Project Report Format

1. **INTRODUCTION**

1.1 Project Overview

The project aims to predict the occurrence of lumpy skin disease based on meteorological and geospatial features. Lumpy skin disease is a significant concern for livestock, and predicting its occurrence can aid in preventive measures.

1.2 Purpose

The purpose of the project is to utilize machine learning techniques to predict the occurrence of lumpy skin disease based on meteorological and geospatial features. This prediction can be valuable for livestock management and disease control strategies. The project serves several purposes:

Early Detection and Prevention:

By predicting the likelihood of lumpy skin disease, the project enables early detection, allowing for timely preventive measures. Early intervention can help mitigate the impact of the disease on livestock.

Livestock Health Management:

The project contributes to better management of livestock health by providing insights into environmental conditions associated with lumpy skin disease. Farmers and livestock managers can use this information for targeted health interventions.

2. **LITERATURE SURVEY**

2.1 Existing problem

The existing problem addressed by the project is the challenge of predicting the occurrence of lumpy skin disease in livestock. Lumpy skin disease is a viral infection that affects cattle, causing economic losses for farmers and impacting the overall health of the livestock. The key issues and challenges associated with this problem include:

Lack of Early Detection:

The current methods for detecting lumpy skin disease may not provide early warnings. Traditional diagnostic approaches may identify the disease at a later stage, limiting the effectiveness of intervention strategies.

Limited Use of Meteorological and Geospatial Data:

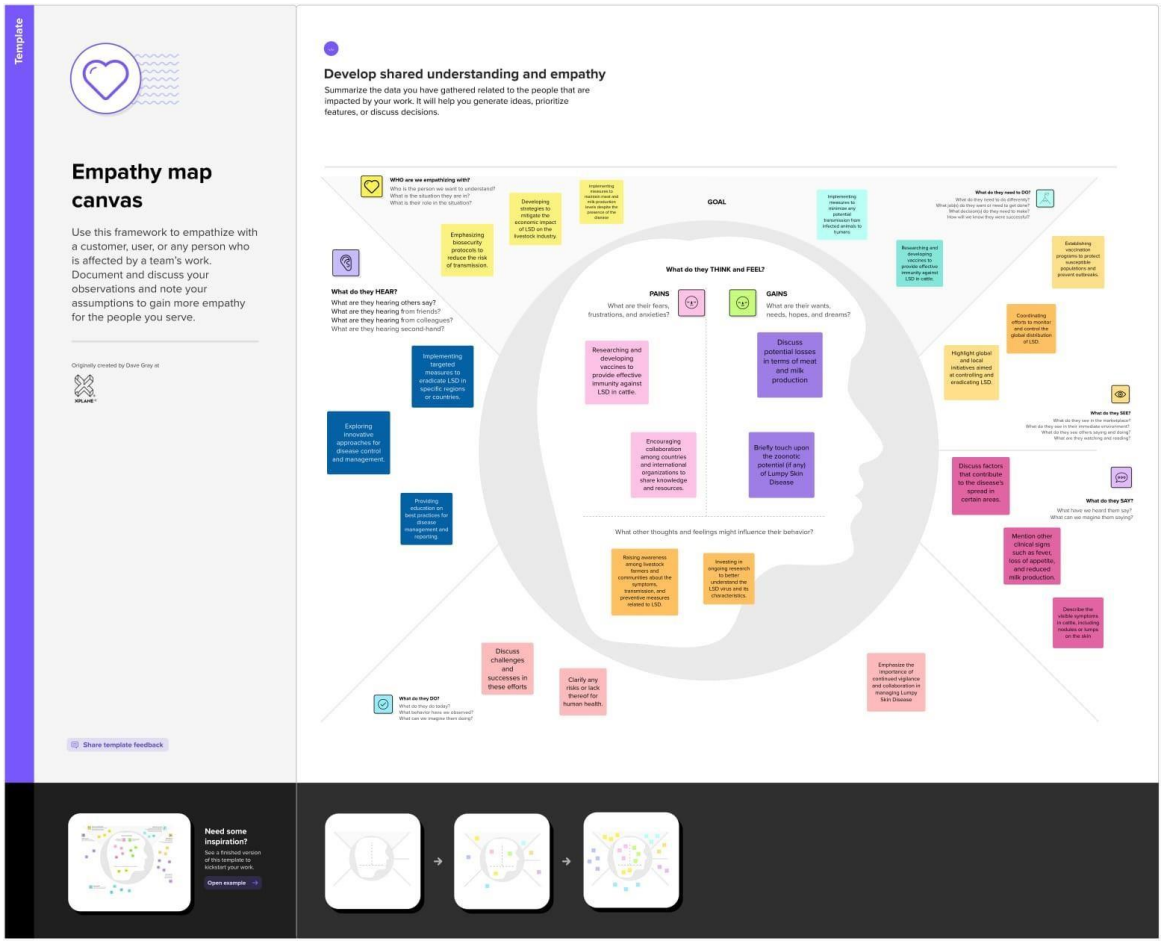
There is often a lack of integration between meteorological and geospatial data and disease prediction models. The existing systems may not fully leverage environmental factors that contribute to the spread and occurrence of lumpy skin disease.

