

# Apeksha Hospital Donor Engagement System

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2023-24-100

# Team Members

Supervisor : Mrs.Lokesha Weerasinghe

Co-Supervisor : Ms.Chamali Pabasara

Student Name	Student ID
Punchihewa S.N	IT20665166
Prabodha K.W.D.S	IT20665098
Bandara H.R.H.S	IT20662028
Wijesooriya P.L.P.G.D.S	IT20660352

# Introduction to the overall project

Our project aims to revolutionize the donation process at Apeksha Hospital, ensuring high-quality donations and patient care.

## Main Components

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- VISUAL VERIFICATION FOR QUALITY ASSURANCE
- SECURE AND TRANSPARENT BLOCKCHAIN-BASED FUND DONATION
- PREDICTIVE ANALYTICS FOR DONATION CAMPAIGN SUCCESS
- PROMOTING QUALITY HAIR DONATION FOR CANCER PATIENTS

## Research Problem



The lack of a reliable and comprehensive platform for donations at Apeksha Hospital poses several challenges, including fraudulent activities and the absence of a specific and trustworthy platform for hair donations. These issues have a significant impact on the overall donation process, leading to inefficiencies, a lack of transparency, and a potential compromise in the quality and suitability of donated items for patient care.

# Objectives

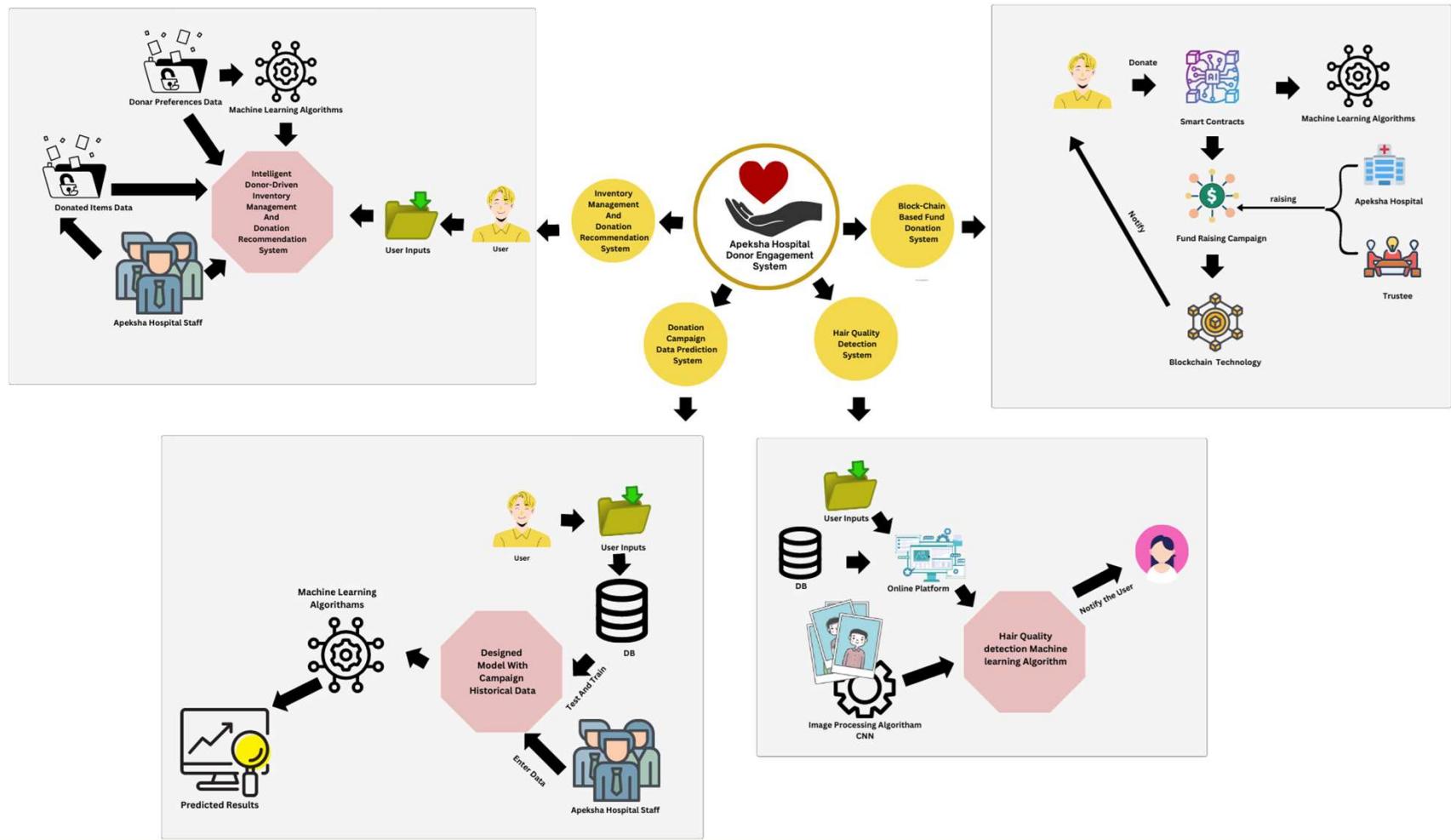
## Main Objective:

Improve communication, engagement, transparency, and security, while also optimizing donation campaigns and promoting high-quality donations.

## Sub Objectives:

- Seamless Integration of Components:
  - User-Friendly Interface and Experience:
  - Scalability and Performance Optimization:
  - Continuous Monitoring and Improvement:
-

# Overall System Diagram



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Bachelor of Science (Hons) in Information Technology

Specializing in Software Engineering

# Contents

## **Intelligent Donor- Driven Inventory Management and Recommendation System**

- Introduction of the topic
- Background
- Research Problem
- Research Gap
- Main Objective
- Sub-Objective
- Methodology

# Introduction and Background

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Why does Apeksha Hospital need an automated donor system?



What are the limitations or disadvantages of the current manual donation process at Apeksha Hospital?



How does the automated donation system at Apeksha Hospital benefit donors?

# Research Gap

	Research [1]	Research [2]	Research [3]	Research [4]	Research [5]	Proposed Solution
Identify both donor and inventory historical data	✗	✗	✓	✗	✗	✓
Suggest insufficient items for donor	✗	✓	✗	✗	✗	✓
Secure donor data (proper authorization and authentication)	✓	✗	✗	✗	✓	✓
Identify Commonly used donation items.	✗	✓	✗	✓	✓	✓
Lack of real-time and centralized inventory data management system	✓	✗	✗	✓	✗	✓

# Research Problem

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- ❖ How can an intelligent donor-driven inventory management and recommendation system optimize inventory utilization and provide personalized item suggestions for donors in the Apeksha Hospital Donor Engagement System?

# Specific Objectives

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- ❖ Develop an intelligent donor-driven inventory management and recommendation system for the Apeksha Hospital Donor Engagement System.



# Sub Objective



Collect and analyze data on donated items, including attributes, utilization history, and departmental needs.



Implement machine learning algorithms (collaborative filtering, reinforcement learning) to identify donor behavior and item preferences.



Develop a recommendation system that suggests specific donated items to donors based on their interests and previous donations.



