PRAGYAN

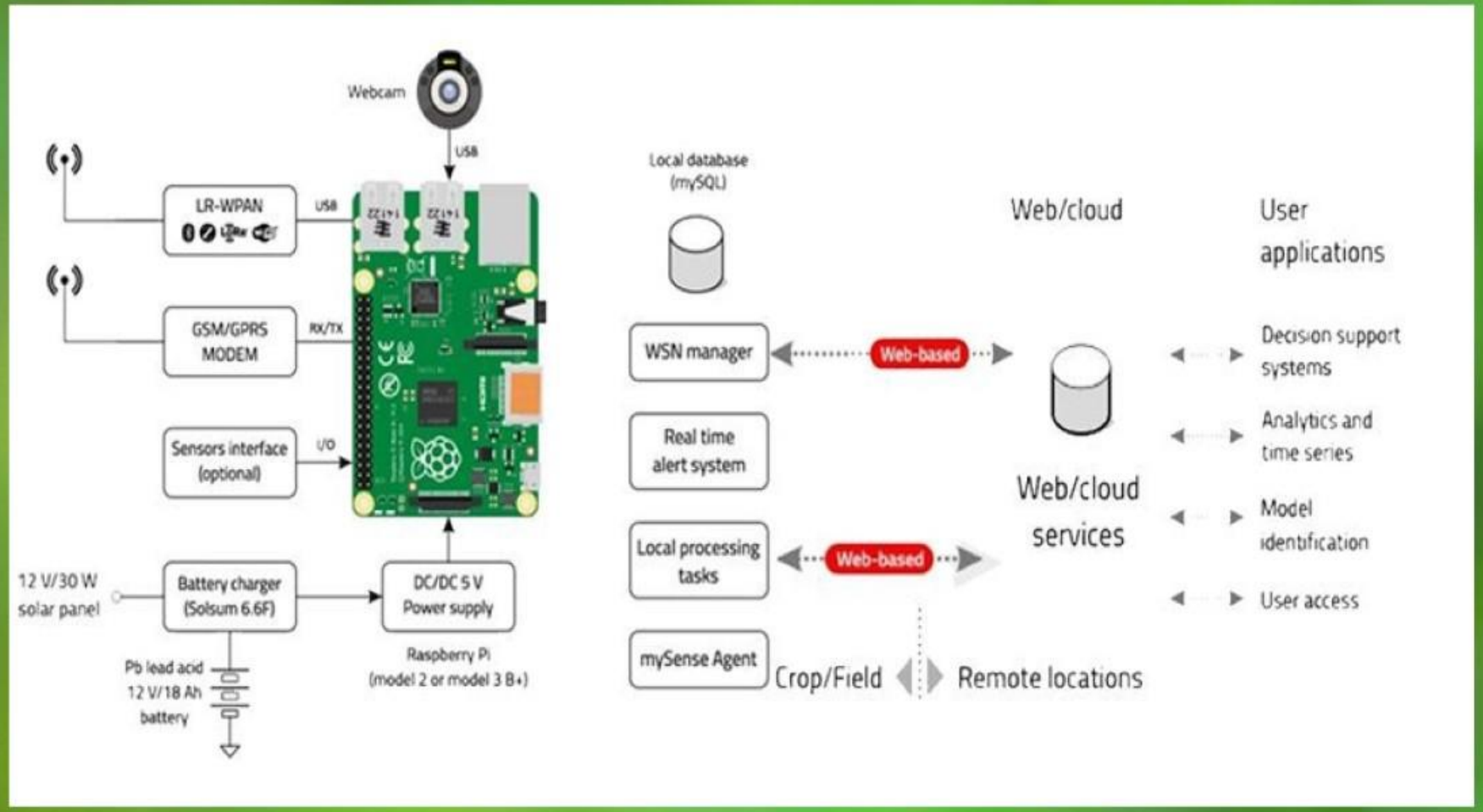
Crop Management using ML and IoT

- Suitable Crop Recommendation
- Resistive seed for existing disease
- Predict Sowing and Harvesting Date
- Disease Detection
- Smart Irrigation
- Crop Monitoring
- Fertilizer, pesticide & insecticide
- Storage and Disaster Management Remedies