2.2 Problem Statement Definition

The agriculture sector, particularly in livestock management, faces challenges related to the prediction and early detection of lumpy skin disease in cattle. Lumpy skin disease is a viral infection that can lead to economic losses and health issues for livestock. The existing methods for disease detection and prediction lack efficiency and fail to leverage critical meteorological and geospatial data. Additionally, there is a gap in user accessibility to predictive models and a need for more data-driven decision-making in the industry.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- **10 minutes** to prepare
- **1 hour** to collaborate
- **2-8 people** recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

A **Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B **Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.

C **Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

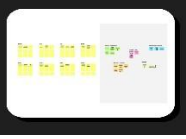
5 minutes

How might we Skin lumpy diseases encompass a broad spectrum of dermatological conditions that manifest as raised, abnormal growths or lesions on the skin. Diagnosing these conditions accurately and in a timely manner is crucial for effective medical intervention.?

Key rules of brainstorming

To run an smooth and productive session

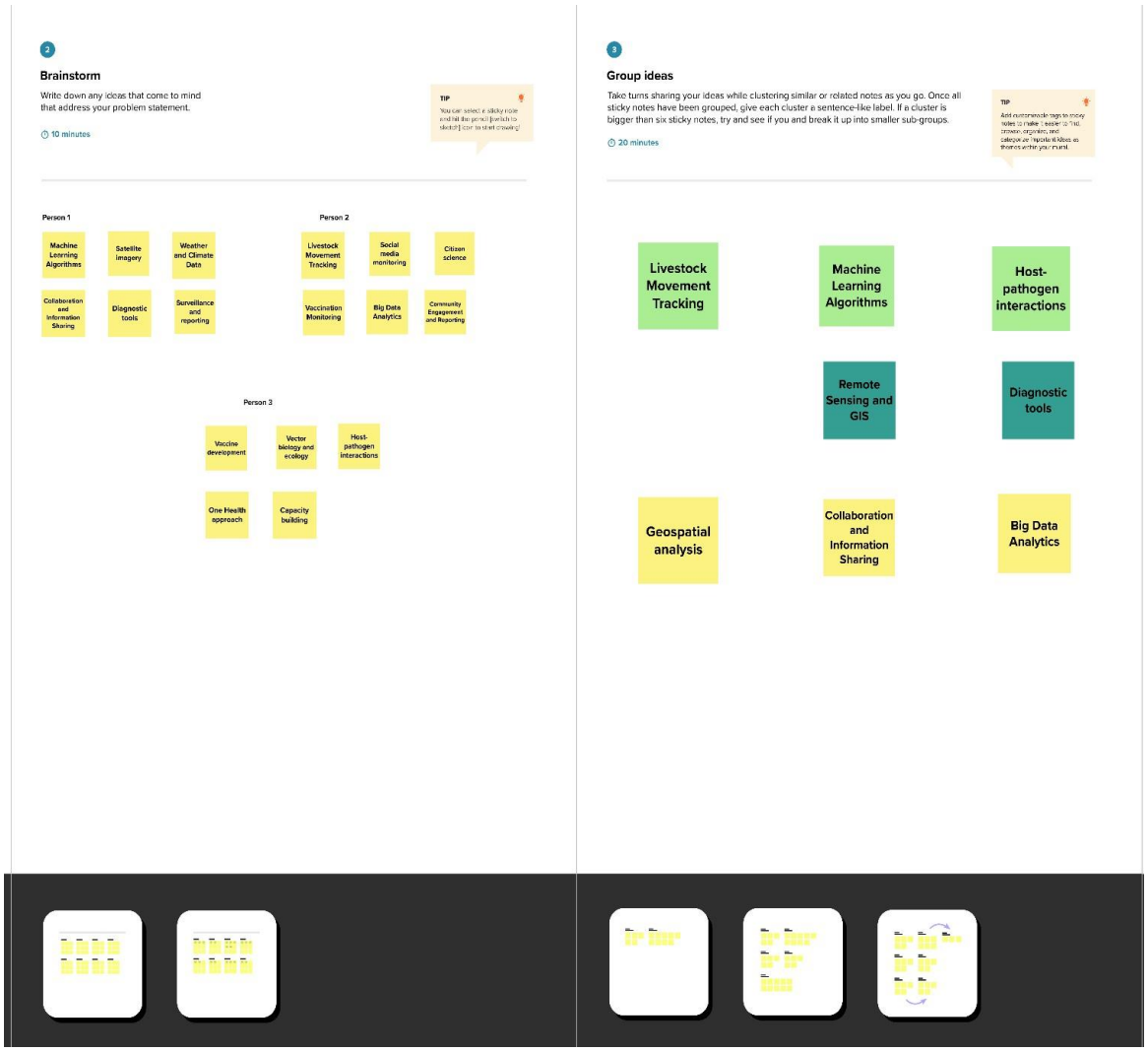
- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.