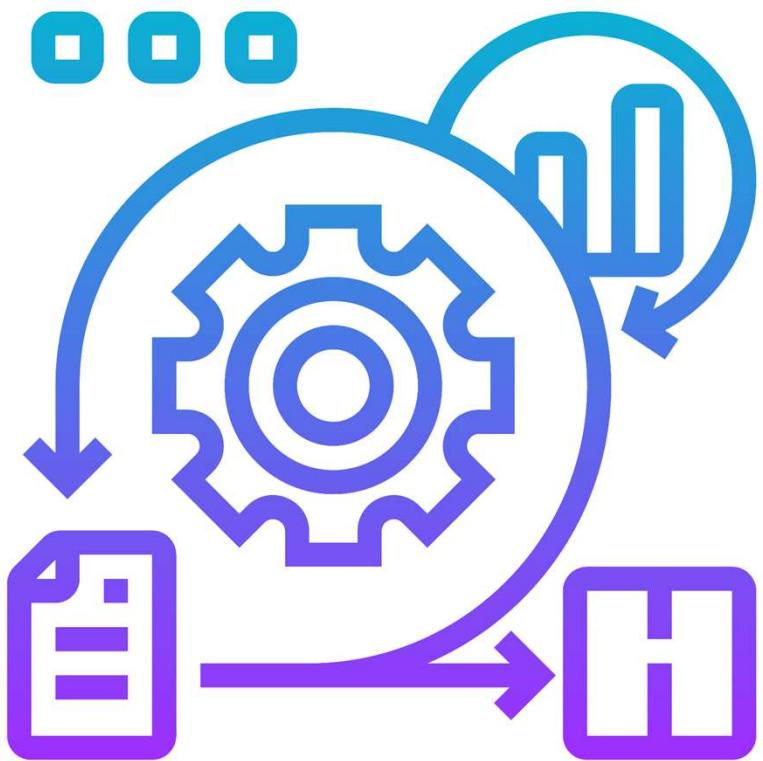
Create an interactive inventory management interface for donors to select recommended items and track their impact.



Evaluate the system's effectiveness through donor satisfaction surveys, donation patterns, and inventory utilization metrics.



Analyze the impact of the system on donor engagement, resource allocation, and overall efficiency of item donations.

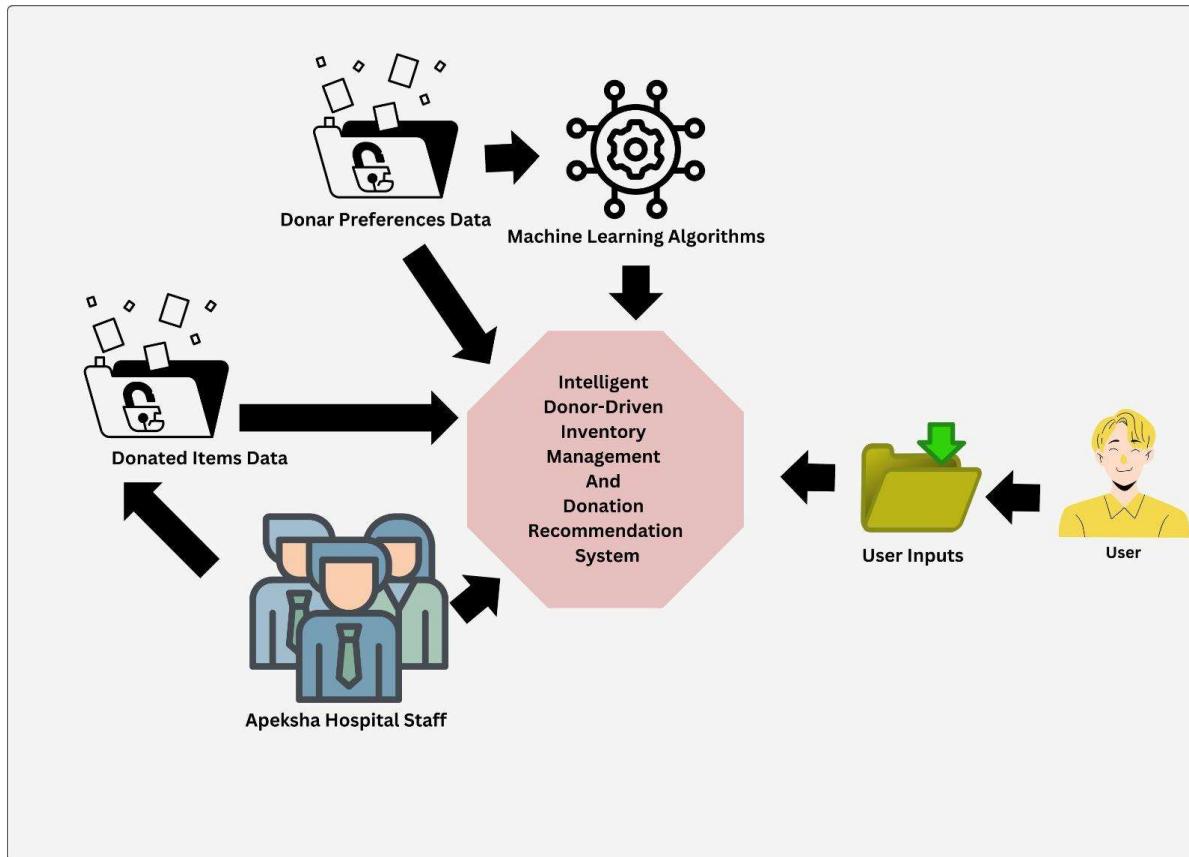


# Methodology

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# System Architecture



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# Tools and Technology

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## Programming Languages

Python, React, JavaScript, Node Js

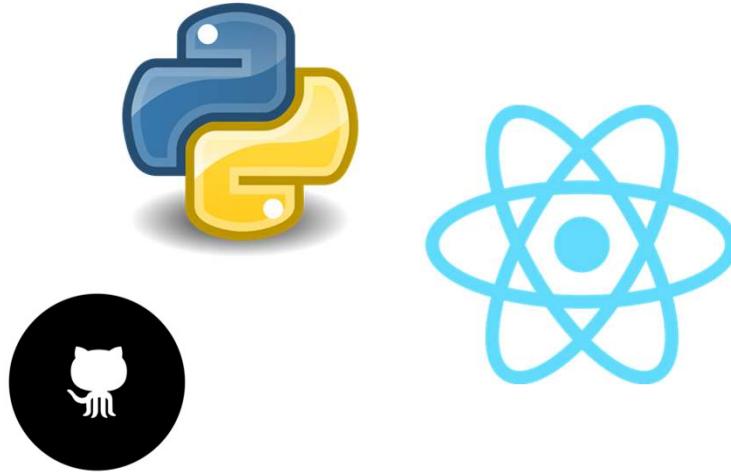
## Tools:

Jupyter Notebook

TensorFlow

Keras

Scikit-learn



## Technology stack:

Version controlling-GitHub

## Algorithm:

Logistic Regression

Random Forest

# Functional Requirements



Create an interactive and user-friendly inventory management interface that allows donors to select from recommended items and track the impact of their donations.



Develop a recommendation system that suggests specific donated items to donors based on their interests, previous donations, and overall engagement.



The system should be able to collect and store data on donated items, including attributes, utilization history, and departmental needs.



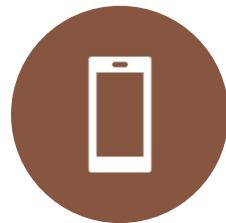
The system should be flexible enough to adapt to changes in donor preferences, item requirements, and hospital needs.

