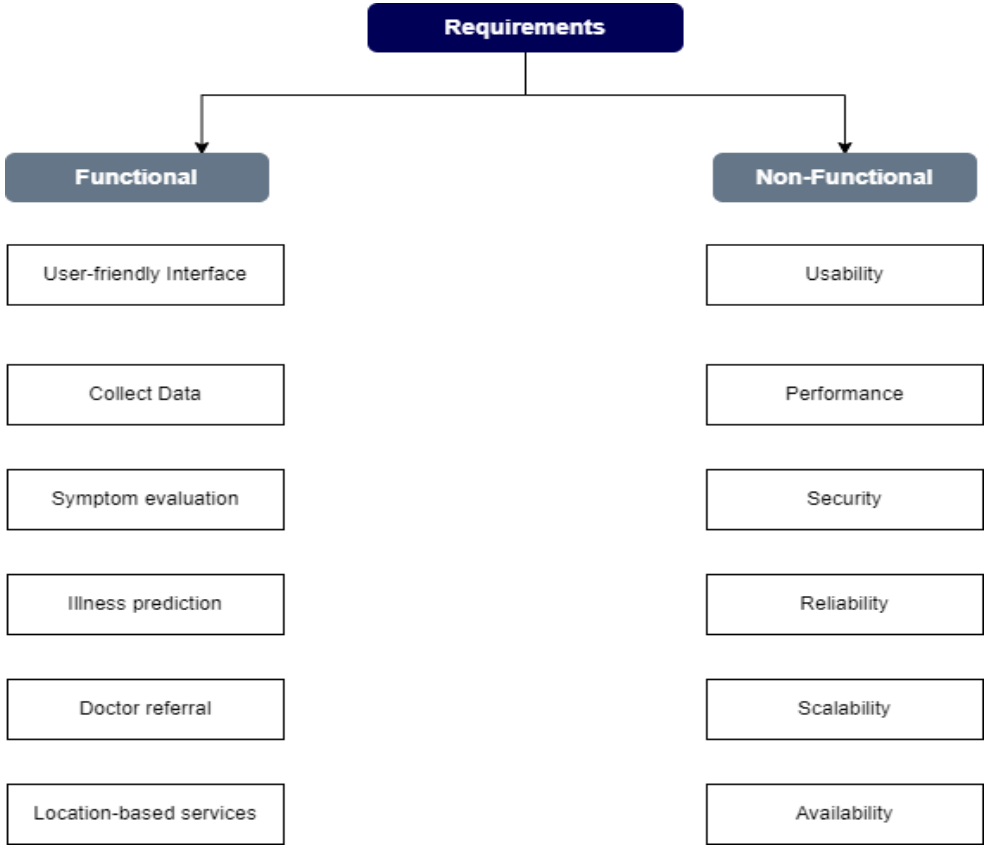
System Diagram

HAIR DISEASE DETECTION



Requirements

- Functional and Non-Requirements



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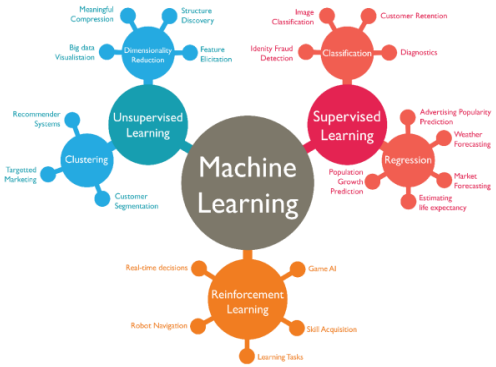
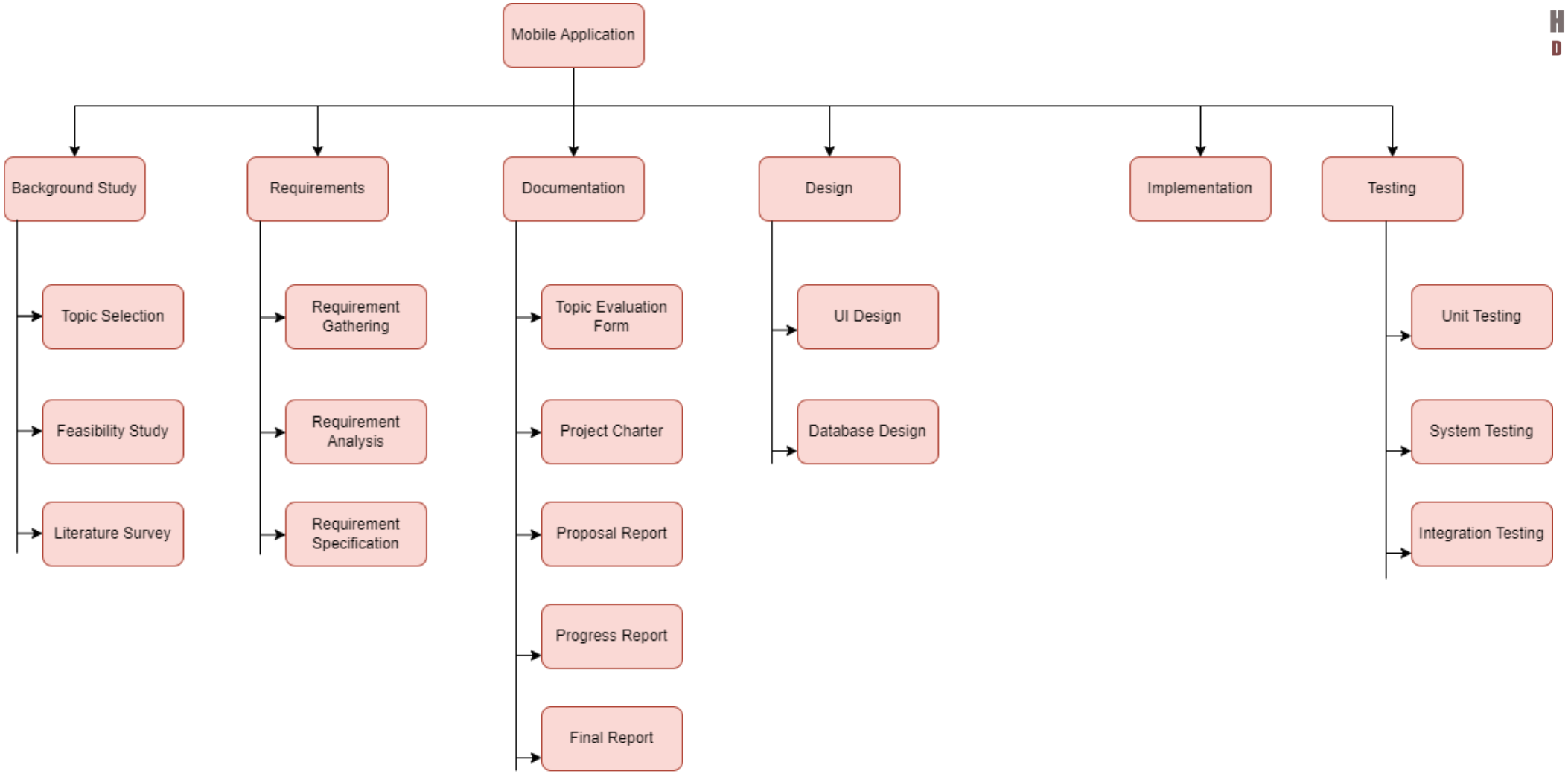


Work Breakdown Structure

HAIR DISEASE DETECTION



Gantt Chart

HAIR DISEASE DETECTION

References

HAIR DISEASE DETECTION

[1] Rawat, S., Chauhan, A., & Agrawal, S. (2019). Prediction of hair diseases using machine learning algorithms. In 2019 3rd International Conference on Inventive Systems and Control (ICISC) (pp. 932-935). IEEE.

[2] Patel, A., Dave, A., & Joshi, M. (2018). Hair disease identification and prediction system using decision tree classifier. International Journal of Advanced Research in Computer Science, 9(1), 34-37.

