The Future of Ayurveda

Harnessing the Power of Artificial Intelligence for Personalized Treatment and Diagnosis

TMP-23-252

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Introduction

What Ayurveda?

- Ayurveda is a holistic system of medicine that focuses on treating the root cause of diseases, rather than just the symptoms.
- Ayurveda emphasizes the importance of maintaining a balance between the body, mind, and spirit to achieve good health.
- Ayurveda uses natural remedies and therapies, such as herbs, massages, and dietary changes, to promote health and prevent disease.
- Ayurveda recognizes that each person is unique and therefore tailors treatments to each individual's specific needs.
- Ayurveda emphasizes the importance of self-care and self-awareness to maintain good health.
- Ayurveda recognizes the connection between the environment and health, and emphasizes the importance of living in harmony with nature.

Introduction

Why **Ayurveda**?

- Modern lifestyle leads to poor health and unhappiness.
- Ayurveda offers alternative solutions for non-communicable diseases.
- Cost of western medicine can be prohibitive, and not all diseases are curable.
- Availability of herbal plants and medicines is limited.
- Finding qualified Ayurvedic doctors can be difficult.
- Identifying necessary herbs and treatments is challenging for people.

Why AyurMind?

- Proposed solution involves a conversational AI chatbot.
- Image processing-based component identifies herbal plants.
- Geometry library maps out locations of identified herbs and Ayurvedic doctors.
- Proposed solution includes a social network for discussing health-related knowledge.
- Auto-machine learning is used to maintain consistency and provide up-to-date data.

Research Objectives

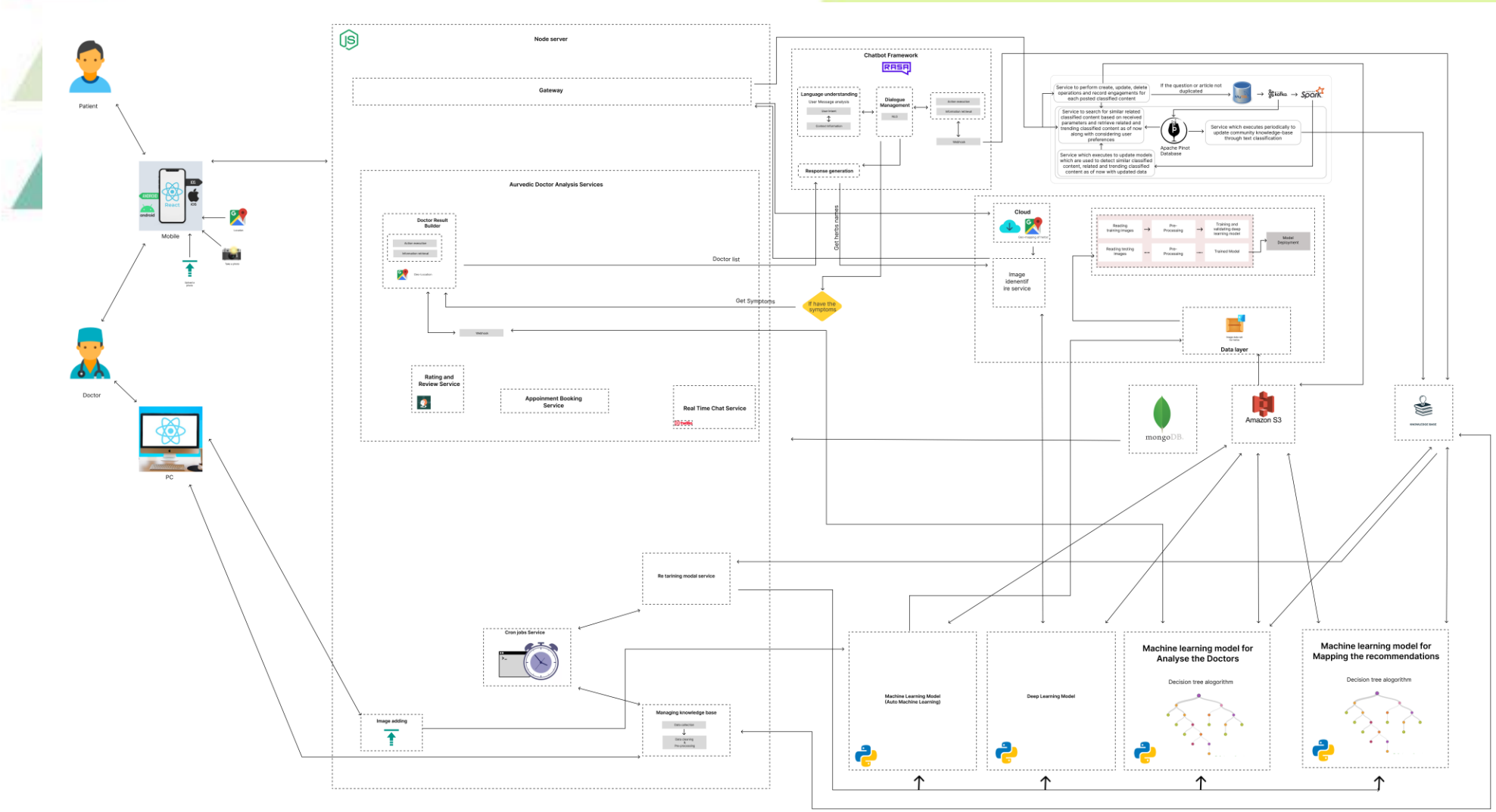
AI chatbot providing Ayurvedic recommendations.

Building more emphatically connection between the patient and ayurvedic doctor

Identifying & mapping herbal plants for Ayurvedic treatments.

Develop a social network to exchange health-related information.

System Architecture Diagram



AI Chatbot Providing Ayurvedic Recommendations

IT20069186 | MADUWANTHA K.A.I

Software Engineering

Introduction

- A healthy lifestyle approach using Ayurveda which recommend basic treatments for conditions and will suggest appropriate Ayurvedic treatments and medical herbs based on known symptoms and common health problems. A conversational AI chatbot will be developed as a platform for users to receive solutions through text.
  - Research non-communicable diseases
  - Create symptom-based knowledge base
  - Train AI model on database
  - Verify suggestions with Ayurvedic experts
  - Develop conversational AI chatbot
  - knowledge base will be updated and improved

And as the novelty,

- • A conversational AI chatbot that allows users to text and receive solutions for noncommunicable diseases through Ayurveda. The knowledge base will be updated and improved.

Research Gap

- Lack of personalized solutions
- Lack of standardization in Ayurvedic medicine
- Lack of research on personalized treatment and diagnosis
- Quality control of Ayurvedic products
- Limited research on Ayurvedic drug discovery
- Integration of AI in Ayurvedic education

Research Problem

- Modern lifestyle contributes to poor health.
- Excess work-related stress leads to diseases.
- Ayurveda offers alternative solutions to diseases.
- Identifying necessary herbs and treatments is challenging.
- Proposed solution is cost-effective and personalized.
- Conversational AI chatbot with knowledge base.

Specific and Sub Objectives

Main Objectives

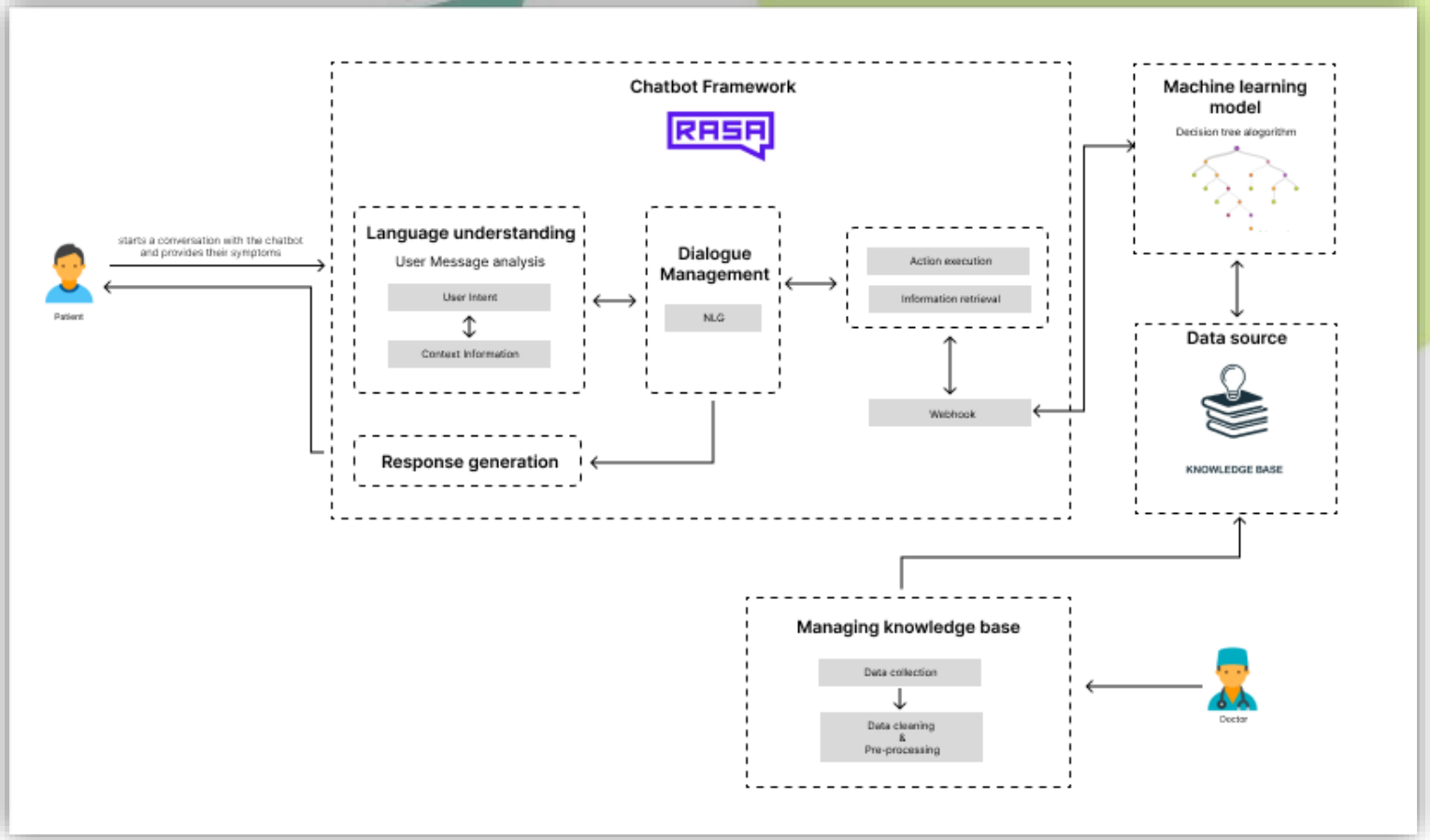
- ✓ AI Chatbot Providing Ayurvedic Recommendations

