

# SMART CROP SPRAYING SYSTEM

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**Abstract:** We live in a nation which is agriculture based. Progressive growth of the agricultural field is the need of this country. Indian farmers and agriculture need protective agricultural methods along with increased productivity. For the crops, to protect them from the insects and to increase their growth we need pesticides to spray on them. There are more than 1 million pesticide cases every year which is declared by World Health Organization(WHO). In developing countries like India the pesticides are sprayed by human beings which affects their health. Remote control drones or unmanned vehicles will help people to spray pesticides or fertilizers on crops without handling it. The Unmanned Aerial Vehicles (UAV) reduces the direct handling of pesticides/fertilizers by human beings .The drones that are being used now spray pesticides/fertilizers on entire selected field area including the empty areas between the plants .In this approach a lot of pesticides/fertilizers are being wasted by spraying on empty areas thereby increasing air and soil pollution. A smart spraying system in agriculture is a targeted spraying system with efficient application of chemicals, low cost and less harm to the environment.

**Index Terms:** Remote Control Drones, Unmanned Aerial Vehicles, Smart Spraying

## INTRODUCTION

Agriculture is the backbone of India. Around 34.5% of land is irrigated crop area in our country. One Economic Survey states that farm mechanization in the country has to be enhanced. To increase the productivity controlling of pest infestation plays an important role. The major problems faced by the farmers are controlling pest infestation. Pests are unwanted insects or germs that interfere with human activity and they may bite, destroy food crops or otherwise makes farmers lives more difficult. Early detection and prevention of pests is a key-point in crop management. Effective pest control requires some knowledge about pests and its habitats. Currently, farmers go around their field and spray pesticides. The major disadvantages with respect to this technique are: While spraying, the pesticide might come in contact with farmer which might cause diseases skin cancer and asthma. Increased spraying of pesticides can affect the health of consumers as it enters the food chain. Also Pesticides are sometimes sprayed on plants that are not affected resulting in wastage of the same.

Thus, in order to avoid the direct human contact with the pesticides and fertilizers unmanned vehicles came into play a crucial role. Agricultural aircraft have been in use since the 1920s, while agricultural experts increasingly use satellites to assess crop health from the sky.

## Existing System:

- In the present Indian farms the farmer has to spray the pesticides manually. The manual spraying makes them easily susceptible to hazardous disease mostly like air borne and water borne.
- A remote control drone or unmanned vehicles will help the people to spray pesticides on crops without handling it.
- The Unmanned Aerial Vehicles (UAV)reduces the direct handling of pesticides by human beings.
- The drones that are being used now spray pesticides on entire field area including the empty areas between the plants.

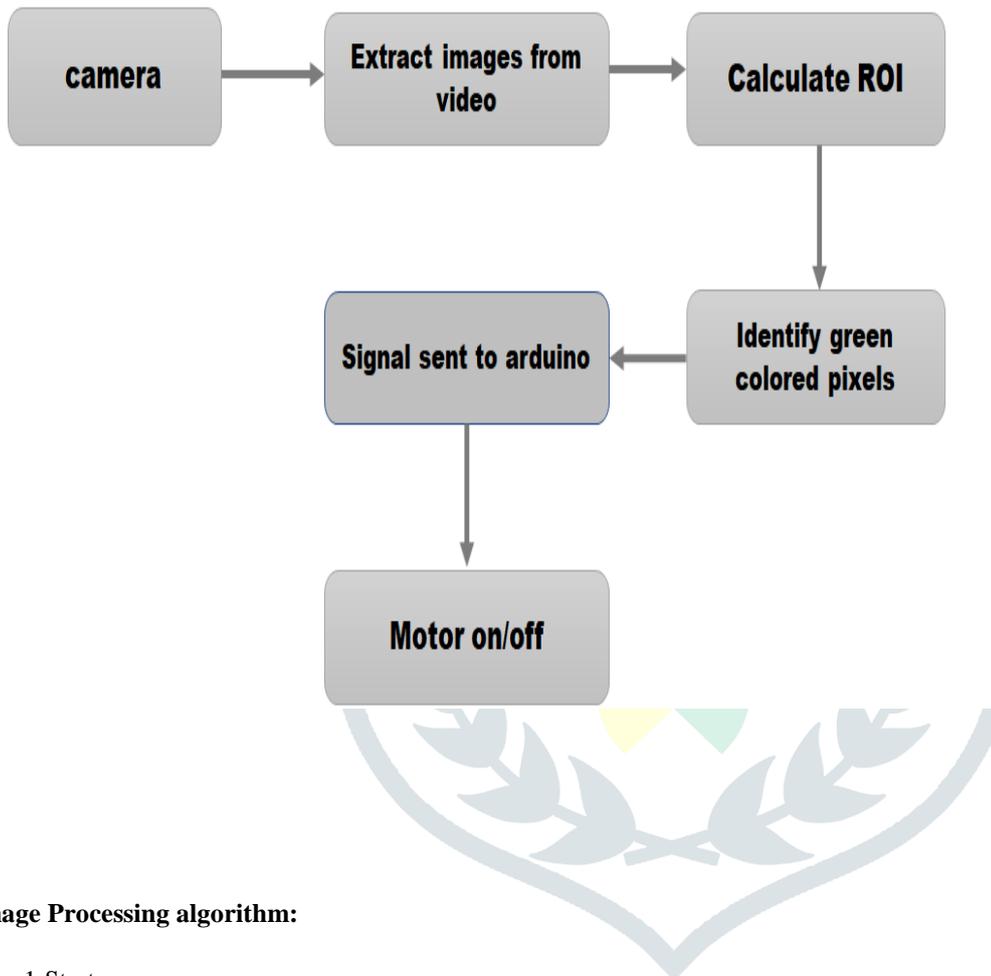
## Proposed System:

- In our proposed system in order to avoid the wastage of pesticides/fertilizers and to reduce the pollution to some extent cameras are fixed to the drone and plant images are captured to differentiate crop areas from empty field areas.
- This process is done for every frame that is captured.
- It helps to fed off fertilizers/pesticides under crop area only, hence the fertilizers/pesticides are not wasted by spraying

on empty parts of the field.

- A motor which will be powered on when the camera is focused on a plant and powered off when the camera is over empty field is used.
- The same can be used in the real time by fixing our proposed system to a drone and motor replaced with sprinkler.

#### ARCHITECTURE DIAGRAM:



#### Image Processing algorithm:

Step 1:Start

Step 2:Initialise the camera

Step 3:Camera captures the images from the field.

Step 4:Get the image dimensions.

Step 5:Declare variables  $midx=width/2$  ,  $midy=height/2$ ,  $p$

Step 6:Create black mask to the captured image.

Step 7: Calculate Region of Interest(ROI).

$[midx-p, midy-p], [midx-p, midy+p], [midx+p, midy+p], [midx+p, midy-p]$

Step 8: Create the polygon of size of the calculated ROI.

Step 9: On ADD ing the black mask containing white polygon and the source image we get the final image in the ROI.

Step 10: Create another black mask

Step 11: Separate green ,red ,blue pixel values.

Step 12: if green\_pixel\_value > threshold

then

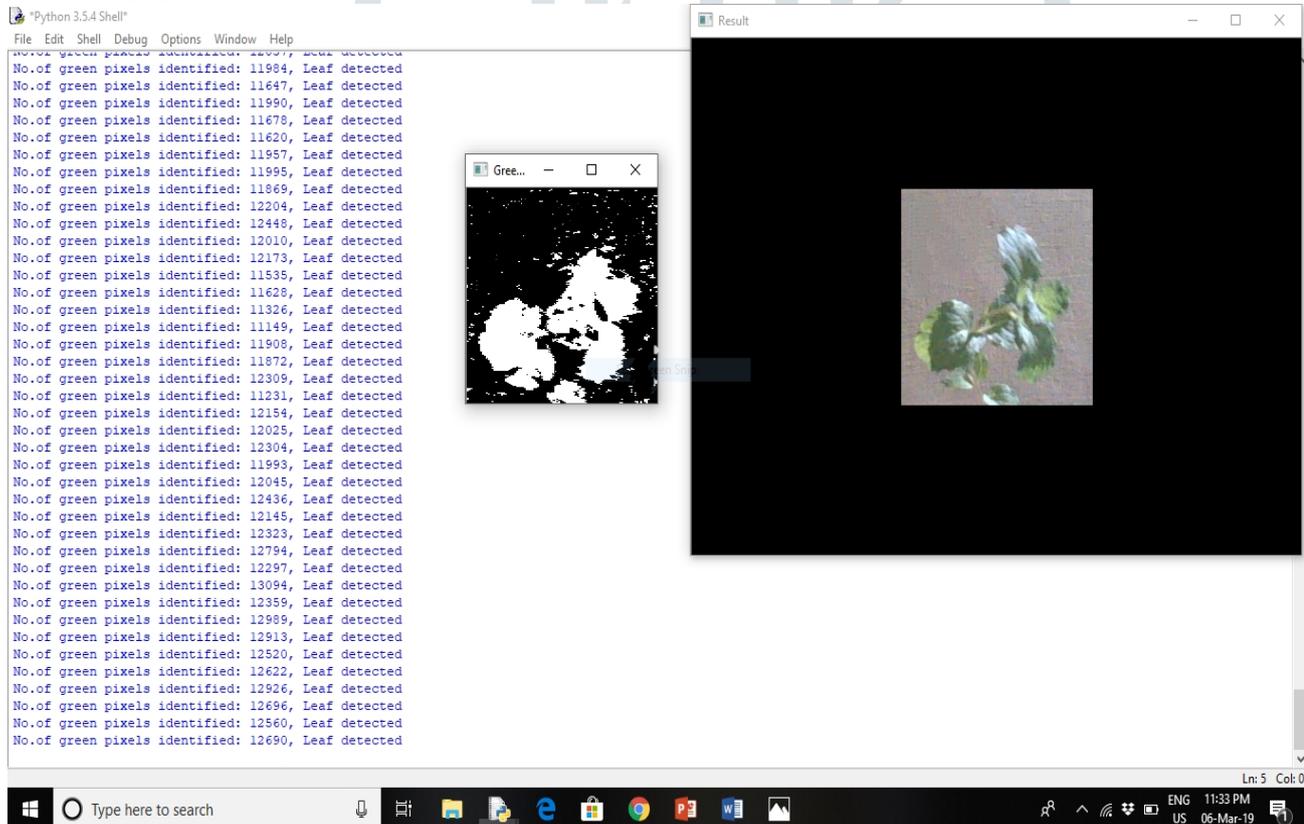
leaves are identified and 'a' is sent to Arduino as input.

