Pesticide Spraying Drone

Using drone technology along with ML model for effective spraying of pesticides.

Problem Statement

Using of pesticide spraying drones that predict the infected area and spray pesticides based on the pest.

The issues with the common methods:

1. Difficulty in reaching tall stratergic locations.
2. Wastage in case of using of hose pipes
3. Recurrent costs
4. Needs huge stationary machinery incase of wider area

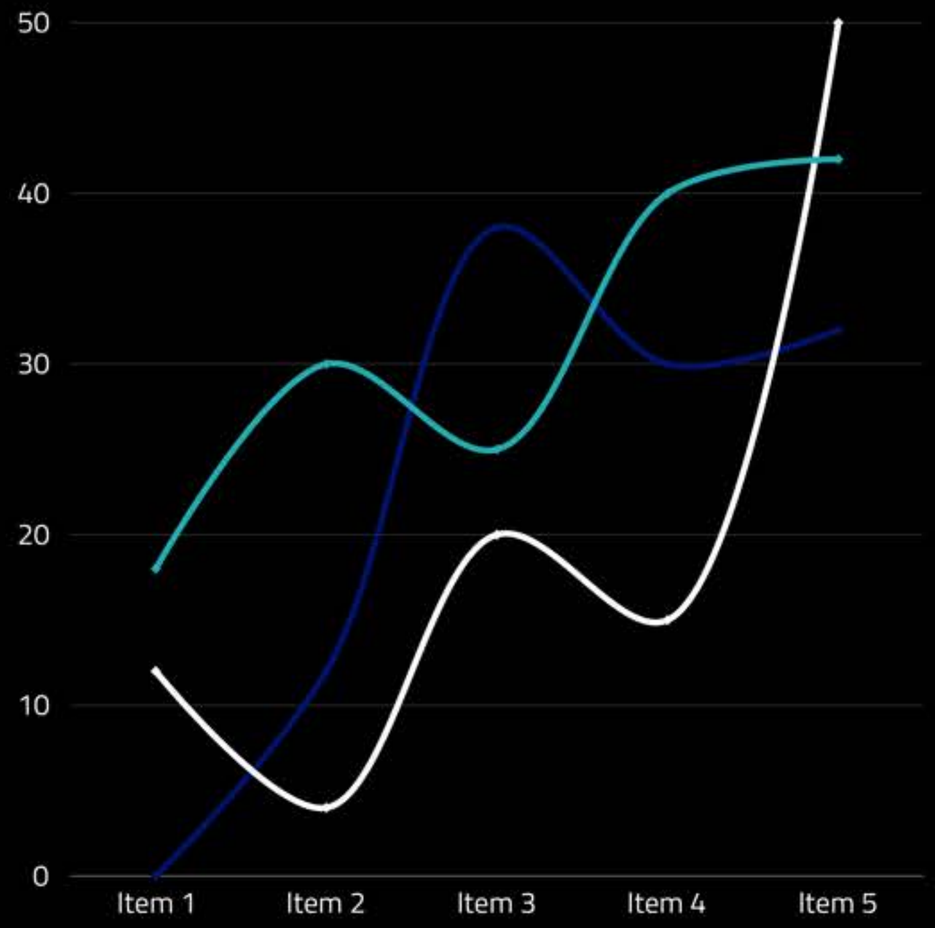
There is always a better way of doing it, commit yourself in finding it

Novelty of the study

1. Reduced cost for pesticides due to ML-based calculated spraying
2. Better focusing on only the affected area
3. A community for the farmers to discuss on the pesticides that can be used
4. An online platform that enables farmers to post pictures of the infection and the most suitable pesticide used for it is displayed.

Advantages:

1) The main aim of the project is to make pesticide spraying more affordable to farmers by the use of light weight drone
2) Single investment
3) Eliminates need of protective suits
4) Main focus on small farmers
5) Lesser wastage
6) Focused on tall unreachable areas
7) Lesser washout of harmful pesticides



Tech Stack

1.Configuration of the kk 2.1.5 microcontroller

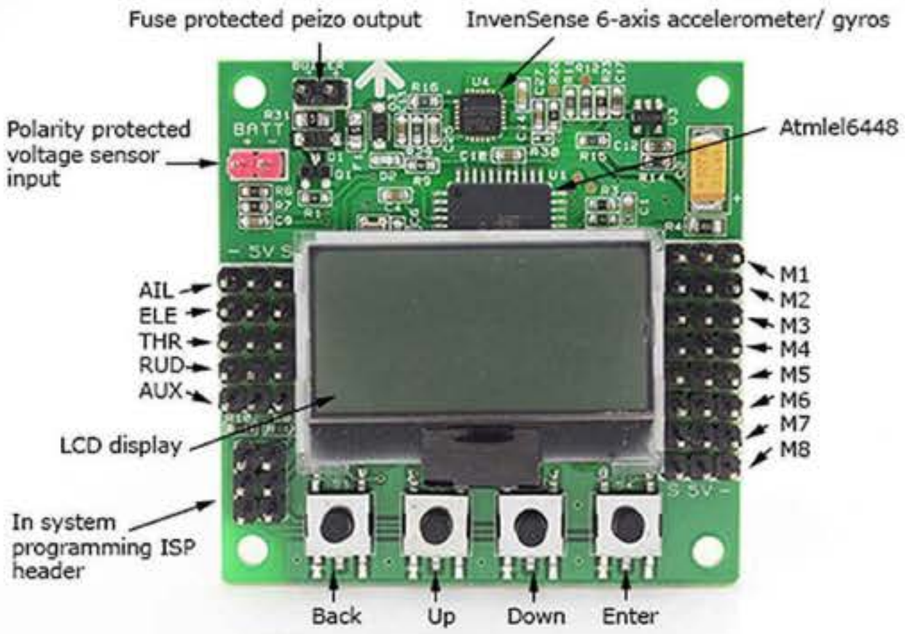
2. ML model deploying on the edge device