Sub Objectives

- ✓ Manage knowledge base
- ✓ ML model
  - ✓ between symptoms, common health problems, and Ayurvedic treatments and medical herbs.
- ✓ NLP implementation
  - ✓ Intent recognition
  - ✓ Named entity recognition
  - ✓ Dialogue management

Methodology

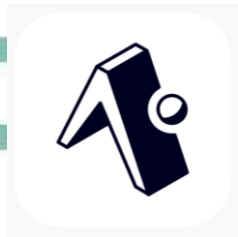
System Architecture Diagram



Tools & Technologies

Technology	Techniques	Algorithms	Architecture
• React-native	• Intent recognition	• Decision Tree	• RASA(chatbot teamwork)
• Expo	• Named entity recognition	• Random Forest	
• Python	• Sentiment analysis		
• Node Server	• Text classification		
	• Dialogue management		



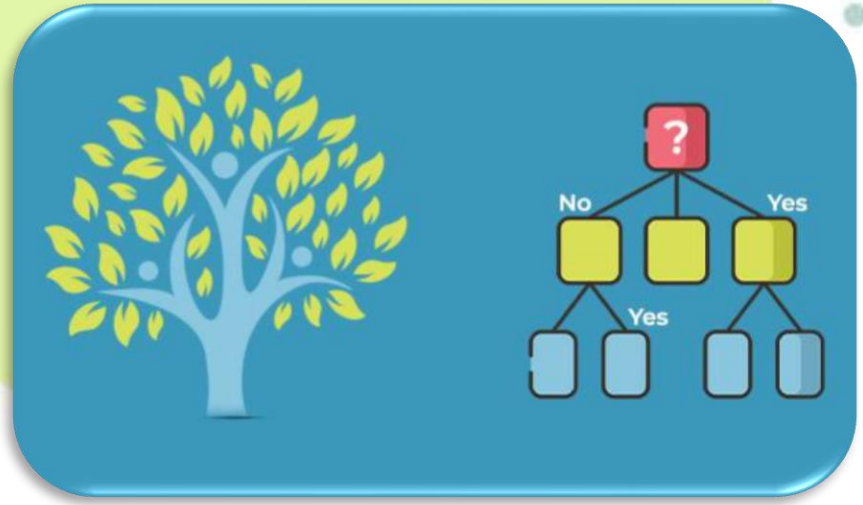




RASA Chatbot Framework

- RASA is an open-source chatbot framework.
- It uses natural language processing (NLP) and machine learning.
- RASA can be used to build AI assistants.
- It allows for customizable dialogue management.
- RASA supports multiple languages.
- RASA has a large and active community.

Decision Tree Algorithm

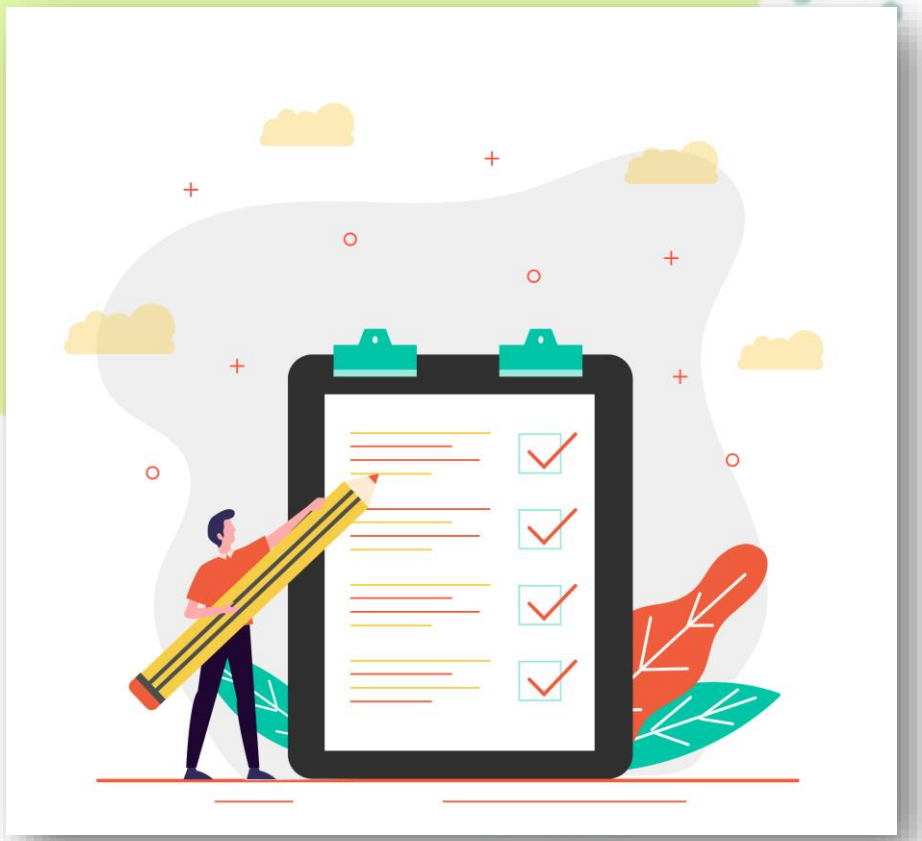
- Supervised machine learning algorithm.
- Represents decisions and decision-making processes.
- Uses tree-like model to classify data.
- Can handle both categorical and continuous data.
- Builds model iteratively by selecting best features.
- Popular in data mining and predictive analytics.



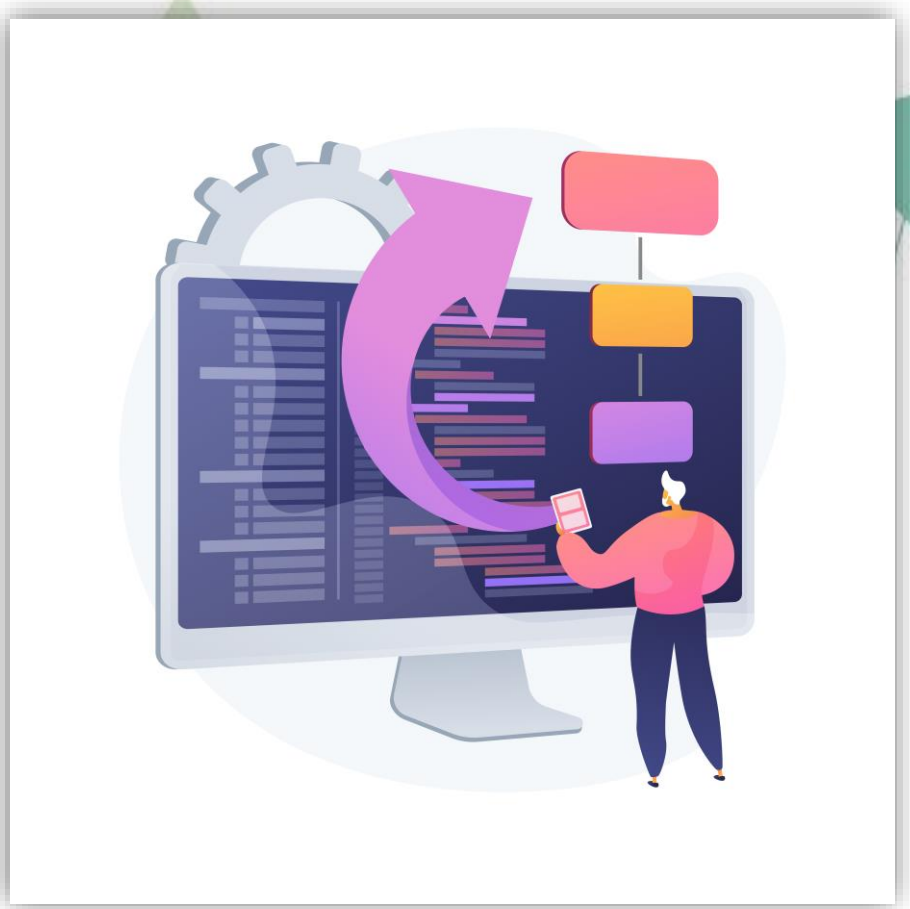
Requirements

Functional Requirements

- Chatbot understands symptom-related questions.
- Identify conditions based on symptoms.
- Provide suggestions and treatments offered.
- Keep records, provide follow-up advice.
- Recognize emergencies, give appropriate advice.
- User-friendly interface for patient interaction.
- Available 24/7 for patient support.
- Handle multiple conversations to avoid delays.
- Doctors can easily update knowledge base.



