Integrated Veterinary Application for Enhanced Cow Health Management

Group ID : 24-25J-085

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Brief Overview

Our project aims to address critical needs particularly in daily farming, providing a comprehensive solution for managing cow health. The Health and productivity of cattle are crucial for agricultural industry, hence maintaining high standards of animal welfare is essential for sustainable farming practices.

Importance

Importance of cow health management in agriculture cannot be overstated. Healthy cows are more productive, providing higher milk yield. Disease outbreaks can lead to significant economic losses and effect the overall productivity of the farm. By the implementation of effective systems, farmers can ensure the well being of their livestock, increasing profitability and efficiency.

Goal

Our primary goals are to leverage advanced technologies in purpose of address the identified research problems

Current Problems

- Difficulty in early disease detection
- Inadequate tracking of health and nutritional data
- Lack of proper method to predict the milk production
- Lack of proper method to reach an available veterinarian in an emergency

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Project Objectives

Enhance disease detection and prevention

Improve cow care practices

Predict milk production

Streamline veterinary communication and services

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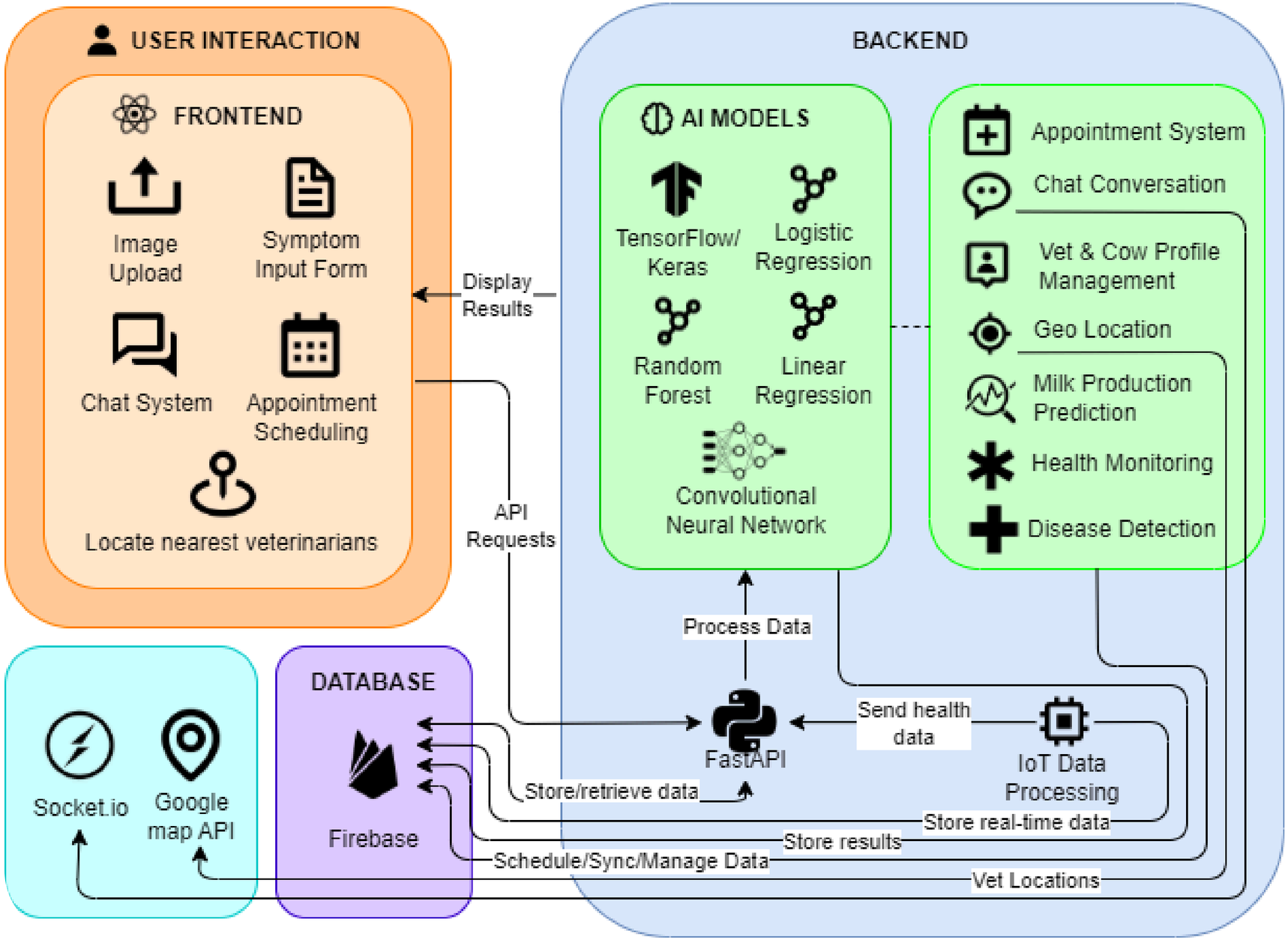
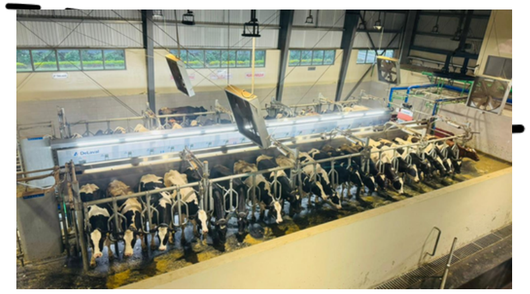
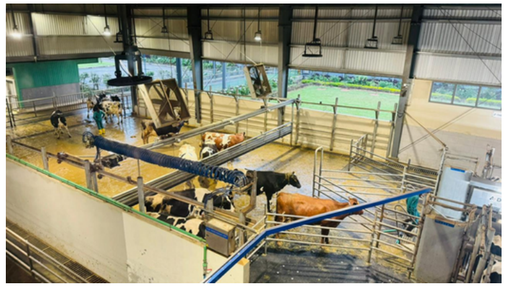
Overall System Diagram



Field Visits

Ambewela Farm





Government Veterinary Surgeons Office Homagama

District Agriculture Tranning Center Homagama

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Component 1 :

Disease Detection and Prevention

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Research Problems

- How to identify the diseases that infected to the cattle skin?
- How to put together a database of different images depicting common cattle diseases?
- What are the preventations that can be taken until channeling a veterinarian?

Project Objectives

Main Objectives

- To Identlfled the skin diseases earlier.
- Provide recommended actions and next steps based on user Inputs
- Maintain a database of cattle diseases with their recommendations and prevention methods.

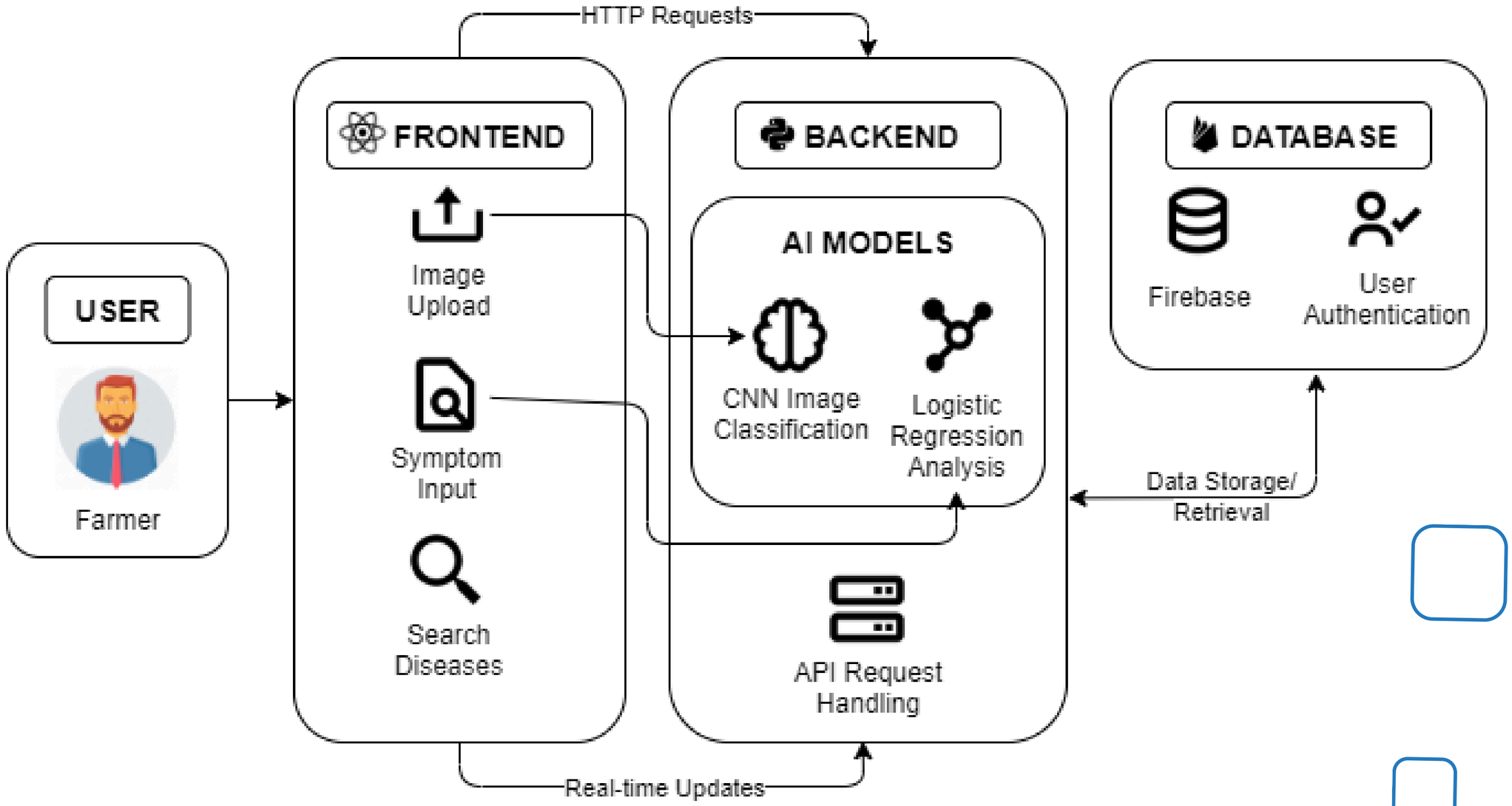
Sub Objectives

- Use of CNN for image classification to detect diseases.
- Develop a tool for farmers to input observed symptoms and receive effectiveness disease diagnoses.
- Compile and maintain a detailed list of common cattle diseases, including symptoms and recommended treatments

Research Gap

Feature / Area	Previous Research	Previous Work	Our Project
Image-based cattle disease detection (CNN)	AlZubi (2024), Ghaffari (2022)	✅	✅
Use of large & diverse datasets	AlZubi (2024), Chavan (2021)	❌	✅
Real-time disease diagnosis via web interfac	Shinde (2023), Segun (2023)	❌	✅
Symptom-based diagnosis	Shanka (2022), Indra (2019)	❌	✅
Combination of image & symptom analysis	Ali Rohan (2024)	❌	✅
Recommendation system	Slob (2020), Shinde (2023)	❌	✅
User-friendly interface for farmers	Chavan (2021), Shanka (2022)	❌	✅

Functional System diagram



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Technologies and Techniques

Technologies

- Python
- React
- TensorFlow
- Keras
- Firebase
- VS code
- GitHub
- FastAPI

Techniques

- Data preprocessing
- Data Visualization
- Data Augmentation
- Convolutional Neural Network

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Requirements

Functional Requirements

- Provide image-based disease classification.
- Enable users to input observed symptoms and receive disease diagnoses.
- Provide recommended actions and next steps based on input symptoms.

Non-Functional Requirements

- Ensure system reliability and accessibility 24/7.
- Ensure quick response time for disease detection (within seconds).
- Achieve high accuracy (90%+) in disease classification.

System Requirements

- High-resolution image capturing and processing capabilities.
- Efficient backend for CNN model integration.
- Secure data handling and transmission protocols.

Personal Requirements

- Expertise in machine learning and image processing.
- Familiarity with veterinary diseases and treatments.
- Proficiency in backend development and database management.

Evidence of Completion

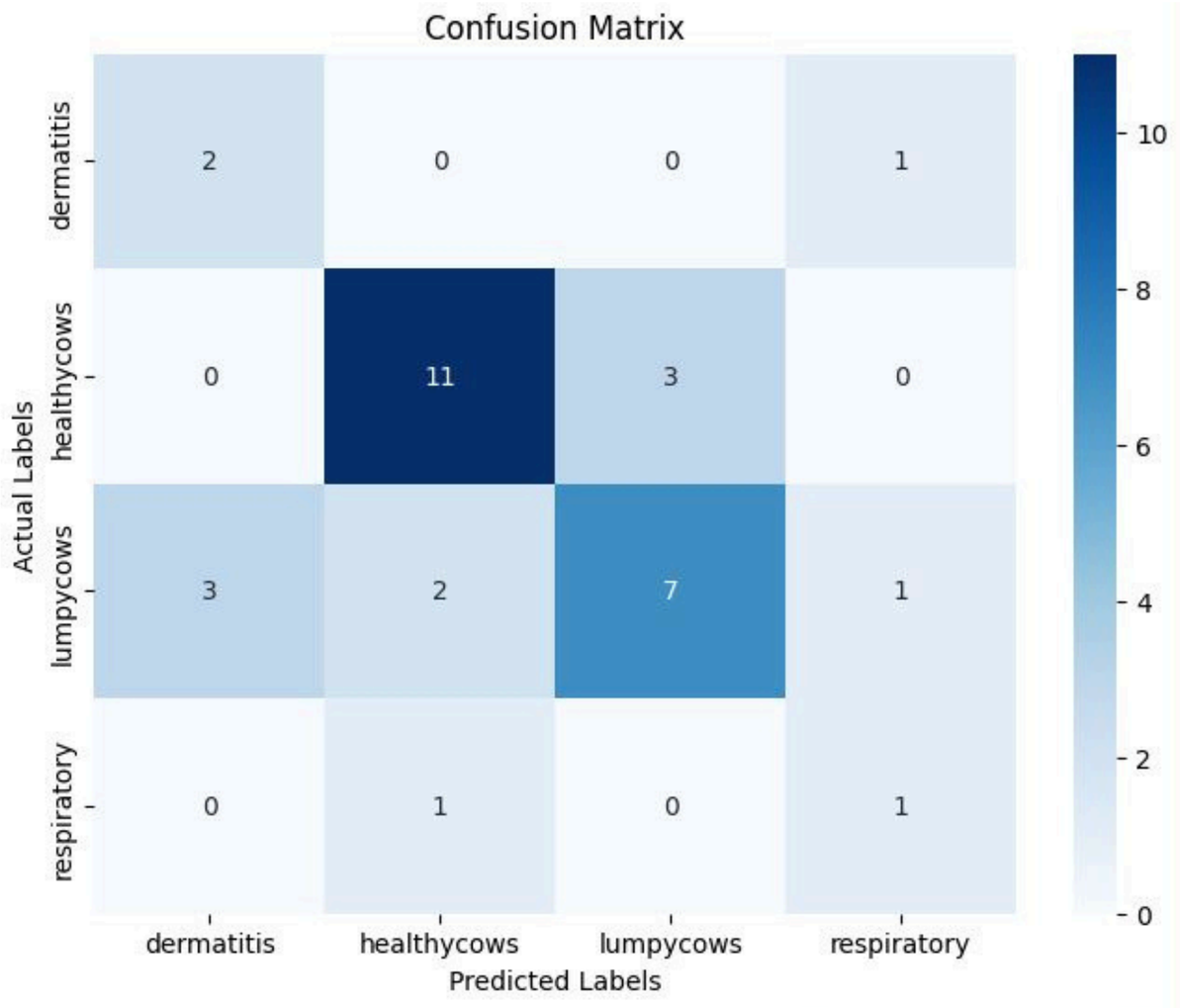
Visualizing Training and Validation Performance

```
epochs = range(1, 41)  # Adjust to match the number of epochs

# Plot training & validation accuracy values
plt.figure(figsize=(12, 5))

plt.subplot(1, 2, 1)
plt.plot(epochs, history.history['accuracy'], label='Training Accuracy')
plt.plot(epochs, history.history['val_accuracy'], label='Validation Accuracy')
plt.title('Training and Validation Accuracy')
plt.xlabel('Epochs')
plt.ylabel('Accuracy')
plt.legend()

# Plot training & validation loss values
plt.subplot(1, 2, 2)
plt.plot(epochs, history.history['loss'], label='Training Loss')
plt.plot(epochs, history.history['val_loss'], label='Validation Loss')
plt.title('Training and Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

# Display the plots
plt.tight_layout()
plt.show()
```