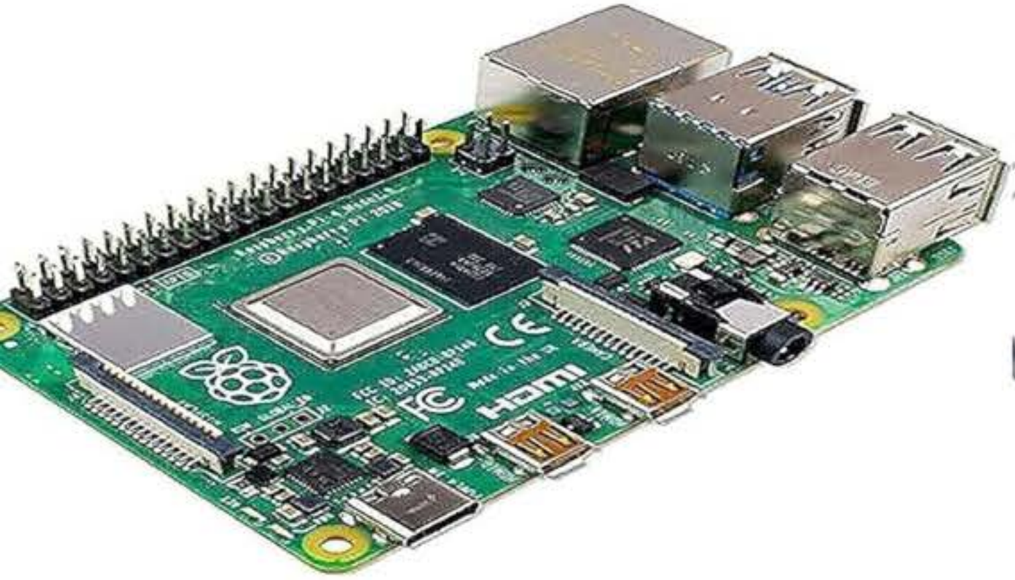
3.Building of the ML model and training it