Requirements



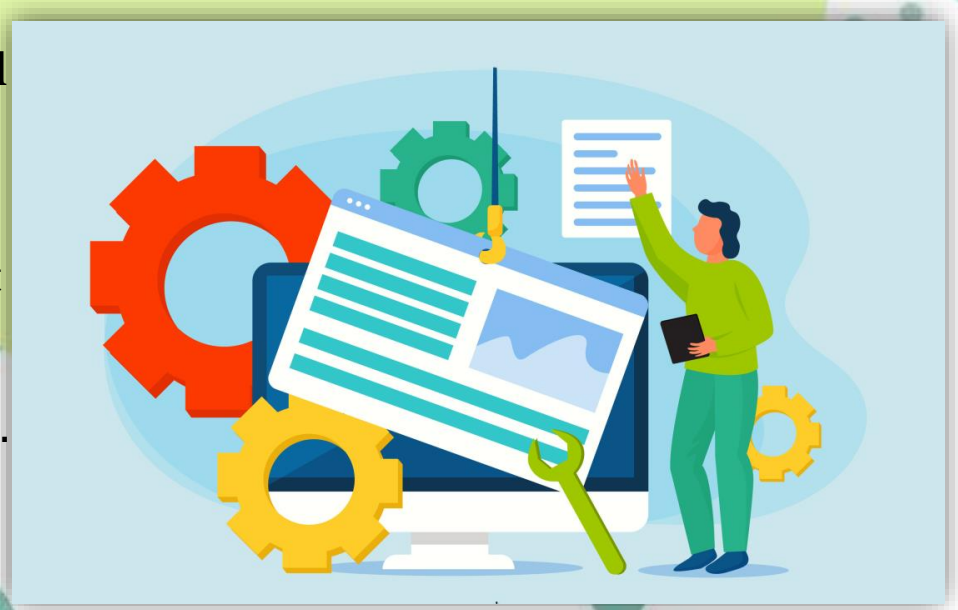
Non-Functional Requirements

- Performance
- Security
- Reliability
- Scalability
- Compatibility
- Performance metrics
- Maintainability
- Usability

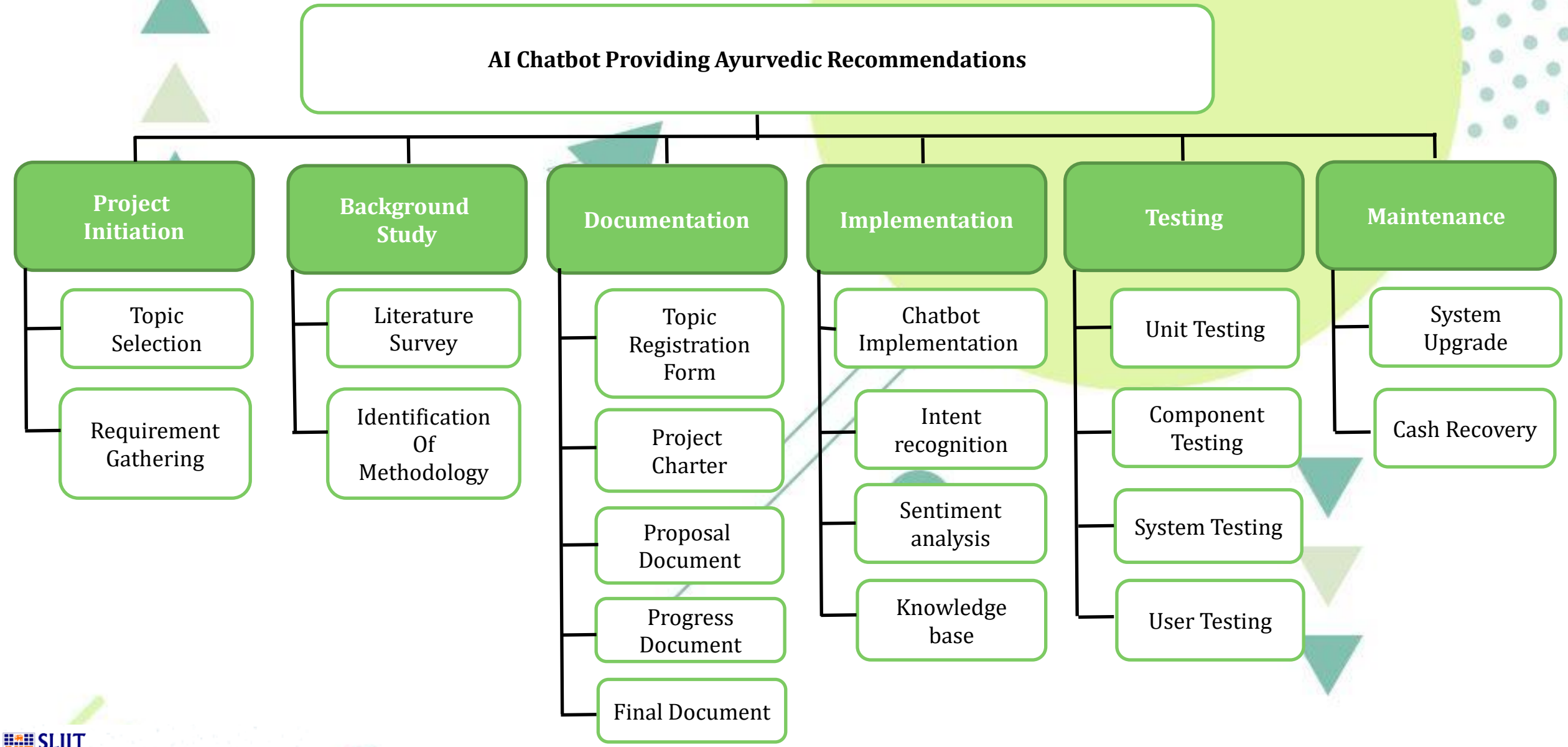
Requirements

System Requirements

- Server infrastructure : to run the necessary software and host the database of patient information and treatment guidelines.
- NLP tools: to analyze patient questions and identify relevant symptoms and medical conditions.
- ML models: to improve its accuracy and efficiency over time.
- DMS: to store and manage patient information, treatment guidelines
- Communication channels: such as web chat or messaging platforms, to enable patients to interact with the chatbot.



Work Breakdown Chart



Gantt Chart

No	Week	November				December				January				February				March				April				May				June				July				August				September				October				November			
	Actions	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
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Identifying and Mapping of Herbal Plants

IT20166038 | DE SILVA A.S.

Software Engineering

Introduction

- **Identification of ayurvedic medical herbs** which are needed for treatments for some diseases using Image processing through training machine learning models and **mapping of herbal plants with locations.**
- Using continual learning/transfer learning to improve accuracy. Also, can incorporate Auto Machine Learning to make it easier to add new plants.

Research Gap

- There is a lack of AI-based solution for accurately identifying and mapping ayurvedic medical herbs for non-communicable diseases using image processing and machine learning models
- Existing image recognition models are not specifically trained to recognize ayurvedic medical herbs and are not optimized.
- Limited research on mapping herbal plants with their respective locations, which is crucial for sustainable cultivation and conservation
- Need for a comprehensive AI-based solution that accurately identifies ayurvedic medical herbs for non-communicable diseases and maps their locations for sustainable cultivation and conservation
- Also, research gap exists in investigating the potential of continual learning techniques and Auto Machine Learning to enhance the accuracy of identifying and mapping ayurvedic medical herbs and facilitate the addition of new plants.

Research Problem

- Research problem: Lack of efficient and accurate solution for identifying Ayurvedic medical herbs using image processing and machine learning
- Need for an AI-based solution to accurately identify Ayurvedic medical herbs for treating non-communicable diseases and map their locations
- Continual learning and transfer learning techniques can improve accuracy
- Auto Machine Learning can make the system more accessible for adding new plants
- Therefore, develop an AI-based solution for accurately identifying Ayurvedic medical herbs and their locations, utilizing continual learning and Auto Machine Learning techniques to improve accuracy and accessibility.

Specific and Sub Objectives

Main Objectives

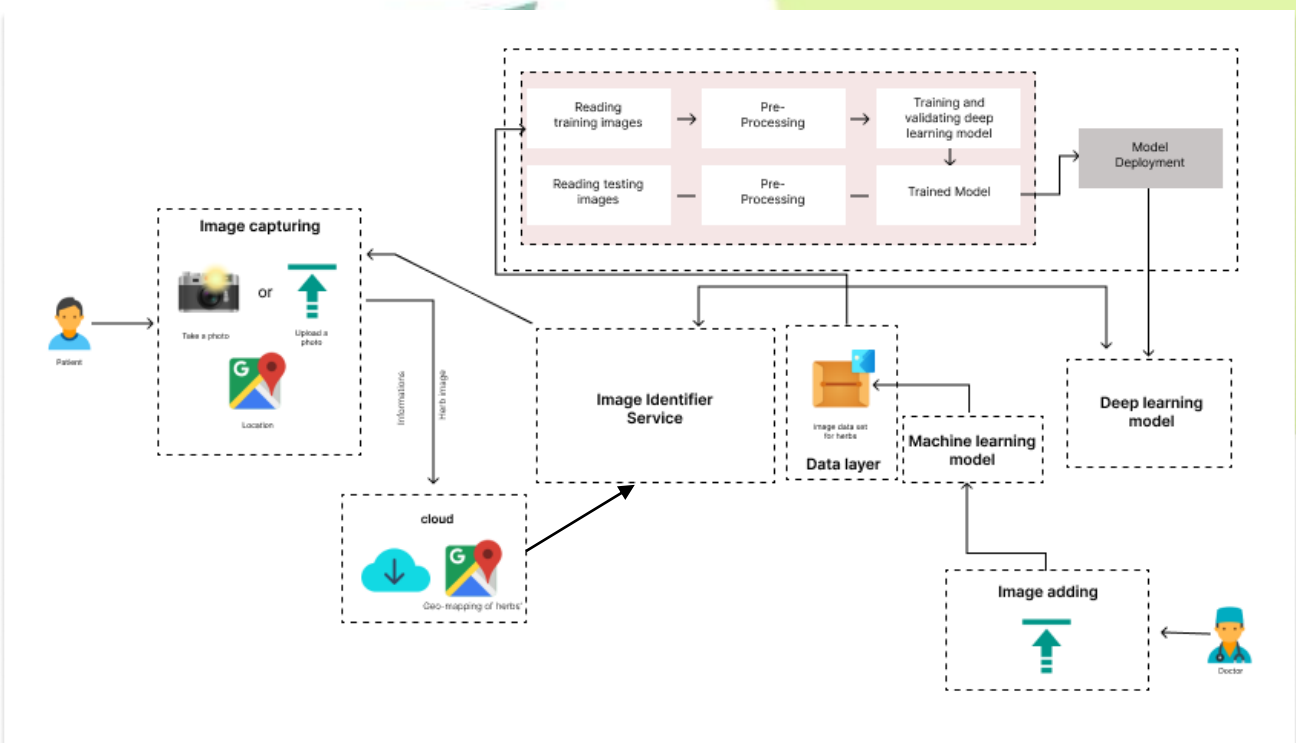
- Identifying appropriate Ayurvedic medical herbs. Additionally, a component based on a geometry library will be implemented to map out the locations of these identified herbs which will make easier for the patient to find herbs.

Sub Objectives

- Pre-processing of the collected images, such as resizing and normalization
- Splitting the data into training, validation, and testing sets.
- Training a machine learning model using pre-processed image data.
- Evaluating the model on the validation set to identify areas of improvement.
- Collecting and processing large amounts of image data from various geographical areas to map the distribution of herbal plants.
- Fine-tuning the model based on the evaluation results.
- Testing the final model on the testing set to measure its accuracy and robustness.