[3] Patwardhan, N., & Joshi, M. (2017). Detection of hair diseases using image processing techniques. International Journal of Computer Applications, 168(3), 9-13.

[4] Zhang, Y., Chen, M., Xie, Y., & Xu, Y. (2020). Hair disease detection and classification using deep convolutional neural networks. International Journal of Pattern Recognition and Artificial Intelligence, 34(9), 2058006.

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HAIR DISEASE DETECTION

Identifying Hair Diseases using IOT Device and Move to Healthy daily works.

Introduction

HAIR DISEASE DETECTION

- Background
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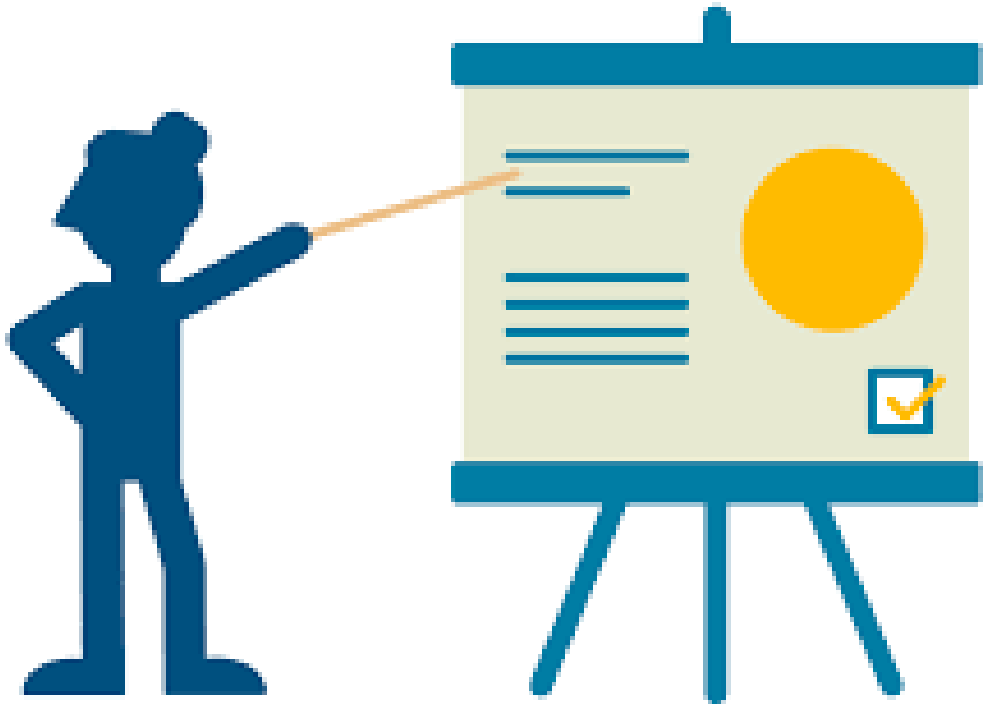


Background

HAIR DISEASE DETECTION

- Why monitoring real time hair health?

- How to improve hair health

Research Problem

HAIR DISEASE DETECTION

How machine-learning-based computer-aided systems take place the monitoring of hair disease using risk factors?

Research Gap

HAIR DISEASE DETECTION

The research aims to develop an intelligent hair disease detection system using machine learning algorithms and sensor technology to address the current gap in early detection of hair diseases, especially in remote areas where access to quality hair care is limited.

Main Objective

HAIR DISEASE DETECTION

Develop a machine learning-based model that can provide accurate hair decease detection system, while considering cultural differences and patient preferences, to improve hair health and empower patients to manage their own health.