Approch 01 - Custom CNN

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense


model = Sequential([
    Conv2D(32, (3,3), activation='relu', input_shape=(128, 128, 3)),
    MaxPooling2D(pool_size=(2, 2)),
    Conv2D(64, (3, 3), activation='relu'),
    MaxPooling2D(pool_size=(2, 2)),
    Flatten(),
    Dense(128, activation='relu'),
    Dense(4, activation='softmax')  # Updated for 4 classes
])
```

Confusion Matrix: Identifies specific classes that are often misclassified



Data Preprocessing with ImageDataGenerator

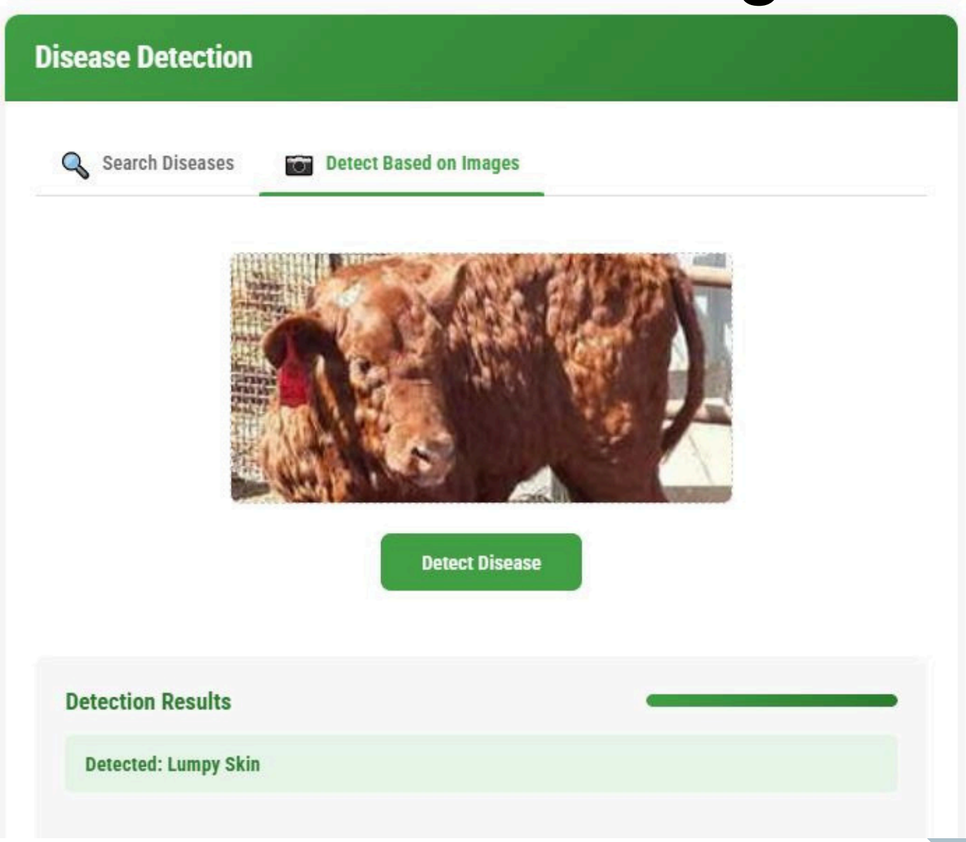
Evidence of Completion

Accuracy

```
Epoch 40/40
27/27 ━━━━━━━━━━━━━━━━━━━━ 41s 1s/step - accuracy: 0.7874 - loss: 0.4447 - val_accuracy: 0.7594 - val_loss: 0.5948
```

```
// Handle file selection
const handleFileChange = (event) => {
  const file = event.target.files[0];
  if (file) {
    setUploadedImage(file);
    setPreviewUrl(URL.createObjectURL(file)); // Create a preview URL for the image
  }
};

// Handle disease detection
const handleDetectDisease = async () => {
  if (!uploadedImage) {
    alert('Please upload an image first.');
    return;
  }

  const formData = new FormData();
  formData.append('file', uploadedImage);

  setLoading(true);
  setPrediction(null);