Need some inspiration?

See a finished version of this template to kickstart your work.

Open example →



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

Functional requirements specify the capabilities and features that the system must have to address the identified problem and achieve its objectives. In the context of the project for predicting lumpy skin disease, the functional requirements include:

Data Ingestion:

The system should be capable of ingesting and processing meteorological and geospatial data relevant to livestock health.

Data Preprocessing:

Implement data preprocessing steps, including handling missing values, encoding categorical variables, and scaling features to prepare the data for model training.

Machine Learning Model:

Develop a machine learning model (Support Vector Classification, for instance) capable of predicting the likelihood of lumpy skin disease based on input features.

Hyperparameter Tuning:

Include functionality for hyperparameter tuning to optimize the performance of the machine learning model.

Validation Mechanism:

Implement a validation mechanism to assess the performance of the model. This may involve methods such as k-fold cross-validation.

Web Application Interface:

Develop a user-friendly web application interface for users to interact with the predictive model.

4.2 Non-Functional requirements

Non-functional requirements specify the characteristics and qualities that the system must have but are not directly related to its specific behaviors or functions. In the context of the project for predicting lumpy skin disease, the non-functional requirements include:

Performance:

The system should be able to handle a reasonable number of concurrent users, ensuring responsive interactions with the web application.

Scalability:

The system should be designed to scale easily, accommodating potential increases in data volume, user traffic, and additional features in the future.

Reliability:

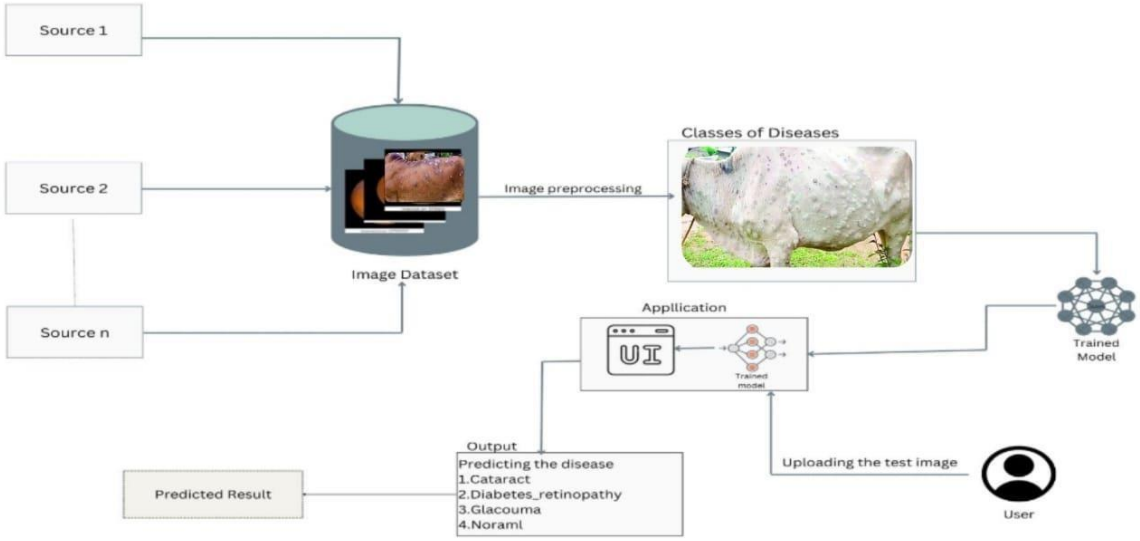
The system should be reliable, minimizing downtime and ensuring that it is available for users when needed.

Availability:

The web application should have a high level of availability, minimizing maintenance periods and ensuring users can access it consistently.