# Non-Functional Requirements

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RELIABILITY



USER FRIENDLY

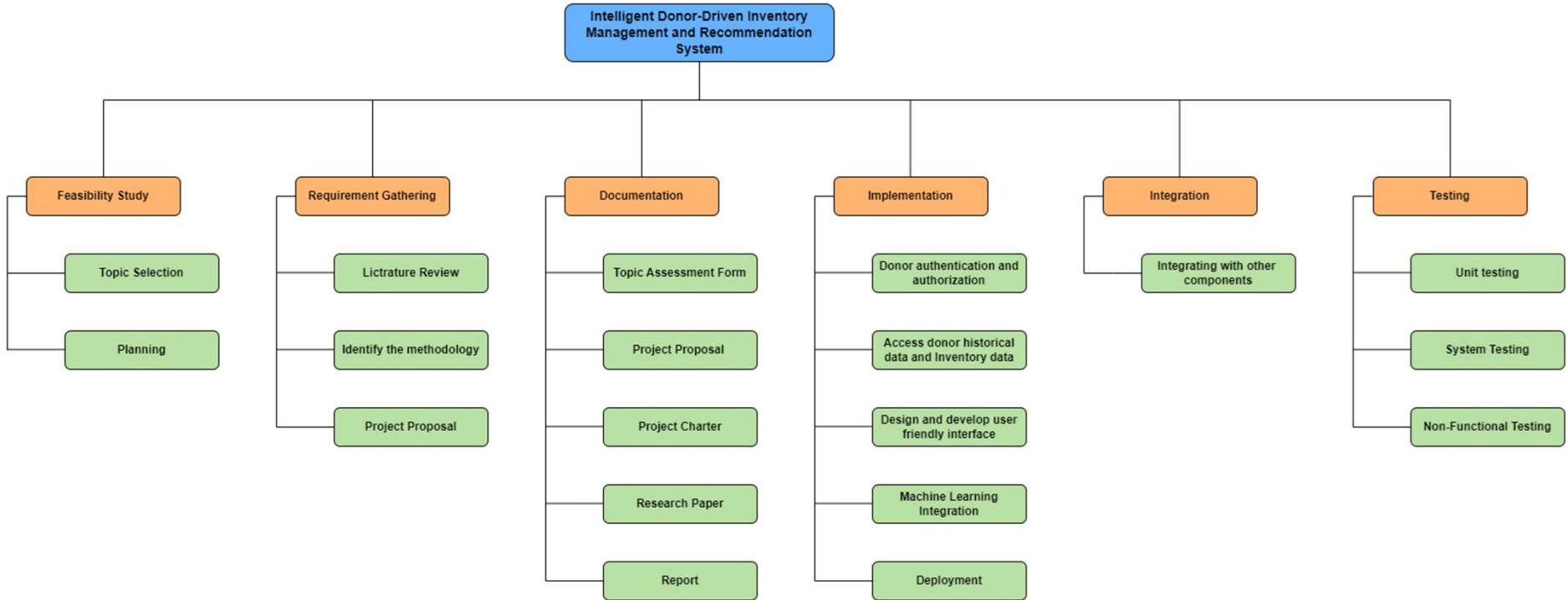


EFFICIENCY



ACCURACY

# Work Breakdown structure



# Gantt Chart

Task Name	Semester 1						Semester 2					
	June	July	August	September	October	November	December	January	February	March	April	May
Feasibility Study	■											
Topic Selection	■											
Topic Evaluation	■	■										
Background Study	■	■	■									
Background Study and Literature Survey		■	■									
Proposal Draft			■									
Project Proposal			■									
Proposal Presentation			■									
Proposal Report			■									
Project Initiation			■	■	■							
Data gathering			■	■	■							
Selecting technologies			■	■	■							
Project Implementation			■	■	■	■	■	■	■	■	■	
Donor authentication and authorization			■	■	■	■	■	■	■	■	■	
Access donor historical data and inventory data			■	■	■	■	■	■	■	■	■	
Design and Develop a user friendly interface			■	■	■	■	■	■	■	■	■	
Machine Learning Integration			■	■	■	■	■	■	■	■	■	
Research Paper			■	■	■	■	■	■	■	■	■	
Final Implementation			■	■	■	■	■	■	■	■	■	
Unit Testing			■	■	■	■	■	■	■	■	■	
Evaluating and error fixing			■	■	■	■	■	■	■	■	■	
Integrating with other components			■	■	■	■	■	■	■	■	■	
Final Stages			■	■	■	■	■	■	■	■	■	
System Integration			■	■	■	■	■	■	■	■	■	
System Testing			■	■	■	■	■	■	■	■	■	
Evaluating and error fixing			■	■	■	■	■	■	■	■	■	
Final Report			■	■	■	■	■	■	■	■	■	

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[1] S. Seetharaman, P. Subramanian, G. Somasundaram, and M. Senthil, "Automated Donation Campaign Success Prediction using Ensemble Machine Learning Techniques," 2021 International Conference on Communication, Computing and Electronics Systems (ICCCES), Coimbatore, India, 2021, pp. 48-53. Available: <https://ieeexplore.ieee.org/abstract/document/9565320>

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[5] S. R. Sharma and D. S. Thakur, "Blood Donation Prediction using Deep Learning Techniques," Proceedings of the 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS), Chennai, India, 2017, pp. 3395-3400. Available: <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.747.5457&rep=rep1&type=pdf>

**IT20665098 |  
Prabodha K.W.D.S**

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# Contents

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## **Blockchain Based Fund Donation System**

- Introduction of the topic
- Background
- Research Problem
- Research Gap
- Main Objective
- Sub-Objective
- Methodology

# Introduction And Background

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The Significance of a Secure System in Fund Donations



Challenges of Conventional Donation Systems



How this system Revolutionizing Donations by Empowering Transparency and Trust

# Research Gap

Research (Reference)	Research A [01]	Research B [02]	Research C [03]	Research D [04]	Research E [05]	Proposed Solution
Healthcare Focus.	✗	✗	✗	✗	✓	✓
Smart Contract Automation.	✓	✗	✗	✓	✓	✓
Fraud Prevention Evaluation.	✓	✗	✓	✓	✓	✓
Integration of Machine Learning.	✗	✗	✗	✗	✗	✓
Focus on Transparency Enhancement.	✓	✓	✓	✓	✓	✓

# Research Problem

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- ❖ Lack of a reliable, secure, and transparent platform for fund donations to the Apeksha Hospital, coupled with concerns about fraudulent activities

# Specific Objectives

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- ❖ Explore, design, and implement a blockchain-based fund donation system within the Apeksha Hospital Donor Engagement System, with a focus on achieving security, transparency, and efficiency in healthcare-specific donation processes



# Sub Objectives

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Evaluate Blockchain Platforms



Design Smart Contracts



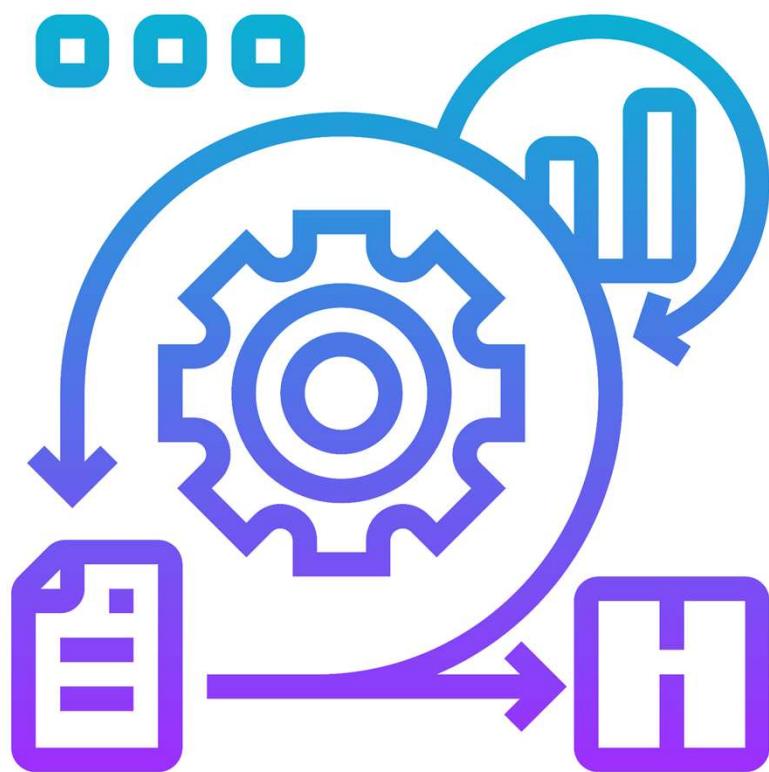
Implement Fraud Detection with Machine Learning