  try {
    const response = await axios.post('http://localhost:8000/predict-pest', formData, {
      headers: { 'Content-Type': 'multipart/form-data' },
    });
    setPrediction(response.data);
  } catch (error) {
    console.error('Error detecting disease:', error);
    alert('Failed to detect disease.');
  } finally {
    setLoading(false);
  }
```

Disease Detection Page



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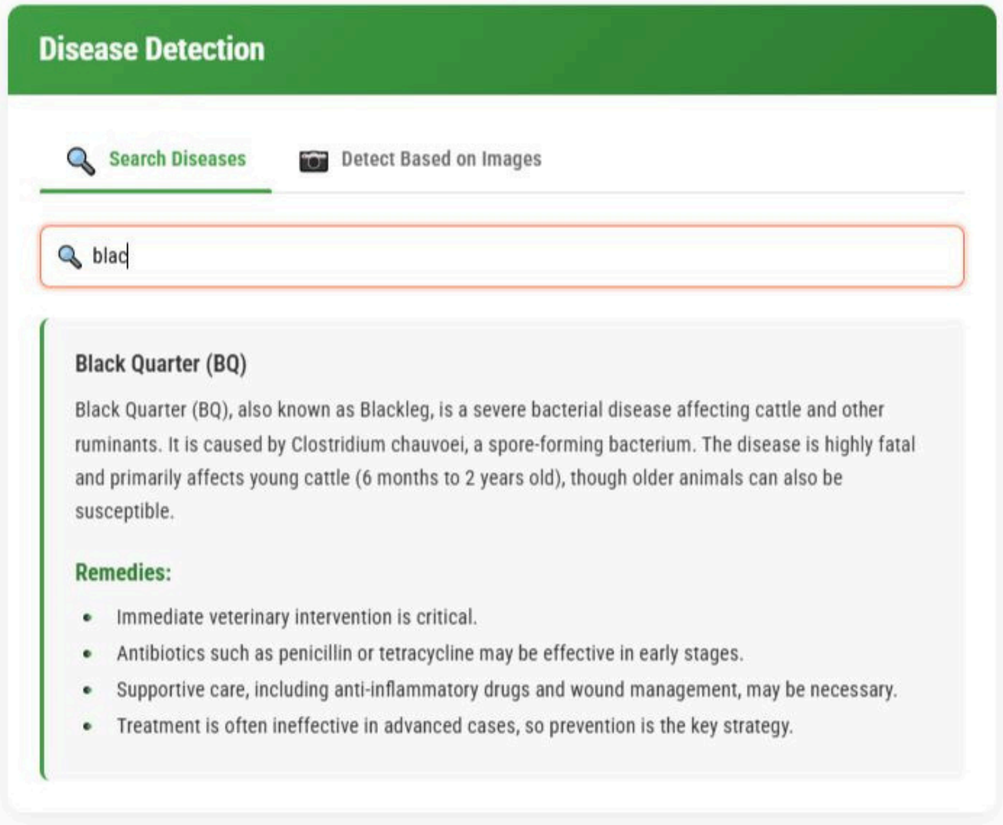
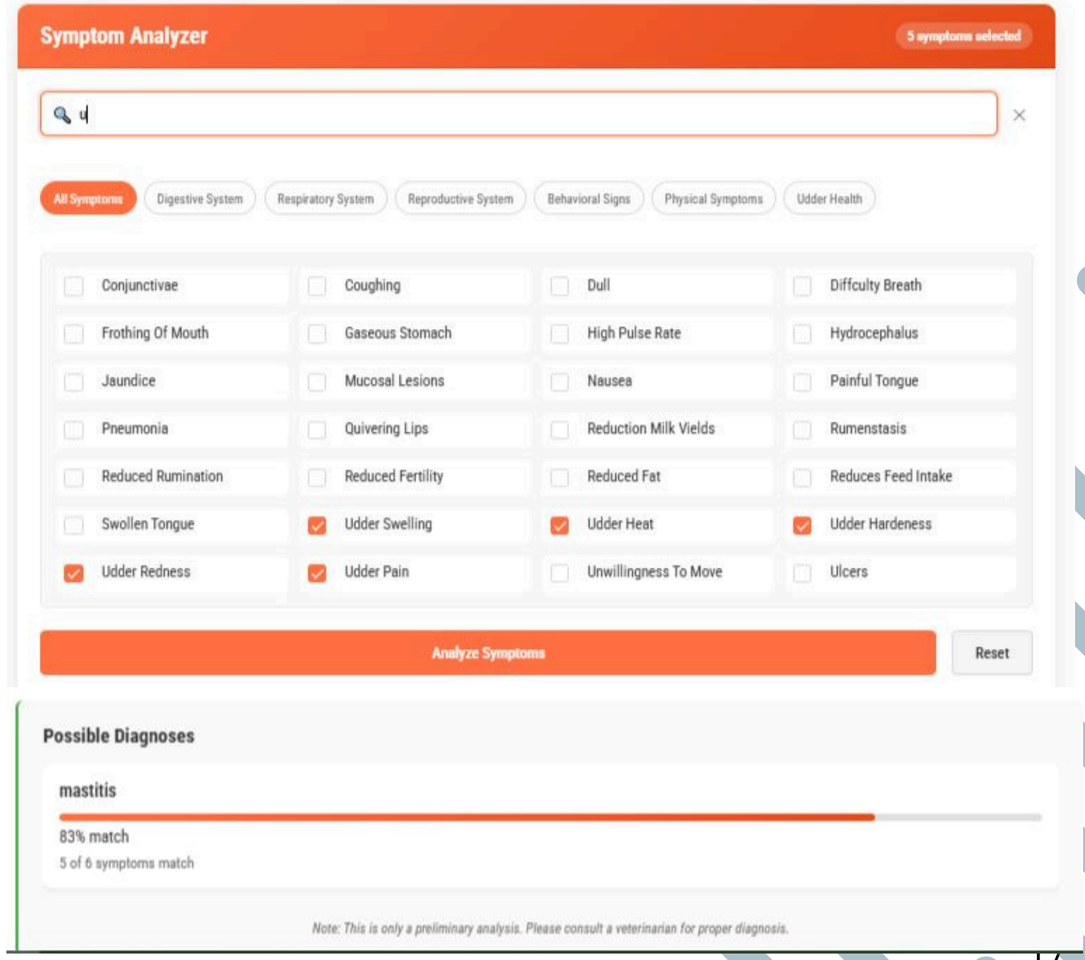
Evidence of Completion

Recommendations for disease

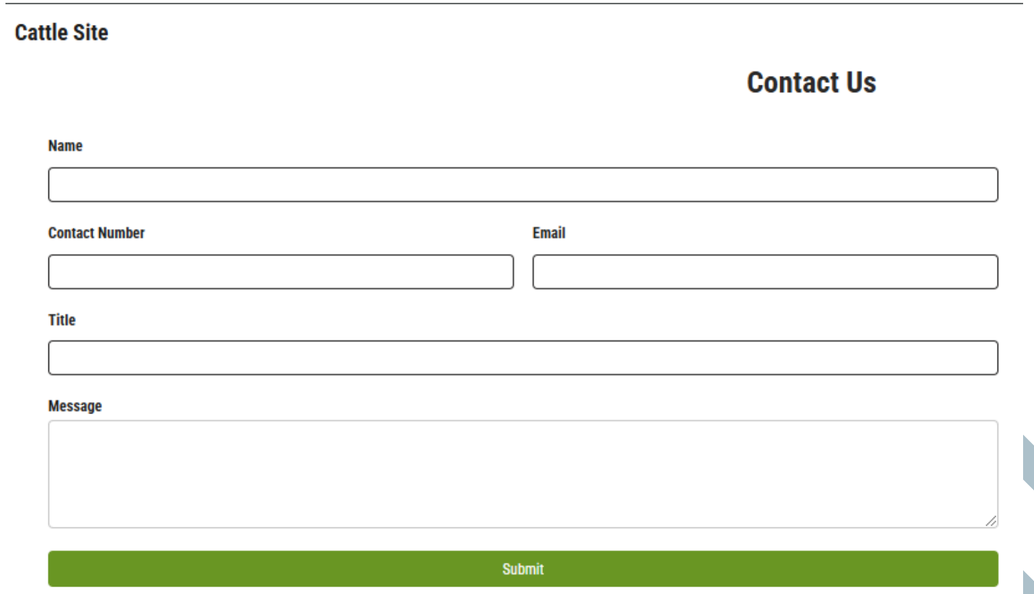


Behavioural Disease Detection Page



Evidence of Completion

Home Page



Contact Us Page

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Challenges and deviations

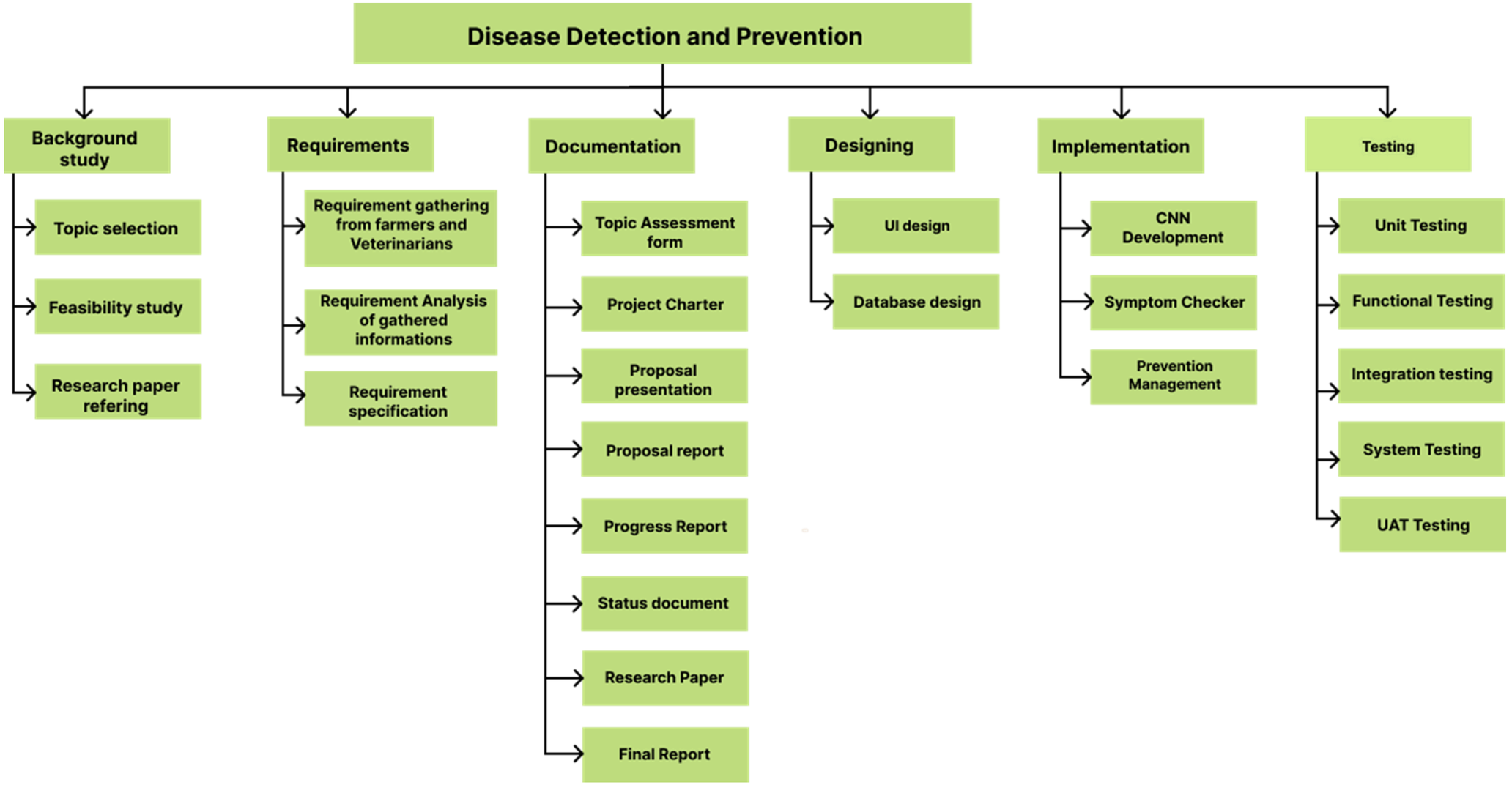
- **Data Collection Difficulties.**
  Names of diseases detected by the component:

  CNN model:- Dermatitis, Lumpy Sikn Disease, Respiratory, Parasitic Mange, Foot and Mouth disease, Fly Strike (MYIASIS), Dermatophytosis (RINGWORM)

  Recommendations and prevention tips:- Tick Infestation, Black Quarter (BQ), Dermatophytosis (RINGWORM), Fly Strike (MYIASIS), Foot and Mouth disease, Lumpy Skin, Mastitis and Parasitic Mange

- **Some farmers may lack technical knowledge to effectively use the application.**

Workbreakdown structure



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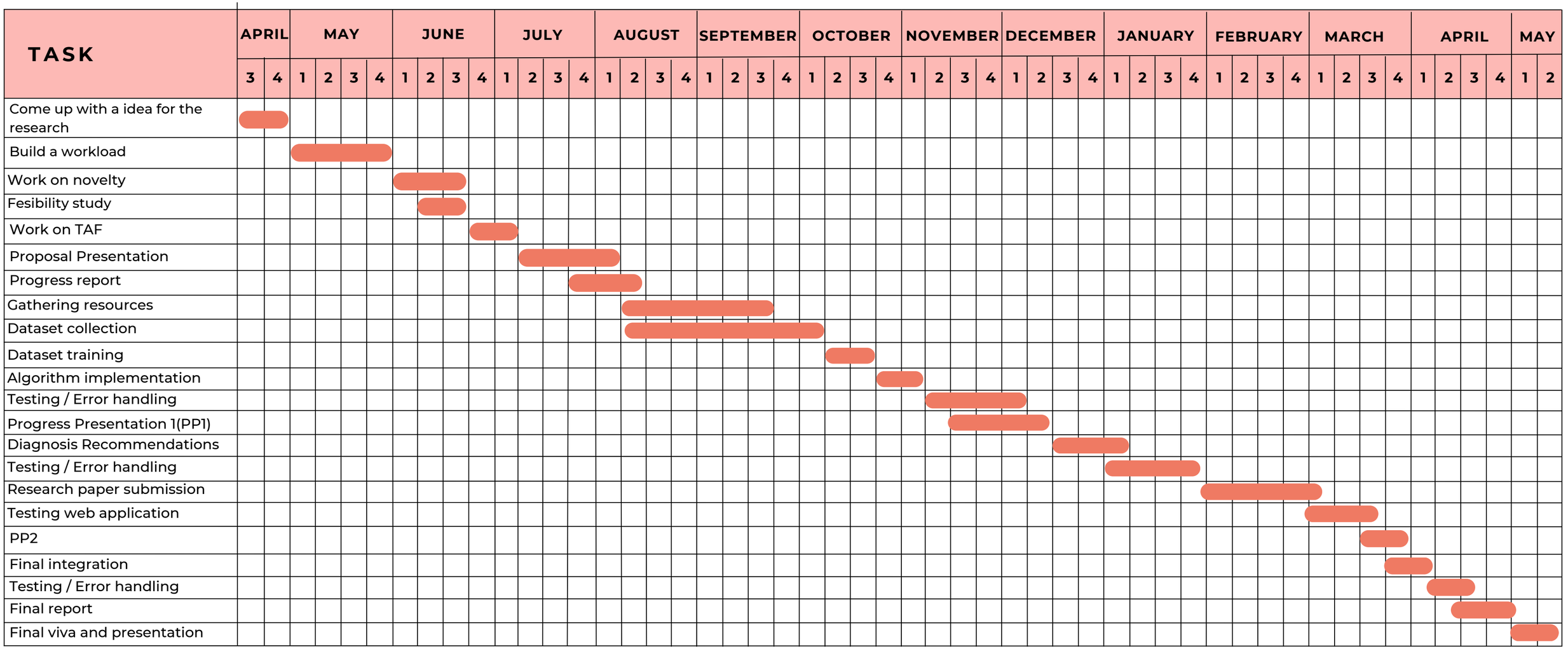
Estimated Budget per month

	Amount (LKR)
Travel fees for data collection(Government Veterinary Surgeons Office - Homagama, District Agriculture Tranning Center Homagama)	2000.00
Internet charges (the development and technical information learning)	2500.00
Electricity	3000.00
Documentation and Printing Cost	500.00
Total	8000.00

Gantt Chart



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[2] A. M. D. F. C. G. M. H. Ghaffari, ".journalofdairyscience," 2022. [Online]. Available: https://www.journalofdairyscience.org/article/S0022-0302(22)00609-9/fulltext#:~:text=A%20deep%20convolutional%20neural%20network,3%20d%20of%20life%20on..

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Component 2 :

Enhancing Cow Care Practices

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Research Problems

- Real-time health monitoring and management.
- Lack of personalized nutrition plans.
- Manual tracking of vaccinations and vet check-ups.

Project Objectives

Main Objectives

To present a holistic approach to cow care by integrating the management of cow profiles, nutrition tracking, and automated reminders using Machine Learning, focusing primarily on enhancing cow productivity.

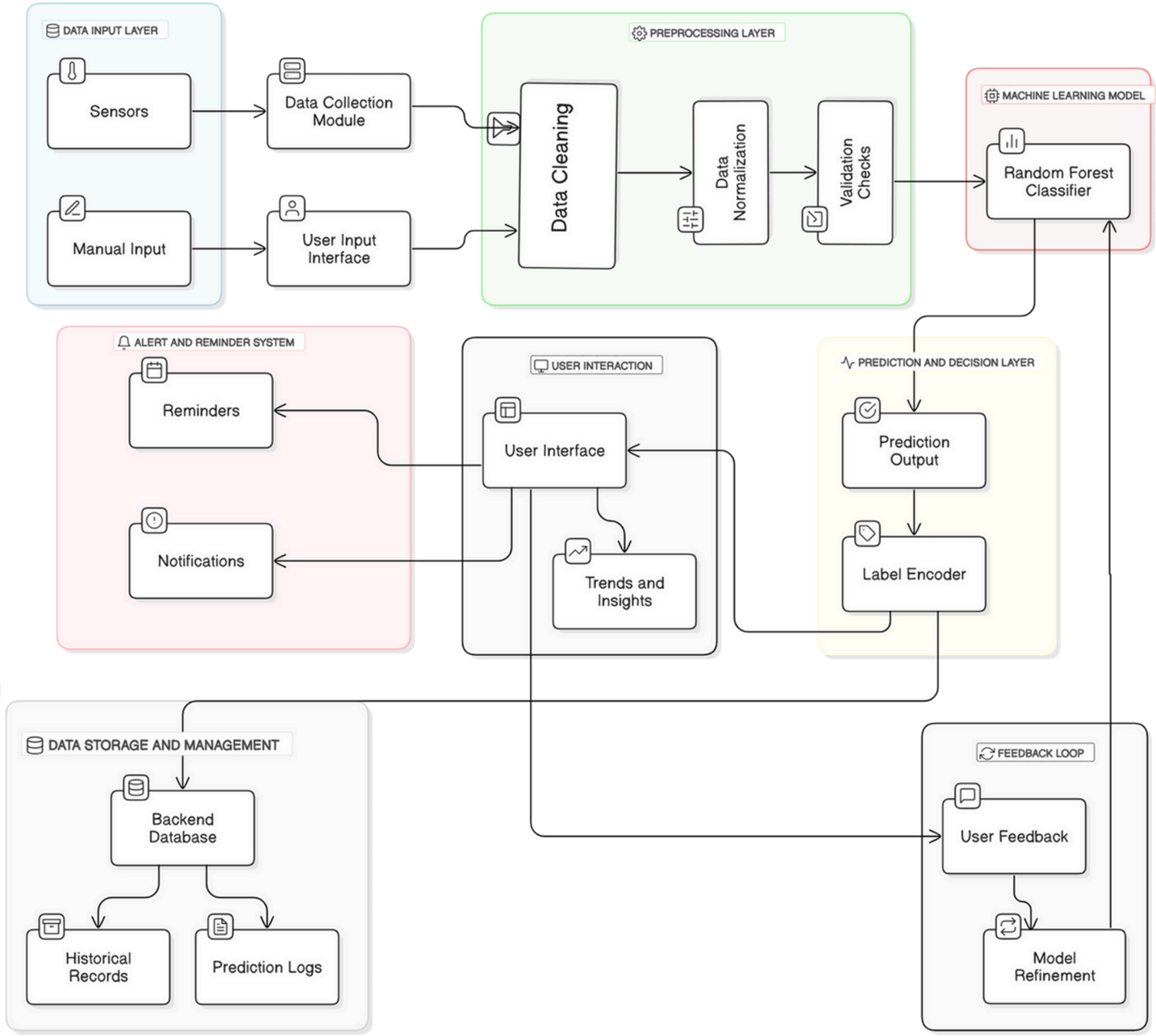
Sub Objectives

- **Develop Comprehensive Cow Profiles for individual cattle Management**
- **Implement a health monitoring function using machine learning and IoT devices**
- **Implement Personalized Nutrition and Diet Tracking using machine learning**
- **Create Automated Reminder Systems**
- **Improve Overall Cow Welfare and Management Efficiency**

Research Gap

	Vet2Pet	Vetter Software	PetDesk	Our Research
Application type	mobile	web	mobile	web
Comprehensive Cow Profile Management	✗	✗	✗	✓
Integrated Health Records and Nutrition	✗	✗	✗	✓
Personalized Nutrition and Diet Tracking	✗	✗	✗	✓
Machine Learning Predictive Analytics	✗	✗	✗	✓
Automated Reminders for Medical Situations	✗	✗	✗	✓

Functional System diagram



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Technologies and Techniques

Technologies

- Python
- React
- TensorFlow
- Firebase
- VS code
- GitHub

Techniques

- ML Techniques
- Data Preprocessing
- Deployment Strategies
- Automated Alerts
- Real-Time Data Integration

Requirements

Functional Requirements

- Provide interfaces to create and mange comprehensive cow profile.
- Allow modifications to cow profiles.
- Enable tracking of individual cow's feeding regimens and health records.
