SMART INDIA HACKATHON 2024

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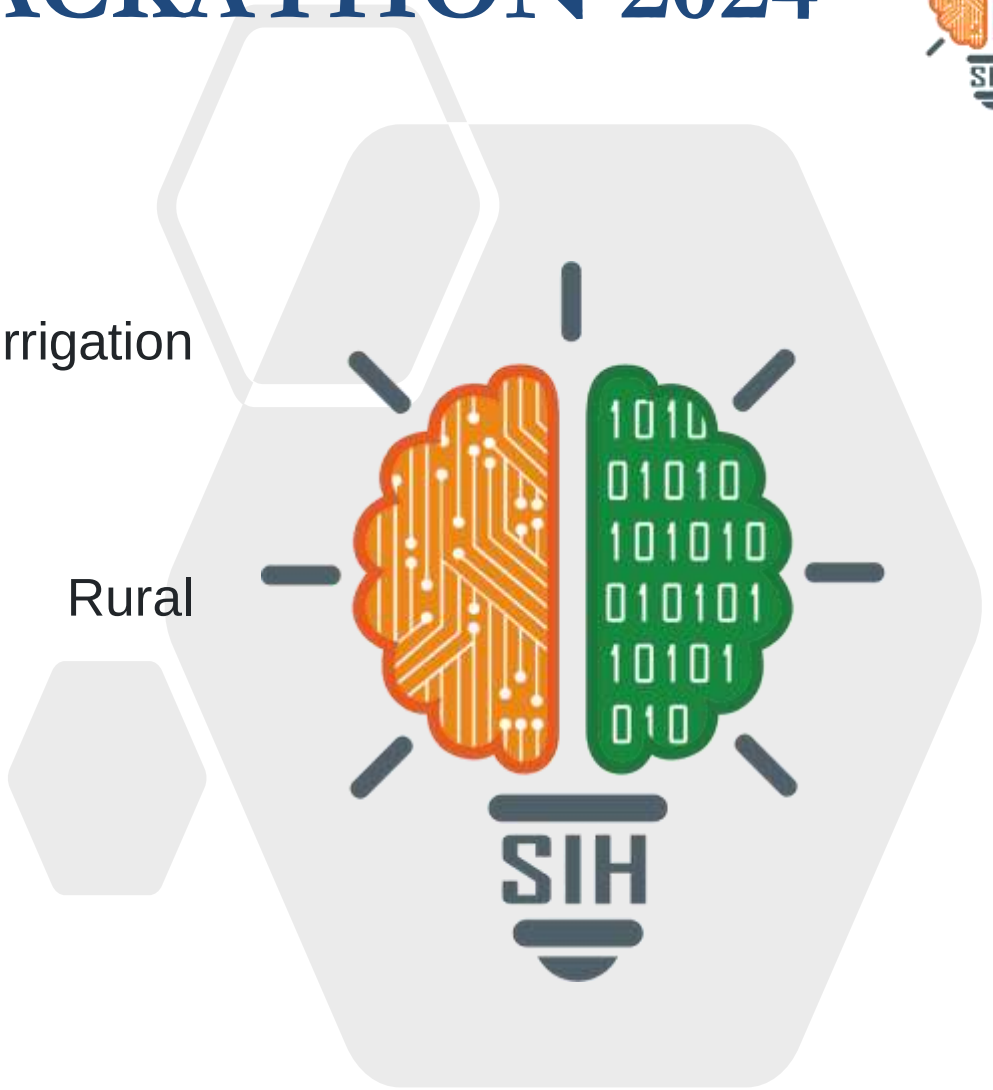
- **Problem Statement ID –** SIH1554
- **Problem Statement Title-** Smart Irrigation System for Precision Farming
- **Theme-** Agriculture, FoodTech & Rural Development
- **PS Category-** Hardware
- **Team ID-** 35589
- **Team Name-** darkSTAR