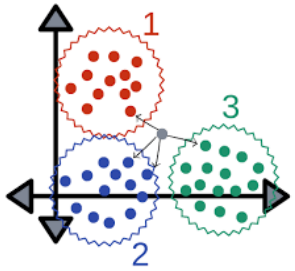
Methodology

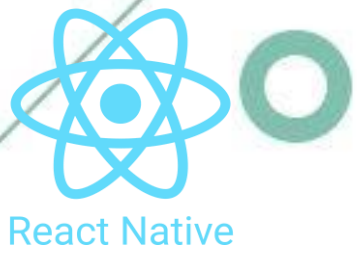
System Architecture Diagram

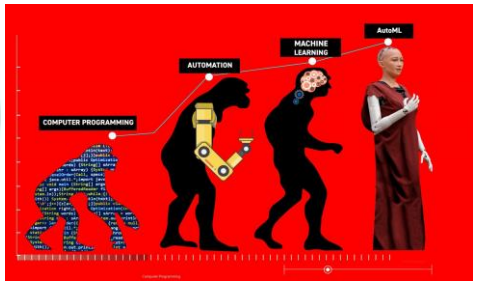


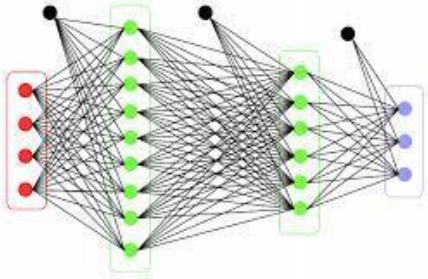
Tools & Technologies

Technology	Techniques	Algorithms	Architecture
• React-native	• Image processing	• K-Nearest	• ResNet
• Expo	• Computer vision	• Naïve bayes	
• Python	• Continual Learning		
• Node Server	• Auto Machine Learning		
Google map			



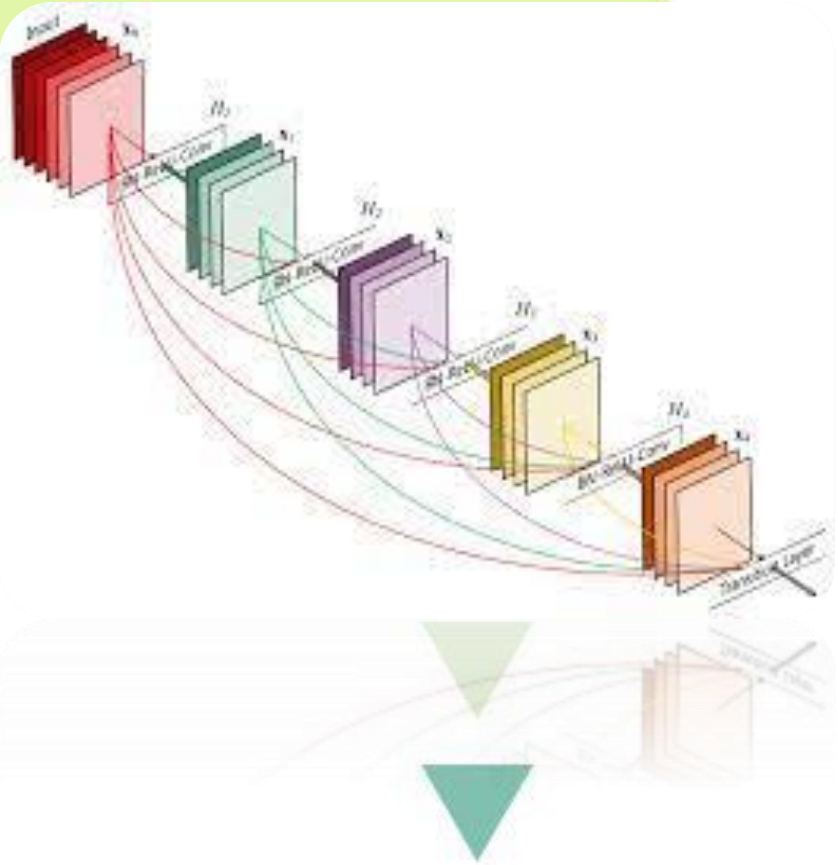






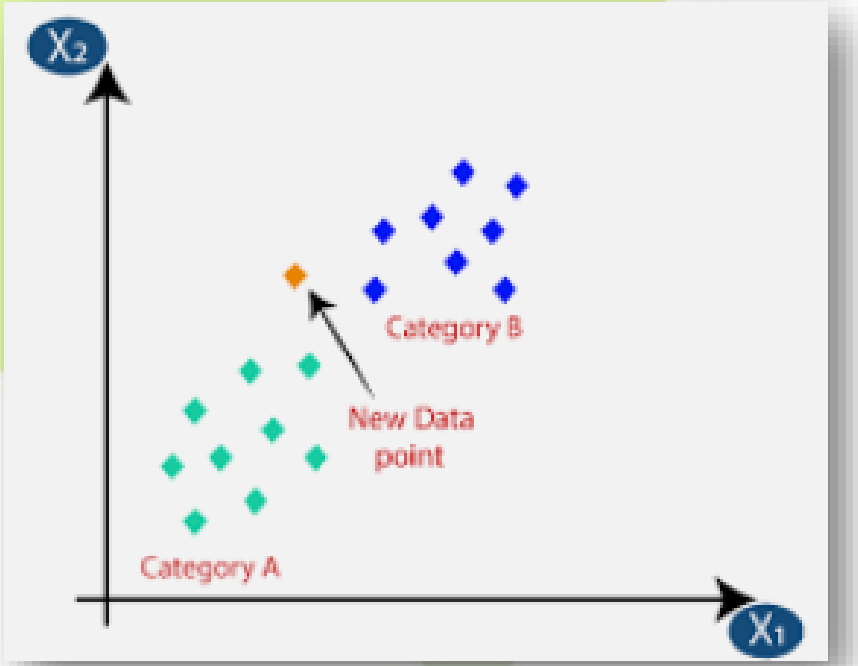
ResNet Architecture

- Residual Network (ResNet) is a deep learning model used for computer vision applications.
- It is a Convolutional Neural Network (CNN) architecture designed to support hundreds or thousands of convolutional layers.
- The principle on which ResNets work is **to build a deeper networks compared to other plain networks and simultaneously find a optimised number of layers to negate the vanishing gradient problem**.



K-Nearest Algorithm

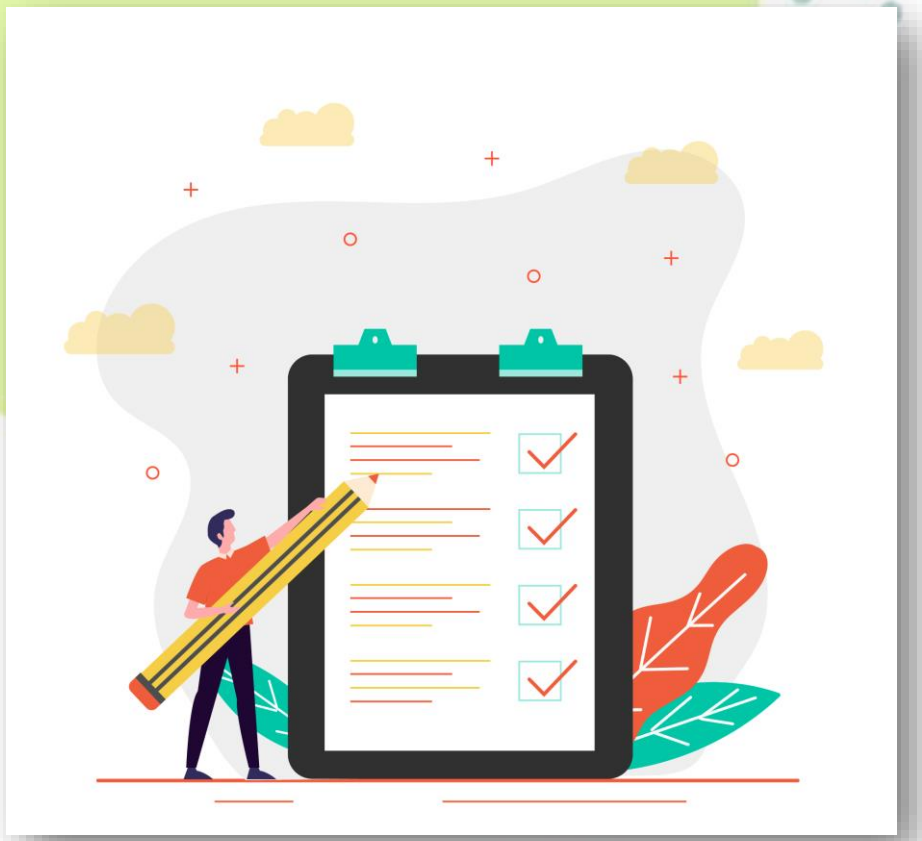
- The k-nearest neighbors algorithm, also known as KNN or k-NN, is a non-parametric, supervised learning classifier, which uses proximity to make classifications or predictions about the grouping of an individual data point.
- k-NN algorithm classifies unknown data points by finding the most common class among the k closest examples.