- Create systems for setting alerts and reminders for critical tasks.

Non-Functional Requirements

- Ensure system reliability and accessibility 24/7.
- Maintain high system availability and minimal system downtime.
- Provide latency-free communication channels for real-time interaction

System Requirements

- User-friendly interfaces for data input and management.
- Notification system for reminders and alerts.
- Communication option for emergency assistance.
- Appointment scheduling system.

Personal Requirements

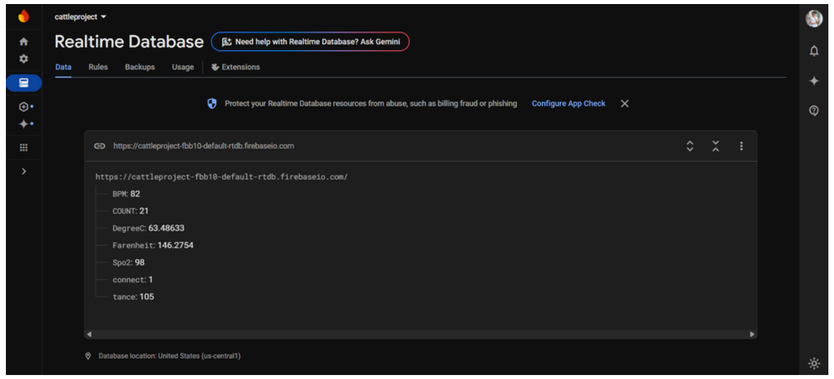
- Skills in API integration and data security.
- Familiarity with veterinary practices and services.
- Proficiency in backend development and database management.

Evidence of Completion

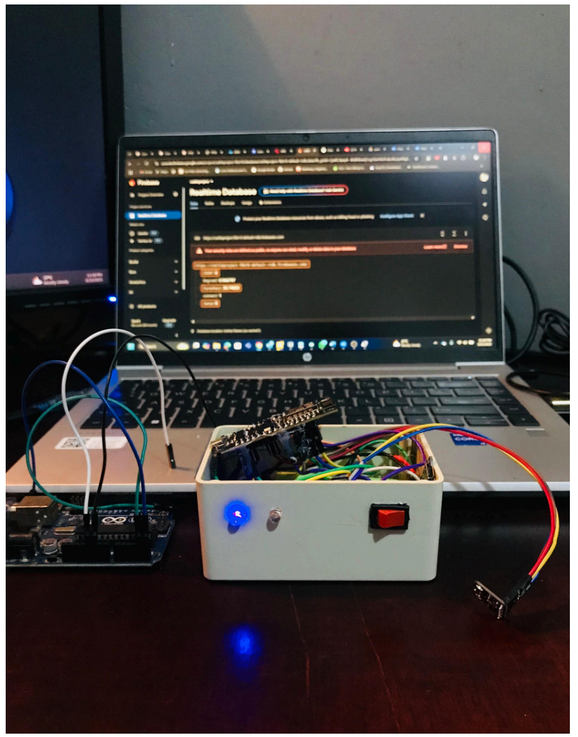
Demonstration IoT devices for capturing cattle health parameters.

- Temperature
- Heart Rate
- SpO_2

Fairebase Realtime Database



IoT device capturing data



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Evidence of Completion

Cattel Profile UI

CattleFarm

- Summary
- My Profile
- Locate Veterinarian
- Communicate
- Milk Production Details
- Milk Records History
- Disease Detection
- Health Checkup
- Sign Out

Search here

user

User Summary

Full Name:	mala gamage
Username:	mala
Email:	rajmalperera@gmail.com
NIC:	2777465278
Contact:	0714777848

Cattle Summary

cow1
(BgquSVMvgIDJLLnBnCFi)

Breed: Sahiwal
Birth: 2022-01-07
Health: Healthy
Status: Deceased
Owner: mala
Age: 3 years, 4 months
Update Remove

cow2
(C17Bvt2pjqDmPrU0HN3r)

Breed: Sahiwal
Birth: 2022-06-16
Health: Healthy
Status: Active
Owner: mala
Age: 2 years, 11 months
Update Remove

cow4
(GXHsVfzK4WOZcPXucDqM)

Breed: Red Sindhi
Birth: 2025-03-20
Health: Healthy
Status: Active
Owner: mala
Age: 0 years, 2 months
Update Remove

cow4
(XF6vy0RmN0vhC8yEByMr)

Breed: Red Sindhi
Birth: 2020-02-12
Health: Healthy
Status: Sold
Owner: mala
Age: 5 years, 3 months
Update Remove

Add New Cattle

Name:

Breed: Sahiwal

Birth Date: dd-mm-yyyy

Health: Healthy

Status: Active

Image: Choose File No file chosen

Image Preview:

Add Cattle

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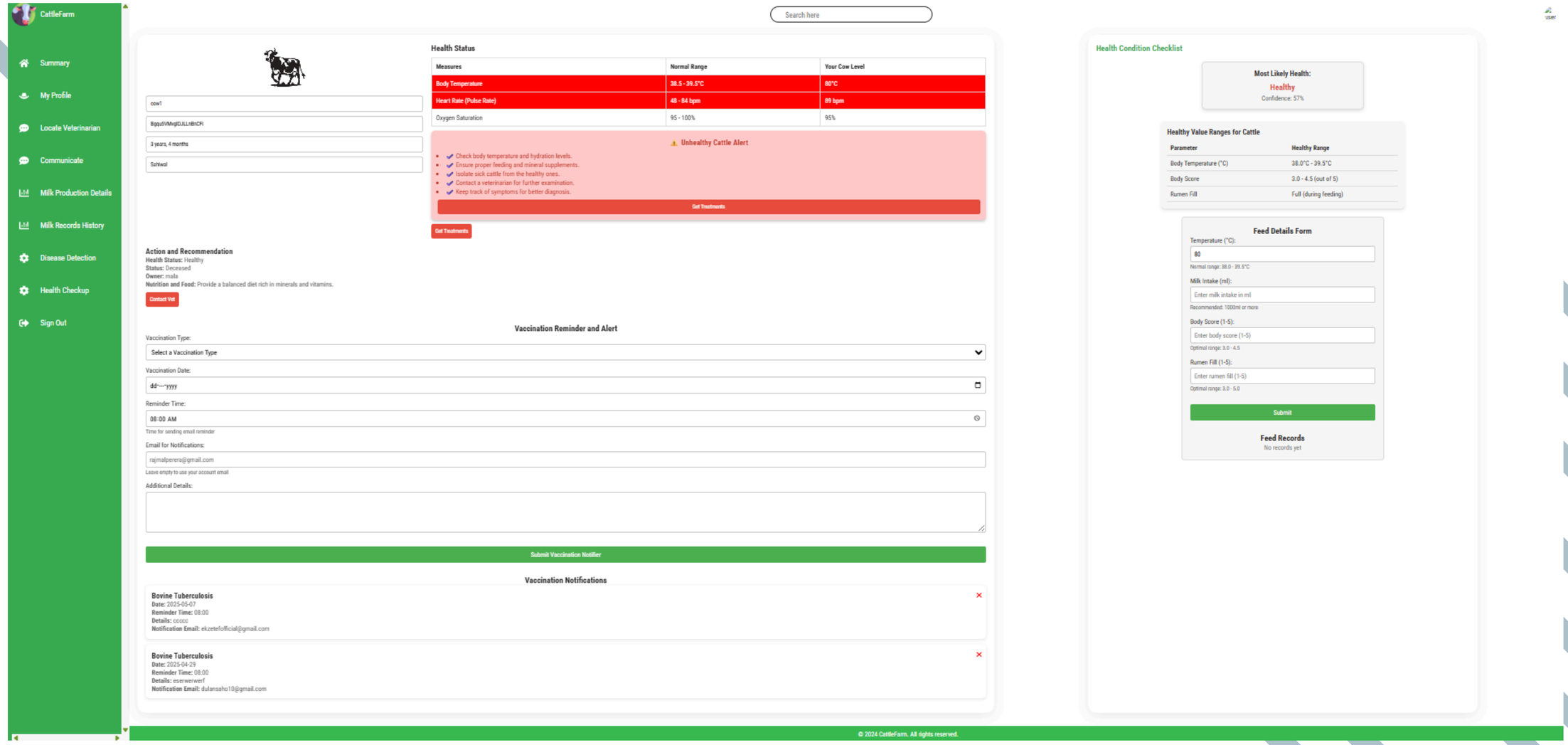
Evidence of Completion

Profile Components



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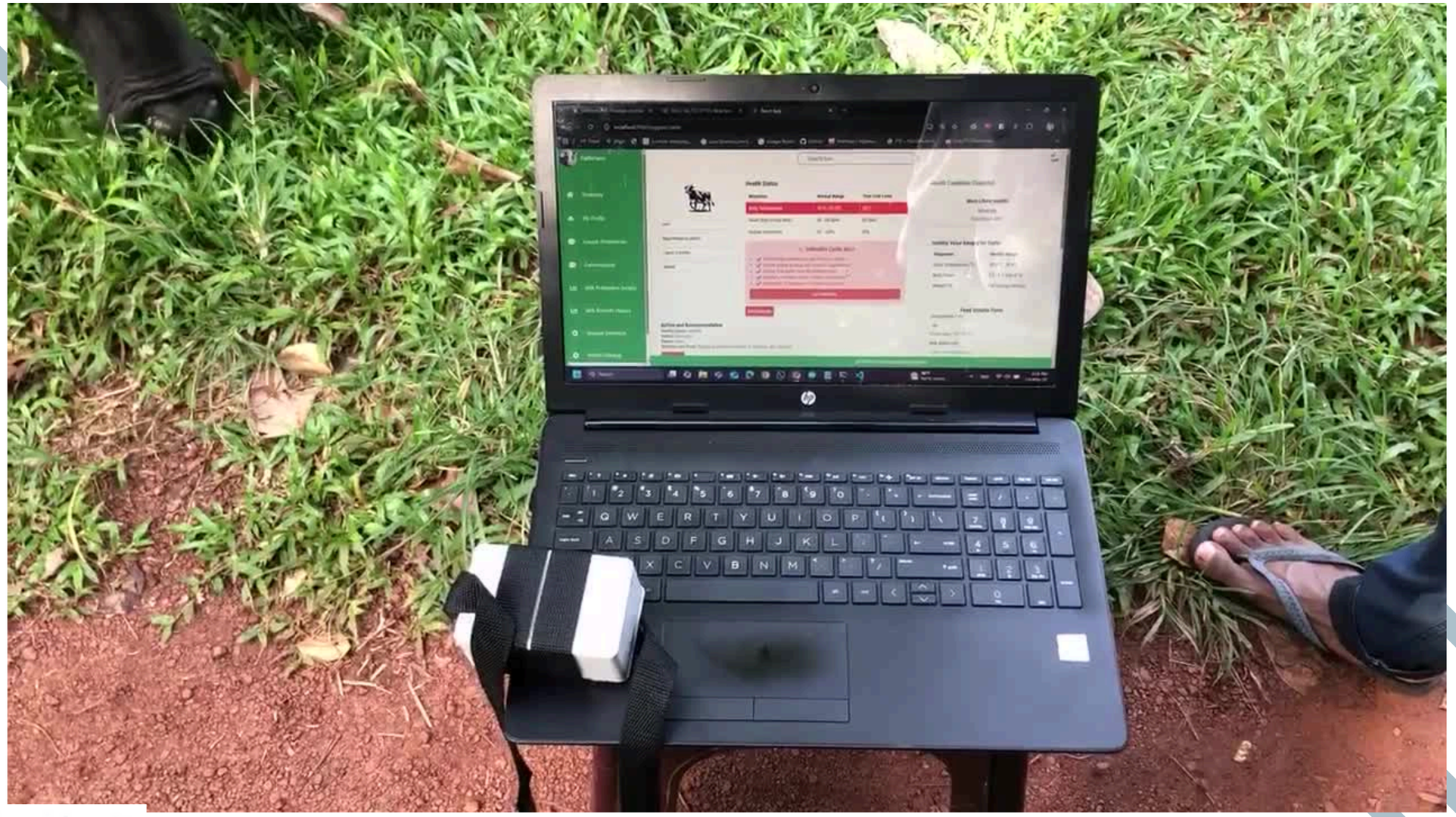
Evidence of Completion

Real-world Scenario Testing



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Challenges and deviations

- **Data Collection Difficulties.**
  Limited Availability of Cattle Health Data:
  Many farms lack historical health records, making ML training challenging.

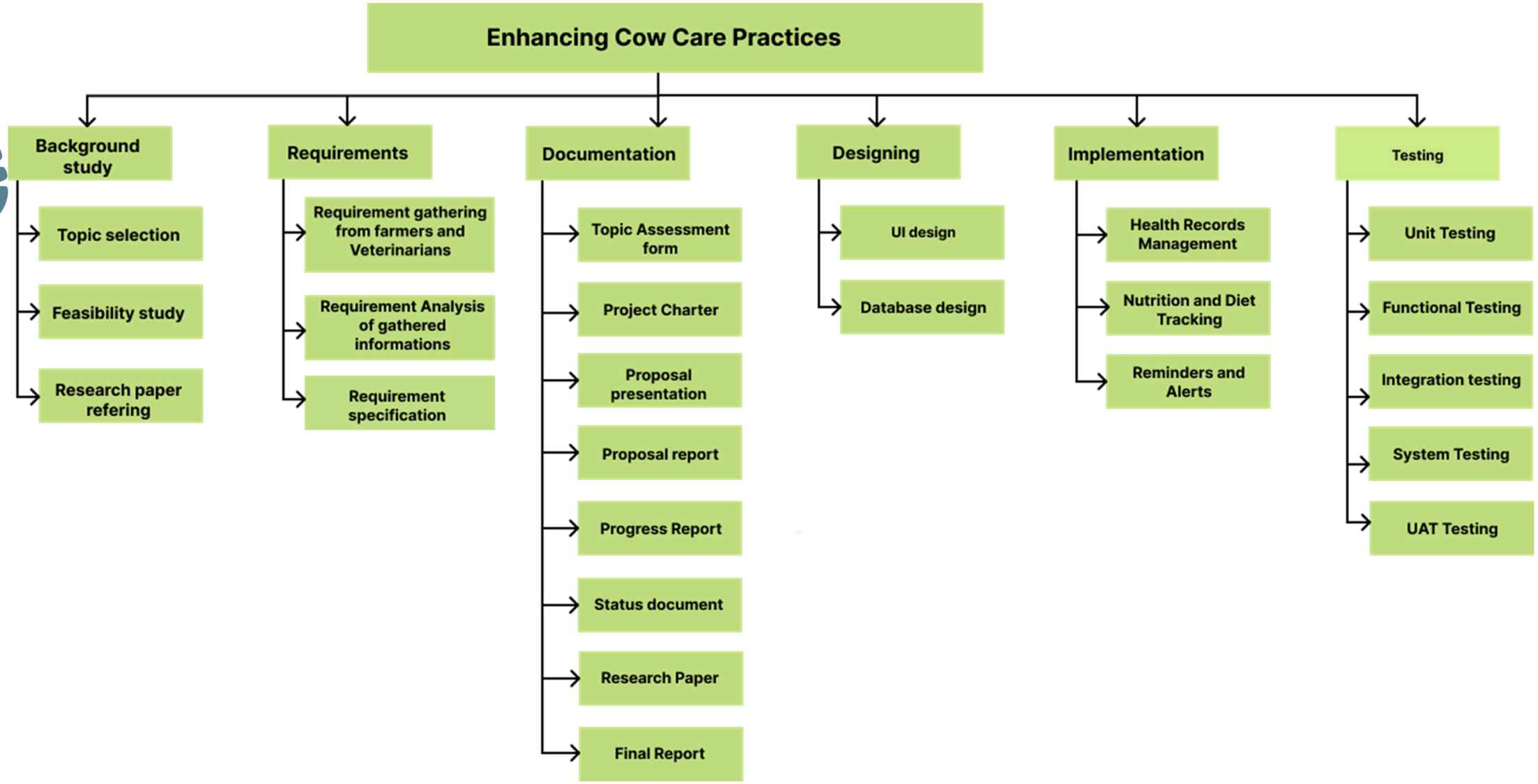
  Sensor Accuracy Issues:

  IoT sensors may provide inconsistent or noisy data because these devices are not industrial-grade equipment; I used for demonstration purposes.

- **Difficulty in Finding Suitable Sensors.**

  Most sensors do not function properly, and finding reliable ones can be challenging. In Sri Lanka, the MAX30102 sensor, which is used for measuring SpO_2 and heart rate, is not readily available.

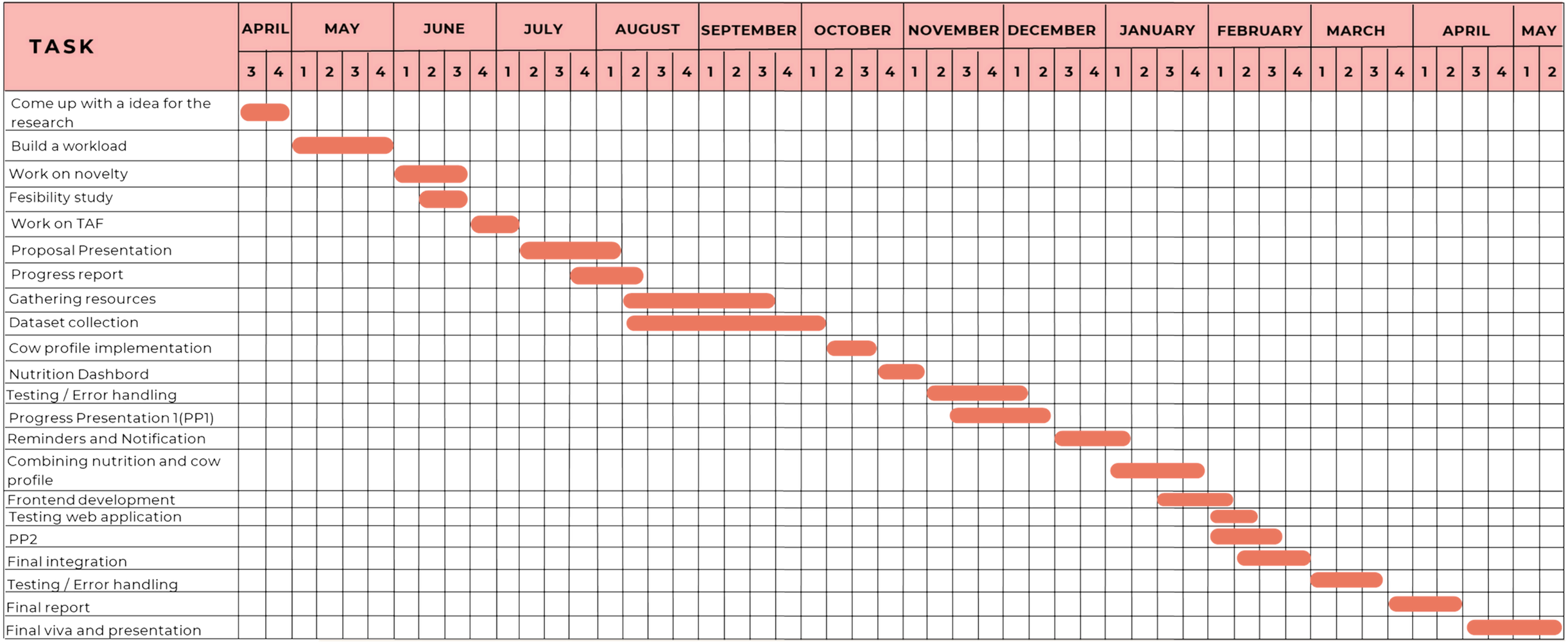
Workbreakdown structure



Estimated Budget per month

	Amount (LKR)
Travel fees for data collection(Government Veterinary Surgeons Office - Homagama, District Agriculture Tranning Center Homagama)	4000.00
Internet charges (the development and technical information learning)	2500.00
Electricity	3000.00
Documentation and Printing Cost	500.00
IOT Devices	7000.00
Total	8000.00

Gantt Chart


TASK
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
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 1 2
Come up with a idea for the research
Build a workload
Work on novelty
Fesibility study
Work on TAF
Proposal Presentation
Progress report
Gathering resources
Dataset collection
Cow profile implementation
Nutrition Dashbord
Testing / Error handling