Hardware and Technology Stack

Software resources

- Python & R-programing
- Logistic and Neural Network Algorithm
- Jupyter Notebook & R-studio Environment
- TensorFlow, Keras & SciKit Learn Frame Work
- Computer vision, Convolution Neural network
- Amazon Web services and Mondo DB
- Data from "INDIAN METROLOGICAL DEPARTMENT"



Data Fetching

1. Installation and Activation

installation of device and activation of GPS for getting info about location of field.

2. Retrieving Data

Fetching pervious 10-15 years Data of Rain fall, temperature, weather conditions, crop yield and etc.

3. Real Time Data

Sensors of the device in the field providing parameters as real time data.

4. Soil Health Card

Linking of soil health card and collection the information about soil condition.

5. Data Processing

Processing and manipulation of furnished Data-set to achieve targets for omitting Crop loss using ML algorithms.

Recommendation system

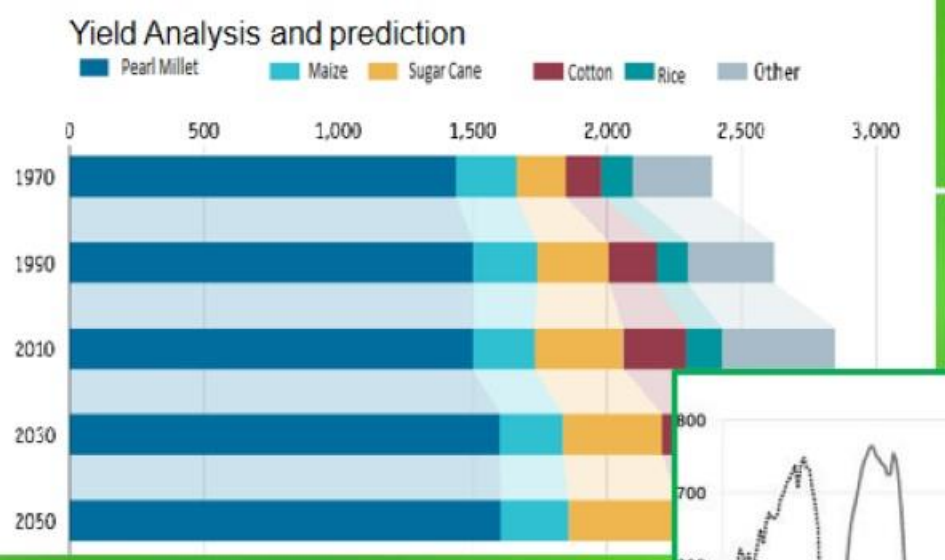
Fertilizer
Using soil nutrients parameter or analysis and computation through ML model which in turns helps the farmers to cultivate and produce healthy crop.