4.Using webdev ,flask framework for the forum website

5.Programming servos

Flight Controller Board

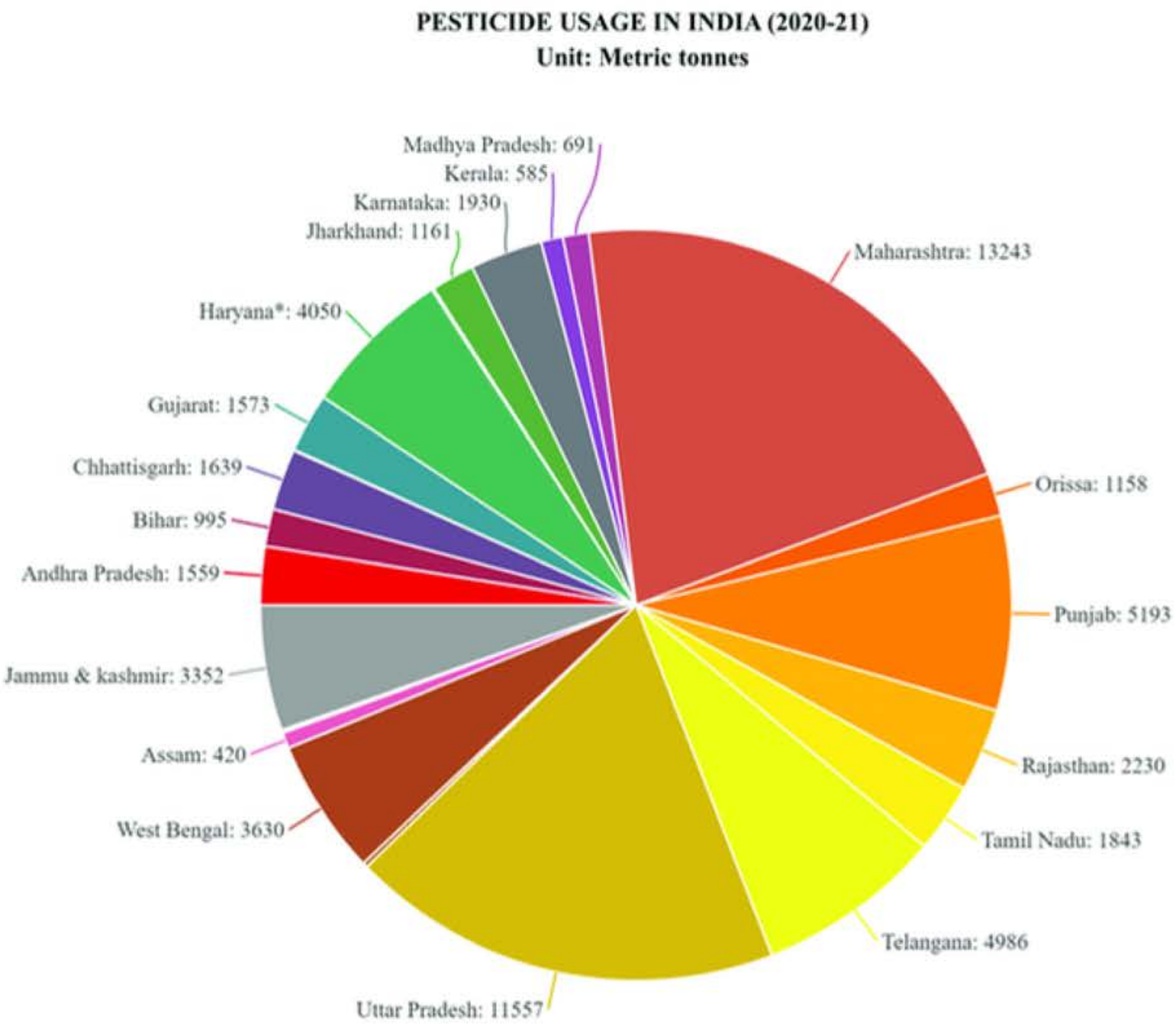




External components to be connected

1843 Tonnes of pesticide each year.

Data were taken from statistical database of government of India, directorate of plant protection

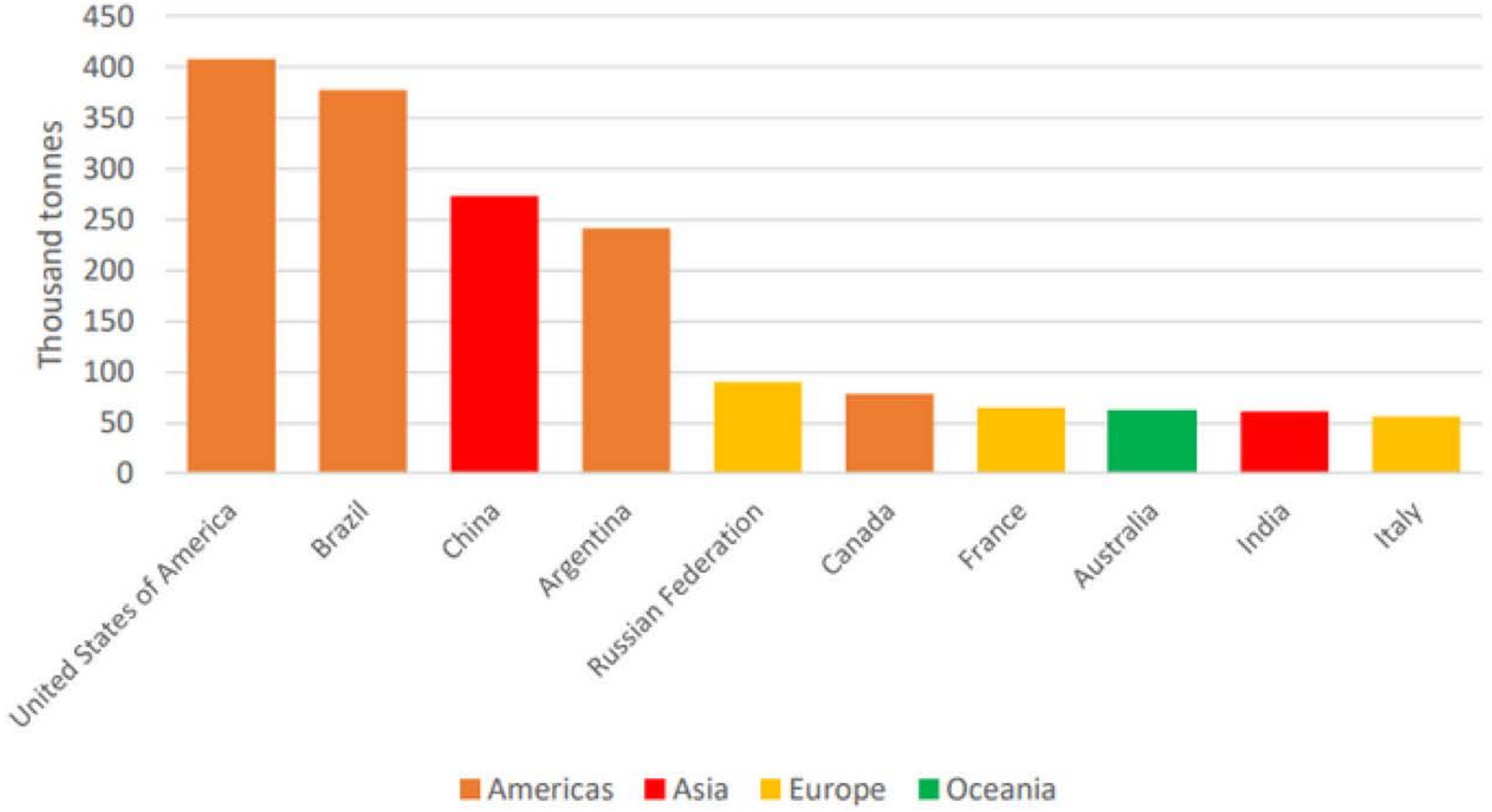


Pesticides 'cost double the amount they yield', study finds

A Paris-based NGO found pesticide producers cost the EU €2.3bn in subsidies, while only booking €900m in profits - and suggest the money is better spent elsewhere.