Progress Presentation 1(PP1)
Reminders and Notification
Combining nutrition and cow profile
Frontend development
Testing web application
PP2
Final integration
Testing / Error handling
Final report
Final viva and presentation

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Component 3 :

Enhancing Dairy Farm Efficiency through Milk Production Prediction

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Research Problems

- How do seasonal changes affect milk production?
- How to use past performance data to forecast future production?
- What are the economic implications of milk production predictions?

Project Objectives

Main Objectives

- Gather historical and real-time data on environmental factors and milk production.
- Choose suitable machine learning models and train them.
- Develop an application or dashboard that integrates the predictive model for real-time predictions.

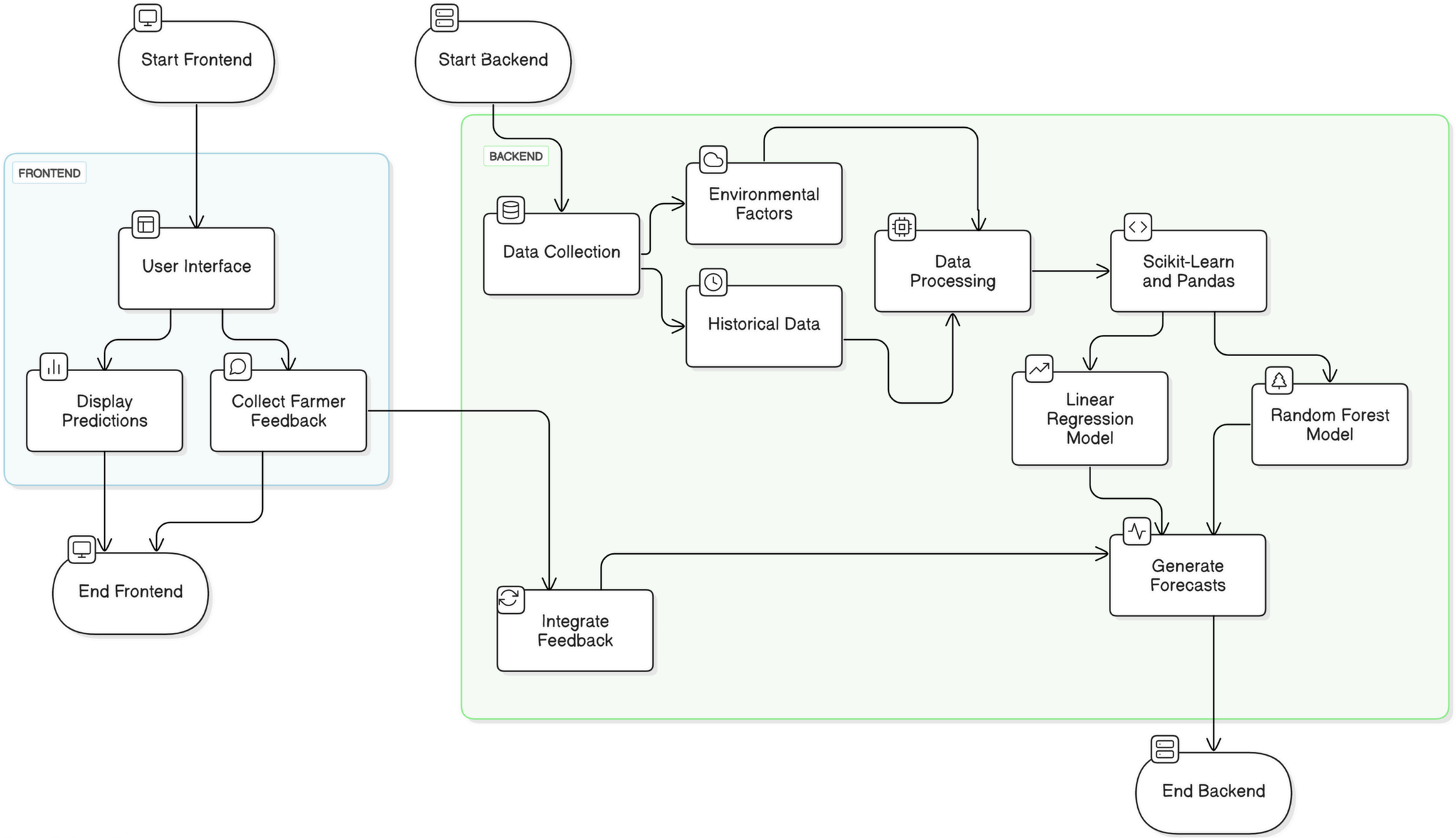
Sub Objectives

- Select factors like temperature, humidity, and rainfall.
- Gather historical and real-time data from weather stations, IoT devices, and farm systems.
- Train models with historical data and optimize parameters.
- Create a user-friendly dashboard that integrates the predictive model.

Research Gap

	1	2	3	4	5	6	7	8	Our Research
Data Prediction	✓	✓	✓	✓	✓	✓	✗	✗	✓
Machine Learning	✓	✓	✓	✓	✗	✗	✗	✗	✓
Weather Parameters	✗	✗	✗	✗	✗	✓	✗	✗	✓
Health Management	✗	✗	✗	✗	✓	✗	✓	✓	✗
Lactation Modeling	✓	✓	✓	✓	✗	✗	✗	✓	✓
Robotic modeling	✗	✗	✗	✓	✗	✗	✗	✗	✗
Genetic Data	✗	✓	✓	✗	✗	✗	✗	✗	✗
Data Accuracy	✓	✓	✓	✓	✓	✓	✗	✗	✓
Individualized Nutrition Plans	✓	✗	✗	✗	✗	✗	✓	✓	✗
Historical Milk Production Data	✓	✓	✓	✓	✓	✓	✗	✗	✓

Functional System diagram



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Technologies and Techniques

Technologies

- Python
- React
- TensorFlow
- Firebase
- VS code
- GitHub

Techniques

- Data Collection
- Data Cleaning
- Integrating Domain Knowledge
- Decision Trees
- Random Forests
- ARIMA (AutoRegressive Integrated Moving Average)
- Long Short-Term Memory Networks (LSTM)

Requirements

Functional Requirements

- Milk production prediction
- Data collection
- UI & API Integration
- Model Training
- Reporting & Analysis
- User Authentication & Authorization

Non-Functional Requirements

- Performance
- Scalability
- Security
- Usability
- Reliability

System Requirements

- User-friendly interfaces for data input and management.
- Notification system for reminders and alerts.
- Communication option for emergency assistance.
- Appointment scheduling system.

Personal Requirements

- Skills in API integration and data security.
- Familiarity with veterinary practices and services.
- Proficiency in backend development and database management.

Evidence of Completion

Milk Records

good quality

05/24/2025

4

Add

Update

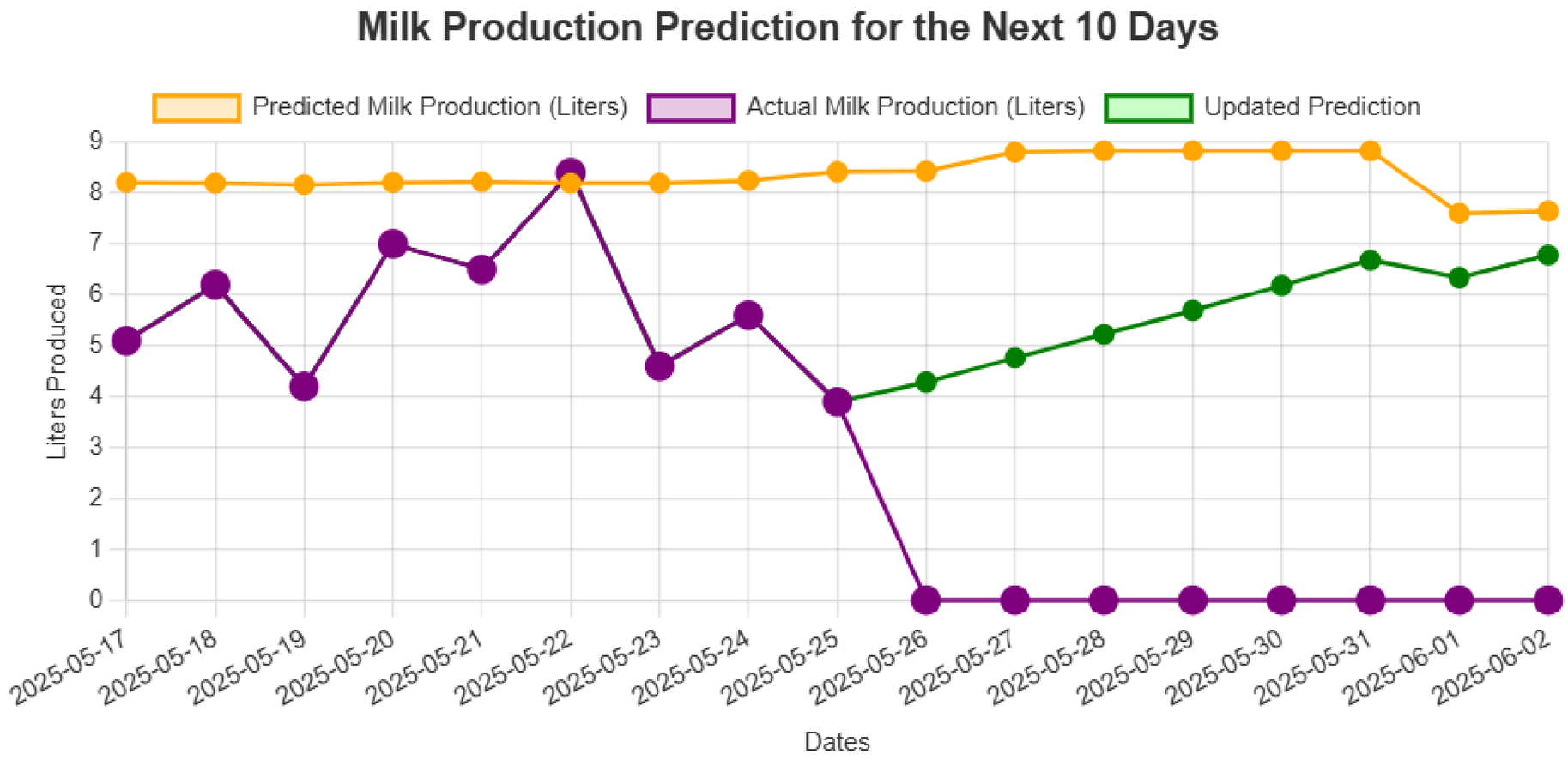
cow1

(kkhbK2qn4BNRssGn07ex)

Breed: Sahiwal
Age:
Health: Healthy
Status: Active

Evidence of Completion

Milk Production Trend



Evidence of Completion

Milk Records

2025-05-25

Milk Amount: 5.1 L
Cattle ID: kkhbK2qn4BNRssGn07ex
Status: ok

Feedback: *good quality. weather is overcast clouds*

2025-05-24

Milk Amount: 5.6 L
Cattle ID: kkhbK2qn4BNRssGn07ex
Status: ok

Feedback: *good quality*

Weather Summary

Colombo

overcast clouds

30.97°C

77%

6.43 m/s

Challenges and deviations

Data Quality & Availability

- Limited historical data (only 5 cows) may not generalize well to larger herds.
- Missing or inconsistent records in temperature, humidity, rainfall, or milk yield.

Environmental Variability

- Sudden climate shifts (droughts, extreme heat, unexpected rainfall) may not align with past trends.

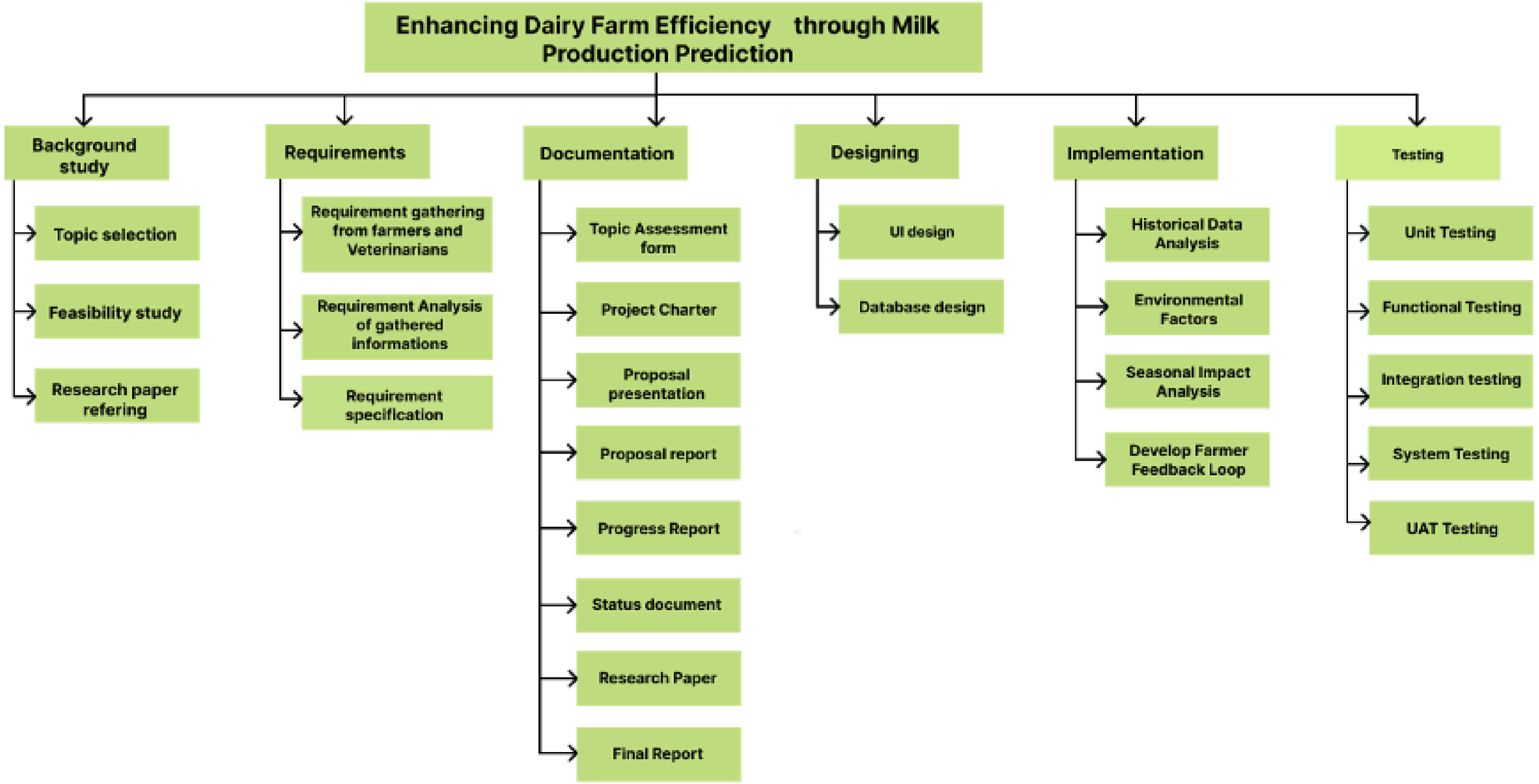
Unexpected Influences on Production –

- Farm management changes (feeding, milking schedules) may not be reflected.

Scaling Issues for Larger Herds –

- Small dataset may not generalize well for large-scale farms.