5. PROJECT DESIGN

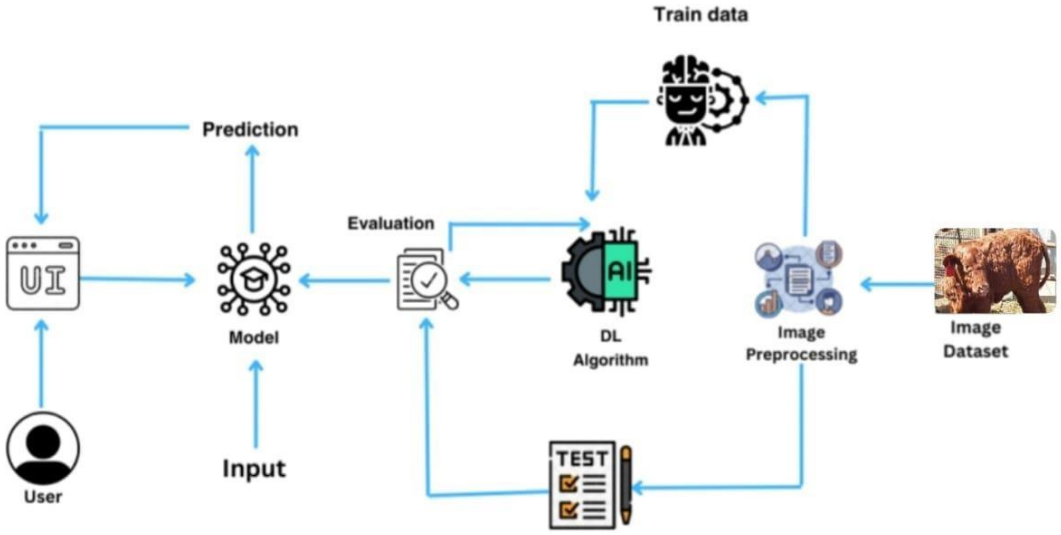
5.1 Data Flow Diagrams & User Stories



User Stories

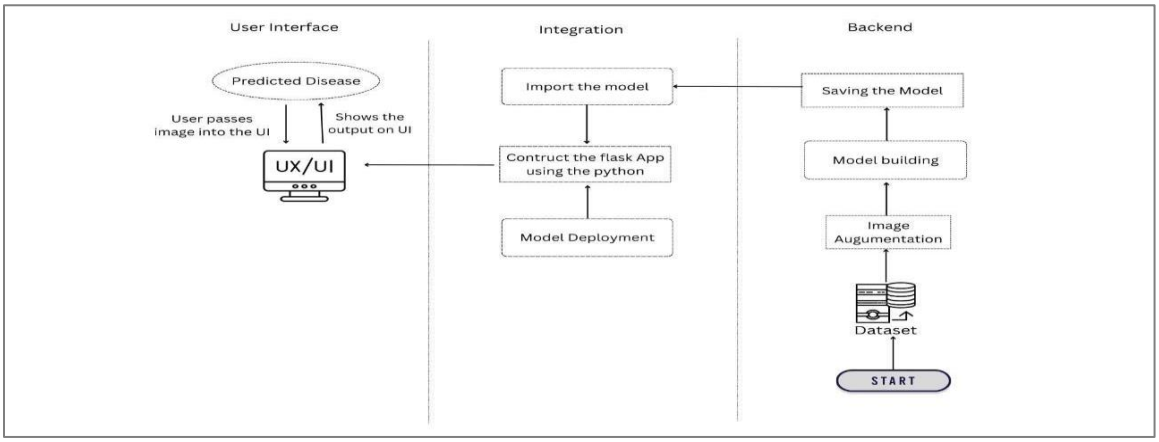
User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Doctors	Project setup & Infrastructure	USN-1	As a doctor, I need to suggest good medicine for the patients	I can access my account / dashboard	High	Sprint-1
Laboratory scientists	Login	USN-2	As a scientist , it helps me in research purposes	I can receive confirmation email & click confirm	High	Sprint-1
Public	Dashboard	USN-3	As a public user , I want to know the skin disease without consulting the doctor	I can register & access the dashboard with Aadhar Login	High	Sprint-1
Students	Dashboard	USN-4	As a student, I want to know the diseases for the educational purposes	I can register & access the dashboard with Aadhar Login	Medium	Sprint-2
Teaching professors	Login	USN-5	As a teacher, I can log into the application by entering email & password	I can receive confirmation email & click confirm	Medium	Sprint-2

5.2 Solution Architecture



6. PROJECT PLANNING & SCHEDULING

6.1 Technical Architecture



6.2 Sprint Planning & Estimation

User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
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7. CODING & SOLUTIONING (Explain the features added in the project along with code)

```
from sklearn.metrics import accuracy_score, confusion_matrix
predictions= svc_model .predict(x_train)
percentage=svc_model.score(x_train,y_train)
res=confusion_matrix(y_train,predictions)
print("Training confusion matrix")
print(res)
predictions= svc_model .predict(x_test)
percentage=svc_model.score(x_test,y_test)
res=confusion_matrix(y_test,predictions)
print("validation confusion matrix")
print(res)
# check the accuracy on the training set
print('training accuracy = '+str(svc_model.score(x_train, y_train)*100))
print('testing accuracy = '+str(svc_model.score(x_test, y_test)*100))
```

```
Training confusion matrix
[[19329   258]
 [  471  1295]]
validation confusion matrix
[[2158   19]
 [  37  159]]
training accuracy = 96.58595981829251
testing accuracy = 97.6401179941003
```

8. PERFORMANCE TESTING

8.1 Performace Metrics

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9. RESULTS

9.1 Output Screenshots

Lumpy Skin Disease Prediction

Monthly Cloud Cover (%):

1

Diurnal Temperature Range (°C):

4

Frost Day Frequency (per month):