According to a study in green economy

Figure 8: Pesticides use, top countries (2020)



Workflow planned:

Assembling the drone

Building of the ML model

Deploying the model in rpi

Integration

FUTURE SCOPE

Making the entire drone fully automated

By making the flight controller controlled based on decisions made on the system.

Adding more tree details and possible infectious attacks:

To add a broader group of infections possible and pesticide switching.

Ethylene spraying

As a way to increase fruit yields in trees.

By using of more powerful flightcontrollers and increasing the weight

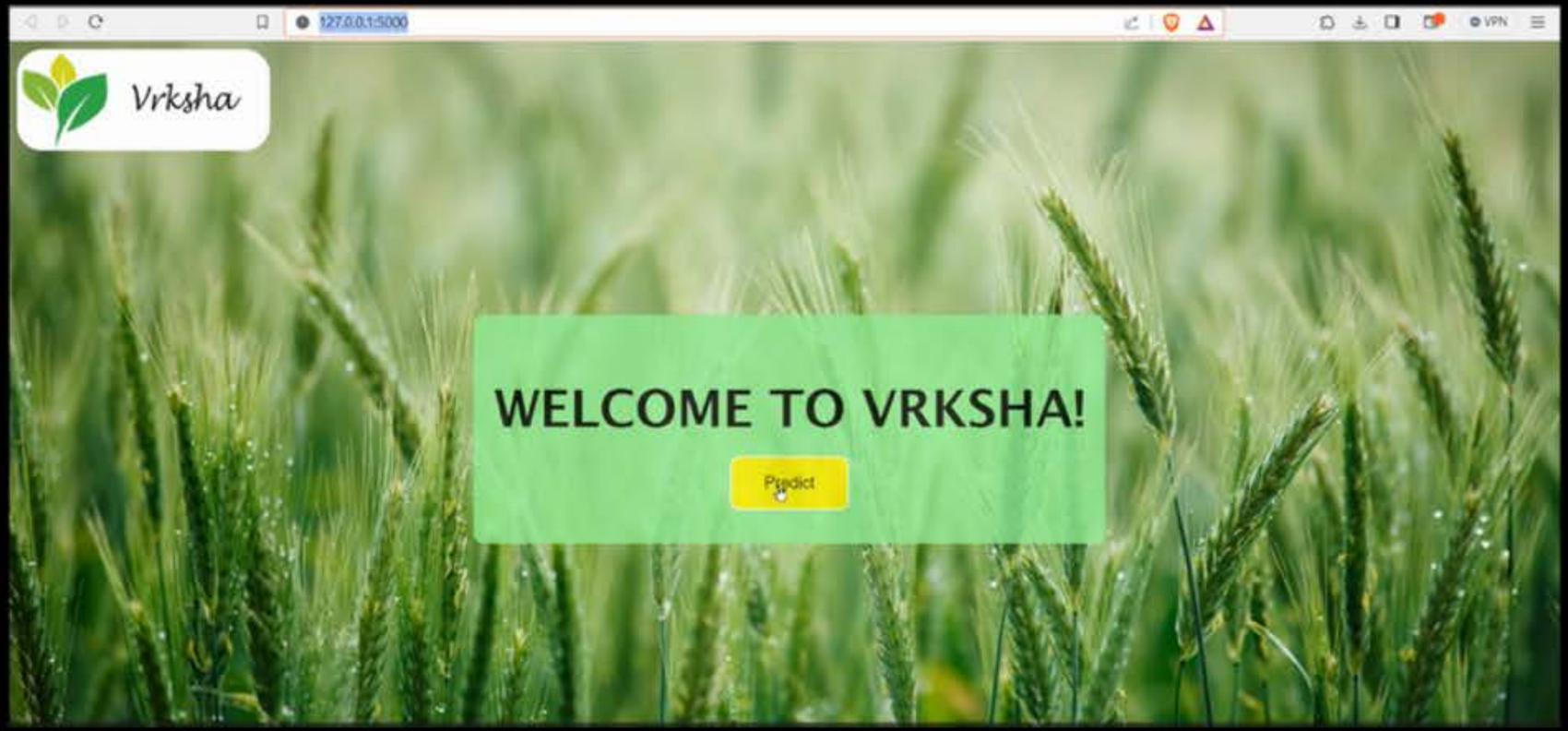
For making the entire system more durable , robust ,fast and efficient.