Sub Objective

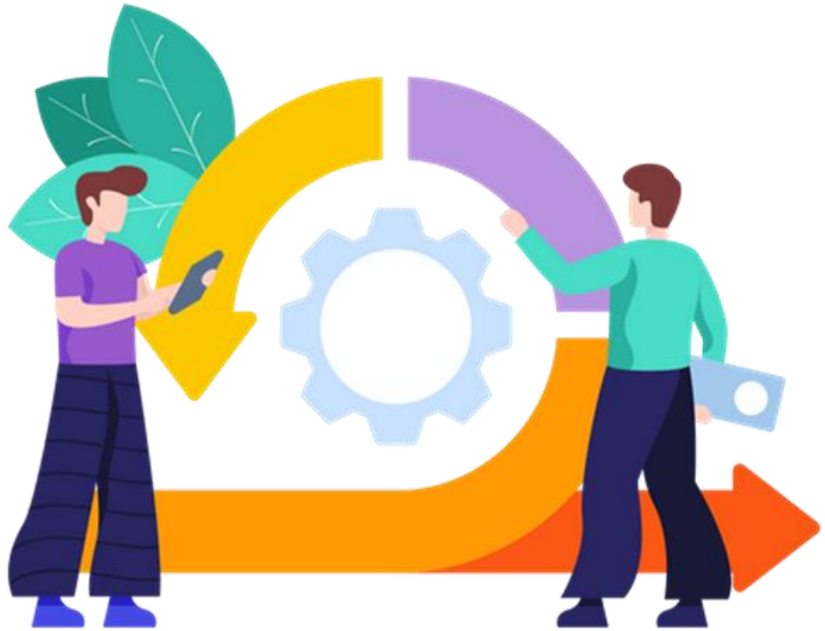
HAIR DISEASE DETECTION

- Build various ML model to Identifying to hair diseases Symptom.
- Identify the status of the patient.
- Shown the Hair Disease.
- Build various ML model to recommend health for hair disease.