Workbreakdown structure



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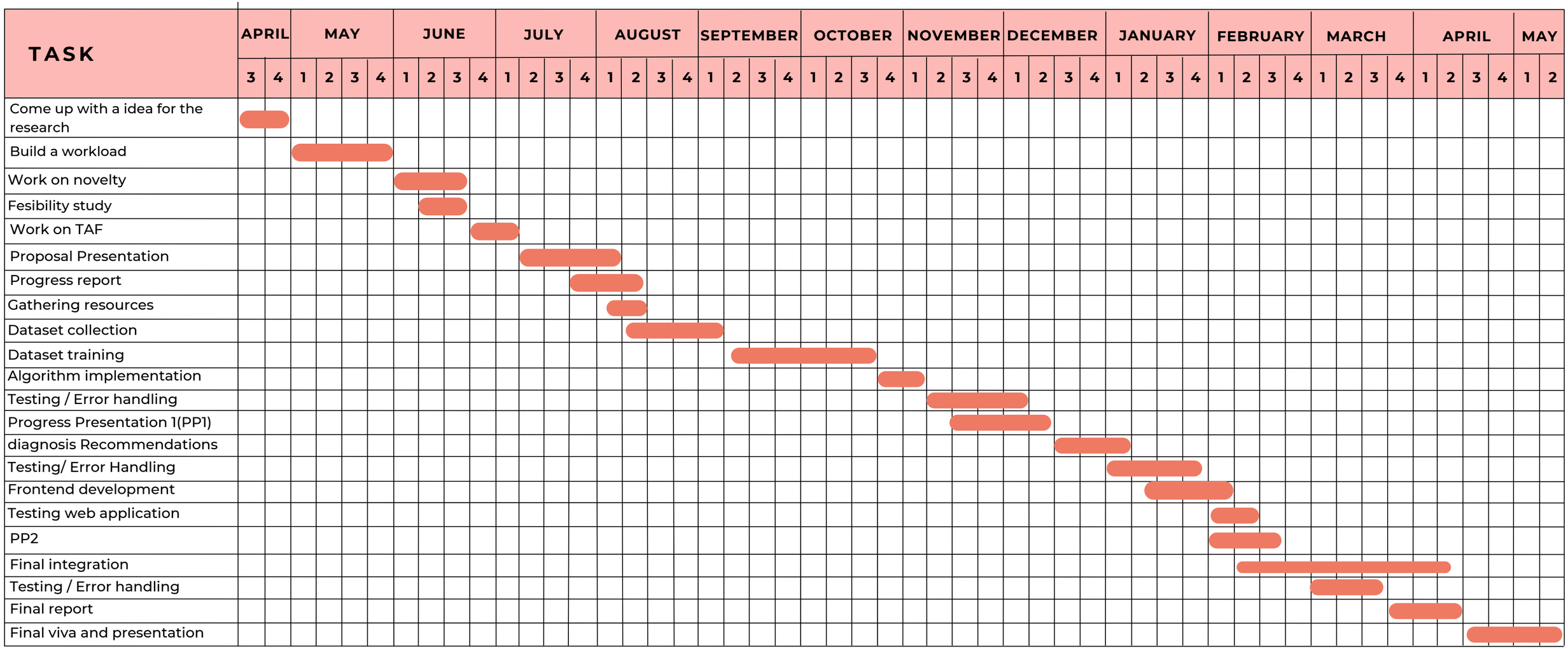
Estimated Budget per month

	Amount (LKR)
Travel fees for data collection(Government Veterinary Surgeons Office - Homagama, District Agriculture Tranning Center Homagama)	2500.00
Internet charges (the development and technical information learning)	3000.00
Electricity	4000.00
Documentation and Printing Cost	500.00
Total	10000.00

Gantt Chart


TASK
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
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 1 2
Come up with a idea for the research
Build a workload
Work on novelty
Fesibility study
Work on TAF
Proposal Presentation
Progress report
Gathering resources
Dataset collection
Dataset training
Algorithm implementation
Testing / Error handling
Progress Presentation 1(PP1)
diagnosis Recommendations
Testing/ Error Handling
Frontend development
Testing web application
PP2
Final integration
Testing / Error handling
Final report
Final viva and presentation

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[1] A. A. AlZubi1, "Arcc Journals," 2024. [Online]. Available: https://arccjournals.com/journal/indian-journal-of-animal-research/BF-1793.

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IT21379956 Hettiarachchi V. E

BSc. (Hons) Degree in Information Technology
Specialization in Information Technology

Component 4 :

Streamline veterinary communication and services

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24-25J-085

Research Problems

- How to find nearest available veterinarian center?
- How to find a qualitied veterinarian with good animal care service?
- What are the possible ways to schedule an appointment with the veterinarian?
- What are the better ways to communicate with a veterinarian that will be available immediately?

Project Objectives

Main Objectives

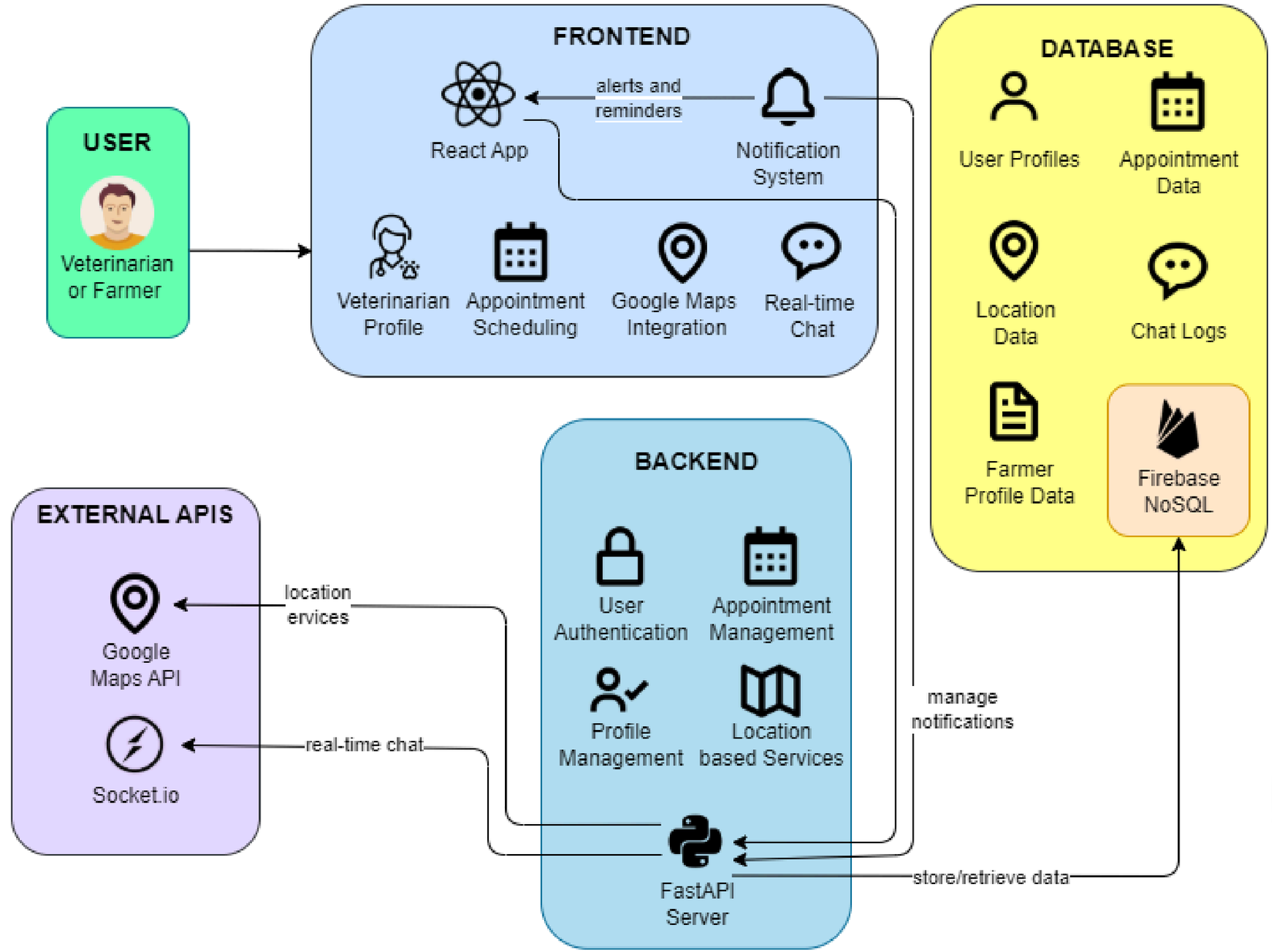
Creating an application which facilitate the ability to identify nearest available veterinarians in an emergencies and provide the support to communicate easily.

Sub Objectives

- Integration of an API to locate the nearest animal hospitals.
- Communication tools for consultations and emergency support.
- Scheduling and managing veterinary appointments.
- Veterinarian Profile Management with qualifications.

Research Gap	Detect nearest location	Appointment scheduling	Chat with veterinarians	Veterinary Profile Management
Petvet	✗	✓	✗	✗
Vet2Pet	✗	✓	✓	✗
DaySmart vet	✗	✓	✗	✗
PetDesk	✗	✓	✓	✗
Vetstoria	✗	✓	✗	✗
afimilk	✗	✗	✗	✗
ezyVet	✗	✗	✓	✗
CowManager	✗	✗	✗	✗
Our Research	✓	✓	✓	✓

Functional System diagram



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Technologies and Techniques

Technologies

- Python
- React
- Firebase
- Google map API
- Postman
- VS code
- GitHub

Techniques

- User Authentication
- Geolocation Service
- Map customization
- Asynchronous Data Fetching
- Form validation
- Notification System

Requirements

Functional Requirements

- Veterinary appointment scheduling option.
- Enable emergency assistance.
- Integrate API to locate nearest veterinary clinic.
- Offer real time information.
- Ensure secure transmission and data protection.

Non-Functional Requirements

- Ensure system reliability and accessibility 24/7.
- Maintain high system availability and minimal system downtime.
- Provide latency-free communication channels for real-time interaction

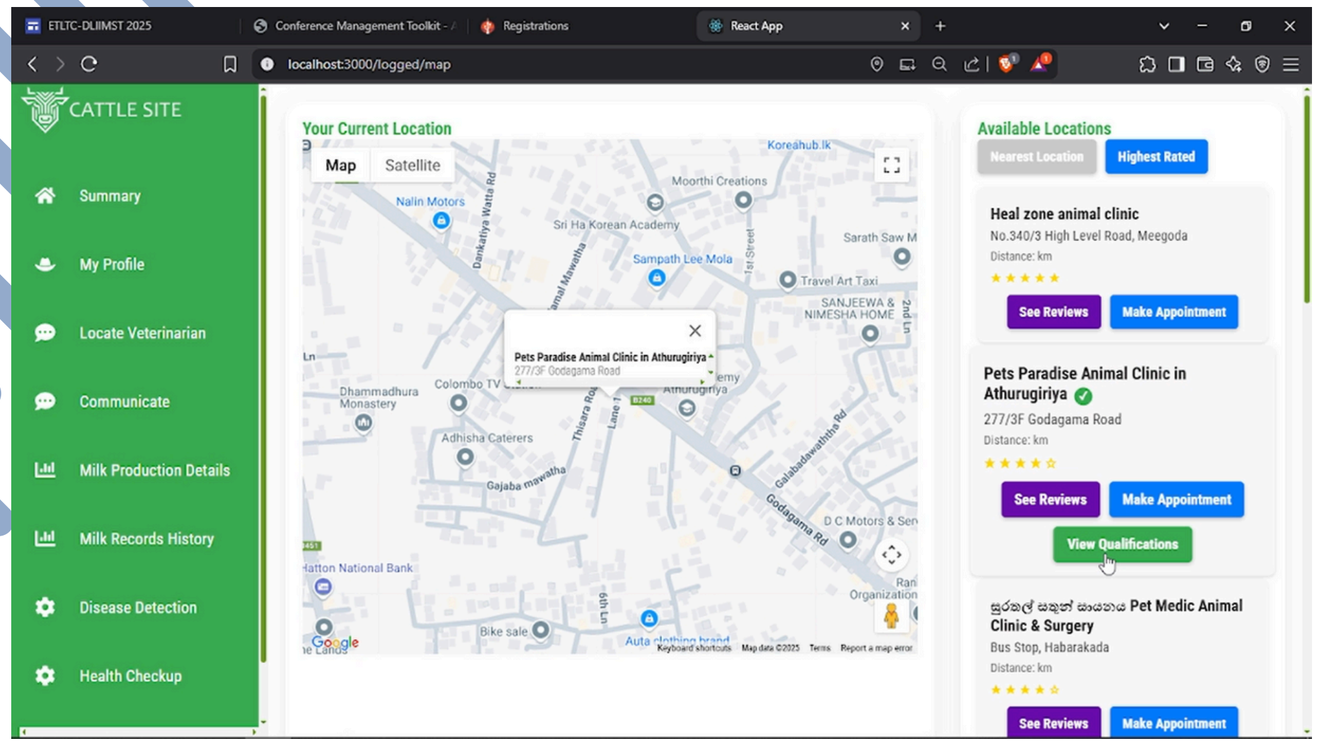
System Requirements

- API for locating veterinarians.
- Veterinary profile management.
- Communication option for emergency assistance.
- Appointment scheduling system.

Personal Requirements

- Skills in API integration and data security.
- Familiarity with veterinary practices and services.
- Proficiency in backend development and database management.

Evidence of Completion



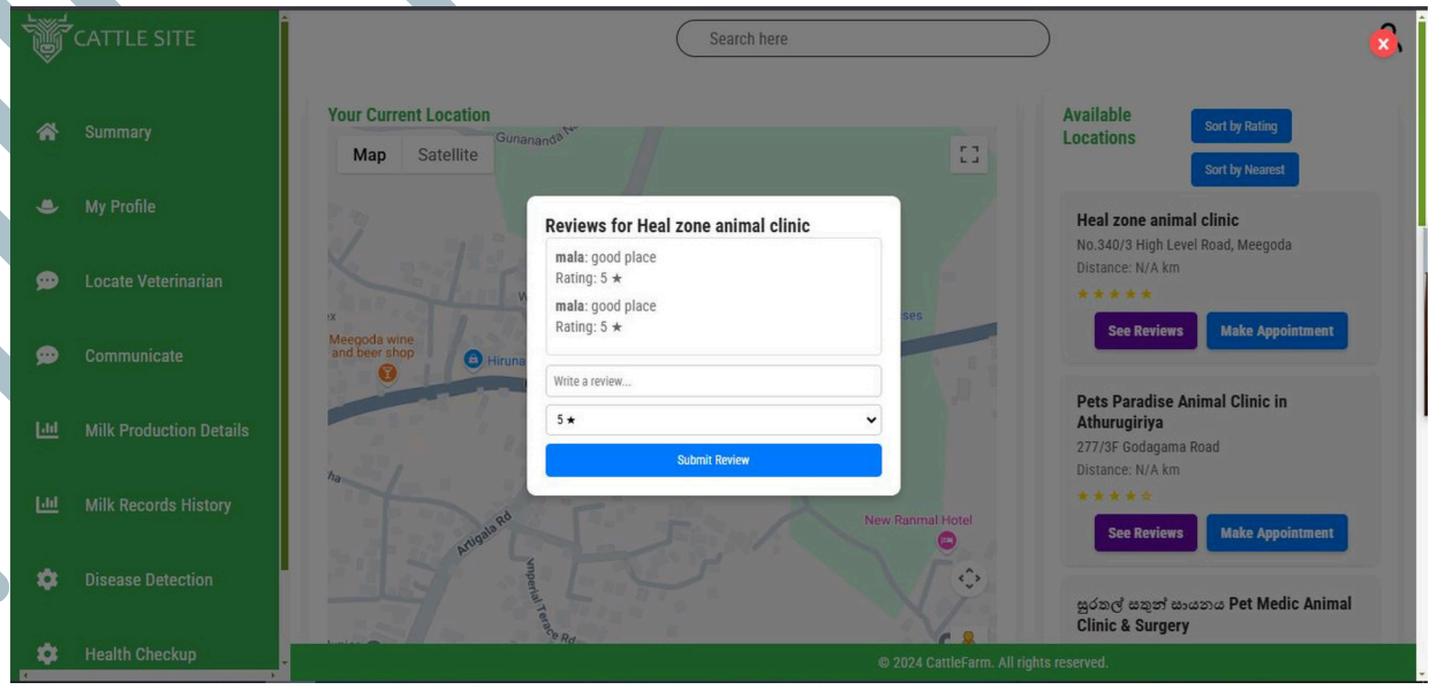