Website

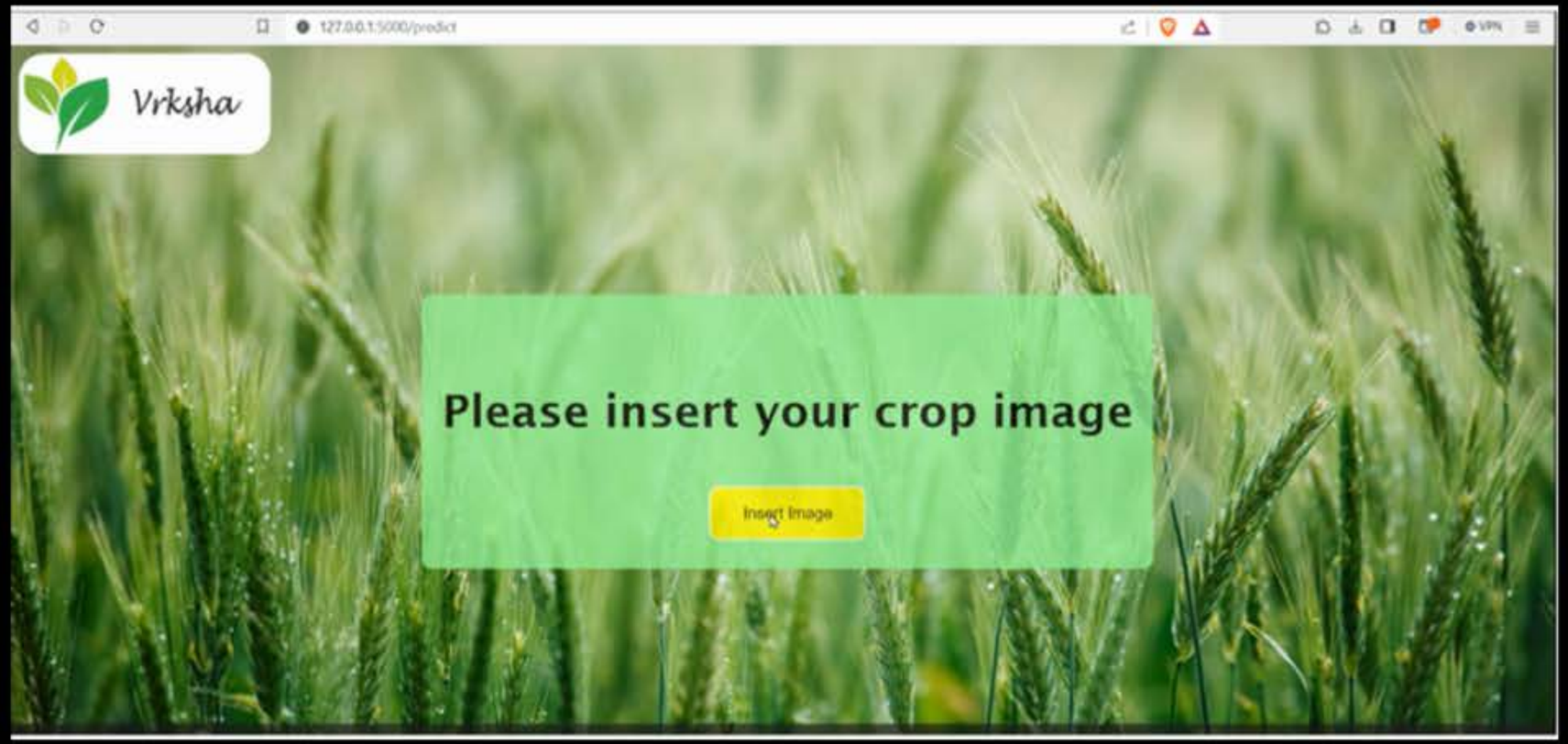
Community forum / discussion board for farmers to discuss, share their experiences, ask questions and offer advice.

Alerts from the drone to detect a new disease currently unknown to the drone.