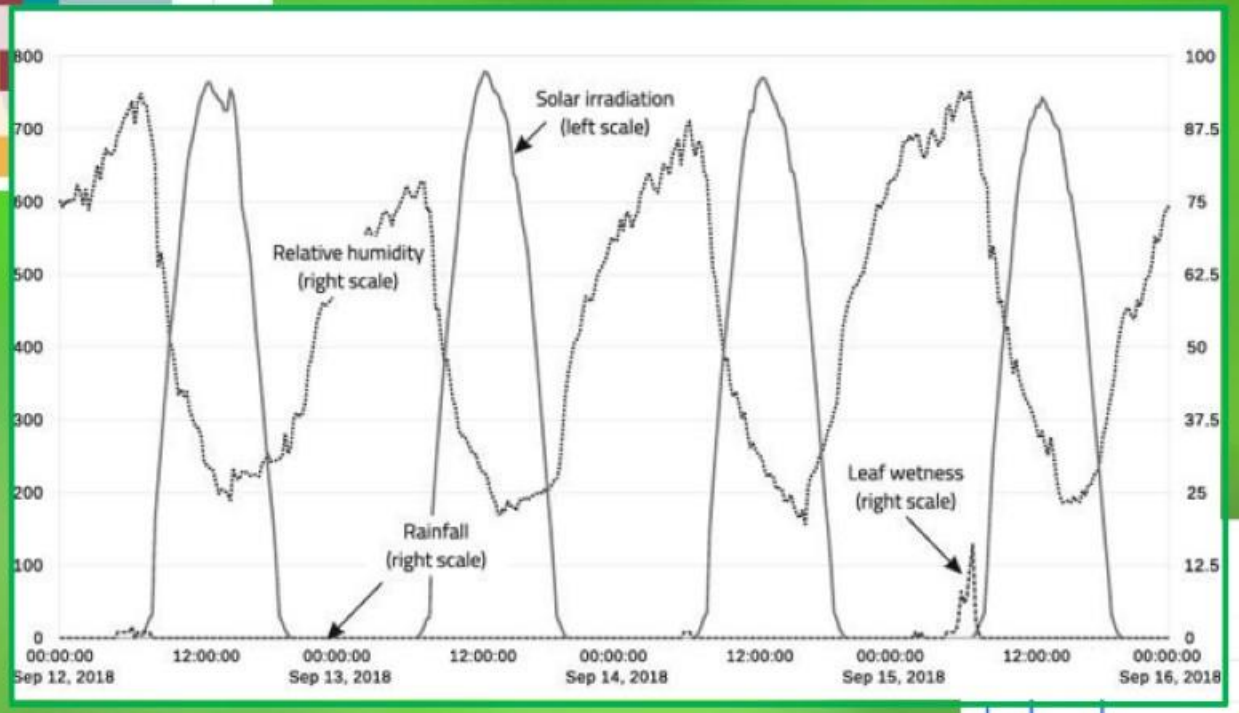
Seed
Disease and pest resistive seed will be selected on the basic of pre-existing diseases in the soil and according to previous years data. That can be used to maintain and improve the quality of crop varieties

Crop
Considering previous years crop yield data, soil characteristics and soil type. suggest farmer the suitable crop based on farm specific parameters in orderto get maximum yield and profit.

Crop Monitoring

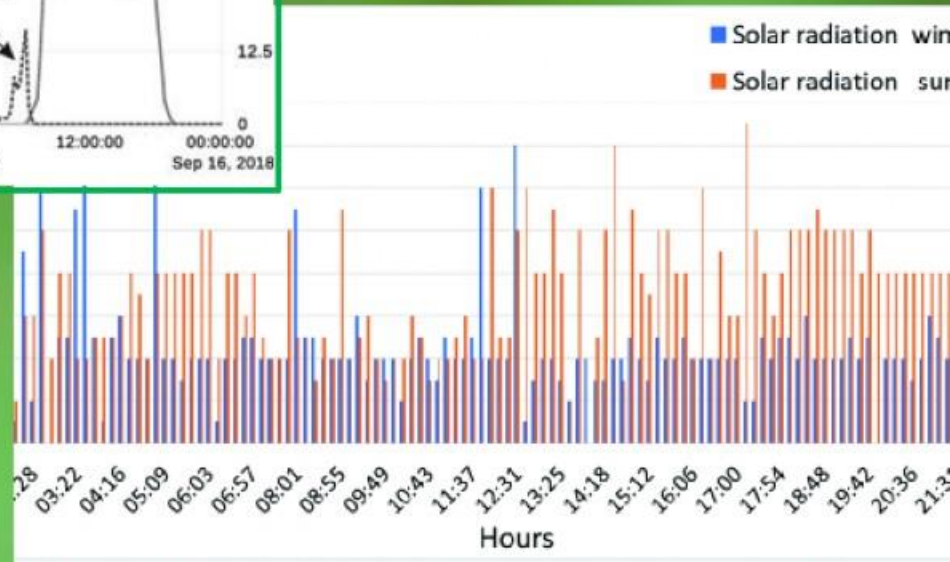
It will take previous year data of different crop yield and compare with real time data and make a yield and prediction analysis system. varies with present situation and depend on time series.