Real-world Deployment and Testing

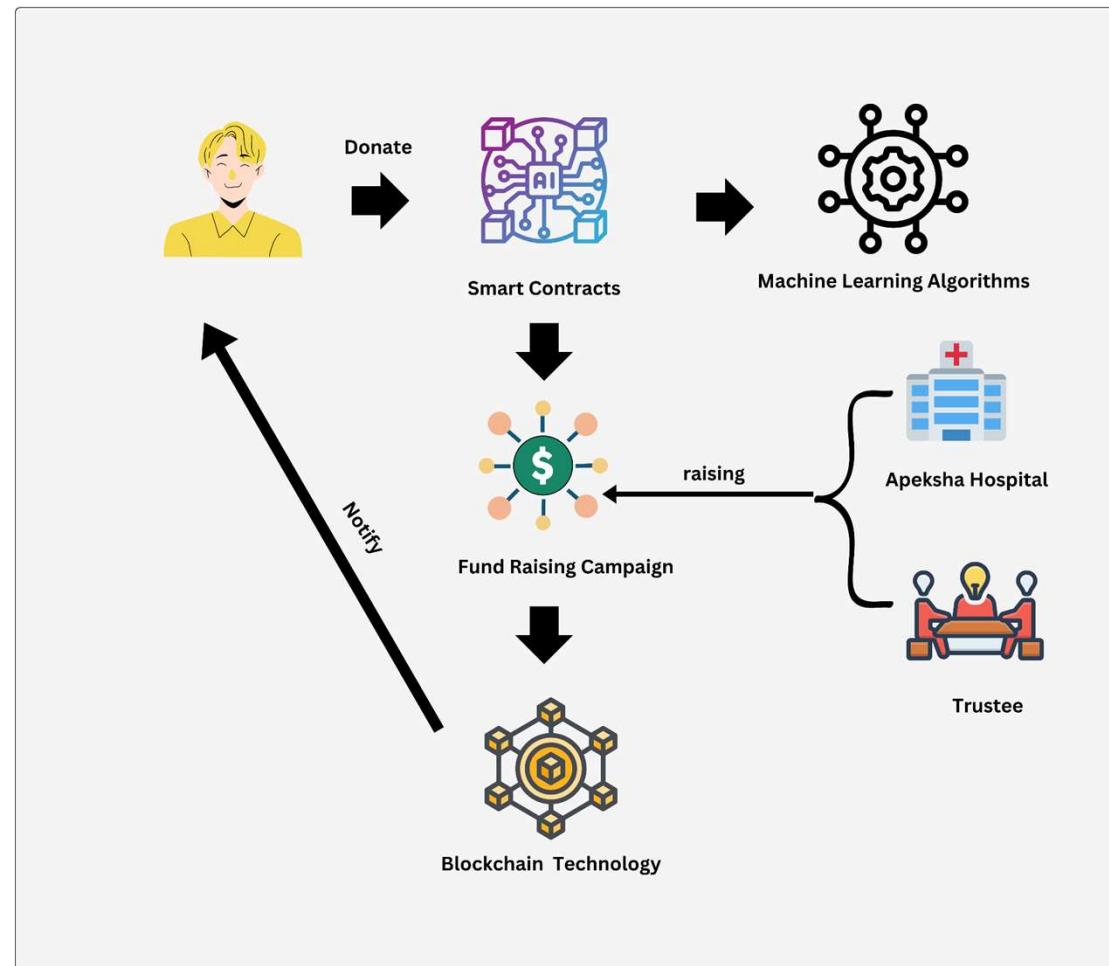
# Methodology

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# System Architecture

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# Tools And Technology

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## Development

- ❖ Node JS
- ❖ React
- ❖ Python

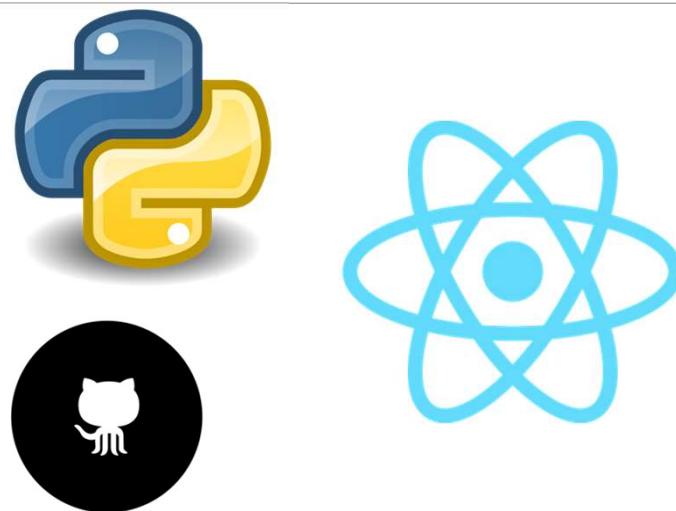
## Blockchain Platform

- ❖ Ethereum

## Smart Contracts Development

- ❖ Solidity

## Machine Learning Algorithms



# Functional Requirements

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Secure User Registration  
and Authentication