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SMART IRRIGATION SYSTEM

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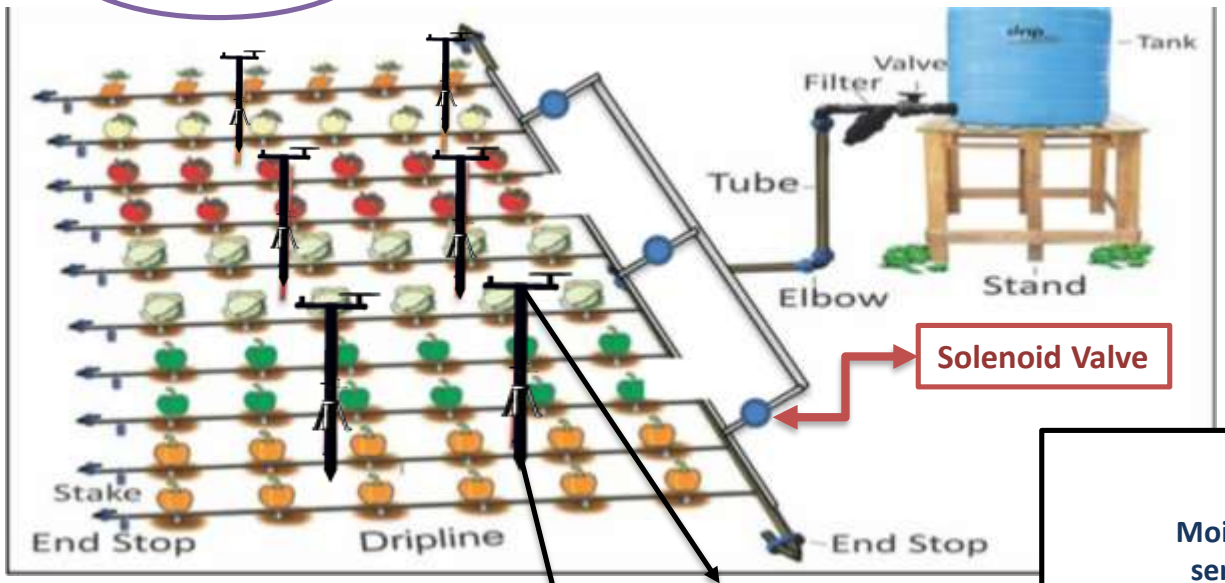

MOBILE APP

Input Factors –

1) Type of Crop.
2) Type of Soil.
3) Date of Plantation.

Output Factors–

1) Red alert for water logging.
2) Alert for manual Support.
3) Alert for need of pesticides or insecticides

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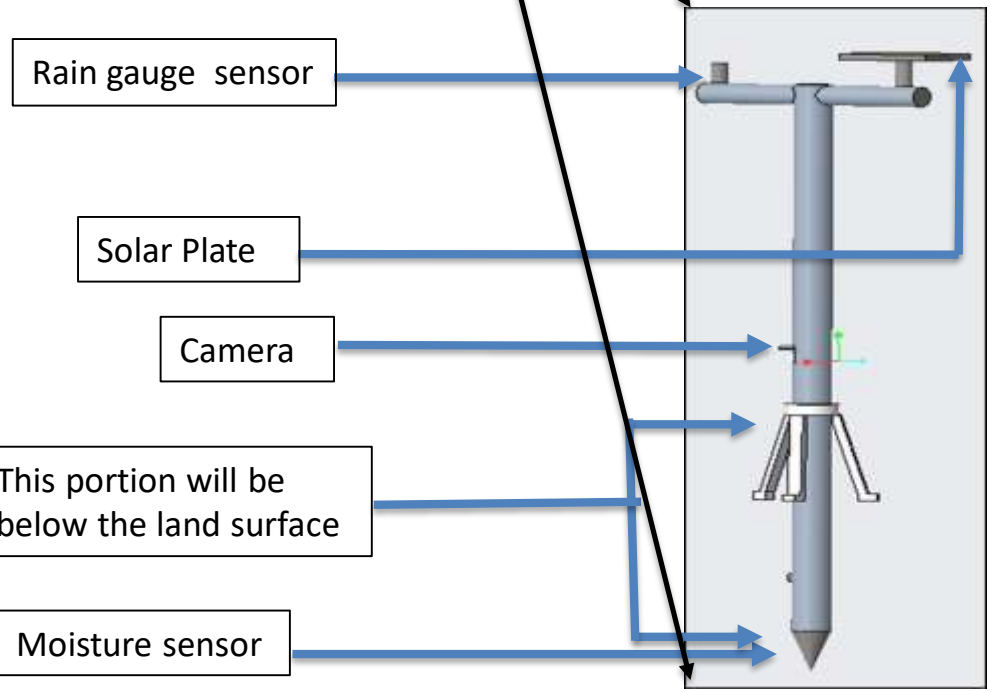