It will monitor crop health using leaf area index and other indexes as well. so that farmer can know what is going in the field without entering in his farm.

It analyses all the parameter. also for user visualization It plot various curve. The sample is shown in figure.



It is also helps to monitor the soil nutrients which is very essential for good crop. It is important to keeps eye on this because farmer add this before sowing. after this, it decreases. Because of this during germination when crop require more nutrients there is deficiency. This can be improved by monitoring its parameters so whenever It experience this kind of lack of nutrients. It provide alert to the farmer.

The Machine Learning Process

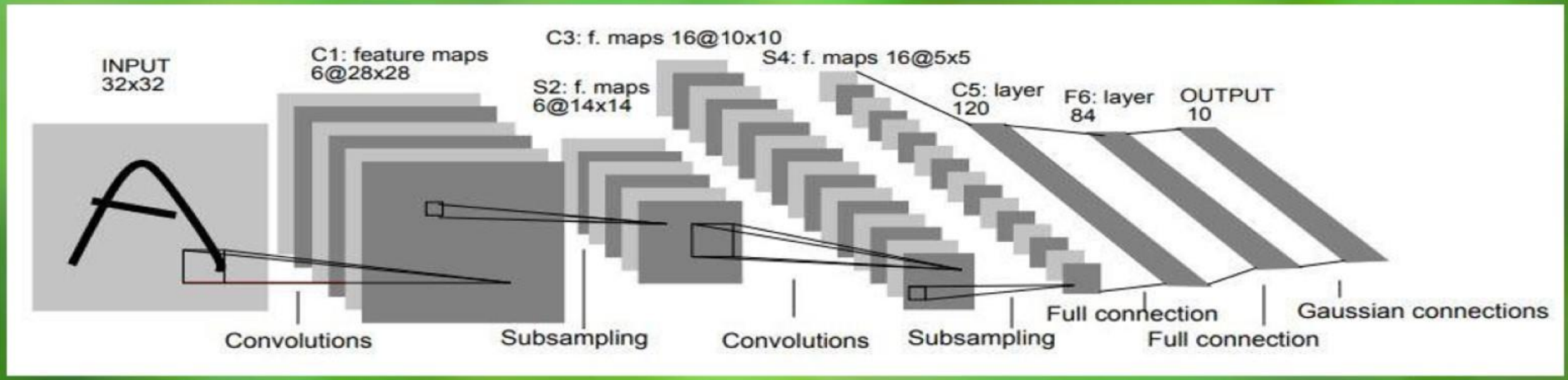
Step 1
Gathering data from various sources