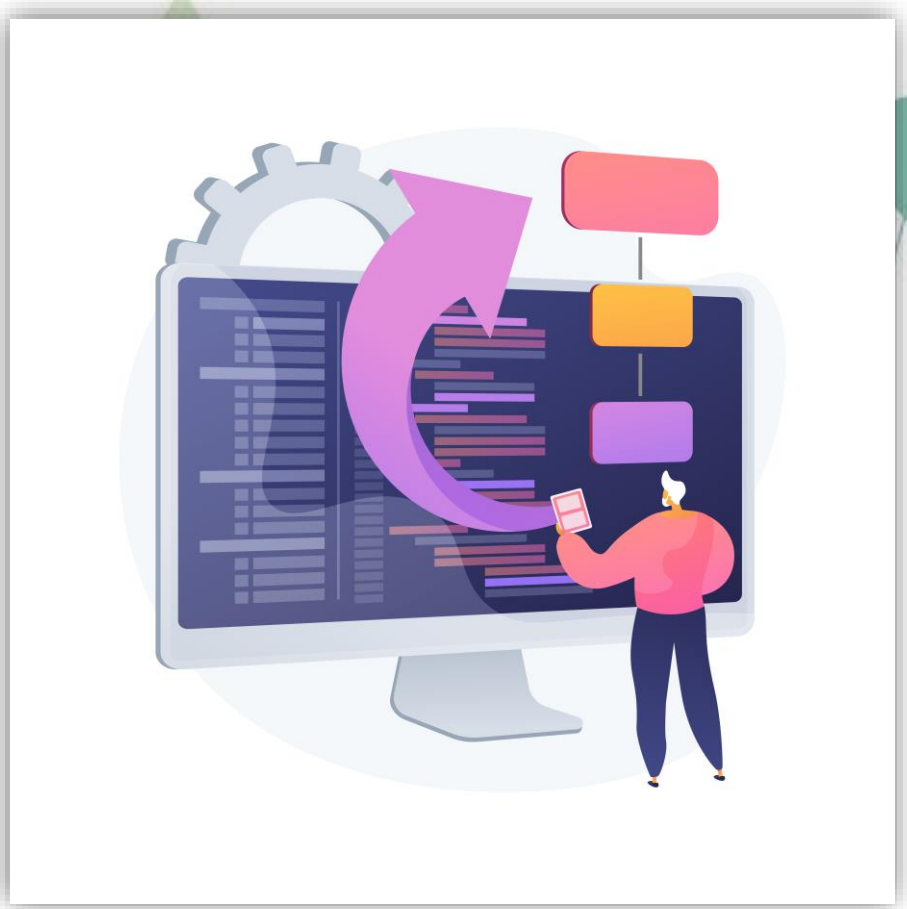
Requirements

Functional Requirements

- The system should allow users to upload images of plants for identification.
- Allow users to capture images of plants for identification.
- Able to identify plants based on the uploaded images and provide information about the plant's name, family, genus, species, and other relevant details.
- Able to identify plants based on the uploaded images and provide information about the plant's location.
- Having a high accuracy rate in identifying plants.
- The system should integrate with a database of plant information to provide accurate and up-to-date information about the identified plants.
- Allow users to provide feedback on the accuracy of plant identification.
- Allowing to make it easier to add new plants.



Requirements



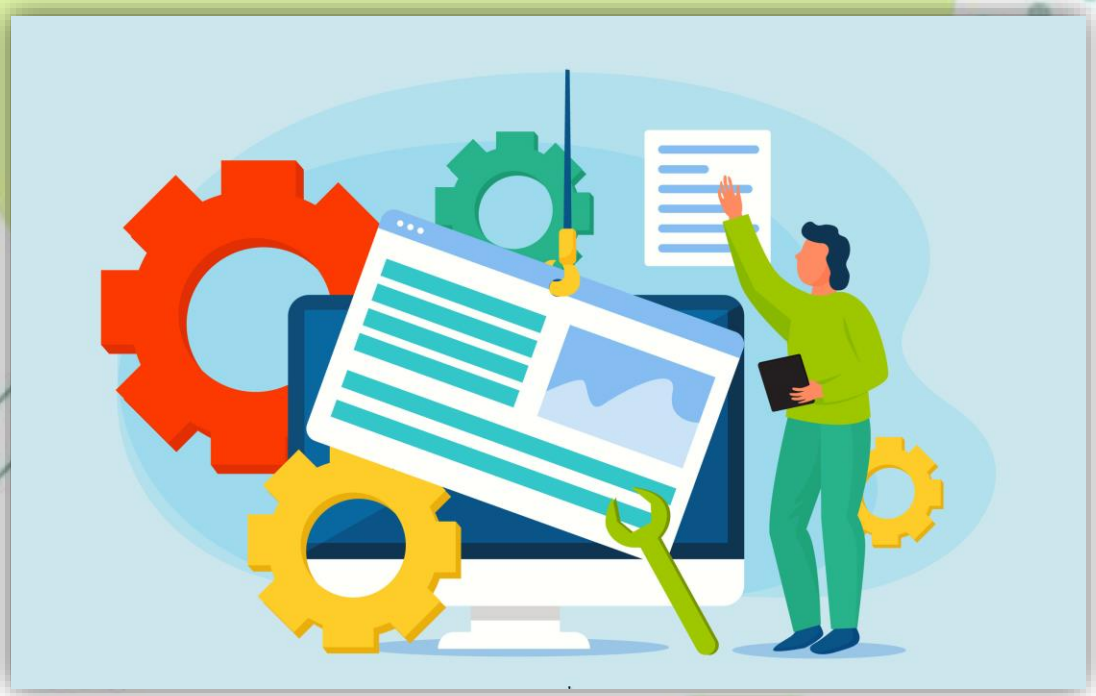
Non-Functional Requirements

- Performance: Able to handle many requests simultaneously, without significant delay or response time degradation.
- Usability: Easy to use and navigate, with clear instructions and feedback provided to the user.
- Reliability: Should be available, with minimal downtime for maintenance or upgrades.
- Security: Should be secure, with appropriate measures in place to protect user data and prevent unauthorized access.
- Compatibility: Be compatible with a range of devices and platforms, be able to operate seamlessly with other software applications.
- Maintainability: The system should be designed and built with maintainability in mind, with clear documentation and easily maintainable code.
- Scalability: The system should be designed to scale up or down as needed, with minimal impact on performance and functionality.
- Regulatory compliance: The system should comply with relevant laws and regulations, such as data protection and privacy laws.

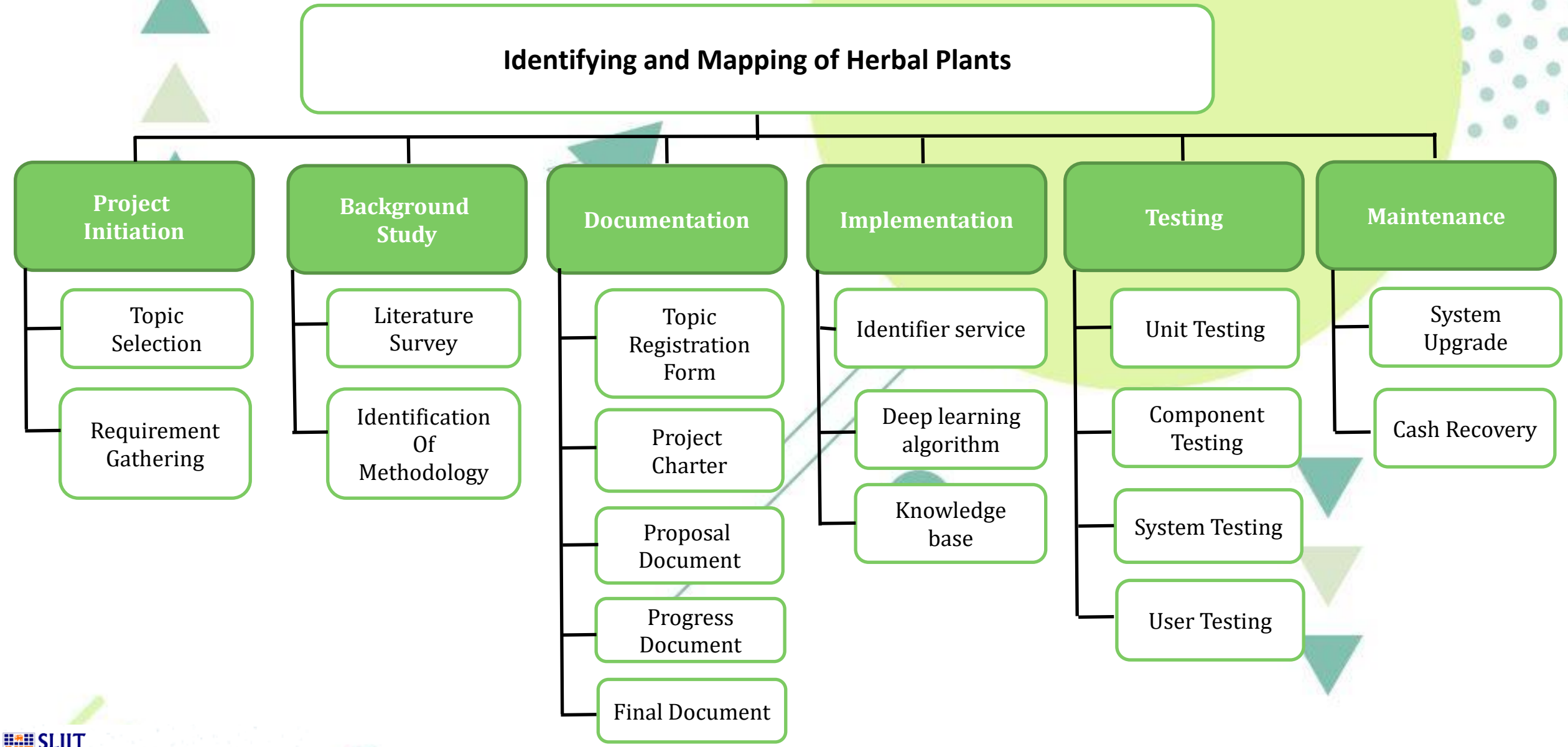
Requirements

System Requirements

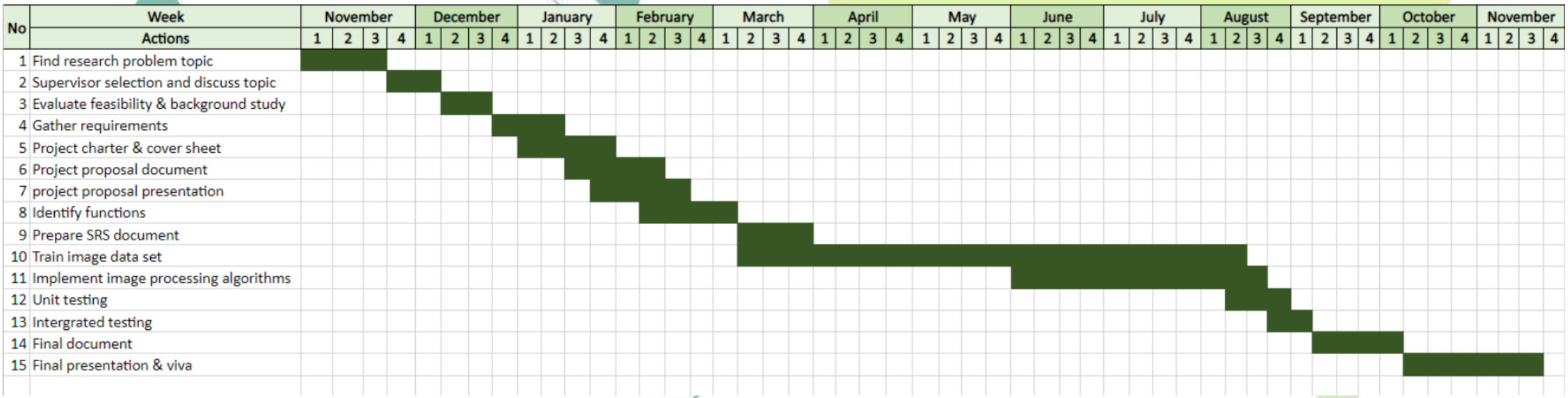
- Image processing capabilities
- Machine learning algorithms
- Database integration
- Mobile compatibility
- Scalability
- Performance
- Usability
- Security
- Reliability
- Integration with third-party APIs
- System backups and data recovery