```python
# Google Maps Configs
GOOGLE_API_KEY = 'AIzaSyDAsJYZSQ92_NQAz9kiSpW1XpyuCxRl_uI'
GOOGLE_PLACES_URL = "https://maps.googleapis.com/maps/api/place/nearbysearch/json"
GOOGLE_DETAILS_URL = "https://maps.googleapis.com/maps/api/place/details/json"
```

Locate nearest veterinarians with their reviews and View Qualifications

```python
def get_nearby_locations(latitude: float, longitude: float, radius: int = 5000):
    location = f"{latitude},{longitude}"
    params = {
        "location": location,
        "radius": radius,
        "type": "veterinary_care",
        "key": GOOGLE_API_KEY
    }
    response = requests.get(GOOGLE_PLACES_URL, params=params)

    if response.status_code == 200:
        data = response.json()
        locations = []
```

Evidence of Completion




```
class Review(BaseModel):
    author_name: str
    rating: int
    text: str
    location_name: str
    polarity: Optional[float] = None


outlets_db = {}
outlet_ref = db.collection("outlets")

def analyze_sentiment(text: str) -> float:
    """Calculate polarity score using TextBlob"""
    return TextBlob(text).sentiment.polarity if text else 0.0

@app.post("/submit_review")
async def submit_review(review: Review):
    try:
        # Calculate polarity score
        review.polarity = analyze_sentiment(review.text)

        # Save review to Firestore
        review_data = review.dict()
        db.collection("reviews").add(review_data)

        return {"message": "Review submitted successfully"}
    except Exception as e:
        raise HTTPException(status_code=500, detail=str(e))


class PlaceDetails(BaseModel):
    name: str
```

```
>
  <button
    onClick={(e) => {
      e.stopPropagation();
      setSelectedLocation(location);
      setShowReviewsPopup(true);
    }}
    style={{
      backgroundColor: "#6a0dad", // Purple
      color: "#fff",
```

Reviewing the veterinarians' service

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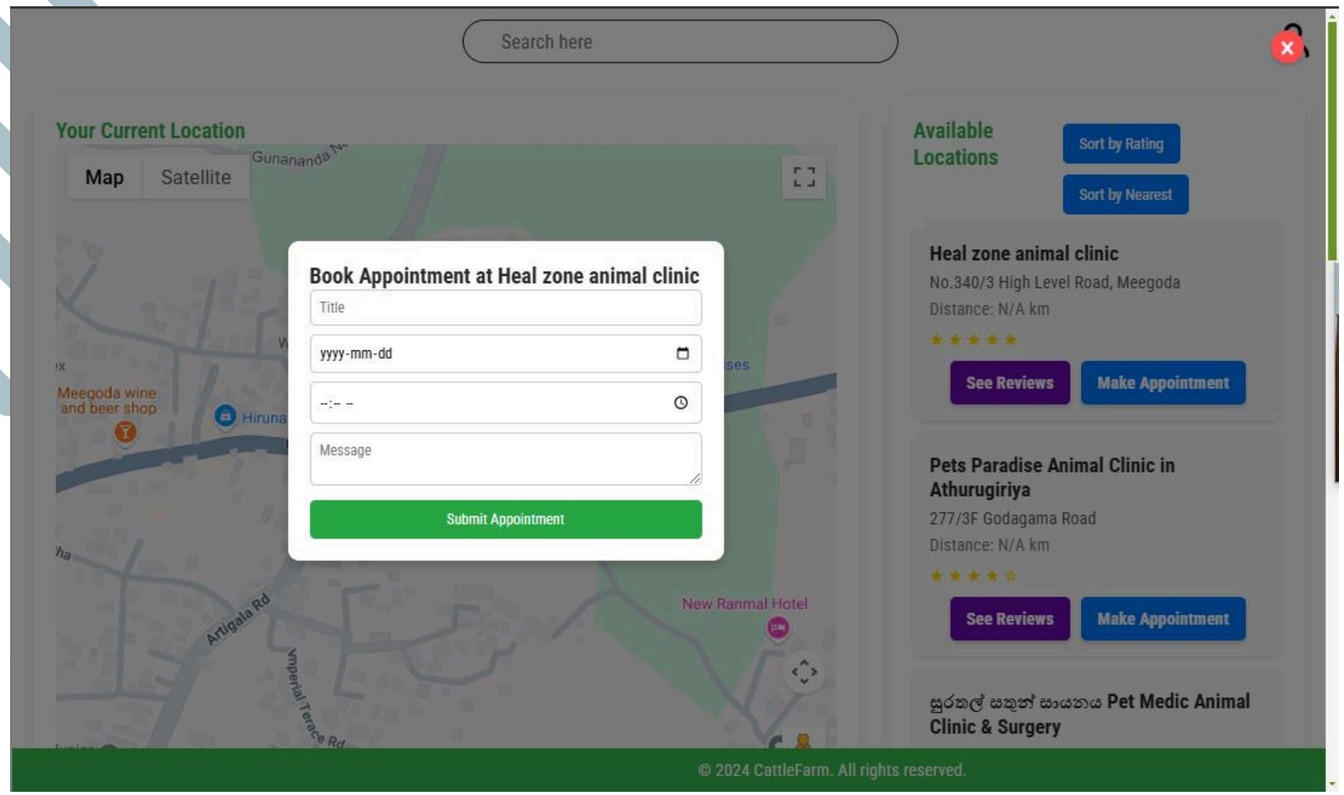
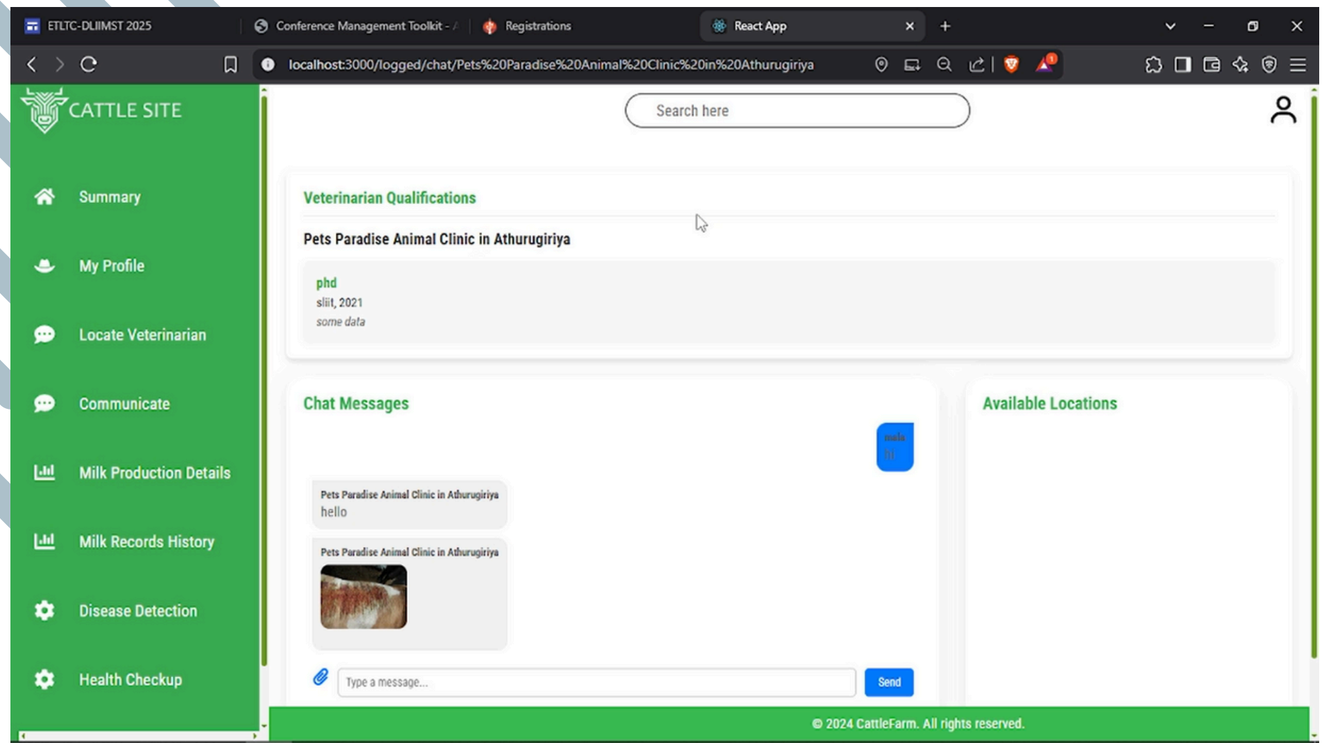
Evidence of Completion



Appointment schedulling

```python
# Appoinement s
class Appointment(BaseModel):
    title: str
    date: str  # Stored in "YYYY-MM-DD" format
    time: str  # Stored as a string, e.g., "14:30"
    message: str | None = None
    username: str  # Dummy user field
    accepted: bool = False  # Default value

# Function to sort by latest date
def sort_appointments_by_date(appointments):
    return sorted(appointments, key=lambda x: x["date"], reverse=True)

# ✅ Endpoint to Create an Appointment
@app.post("/appointments")
async def create_appointment(appointment: Appointment):
    try:
        appointment_data = appointment.~~dict~~()
        doc_ref = db.collection("appointments").document()
        doc_ref.set(appointment_data)

        return {"message": "Appointment created successfully", "appointment_id": doc_ref.id}
    except Exception as e:
        error_trace = traceback.format_exc()
        print(f"Error: {e}\nTraceback:\n{error_trace}")
        raise HTTPException(status_code=500, detail="Internal server error")

# ✅ Endpoint to Get All Appointments (Sorted by Date)
@app.get("/appointments", response_model=List[Appointment])
async def get_all_appointments():
    try:
        appointments_ref = db.collection("appointments").stream()
```

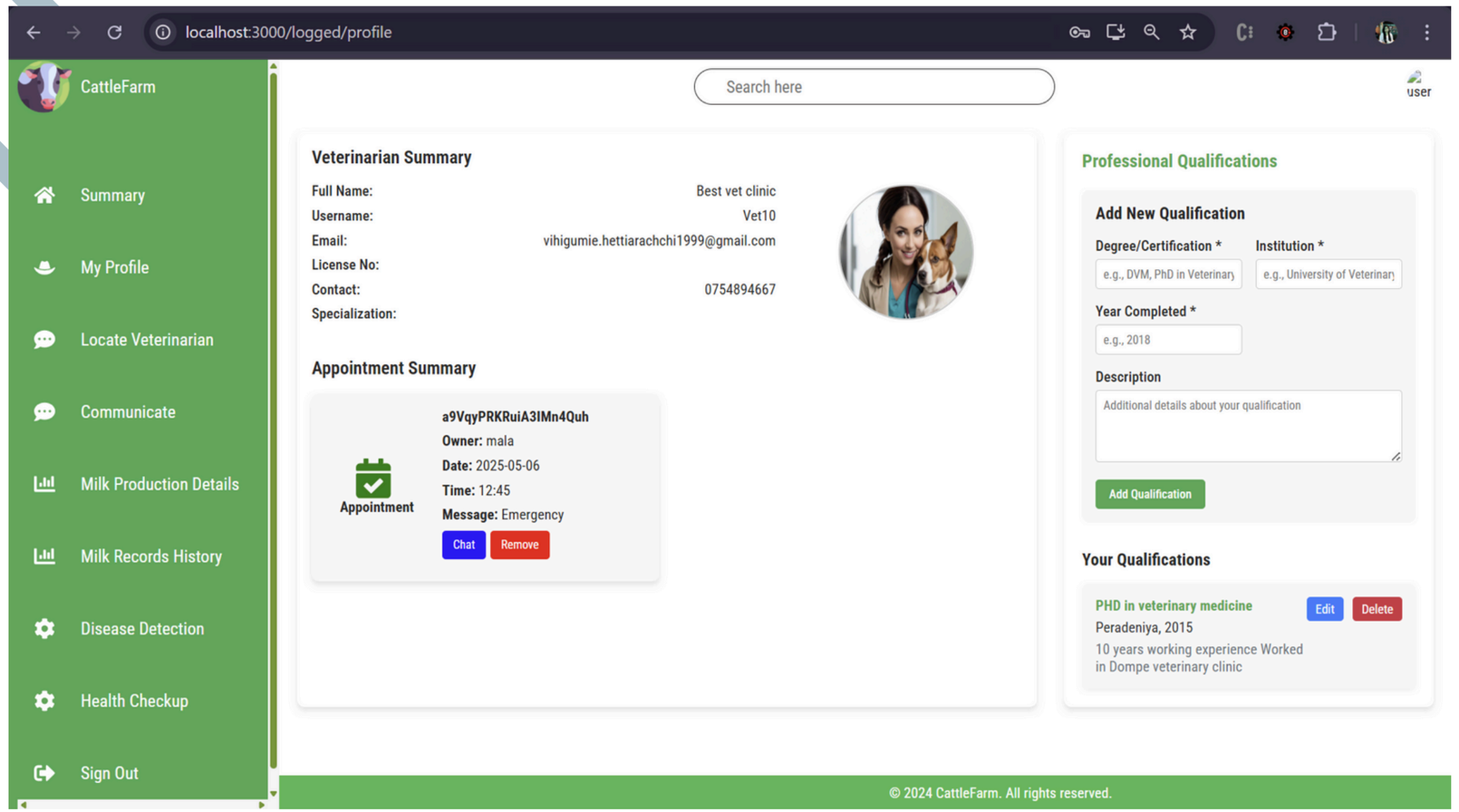
Evidence of Completion




```python
# Setup Redis for storing chat messages
redis_client = redis.Redis(host="localhost", port=6379, db=0, decode_responses=True)

# Function to save messages in Redis
def save_message(room, message):
    chat_key = f"chat:{room}"
    redis_client.rpush(chat_key, json.dumps(message))

# Function to retrieve chat history from Redis
def get_chat_history(room):
    chat_key = f"chat:{room}"
    return [json.loads(msg) for msg in redis_client.lrange(chat_key, 0, -1)]

# Function to initialize the chat system with FastAPI app
def init_chat(app):
    socket_manager = SocketManager(app=app, cors_allowed_origins="*")

    @socket_manager.on("connect")
    async def connect(sid, environ):
        print(f"Client {sid} connected")

    @socket_manager.on("join_room")
    async def join_room(sid, data):
        room = data["room"]
        chat_history = get_chat_history(room)
        await socket_manager.emit("chat_history", chat_history, room=sid)