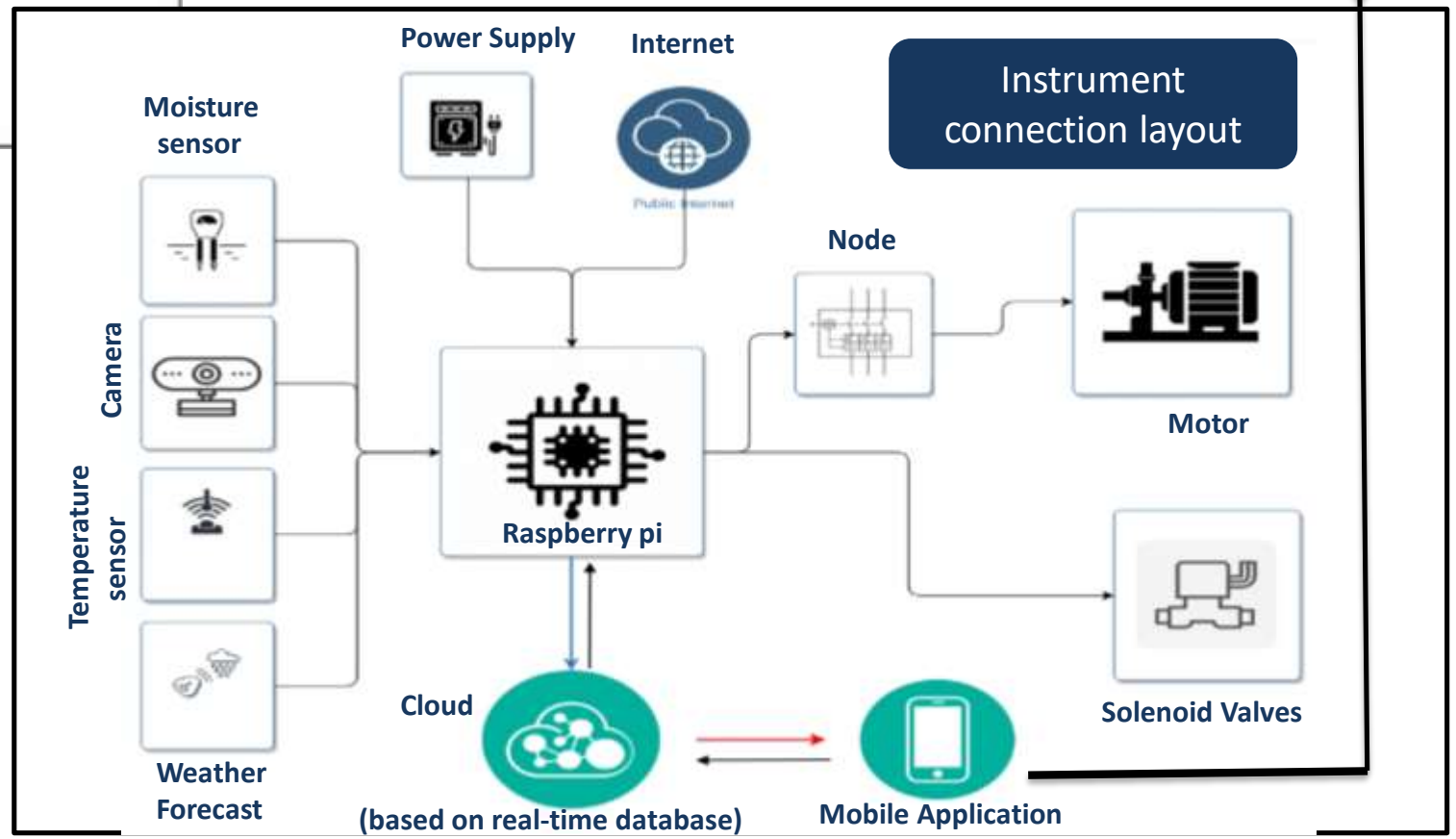

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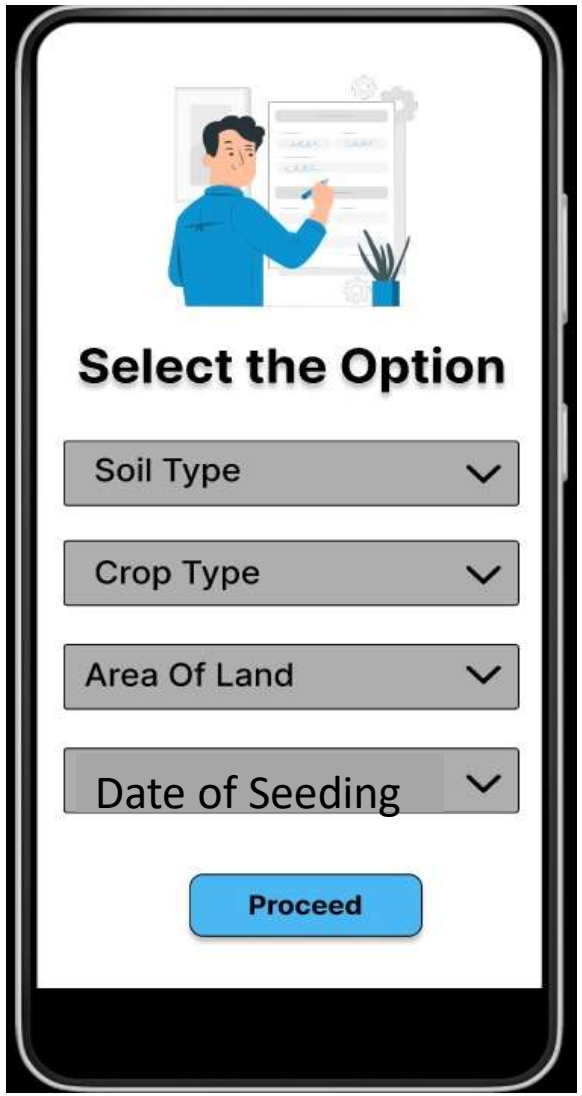

User Friendly App Interface

Start

Initialize_System_and_Collect_Sensor_Data

Gather Data_from_Sensors

Weather forecasting

Check if_Rain_Has_Falle

Determine_Rainfall _Amount

Check_if_Rain_Fulfills_ Conditions

Reschedule_Irrigation _or Cancel_if_Conditions _Met

Camera Module

Moisture Sensor

Obtain_User_Input (Soil type)

Check_Soil_Moisture_Level (For loamy soil , 20% < moisture level < 40%

Check_Crop Growth_Stage_and_Water Requirement

Start_Irrigation

Continue Irrigation Until Met

Monitor_Crop Health_and_Growth

Display_Data_on_Mobile_App

Allow User_to_Reschedule_Irrigation_and Operate_Pump

End

TECHNOLOGY STACK

ARDUINO

RaspberryPi

React Native

TensorFlow

Firebase

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FEASIBILITY AND VIABILITY

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Installed Fabricated Model

Results displayed on Mobile Application

Potential Challenges and Risks

- **High Initial cost**
- **Issue in internet connection in Rural Areas**
- **Power Supply issues**
- **Maintenance of Sensors**
- **Security of data**
- **Environmental Conditions (Extreme weather condition)**
- **Lack of user friendly interface for farmer**

Strategies for overcoming these challenges

- Affordable sensors & micro-controller like Arduino,ESP32.
- alternative connectivity such as LoRa or cellular network like 4G/5G for areas with poor Internet connectivity.
- For electricity power issues we are using solar panels to power IoT device.
- sensor need maintenance in every 6 months, we are giving a check to consumer when they apply for a request for service on our app.
- Using a Secured confirmation method.