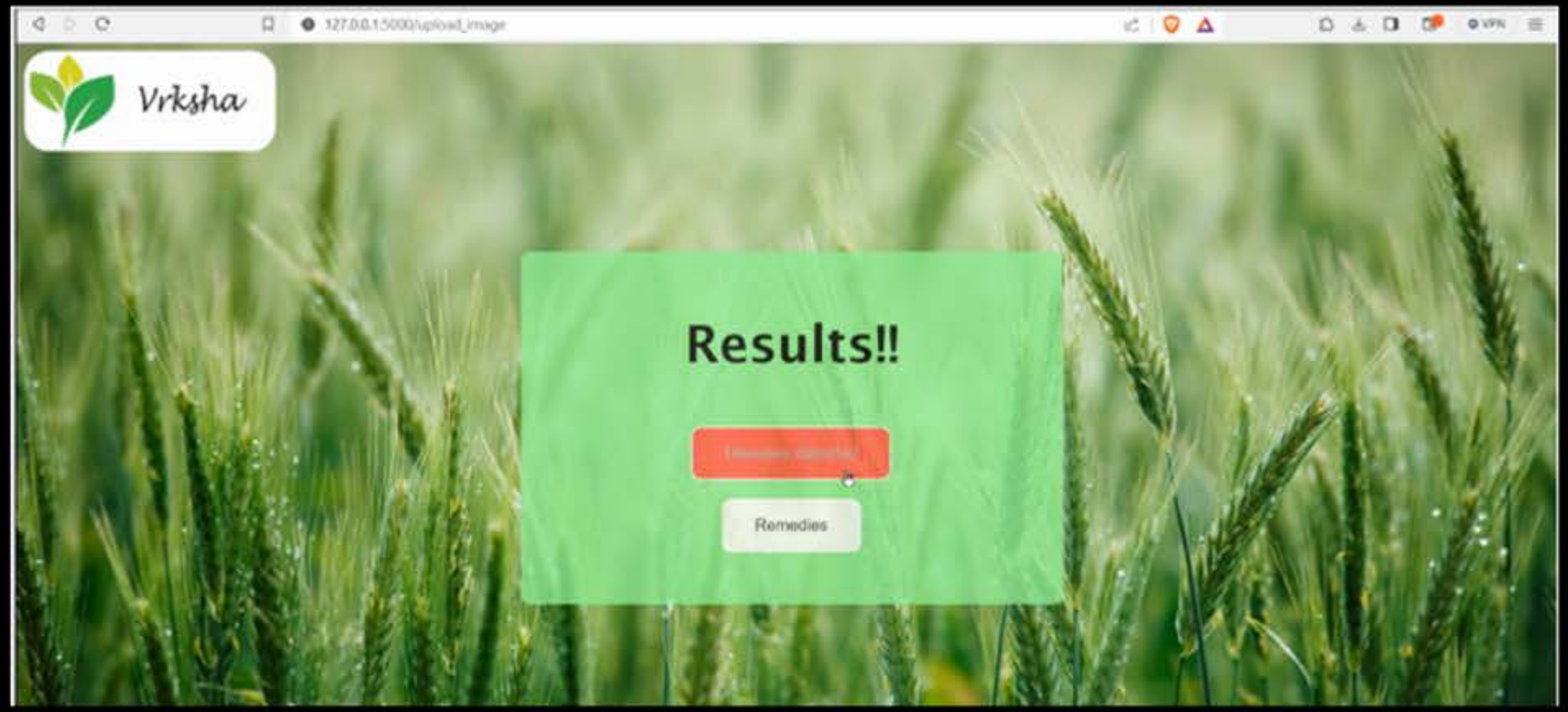
Home page



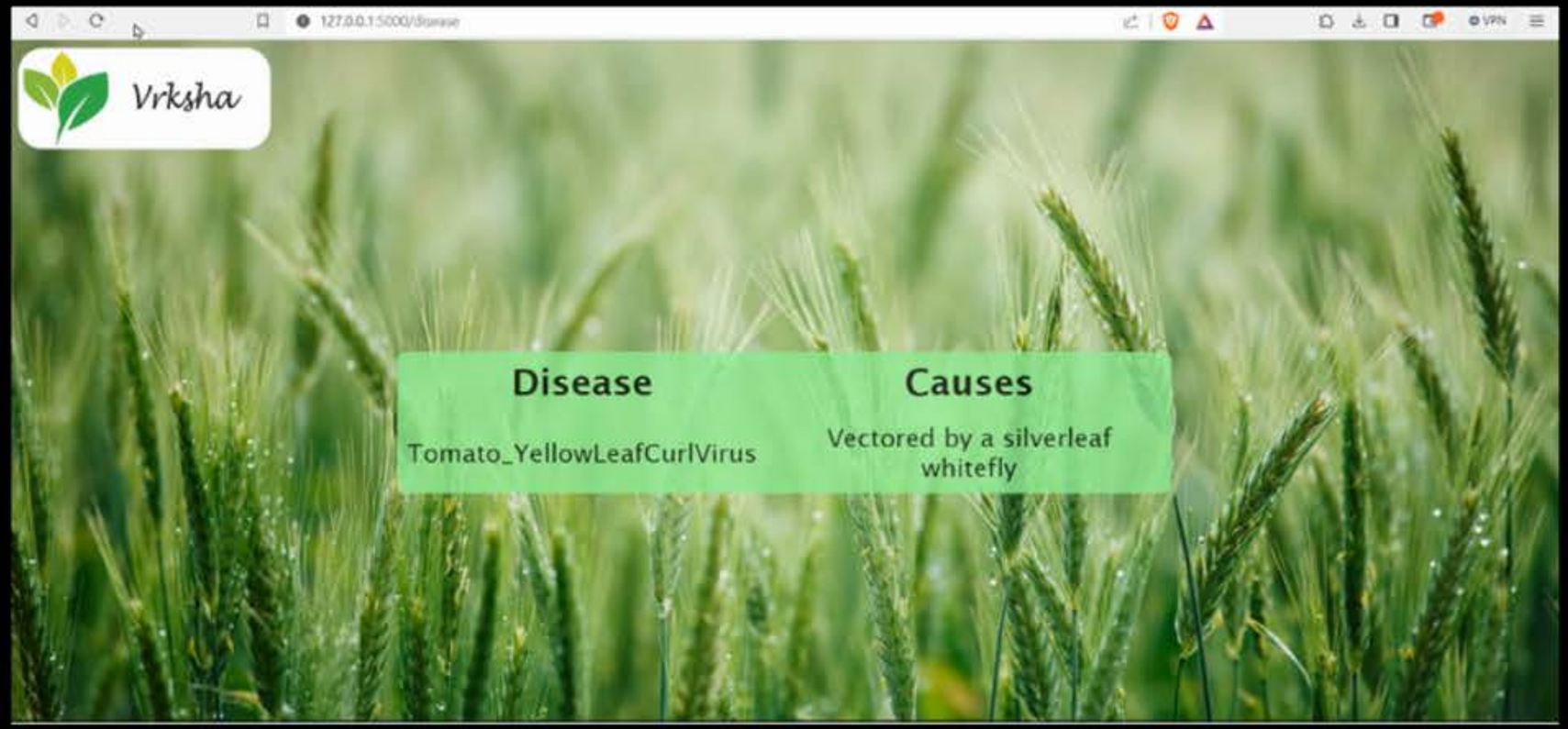
Page to add image of the infected part



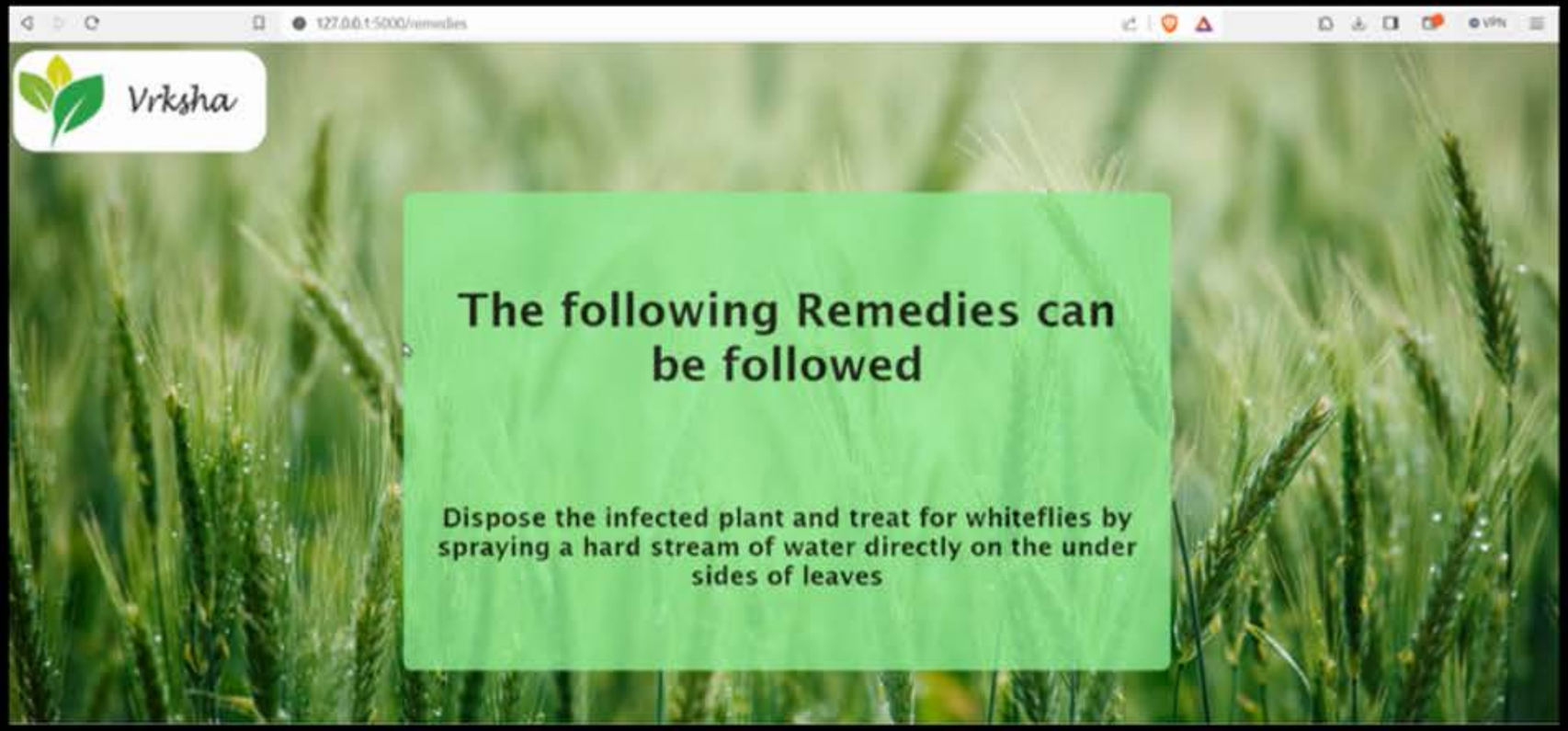
Results displaying 2 options:



Displaying the detected disease and probable cause



Displaying remedies to be followed



Literature Survey

Flying Farmer

1. LPU has developed an affordable drone called 'Flying Farmer' for agricultural use.

2. The drone addresses farming challenges like pesticide treatment and weed detection, aiming to reduce labor costs and improve crop yield.

3. It is designed for mapping, surveying yields, estimating soil nutrients, and delivering pesticides efficiently.

4. The drone's cost is around Rs. 10,000 to Rs. 15,000, making it accessible to small and marginal farmers.

Literature Survey

Real-time recognition of spraying area for UAV sprayers using a deep learning approach