Work Breakdown Chart



Gantt Chart



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Building A More Emphatically Connection Between The Patient And The Ayurvedic Doctor

IT20089436| SENARATHNE S M A D

Software Engineering

Introduction

Ayurveda, an ancient system of medicine, focuses on holistic healing by addressing the physical, mental, and spiritual aspects of an individual. The Ayurvedic doctor plays a crucial role in providing personalized care and treatment to the patient. However, in today's fast-paced world, the doctor-patient relationship has become increasingly transactional, leading to a lack of trust and communication.

Research Gap

- There are no mobile apps specifically using AI to assist patients in choosing the best Ayurvedic doctor based on their specific symptoms.

- There are few existing applications to building a more emphatically connection between the patient and the ayurvedic doctor
  - Ayurveda Expert
  - Ayurvedic Home Remedies
  - Vedique Diet
  - Jiva Health App

Research Problem

The research problem that this study aims to address is the lack of a mobile application that uses AI to provide personalized recommendations for Ayurvedic doctors based on symptoms, feedback, and the user's location

Specific and Sub Objectives

Main Objectives

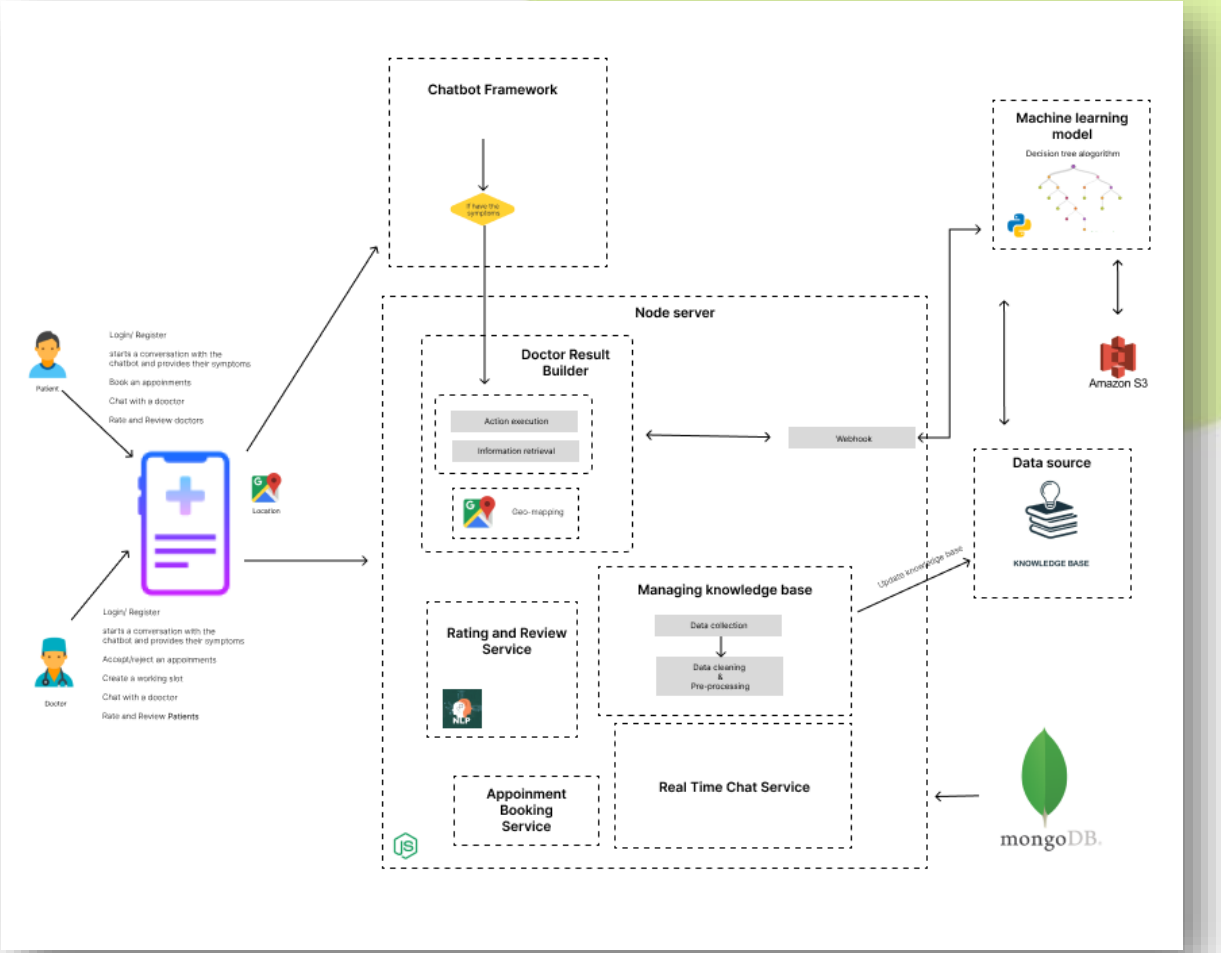
- Identify the best and most suitable Ayurvedic doctor for treatment according to a patient's symptoms and user's location and the doctors' ratings and feedbacks
- An algorithm for appointment booking.
- Real Time Chat system between doctors and other users.

Sub Objectives

- Development of Mobile Application
- Create Data collections
- User Registration

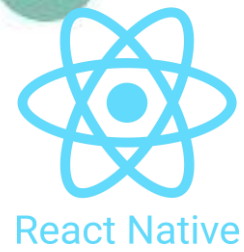
Methodology

System Architecture Diagram



Tools & Technologies

Technology	Techniques	Algorithms	Architecture
• React-native	• Machine Learning	• Reinforcement machine learning algorithms	• Micro Services • Client server
• Expo		• Decision tree machine learning algorithms	
• Python			
• Node Server			
Google map			
NLP (Natural Language Processing)			

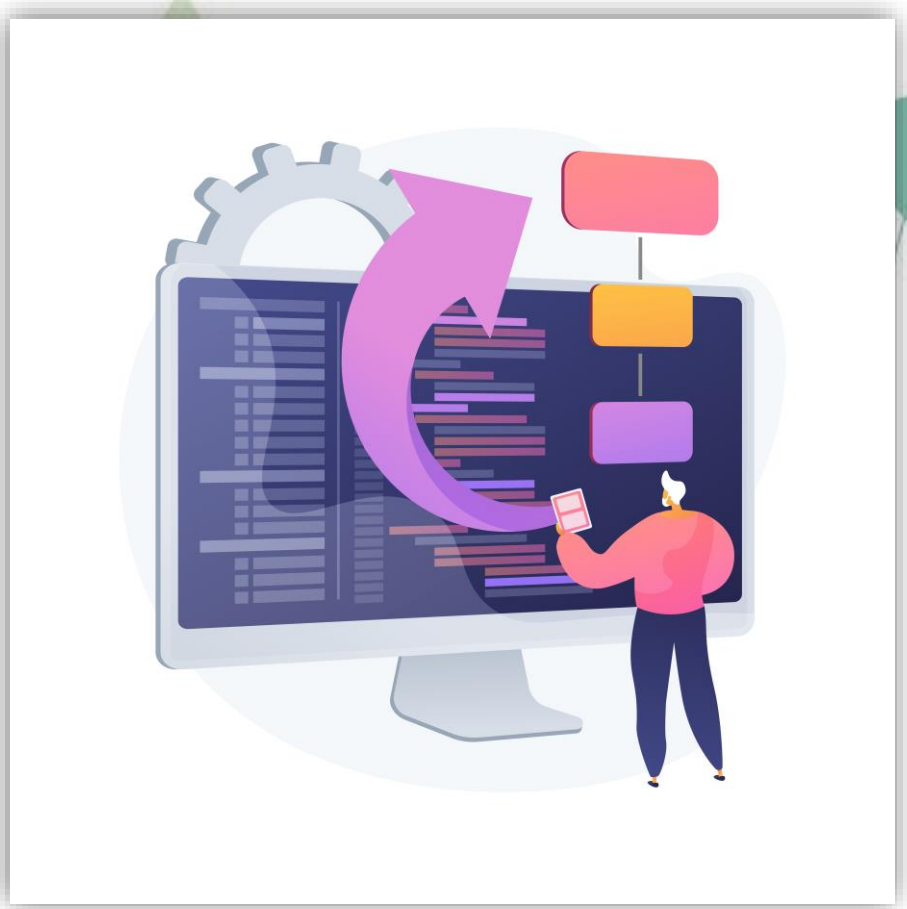


Requirements

Functional Requirements

1. User registration: The application should allow users to register and create an account.
2. Symptom input: The application should allow users to input their symptoms to receive personalized treatment recommendations.
3. Doctor recommendation: The application should utilize machine learning algorithms to recommend the most suitable Ayurvedic doctor based on the user's symptoms and feedback from other users.
4. Doctor rating and feedback: The application should allow users to rate and provide feedback on the selected Ayurvedic doctor.
5. Private chat and appointment booking: The application should allow users to privately chat with the selected Ayurvedic doctor and book appointments.