Step 2
Cleaning data to have homogeneity

Step 3
Model Building- Selecting the right ML algorithm

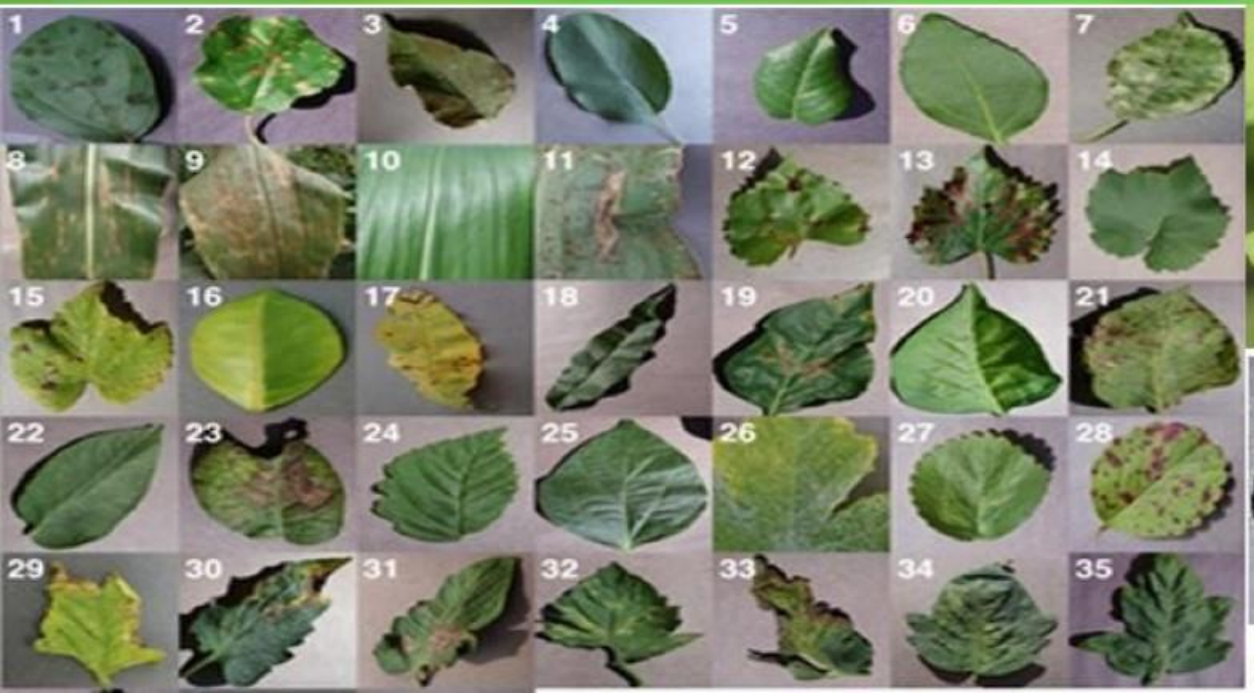
Step 4
Gaining insights from the model's results

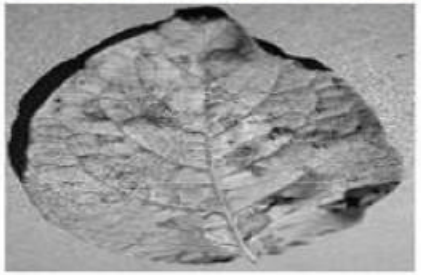
Step 5
Data Visualization- Transforming results into visuals graphs



Disease detection

Our system helps in identify plant disease and pest on the basis of real time monitoring via camera module through CNN and Image processing will detect disease, pest and insect. Also provide Remedies for improving health and yield of the crop.





(d) **Leaf 2**: Color (e) **Leaf 2**: Grayscale (f) **Leaf 2**: Segmented

Smart Irrigation

- The system monitor soil condition and weather forecast and other parameters
- Ensure sustainable and responsible irrigation over time.
- Fully automatic device , no requirement of manual labour.
- Control amount of waste water.
- Enhancement in quality and quantity of crop
- Automatically adjust better irrigation scheduling.
- Water is used in effective way so other farmer can also take advantage of remaining water

Other Features

Sowing Date

Prediction of effective sowing date considering previous years weather data, future weather forecast different soil parameters for harnessing the maximum possible yield potential of any crop. Sowing date selection to maximize the use of environmental resources during growing season.