Methodology

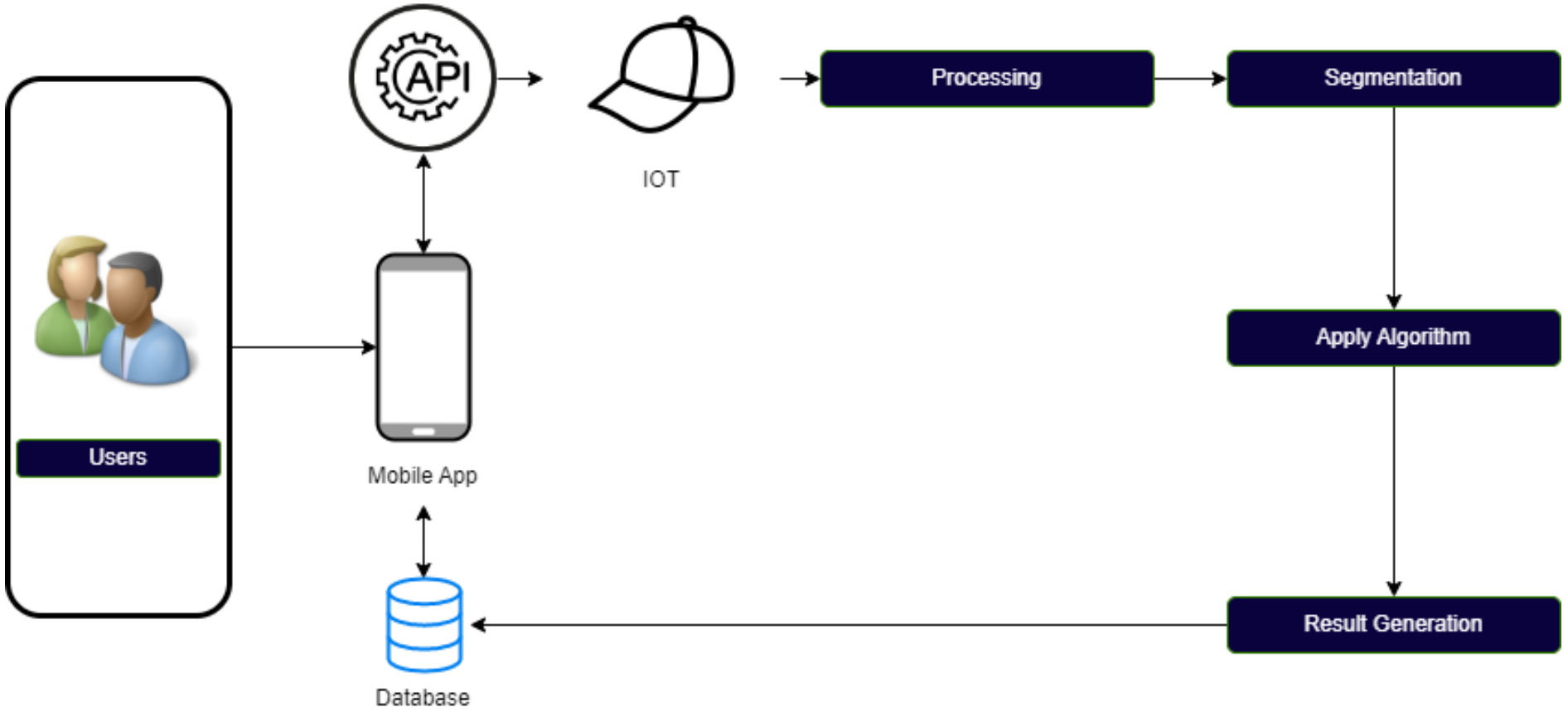
HAIR DISEASE DETECTION

- System Diagram
- Requirements
- Tools and Technologies
- Work Breakdown Structure