Requirements



Non-Functional Requirements

1. User interface: The application should have an easy-to-use and intuitive interface.
2. Security: The application should ensure the security of user data and communication between the user and the Ayurvedic doctor.
3. Performance: The application should provide fast and reliable performance, with quick response times.
4. Scalability: The application should be scalable to handle a large number of users and doctors.
5. Compatibility: The application should be compatible with multiple devices and operating systems

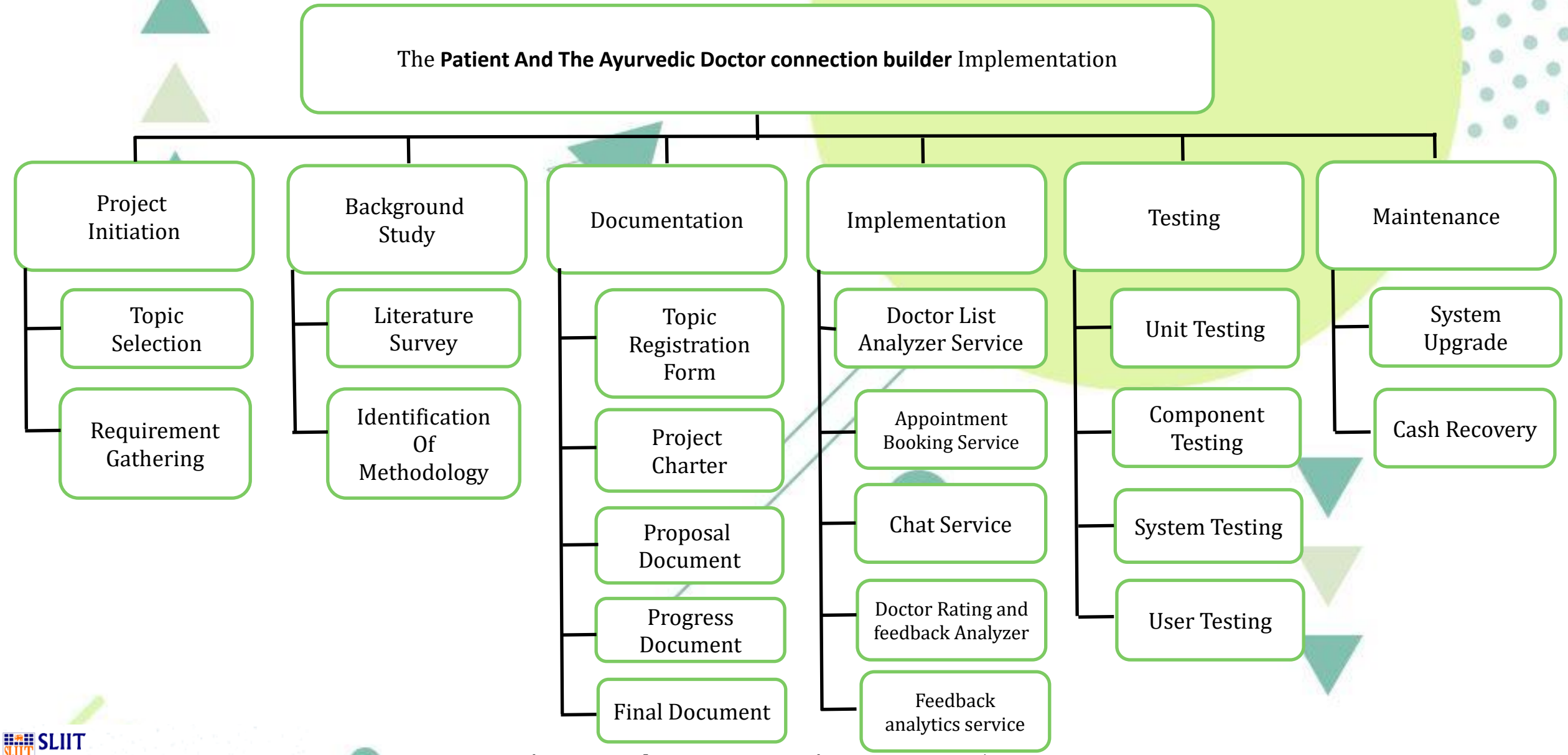
Requirements

System Requirements

Software requirements are created to specify the software resources that must be imposed on a system in order for the suggested system to operate as intended. The following are the requirements for this proposed component's software definition.

1. React Native and Expo to create a cross-platform mobile application.
2. Node Server to connect web and mobile applications
3. Software development platform
4. Natural language processing (NLP) tools
5. Google API

Work Breakdown Chart



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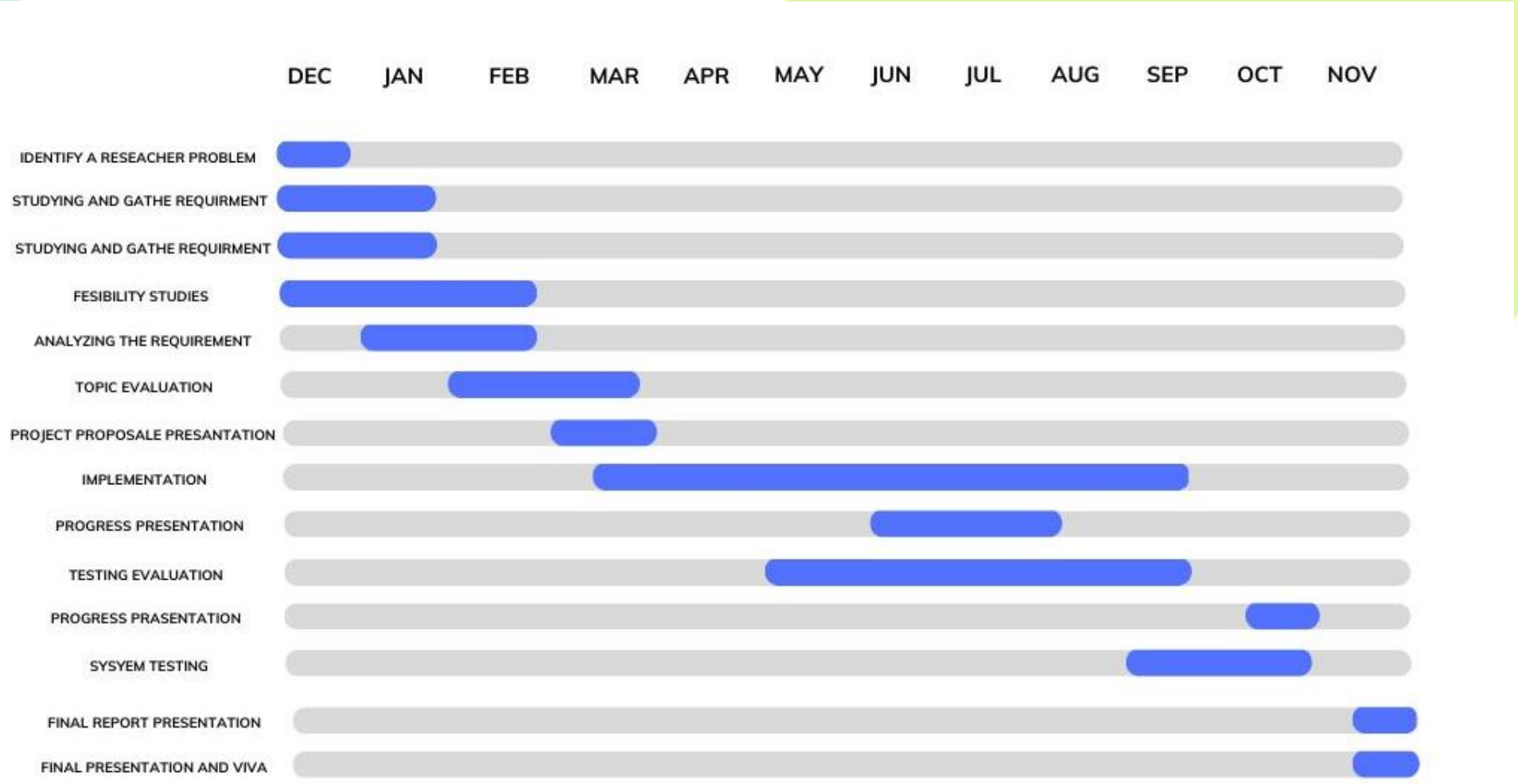
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IDENTIFY A RESEACHER PROBLEM
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FESIBILITY STUDIES
ANALYZING THE REQUIREMENT
TOPIC EVALUATION
PROJECT PROPOSALE PRESANTATION
IMPLEMENTATION
PROGRESS PRESENTATION
TESTING EVALUATION
PROGRESS PRASENTATION
SYSYEM TESTING
FINAL REPORT PRESENTATION
FINAL PRESENTATION AND VIVA

The Health Social Network

IT20216078 | JAYASINGHE J A S C

Software Engineering

Introduction

- A social network implementation which will be limited to share health-related content only.
- Will be allowed share two types of contents.
  - Questions
  - Articles
  - Along with comments on posted questions and articles
- Questions and articles will be checked for duplications against existing data before make them publicly available.
- Publicly available content will be used to detect new knowledge and will be updated in a knowledgebase.