    @socket_manager.on("send_message")
    async def send_message(sid, data):
        room = data["room"]
        message = {"user": data["user"], "message": data["message"]}
        save_message(room, message)
```

Emergency consultation by communication

Evidence of Completion



Veterinary Profile Management with qualifications

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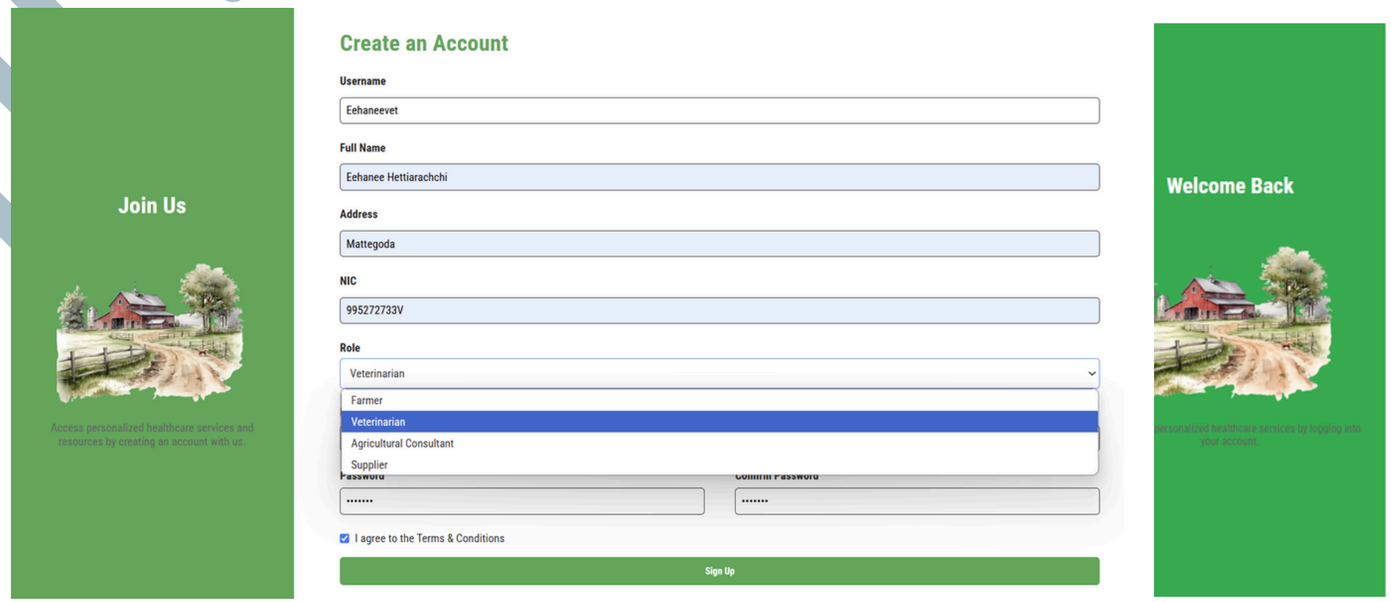
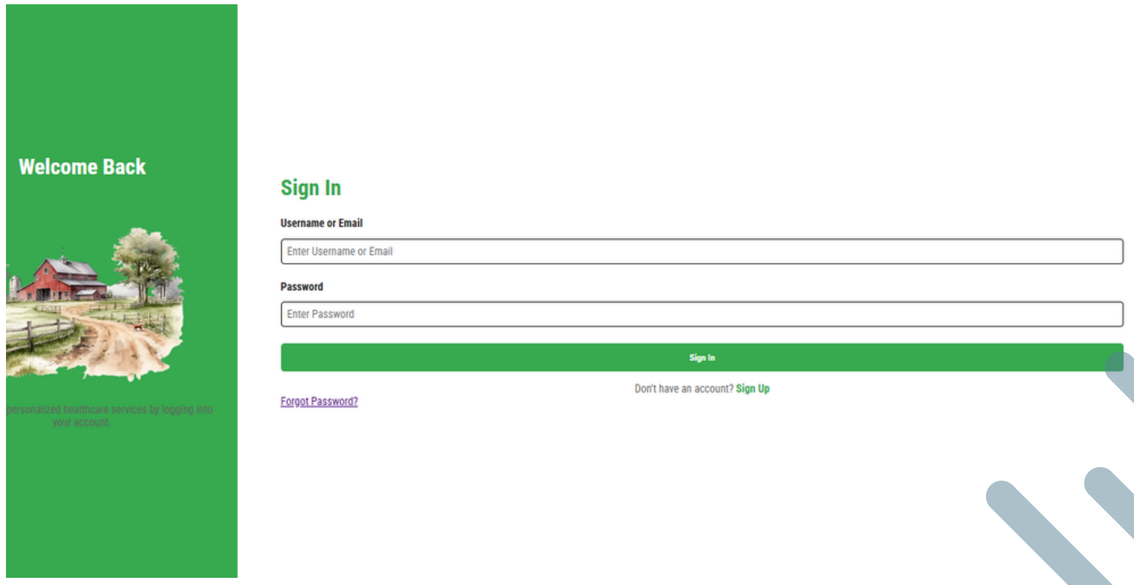
Evidence of Completion



Sign Up (Join now)

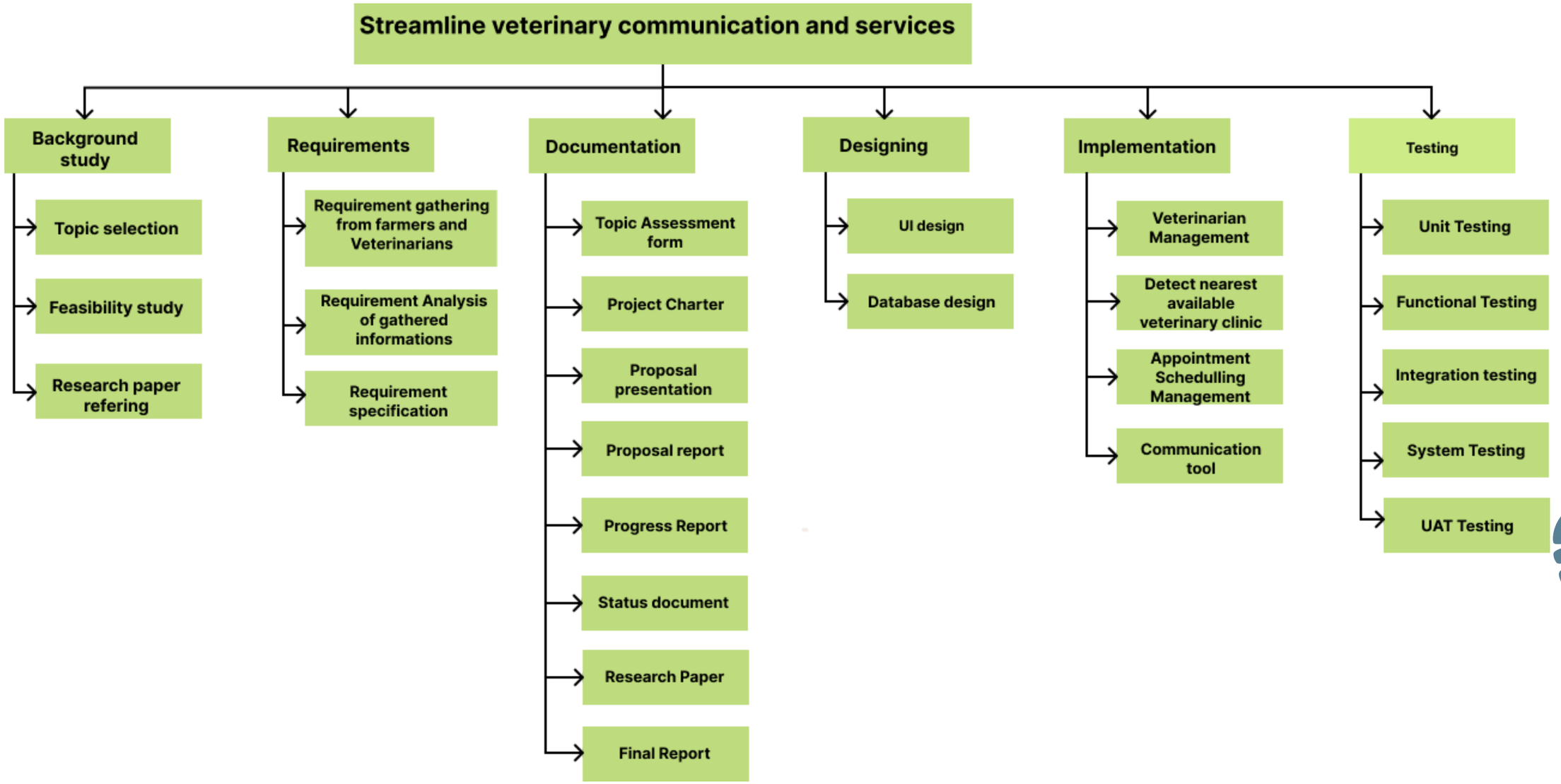


Sign in (Login)

Challenges and deviations

- Getting reviews from the google using Business API
- Difficulty in analyzing reviews which are in languages other-than English.
- Difficulty in accessing real details of available veterinary clinics.

Workbreakdown structure



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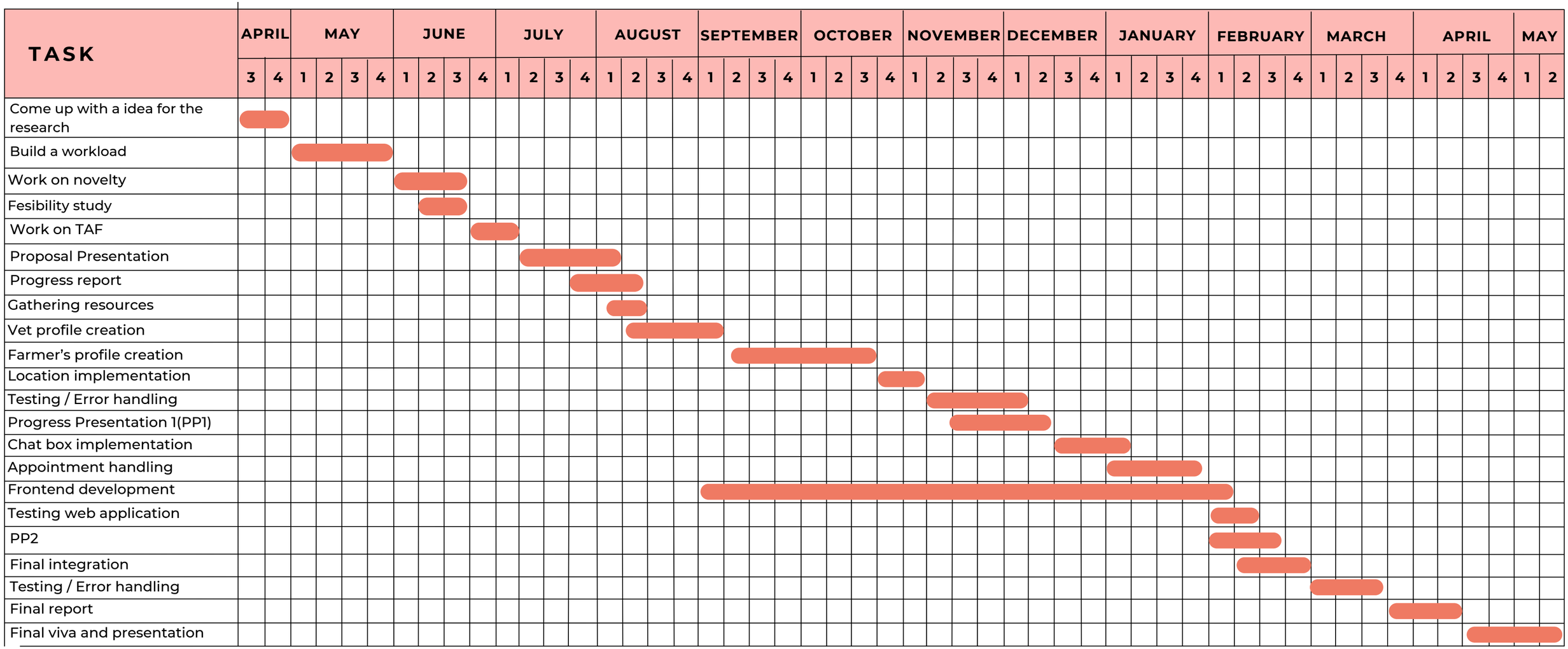
Estimated Budget per month

	Amount (LKR)
Travel fees for data collection(Government Veterinary Surgeons Office - Homagama, District Agriculture Tranning Center Homagama)	2500.00
Internet charges (the development and technical information learning)	3000.00
Electricity	4000.00
Documentation and Printing Cost	500.00
Total	10000.00

Gantt Chart



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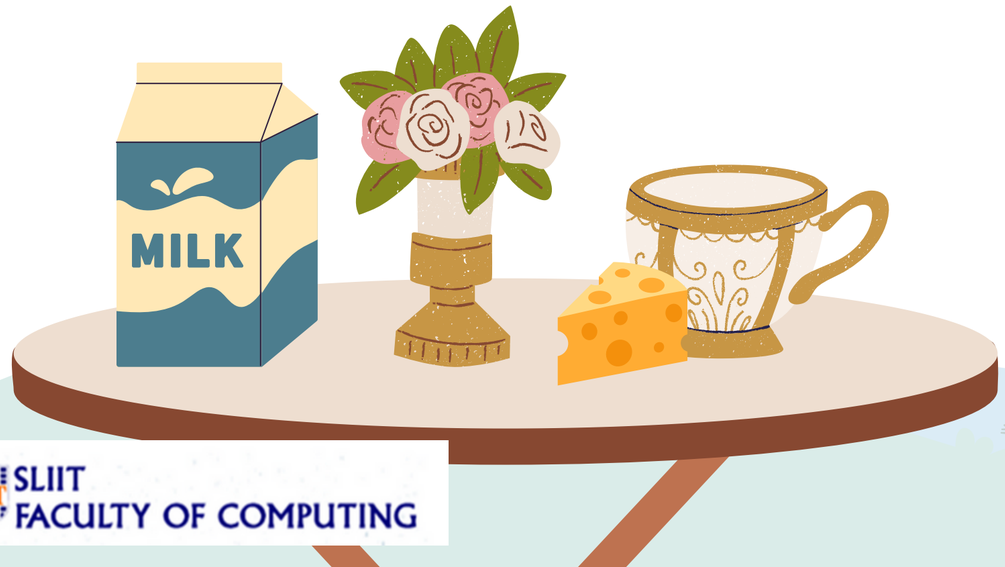
Market Need

- The agricultural industry, particularly dairy farming, is constantly seeking ways to improve productivity, animal welfare, and operational efficiency.
- Current challenges such as delayed disease detection, inefficient cow care practices, and lack of predictive tools for milk production create a substantial demand for advanced technological solutions.
- Our application meets these needs by providing a comprehensive and user-friendly platform that integrates multiple functionalities.



Target Market

Dairy Farmers

Primary users who will benefit from improved disease detection, personalized cow care, and accurate milk production predictions.

Veterinarians

Professionals who require efficient tools for managing appointments, accessing health records, and providing timely advice and support.

Agricultural Enterprises

Companies involved in livestock management and dairy production, looking to optimize their operations and improve productivity

Animal Health Organizations

Institutions focused on animal welfare and health, seeking advanced tools to monitor and improve livestock health.

Market Need

- Online Platform: Primary distribution through a dedicated website
- Initial Launch: Focus on regions with high dairy farming activity
- Subscription-Based: Offer monthly and annual subscription plans for farmers and veterinarians. (LKR 200.00 for month)
- Digital Marketing: Utilize social media and email campaigns to reach target audiences.

Static Website

Commercialization of the application

Vercel

https://cattle-site.vercel.app/

Thank you for listening!

Don't hesitate to ask any questions!