Transparent Donation  
Tracking



Fraud Detection and  
Prevention



User-Friendly Web  
Interface

# Non-Functional Requirements

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Security



Performance



Scalability

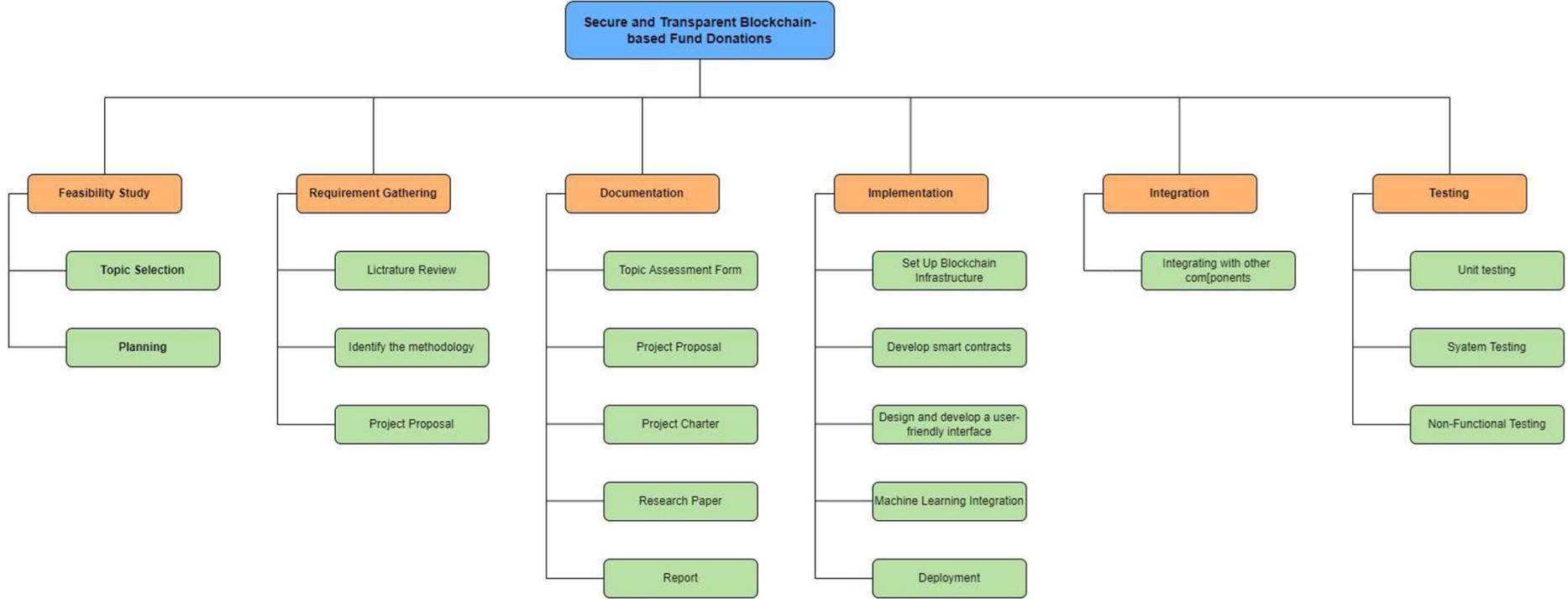


Availability



Reliability

# Work Breakdown Structure



Task Name	Semester 1						Semester 2					
	June	July	August	September	October	November	December	January	February	March	April	May
Feasibility Study	Red											
Topic Selection	Yellow											
Topic Evaluation	Yellow											
Background Study	Red	Red										
Background Study and Literature Survey		Yellow	Yellow									
Proposal Draft		Yellow	Yellow									
Project Proposal			Red									
Proposal Presentation			Yellow									
Proposal Report			Yellow									
Project Initiation			Red	Red								
Data gathering			Yellow	Yellow								
Selecting technologies			Yellow	Yellow								
Project Implementation							Red	Red	Red	Red	Red	Red
Set up Blockchain Infrastructure							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Develop smart Contracts							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Design and Develop a user friendly interface							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Machine Learning Integration							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Research Paper							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Final Implementation							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Unit Testing							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Evaluating and error fixing							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

# Gantt Chart

# References

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- [1] R. D. Bandara, R. S. Rajapakse, and R. K. C. K. Rajapakse, "A Framework for Donation Fraud Detection using Deep Learning and Blockchain," in Proceedings of the 16th International Conference on Advances in ICT for Emerging Regions (ICTer), Colombo, Sri Lanka, 2021, pp. 1-8. Available: <https://dl.acm.org/doi/abs/10.1145/3473714.3473730>
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# IT20662028 | Bandara H.R.H.S

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# Contents

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- ❖ Predictive Analytics for Donation Campaign Success
- ❖ Introduction of the topic
- ❖ Background
- ❖ Research Problem
- ❖ Research Gap
- ❖ Main Objective
- ❖ Sub-Objective
- ❖ Methodology



# Introduction and Background

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What is the current Mechanism to predict ?



What are the drawbacks of that mechanism?



How this system address those drawbacks and make the prediction process more successful?

# Research Gap

Research (Reference)	Research A [01]	Research B [02]	Research C [03]	Research C [04]	Proposed Solution
Machine Learning Model.	✗	✓	✗	✗	✓
Using Message alert system	✗	✓	✗	✗	✓
Using Historical Data	✓	✗	✗	✗	✓
Manage the related People	✗	✗	✓	✗	✓



How can predictive analytics be used to improve the effectiveness and success of donation campaigns within the Apeksha Hospital Donor Engagement System?

# Research Problem

# Specific Objectives

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- ❖ Implementation of machine learning for blood donation campaign prediction aims to enhance the effectiveness of blood donation campaigns and increase donor participation, ultimately leading to a higher number of blood donations and greater success for Apeksha Hospital's blood donation initiatives.

# Sub Objectives



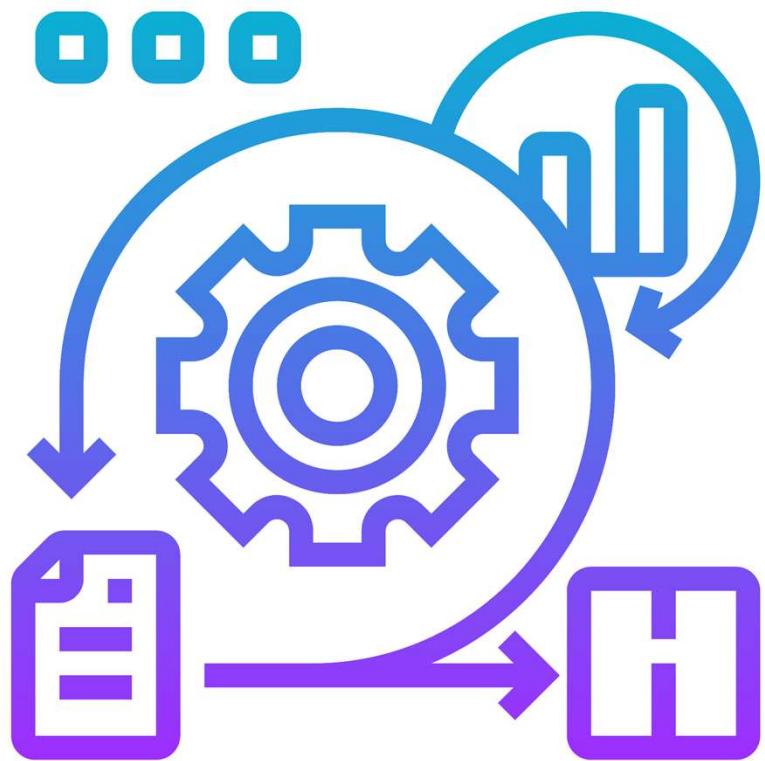
Identify the factors that influence the success of donation campaigns. This could include factors such as the timing of the campaign, the content of the campaign, and the target audience.



Develop predictive models that can forecast the success of donation campaigns. These models could be used to guide campaign planning and resource allocation.



Evaluate the accuracy and reliability of the predictive models. This could be done by comparing the predictions of the models to the actual results of past campaigns.