Research Problem

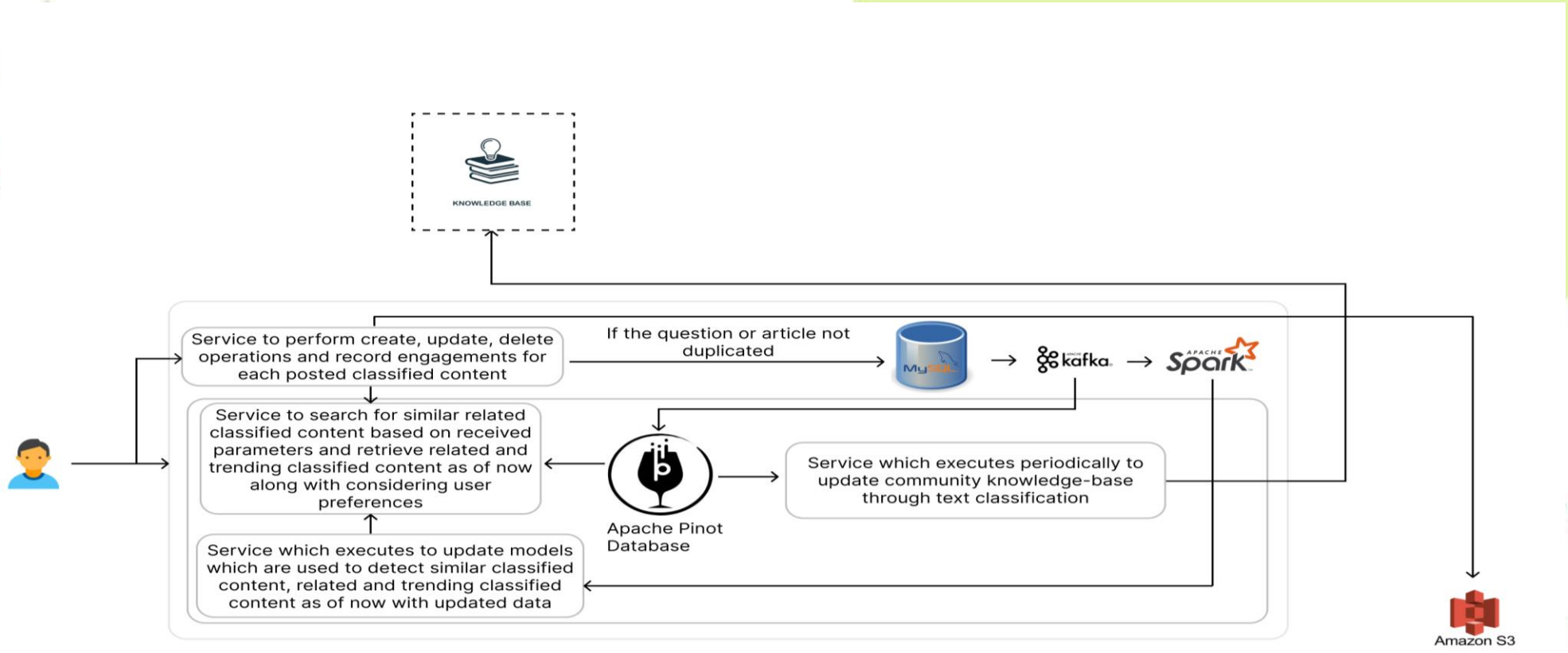
- Social networks generate a lot of data.
- A proper analysis makes it possible to identify important information from such data.
- There may be a lot of duplicated content.
- Existing studies are available to detect duplicated content.
- With the expected social network implementation, it is expected to identify new knowledge, or any contradicts with existing knowledge.
- Existing social network platforms do not have such a feature or may not have publicly announced it.

- Existing studies are available to detect duplicating texts.
  - Machine learning approaches such as SVM, LR, RF and eXtreme Gradient Boosting
  - Stack Overflow, which is a community-based question and answers social network, uses a Word2Vec-based LSTM (long short-term memory) deep learning-based approach
- Existing studies are available to extract health-related knowledge from texts.
  - Apache cTAKES
  - MetaMap System provided by The United States National Library of Medicine
  - QuickUMLS, unsupervised bio-medical concepts extracting library
- A solution will be proposed to extract publicly available content in social media and update them in a knowledgebase.
- Must be checked before updating new knowledge for duplications against existing data.
- Since the knowledge expected to collect relating to healthcare can be very sensitive, it will label as community knowledge.
- It is expected to use eXtreme Gradient Boosting in detecting duplicating texts with continual learning and automated machine learning pipelines.

Objectives

- Main Objective:
  - ✓Implement a social network limiting to share of health-related content to identify people's experiences and followed approaches for treatments
- Specific Objectives:
  - ✓The social network implementation
  - ✓Detection of duplicating content
  - ✓Extract health-related knowledge from collecting texts and update in a knowledgebase

Methodology
System Architecture Diagram



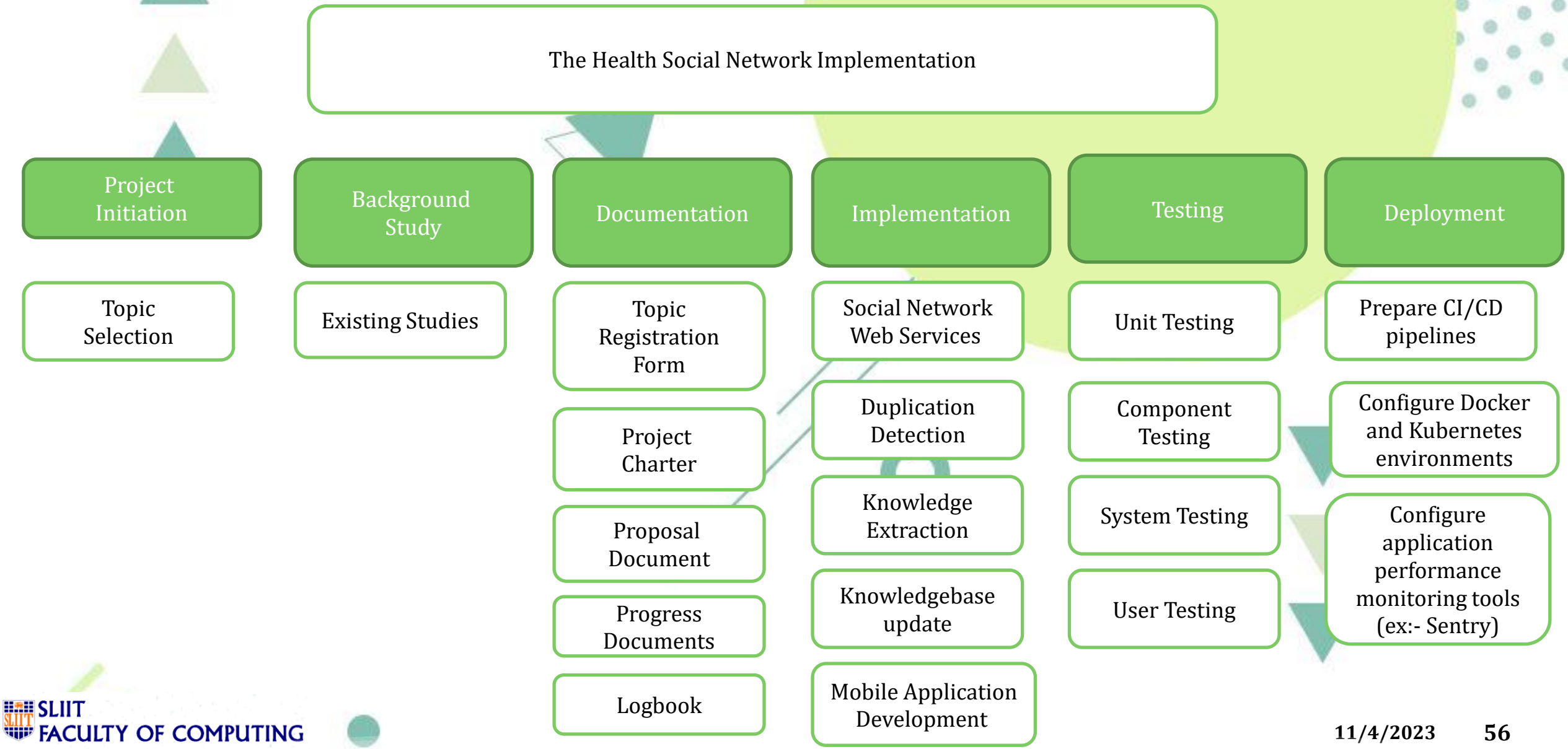
Non-Functional Requirements

- Responsiveness
- Up-to-date experience with the latest data
- Scalable
- Reliable
- Improved query efficiency
- Cost-effectiveness
- Maintainability

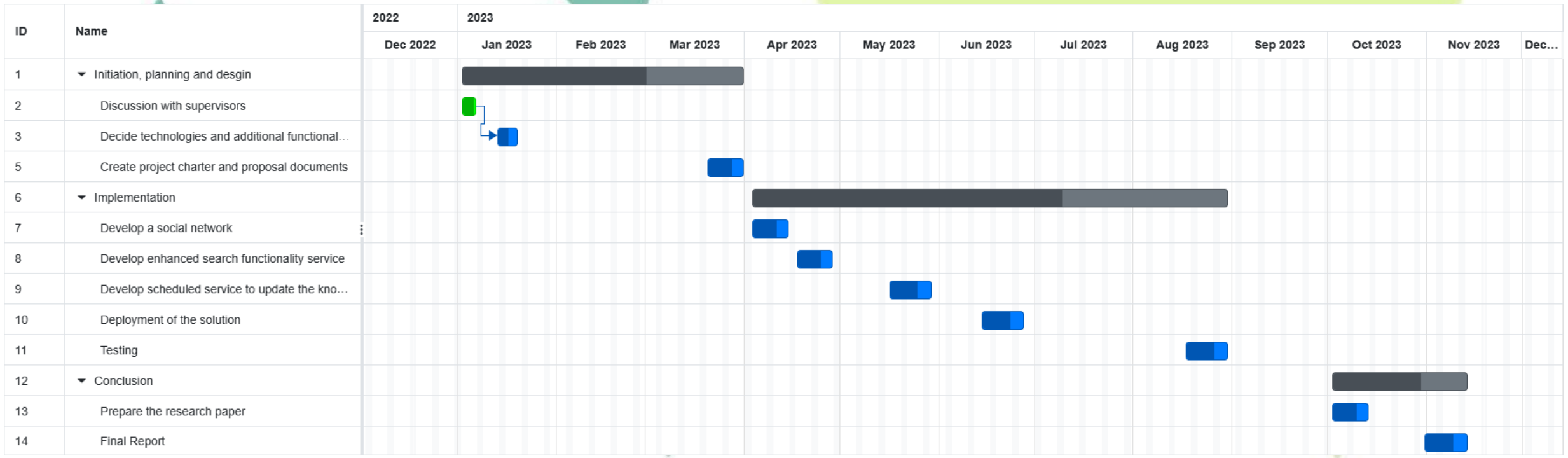
Technologies

- React Native with Expo
- Relevant web, machine learning frameworks and libraries written in Java and Python as required
- Xgboost Library
- Neo4j
- MySQL
- Apache Pinot
- Apache Kafka
- Relevant cloud services as required

Work Breakdown



Gantt Chart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Dec...
1 Initiation, planning and desgin
2 Discussion with supervisors
3 Decide technologies and additional functional...
5 Create project charter and proposal documents
6 Implementation
7 Develop a social network
8 Develop enhanced search functionality service
9 Develop scheduled service to update the kno...
10 Deployment of the solution
11 Testing
12 Conclusion
13 Prepare the research paper
14 Final Report

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