Harvesting Data

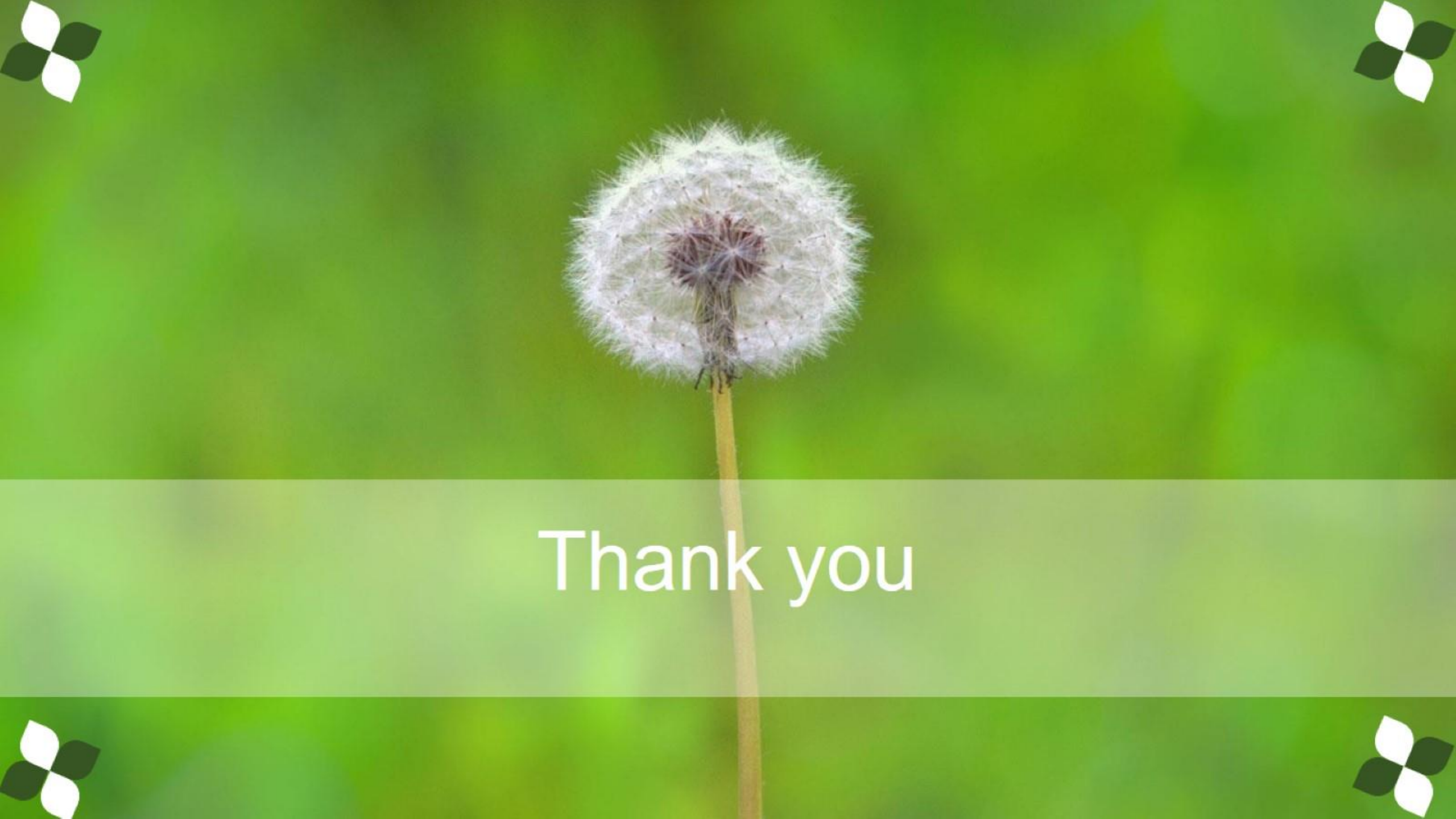
Harvesting date prediction based on growth parameters weather conditions and crop monitoring data analysis to improve quality and yield. Harvesting Date will be introduce by some advanced Machine learning algorithm with some suitable data-set after its pre-processing. To reduce complexing of code will use some frame-work

Mandi Price

Mandi price is important feature. Hard work of farmer comes true after this only. We will provide price fluctuation of farmer's crop considering nearer mandis. Also If he needs Fertilizer, Pesticide and Insecticide. He can find with it them easily with effective pricing and availability.

Remedies

Suggesting appropriate remedies and technology for storage of crop to reduce losses and maintain the better quality so that farmer can enhance his knowledge of crop and its condition for making of good and healthy food for world.
By proper tips and remedies they can improve crop yield which improve more profit.


Thank you