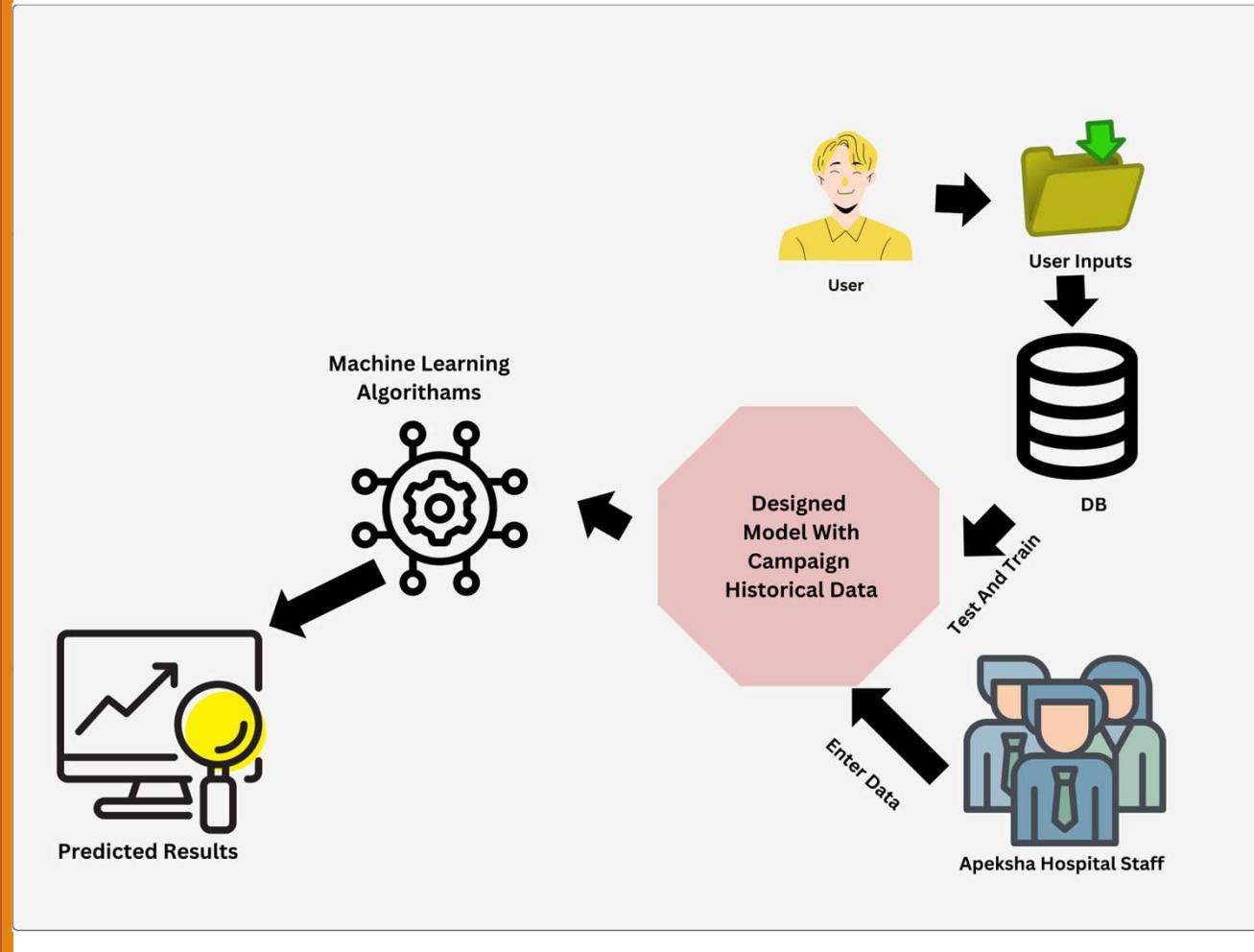
# Methodology

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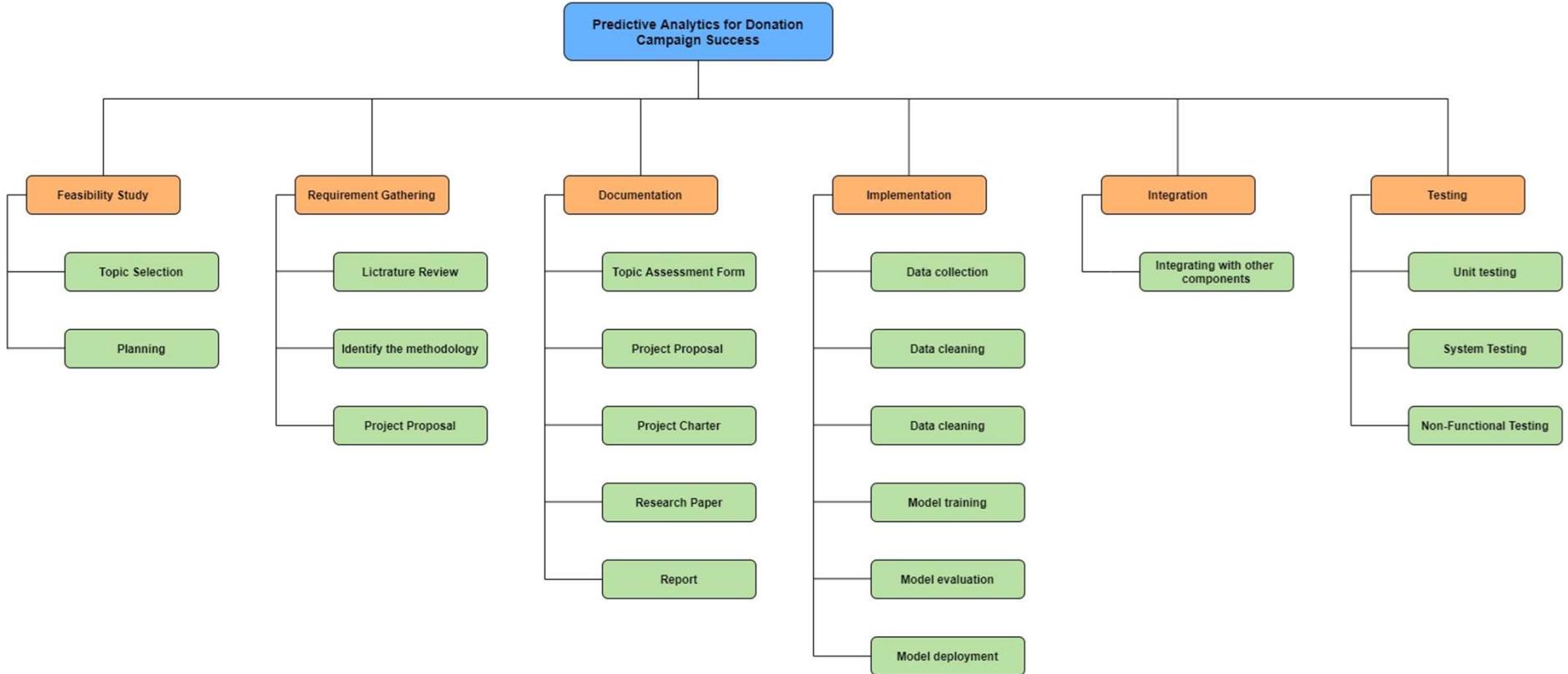
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# System Architecture

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# Work Breakdown Structure



# Gantt Chart

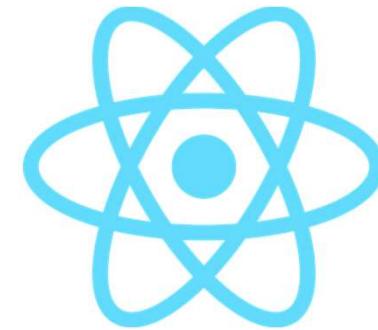
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Proposal Draft												
Project Proposal			Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Proposal Presentation			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Proposal Report			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Project Initiation			Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Data gathering			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Selecting technologies			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Project Implementation			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Set up Blockchain Infrastructure			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Develop smart Contracts			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Design and Develop a user friendly interface			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Machine Learning Integration			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Research Paper			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Final Implementation			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Unit Testing			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Evaluating and error fixing			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Integrating with other components			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Final Stages			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
System Integration							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
System Testing							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Evaluating and error fixing							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Final Report							Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

# Tools and Technologies

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## Programming Languages

Python, React, JavaScript, Node Js



## Tools:

Jupyter Notebook

TensorFlow

Keras

Scikit-learn

## Technology stack:

Version controlling-GitHub

## Algorithm:

Logistic Regression

Random Forest

# Functional Requirements

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Data Collection and  
Integration



Develop and implement  
machine learning  
models



Campaign Performance  
Evaluation



Optimal Resource  
Allocation and Planning

# Non-Functional Requirements

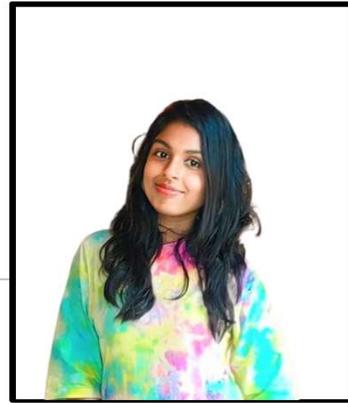
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- ❖ Accuracy
- ❖ Usability
- ❖ Availability
- ❖ User-friendliness
- ❖ Efficiency