- our smart app will offer weather data to a farmer when it’s heavy rainfall in upcoming next 1-2 hours our app will suggest the farmer to remove the system from farm.
- we are developing mobile app and dashboard with local language support and clear visuals and offering training session so that can empower farmers.

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IMPACT AND BENEFITS

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POTENTIAL IMPACT

- **Increased Crop Yields-** It leads to more crop yield also benefited for growth of crop.
- **Water Conservation-** It helps save water and electricity by using them efficiently.
- **Cost Saving-** Smart system reduces the manual work and labour cost by using automation.
- **Controlling Water Logging-** Smart irrigation system precisely delivers water when its needed , thus reducing waste of water and prevents water logging.
- **Controlling Soil Erosion-** By maintaining proper moisture in the soil , it helps in controlling the soil erosion.

BENEFITS

Social benefit-
- ✓ Enhance farmer lives
- ✓ Food Security
- ✓ Water scarcity will reduce

Economic Benefit-
- ✓ custom and sustainable use of water
- ✓ More crop yield

Environmental Benefit-
- ✓ Water conservation
- ✓ Energy Savings
- ✓ Save Electricity

COST ESTIMATION

Electronic Equipment: **1000rs**
Moisture sensors: **150 rs**
Solar plates: **300 rs**
Image and other Sensors: **550rs**

INR for 1 **2000** pole

- **For 1 Acre- No of pole : 6, Total cost of the project INR14,000**.
- For 1Acre of land – 5 poles will be integrated in 1acre , which will be connected to the super pole with Raspberry Pie(**super pole 4000rs**).
- 14000rs per acre(5*2000 + 1*4000)

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RESEARCH AND REFERENCES

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Reference links –

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3. https://youtu.be/QxK4YbPrWXk?si=8ZwbI4FC17HPk5nC