TITLE PAGE

- **Problem Statement ID - 1638**
- **Problem Statement Title - AI-Driven Crop Disease Prediction and Management System**
- **Theme- Agriculture, FoodTech & Rural Development**
- **PS Category- Software**
- **Team ID-U_0934-54**
- **Team Name- AgriVision**

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IDEA TITLE

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Idea

- AI-driven crop disease prediction system
- Integrates **AI/ML models** for disease detection
- Uses **IoT sensor data** (soil, weather, location)
- Incorporates **NDVI** (Normalized Difference Vegetation Index) data for vegetation health
- **Predicts bacterial diseases** at crop **growth stages**(vegetative, reproductive)
- Real-time **detection** and **preventive measures**
- Empowers farmers to **protect crops** and **reduce losses.**

Proposed Solution

- **Mobile** and **web-based application** solution
- **Hybrid AI models** (SVM, CNN, RF, LSTM)
- Analyzes **crop images, IoT, and NDVI data**
- **Predicts** and manages bacterial crop diseases
- **Farmers input data** for prediction and that data will be added to database for **continuous improvement**
- Offers **personalized treatment recommendations**

Uniqueness

- **Hybrid AI approach** for accurate predictions
- **Farmer data integration** for real-time updates
- **Continuous dataset updation** for enhanced accuracy
- **NDVI data** for monitoring crop health
- Normalized difference vegetation index (NDVI) is a simple **graphical indicator** that assess whether the target being observed contains **green health vegetation or not.**
- Enhances disease detection via crop health monitoring

TECHNICAL APPROACH

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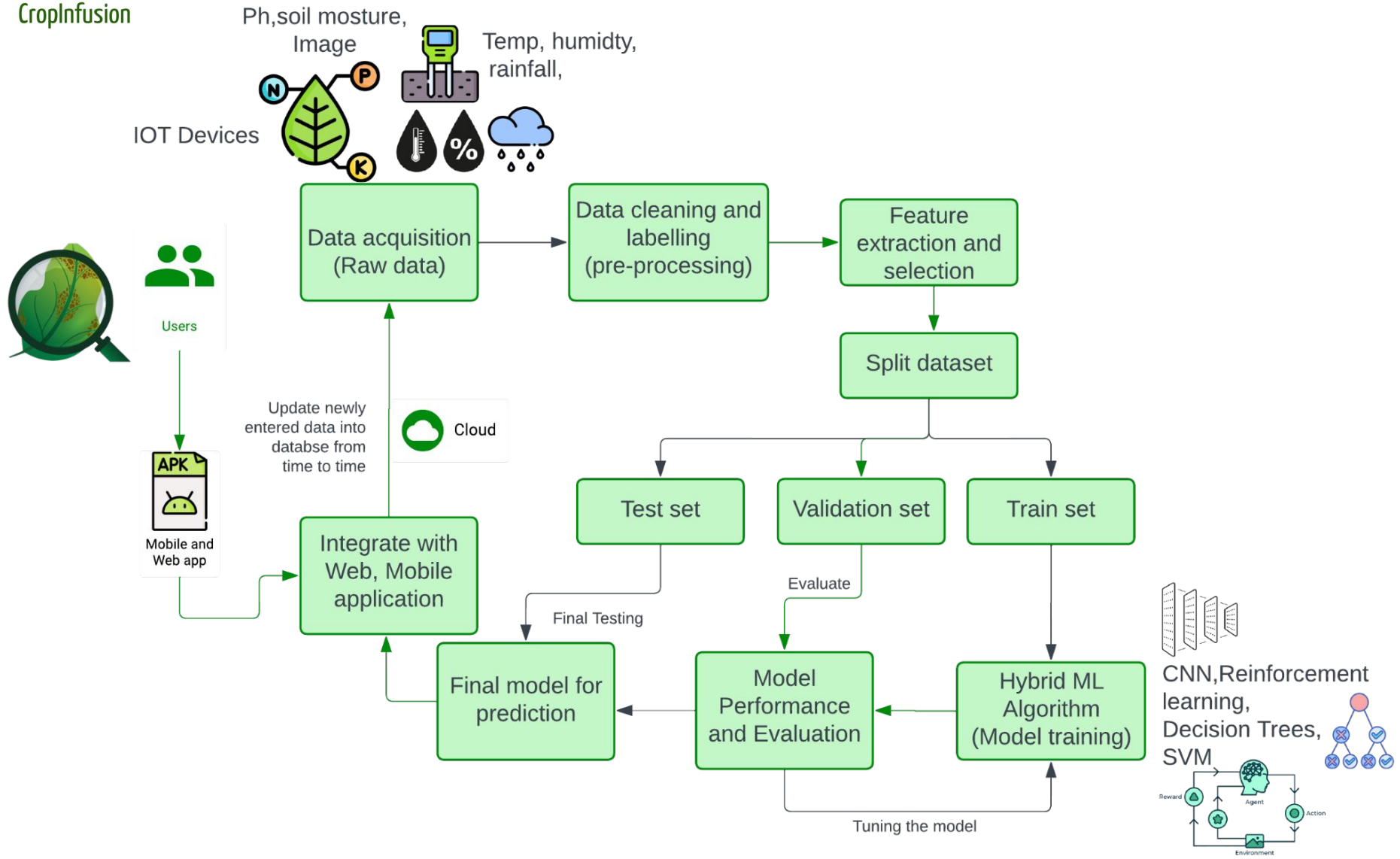

Technology Stack

MERN

IBM Cloud

Flutter

React Native

Flask

python

IoT Devices

Machine Learning Algorithms

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FEASIBILITY AND VIABILITY

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Analysis of the Feasibility of the Idea

Technical Feasibility:

- Combining **image analysis** and **IoT data** (environmental factors) with **hybrid AI/ML models** is achievable using existing technologies.
- **Integration of farmer input data** is also feasible with current database and cloud infrastructure.

Market Feasibility:

- Significant demand for such solutions in agriculture, especially in **regions prone to bacterial rice diseases**.
- The **mobile and web app** approach ensures **accessibility for farmers.**

Potential Challenges and Risks

Data Availability and Quality:

- **Lack** of **high-quality, labeled image datasets** and **accurate IoT sensor data** of specific locations could impact the performance of AI models.

Environmental Variability:

- **Different regions** may have **highly variable environmental conditions,** which could affect the accuracy of disease prediction models.

Strategies for Overcoming These Challenges

Data Collection:

- **Collaborate with agricultural institutions** to gather extensive, labeled image datasets and accurate environmental data.
- Gather regional data via crowdsourcing or **government programs**

Model Customization:

- **Continuously update and adapt the AI models** with farmer feedback for accuracy.

Infrastructure Solutions:

- Leverage **government support**.
- Deploy IoT devices in rural low-connectivity regions

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IMPACT AND BENEFITS

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Potential Impact on the Target Audience

- **Farmers: Improved crop yield** and **reduced financial losses** due to early disease detection.
- **Agricultural Community:** Enhanced decision-making and farming practices through real-time data-driven insights.
- **Agriculture Sector:** Contribution to **sustainable farming**, **improved crop quality,** and **reduced pesticide use.**

Benefits of the Solution

- **Social: Empowers farmers** with technology, improving livelihoods, and promoting tech-driven agricultural practices in rural communities.
- **Economic: Reduces crop losses** due to bacterial diseases, increasing farmer incomes, and contributing to the overall agricultural economy.
- **Environmental: Minimizes excessive use of pesticides** by providing targeted disease management, reducing soil and water contamination.

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RESEARCH AND REFERENCES

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