# References

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- [1] S. D. Rajapakse, A. C. N. Kumara, and N. P. Wickramarachchi, "An Integrated Blood Donation Campaign Management System," in 2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI), Bangalore, India, 2018, pp. 2386-2391. Available:  
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# IT20660352 | Wijesooriya P.L.P.G.D.S

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# Contents

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- ❖ Introduction of the topic
- ❖ Background
- ❖ Research Problem
- ❖ Research Gap
- ❖ Main Objective
- ❖ Sub-Objective
- ❖ Methodology



## Introduction and Background

- How does the Apeksha hospital-based hair donation process currently happen?
- What are the drawbacks of the current hair donation system in the Apekska hospital and the resulting problems?
- The importance of using the image-processing based system instead of the existing method for hair donation

# Research Gap

Research (Reference)	Research A [01]	Research B [02]	Research C [03]	Research D [04]	Research E [05]	Proposed Solution
Standard and quality of hair suitable for donation to cancer patients.	✓	✓	✓	✓	✗	✓
Demand and supply of hair wigs made from donor hair for cancer patients	✓	✗	✓	✓	✗	✓
The need for hair wigs.	✗	✗	✓	✓	✗	✓
Increasing efficiency and participation in hair donation	✗	✗	✗	✗	✗	✓
Hair sample testing.	✗	✓	✗	✗	✗	✓
The success of using image processing to determine the condition and quality of a component.	✗	✗	✗	✗	✓	✓

# Research Problem

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- ❖ How to determine whether hair donated by hair donors meets the standards and qualities of hair recommended by the Apeksha hospital?



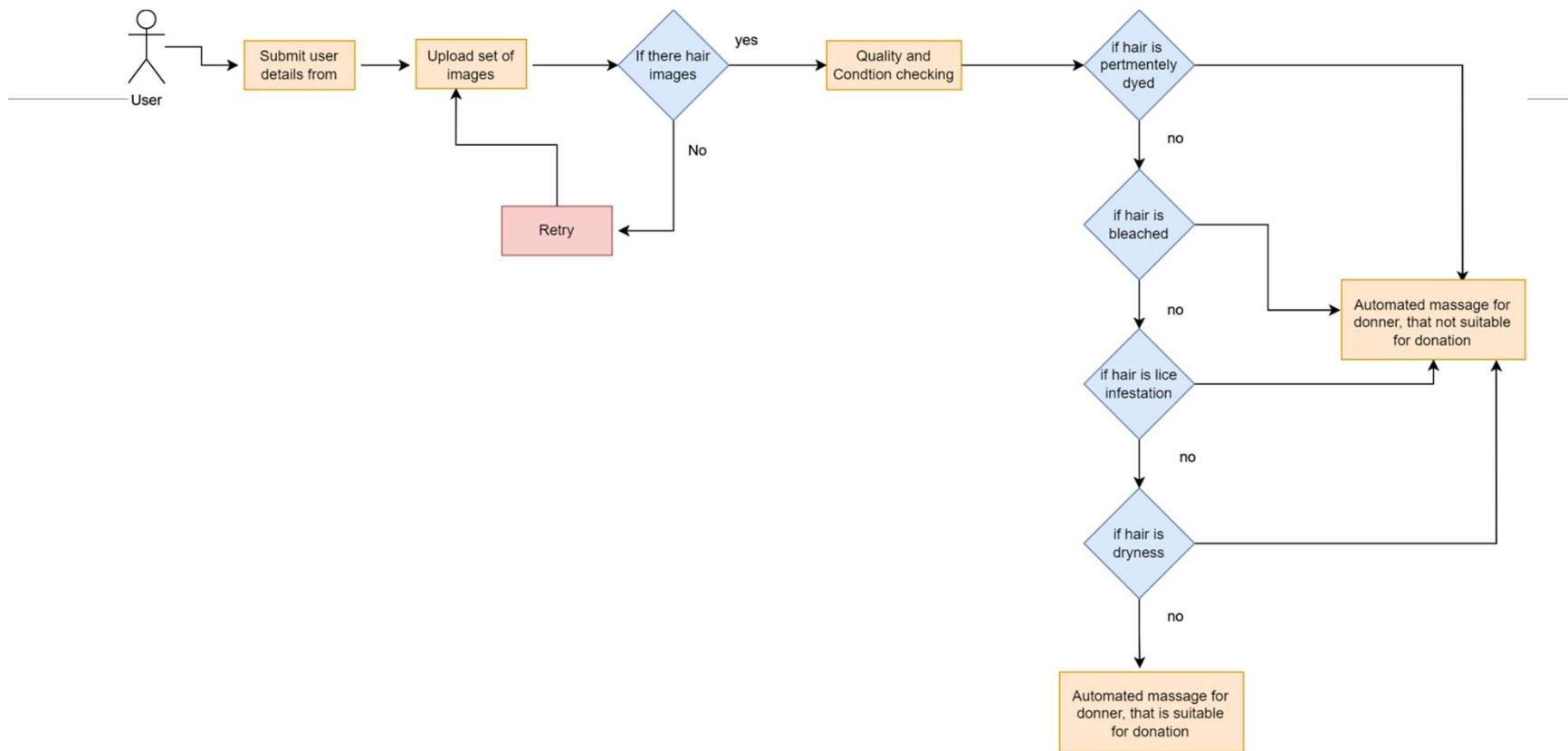
# Specific Objectives

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- ❖ Implementation of Deep Learning Algorithm (CNN) with online platform to examine key quality factors of hair to increase efficiency and effectiveness of hair donation process and notify the donor of its correct output with the relevant donation details

# Specific Objectives



# Sub Objectives



- Build a user-friendly application that does not exhaust the hair donor.