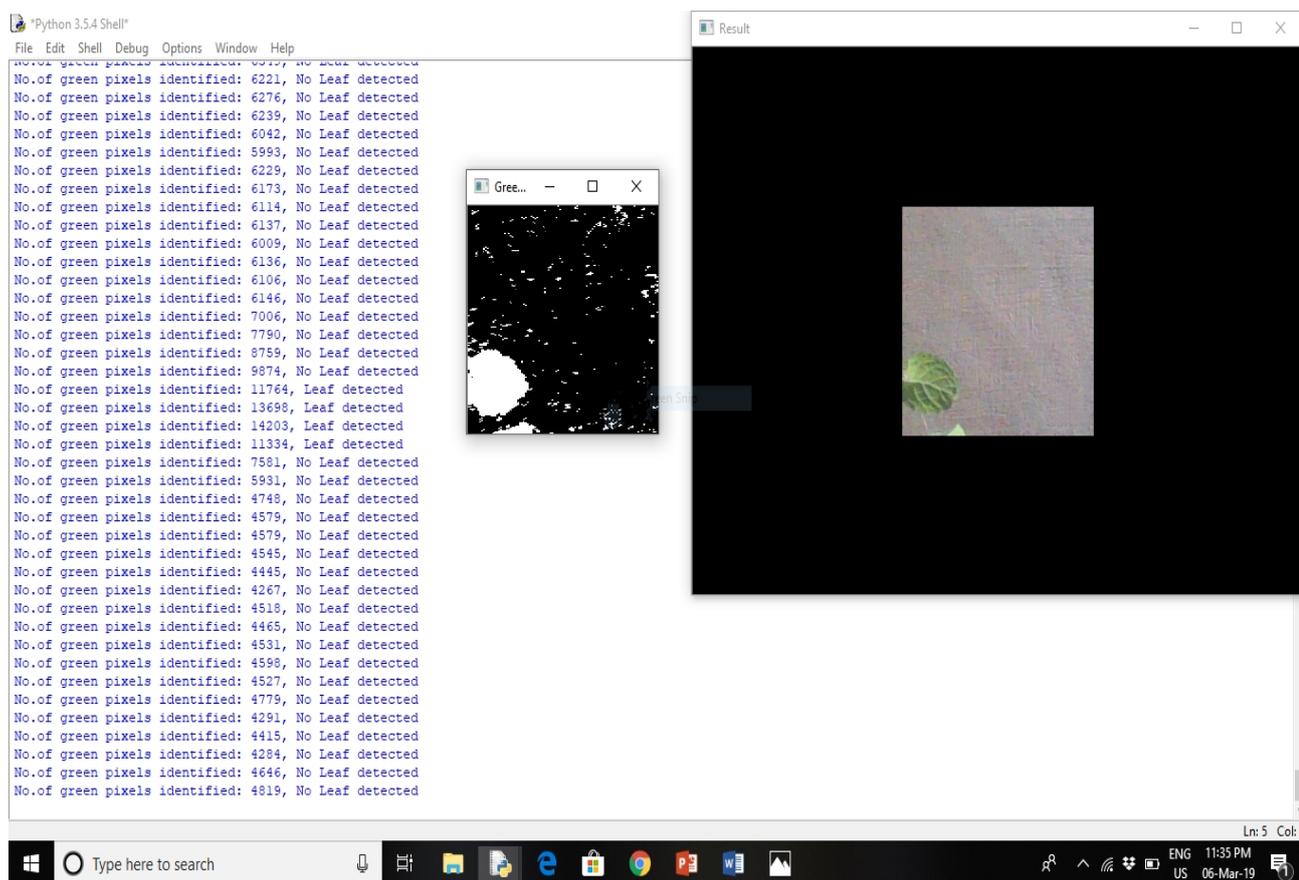
else

leaves are not identified and 'b' is sent to Arduino.

Step 13: Stop

### OUTPUTS:





## CONCLUSION:

Smart crop spraying object is crucial in the current scenario. Green pixels are identified using image segmentation, based on the principles of image processing. This ensures that the fertilizers are sprayed only on the required area of the land, which automatically implies less wastage. On the other hand, it has health benefits associated too. Farmers needn't come into contact, as much as before, with the fertilizers. The labour cost is almost zero. The only required input is power. Upto 70% of the investment can be saved by the farmer by utilising this technique, when compared with the traditional farming. The system is observed to work without supervision too. The system is found to be reliable under all kinds of circumstances. The only investment that needs to be expended is during its initial stages. It is capable of accomplishing its tasks successfully.

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