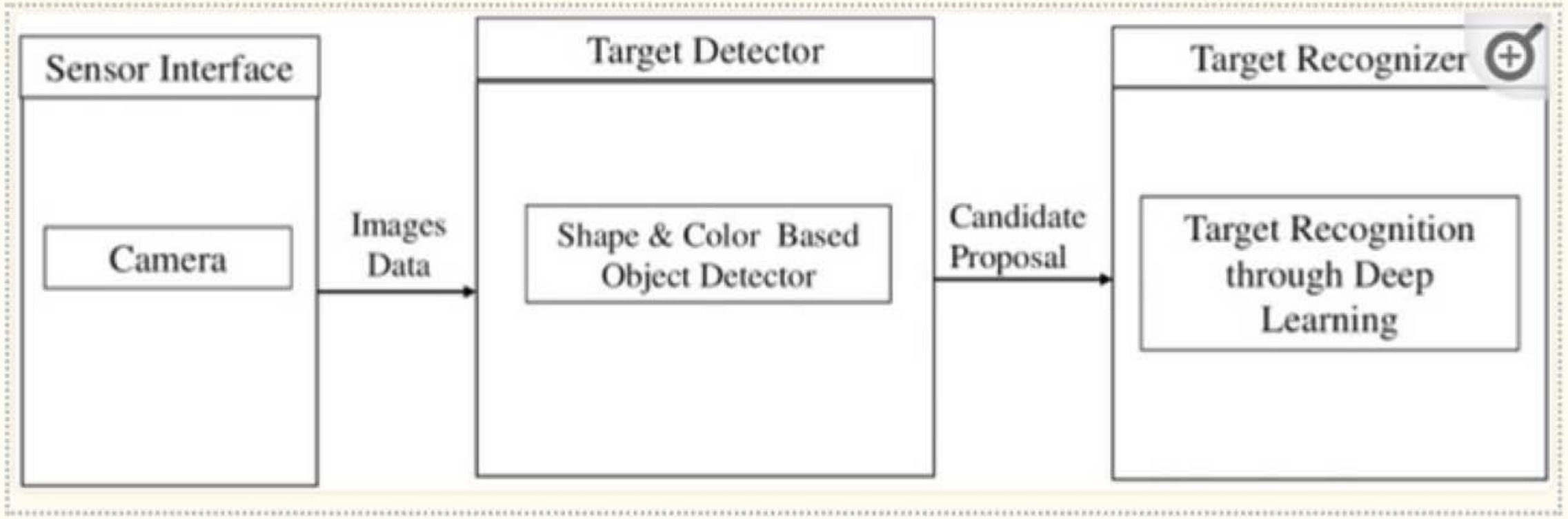


Table 1. Different methodologies and controllers of Drone

Author	Implementation Details	Components	Controller	Nozzle Type	Remarks	Load (L-Litres)
Munmun Ghosal (2018) [12]	Monitoring the exact place in which GPS module is notable for air pollution.	ESC, BLDC motor, sensor such as LM35, AM1001, LDR, MQ6, and MQ135.	Arduino Uno ATmega328		It is a low-cost, high-efficiency model.	
Sabikan (2016) [13]	A platform for the autonomous UAV quad copter was built for open-source projects.	IMU, 2.4GHz telemetry, ESC.	ArduPilotMega (APM) 2.6		The quad copter OSP offers both software and hardware as a comprehensive framework and also flexibility design for research or project purposes.	
Shilpa Kedari (2016) [10]	A quad copter is deployed on Android smartphone. These android applications control the quad-copter for pesticide and fertiliser spraying.	IMU , barometer, accelerometer, gyroscope.	Arduino board		Reduces the problem of the health of farmers during pesticides and fertilizer application.	
Sadhana B (2017) [11]	Developed the quad copter and sprayer module	ESC, BLDC, MPU 6050 sensor.	Arduino Uno ATmega328	Mini nozzle	High stability and increased power lifting. It is easy to compare the quad copter control to a miniature helicopter or vehicle.	1kg
Parth N. Patel (2016) [14]	The quad copters enable the fabrication of unique folding frames for safe transport and convenient packaging of cylindrical cushioned boxes.	Accelerometer, gyroscope, IMU, Infrared camera, BLDC, ESC	Atmel AVR microcontroller		It is adaptable, allows function performance to be modified and also allows technological integration.	

Weicai Qin (2019) [15]	Study the effect in different heights and sprayers of the spraying system.	GPS, digital temperature, humidity indicator, water sensitive.	N-3 type	Rotary atomizer	In this UAV the pesticides were initially employed in low altitude and low volume.	25 lit
Tanga (2018) [16]	Determining the deposition of droplets in various forms.	Digital temperature, Humidity indicator, Water sensitive Sensors. Anemometer, Filter papers.	UAV ZHKU-0404-01	Flat fan	For wind speed measurement. The indicator is used for air humidity measurement.	15 L
Tejas S. Kabra (2017) [17]	Suggest Quad Copter [QC] to be introduced. The quad copter reduces the problem of farming	BLDC			This procedure reduces the medical problem created by hand sprinkling.	1.5 to 3 L
Rahul Desale (2019) [18]	This project is being utilized by UAV in agriculture to spray insecticides.	BLDC, ESC, ratio controller, Transmitter.	Flight Controller	Fog nozzle	The benefit of this project is that it frame to spray pesticides in a safe place by utilizing drone.	
Shaik. Khamuruddeen (2019) [19]	This type is used for quad copter spraying of insecticides.	BLDC, ESC, Transceiver, Infrared Camera.	PID Micro Controller		To identify less work where PSQ is used.	

Literature survey

- Spraying by power tiller operated tall tree sprayer has become the accepted method of pesticide application among fruit growers

The assembly of the sprayer was mounted on the frame which was made of flat iron plate and angle iron and fixed in front of the power tiller

(Fixed structure)

Fig.1 Power tiller operated tall tree sprayer during operation

Performance Evaluation of Power Tiller Operated Tall Tree Sprayer

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Thank you.