6

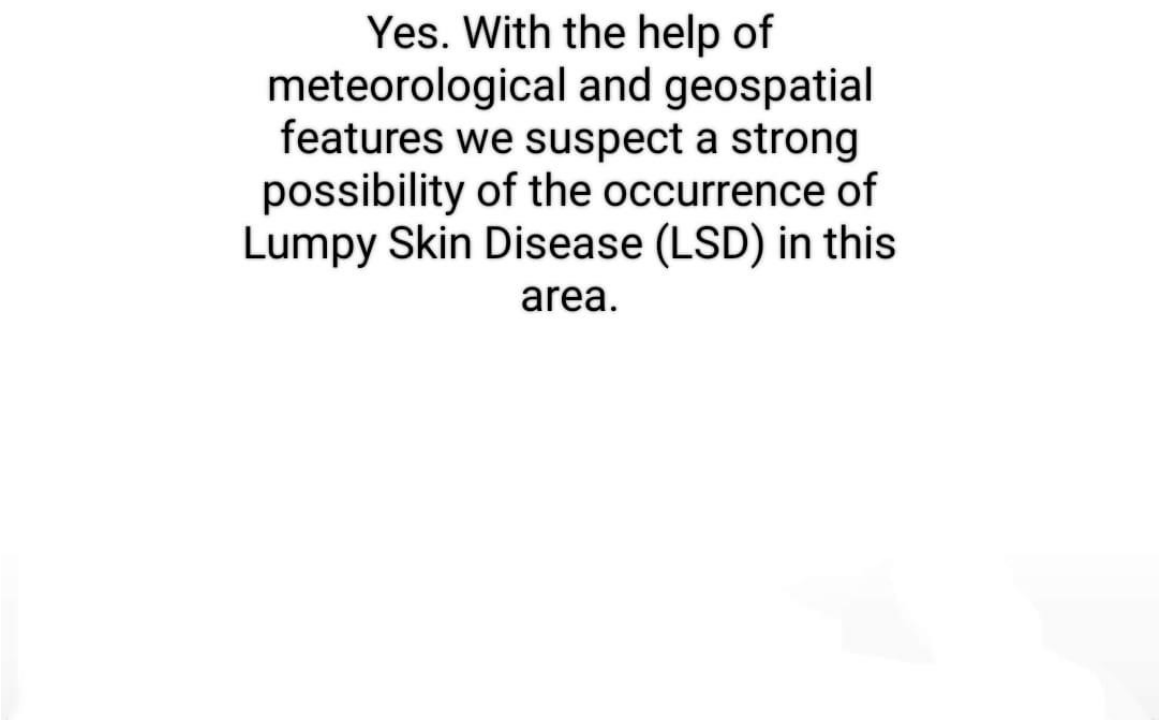
Potential Evapotranspiration (mm/day):

3

Precipitation (mm/month):

7

Predict



10. **ADVANTAGES & DISADVANTAGES**

Advantages:

Early Disease Detection:

The predictive model allows for early detection of lumpy skin disease, enabling proactive measures to prevent its spread and minimize economic losses.

Data-Driven Decision-Making:

The integration of machine learning with meteorological and geospatial data promotes data-driven decision-making in agriculture, improving the overall management of livestock health.

Improved Resource Allocation:

Accurate predictions facilitate optimal resource allocation for disease prevention and control, ensuring that farmers and livestock managers use resources efficiently.

User Accessibility:

The web application provides a user-friendly interface, making the predictive model accessible to a broader audience, including farmers and stakeholders in the agriculture sector.

Disadvantages:

Data Limitations:

The effectiveness of the predictive model depends on the quality and quantity of available data. Insufficient or biased data may impact the model's accuracy.

Model Complexity:

Complex machine learning models, such as Support Vector Classification, may be challenging to interpret, limiting the understanding of how specific features contribute to predictions.

Dependency on External Factors:

The accuracy of predictions may be influenced by external factors not considered in the model, such as unforeseen changes in livestock management practices or disease transmission patterns.

Security Concerns:

Handling sensitive meteorological and geospatial data raises security concerns. Implementing robust security measures is crucial to protect user data and maintain confidentiality.

11. CONCLUSION

The project for predicting lumpy skin disease through machine learning and a user-friendly web application offers substantial benefits for livestock health management in agriculture. Early disease detection, data-driven decision-making, and optimized resource allocation are key advantages. The integration of environmental factors enhances prediction accuracy. However, challenges such as data quality, model interpretability, and user adoption must be addressed. Continuous improvement, collaboration, and ethical considerations are essential for the project's sustained impact on livestock health and economic outcomes in the agriculture sector.

12. FUTURE SCOPE

Education and Outreach: Efforts to educate users in the agriculture sector about the benefits and reliability of the predictive model can enhance user acceptance.

Continuous Improvement: Ongoing research and development are crucial for refining the model, incorporating new data, and addressing emerging challenges.

Collaboration: Collaboration with relevant stakeholders, including farmers, veterinarians, and agricultural experts, can provide valuable insights and improve the overall impact of the project.

Ethical Framework: Developing and adhering to an ethical framework ensures fairness, transparency, and accountability in the use of machine learning in agriculture.