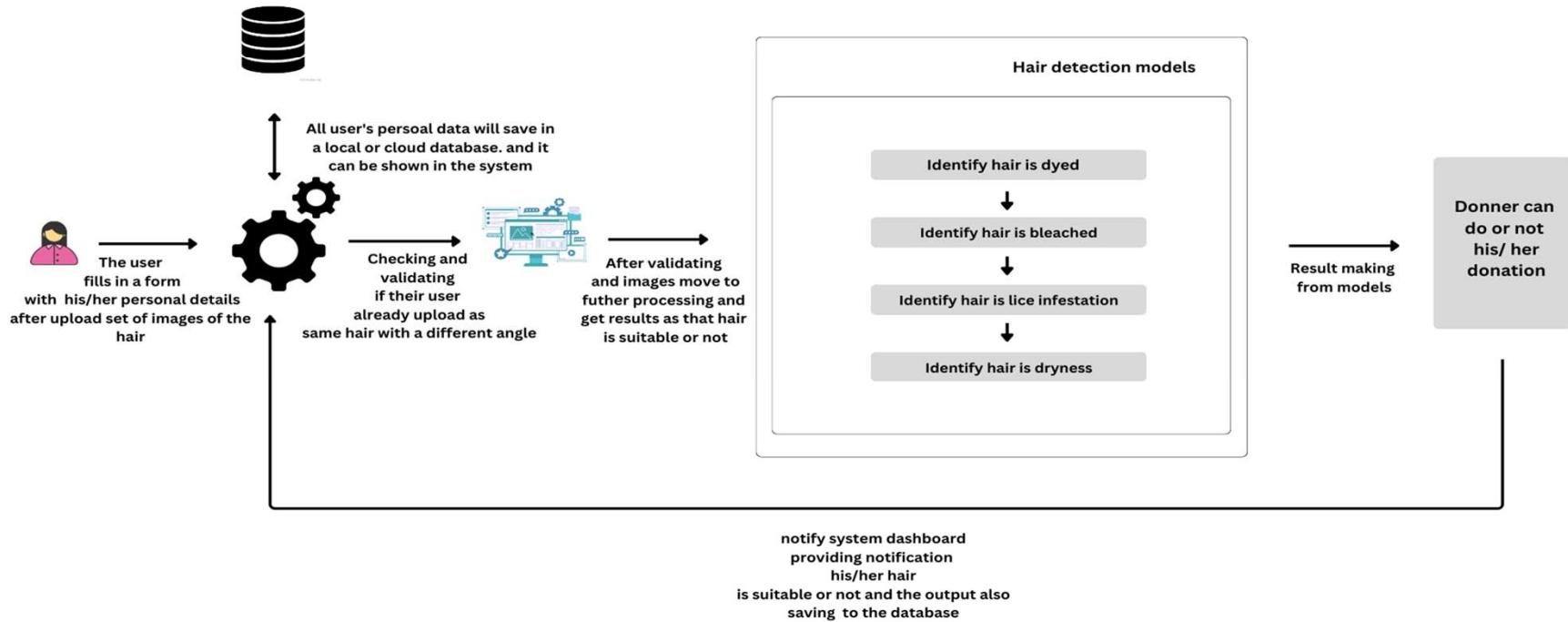


- Match the user input data with the key factors requested by the system and confirm whether it is suitable for donation or not.



- After checking the hair condition, notify the user with other relevant details.

# System Architecture



# Tools and Technologies

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- **Programming Languages**

- : Python, React

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- **Tools:**

- Labeling images- LabelImg tool

- Building the CNN model –Tensorflow and Keras

- Google Colab,Visual Studio Code

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- **Technology stack:**

- Version controlling-GitLab

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- **Algorithm:**

- Training and classifying images -Convolutional Neural

- network(CNN)

- YOLO (You Only Look Once) Algorithm – Object detection

# Functional Requirements

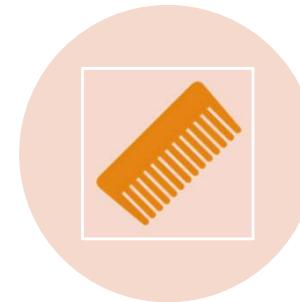
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- VERIFY THAT THE PHOTOGRAPHS PROVIDED BY THE DONORS ARE OF THE HAIR



- GET EXACT MATCH OF DONOR PROVIDED PHOTOS WITH THE FACTORS CHECKED BY THE SYSTEM.



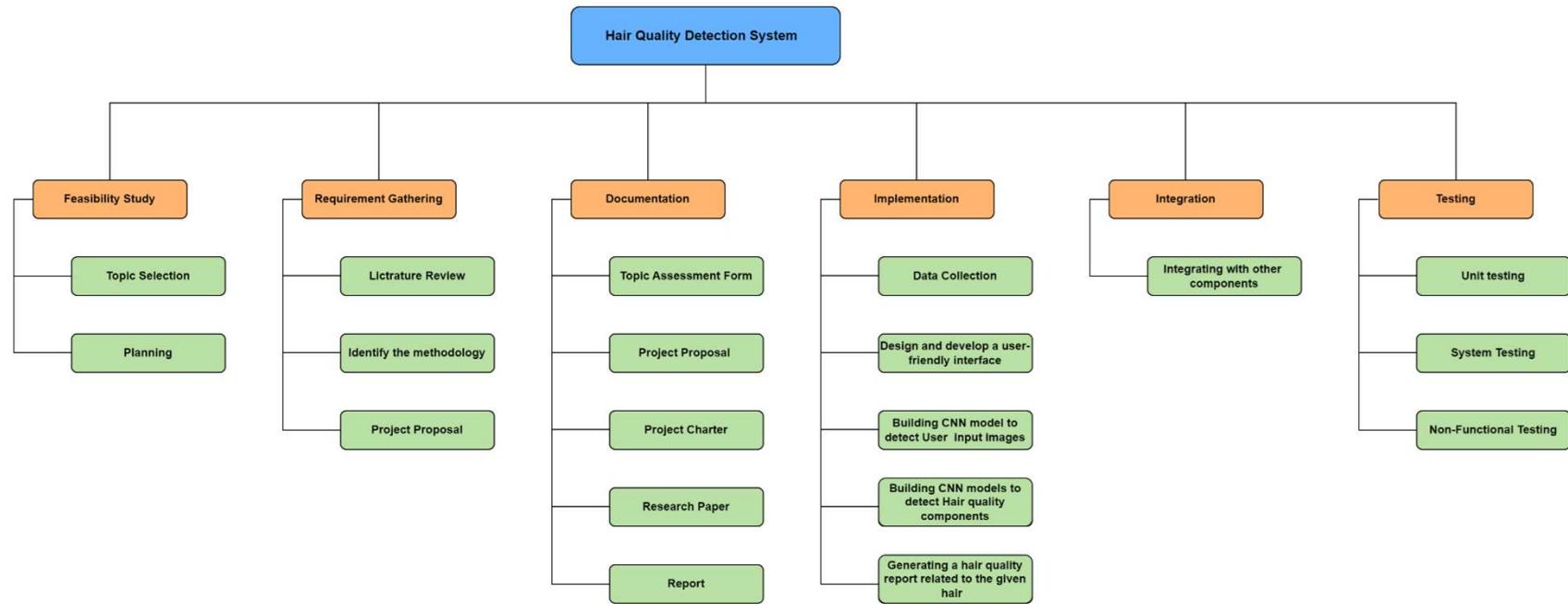
- ACCORDING TO THE FINAL OUTPUT OF THE SYSTEM, IT MUST BE CORRECTLY IDENTIFIED WHETHER IT IS SUITABLE OR UNSUITABLE HAIR FOR DONATION.

# Non-Functional Requirements

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- Accuracy
- Usability
- Availability
- User-friendliness
- Efficiency

# Work Breakdown Structure



# Gantt Chart

Task Name	Semester 1						Semester 2					
	June	July	August	September	October	November	December	January	February	March	April	May
Feasibility Study												
Topic Selection												
Topic Evaluation												
Background Study												
Background Study and Literature Survey												
Proposal Draft												
Project Proposal												
Proposal Presentation												
Proposal Report												
Project Initiation												
Data gathering												
Selecting technologies												
Project Implementation												
Data Collection												
Design and Develop a User friendly interface												
Building CNN Model to detect user input images												
Building CNN models to detect hair quality components												
generating a hair quality report related to the given hair												
Final Implementation												
Unit Testing												
Evaluating and error fixing												
Integrating with other components												
Final Stages												
System Integration												
System Testing												
Evaluating and error fixing												
Final Report												

# References

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# COMMERCIALIZATION

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- **Measuring Success and Continuous Improvement:**

Define key performance indicators (KPIs) to measure the success of the platform, such as donation frequency, donor retention rates, and campaign effectiveness.

- **Scalability and Technical Infrastructure:**

Plan for scalability to accommodate a growing number of donors and transactions.

# Budget & Budget Justification

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Product	Cost
Web Hosting	LKR 4000.00
Internet Cost	LKR 3000.00
Cloud Cost – Digital Ocean	LKR 6500.00
Marketing / Digital Marketing	LKR 12500.00
Total	LKR 26000.00



# Thank You

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2023-24-100