System Diagram

HAIR DISEASE DETECTION



Tools and Technologies

Mobile Application

- Android

Database

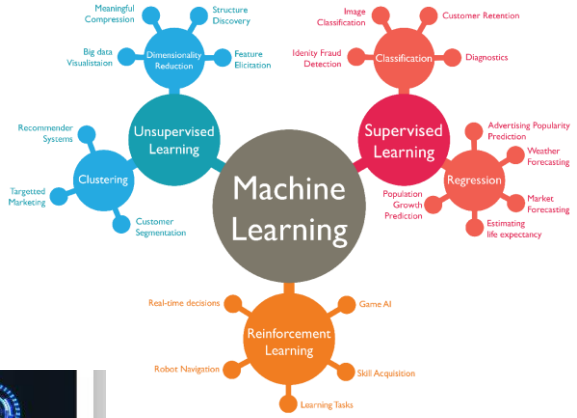
- Firebase

Middle Ware Technologies

- Python
- TensorFlow
- Rest API

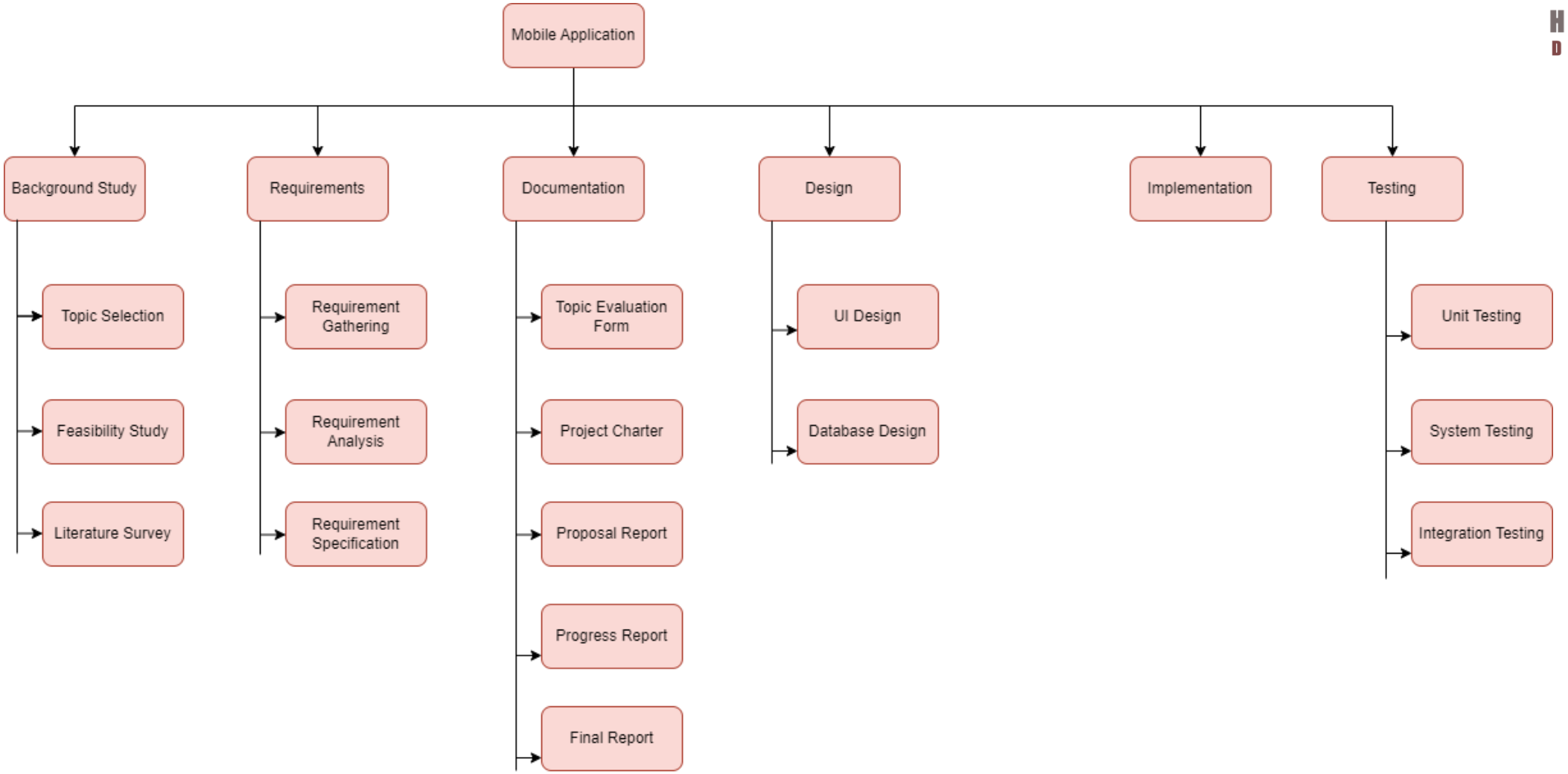
Technical Concepts

- Convolution Neural Network (CNN)
- Machine Learning
- IOT



Work Breakdown Structure

HAIR DISEASE DETECTION



Gantt Chart


Task Name
Q1
Q2
Q3
Q4
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Project Initiation
Project Ideas evalution
Literature Review
Project Charter Document
Project Proposal
RRD Document
Project Planning
System Planning and Design
Gathering and Identifying Resources
System Implementation
Dataset collecting
Dataset Traning
Algorithem Implementation
Configure the smartphone camera
Cloud server configaration
Implement the Mobile Application
Testing
Testing Algorithem
Testing Mobile Application
Finalizing
Testing and Finalizing the implemented System
Final Report

REFERENCES

WAN-JUNG CHANG, “ScalpEye: A deep learning-based scalp hair inspection and diagnosis ...,” *IEEE*, 21-Jul-2021. [Online]. Available: https://ieeexplore.ieee.org/document/9145559/. [Accessed: 29-Mar-2023].

M. Roy and A. T. Protity, “Hair and scalp disease detection using machine learning and image processing,” *European Journal of Information Technologies and Computer Science*, vol. 3, no. 1, pp. 7–13, 2023.

C. S. Shakeel, S. J. Khan, S. F. Aijaz, U. Hassan, and B. Chaudhry, “Classification framework for healthy hairs and alopecia areata using machine learning (preprint),” 2021.

R. M. Trueb, J. P. Henry, M. G. Davis, and J. R. Schwartz, “Scalp condition impacts hair growth and retention via oxidative stress,” *International Journal of Trichology*, vol. 10, no. 6, p. 262, 2018.

Any

Question


Thank You!