



SMART INDIA HACKATHON 2020
NITK Internal Hackathon
(January 21-22, 2020)



NM372 - Extraction of crop cycle parameters from multi-temporal data

Team No. : T9

Team Name: beach_waale

Team Leader: Kumar Saharsh

Team Members: Rishi Sharma, Saurabh Singhal, Adarsh Kumar, Rahul Kumar, Niwedita

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Table of contents

- Understanding of Problem statement
- Assumptions
- Dataset Analysis
- Approaches
 - Method
 - Preprocessing
 - Result
- Final Result

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Understanding Problem statement

Datatype - Multispectral and Multi-temporal images of crop data of 2 years.

Task - Extract Crop cycle Parameters.

Output - Date of Sow and Harvest , Number of Harvest for each pixel.

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Assumptions

1. Month of the image will be given with input image.
2. Each pixel represent a crop field.
3. Low pixel density means no crop and high pixel density means dense crop.
That is lower the value of pixel more will be the density of the crop.

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Dataset analysis

We calculated mean value of all the pixels for each image and plotted it against months.

The trend for the harvesting & sowing for year 2017 & 2018 are as below :-

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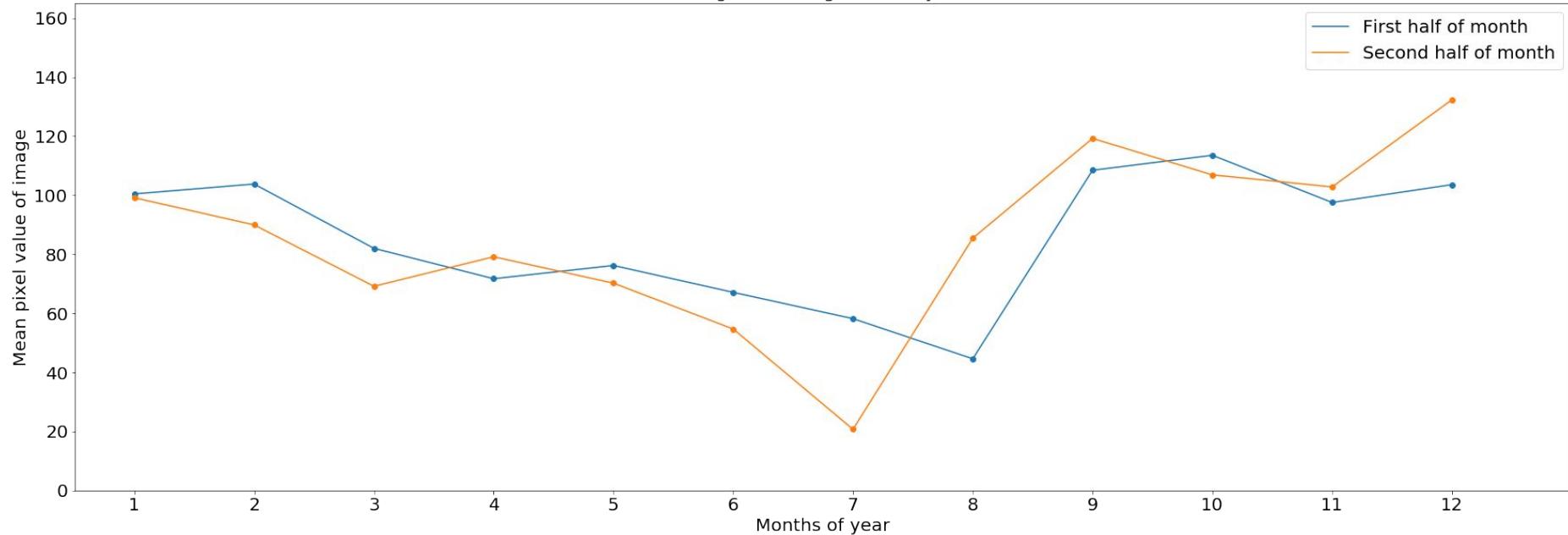
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Image Analysis

Harvesting and sowing trend for year 2017



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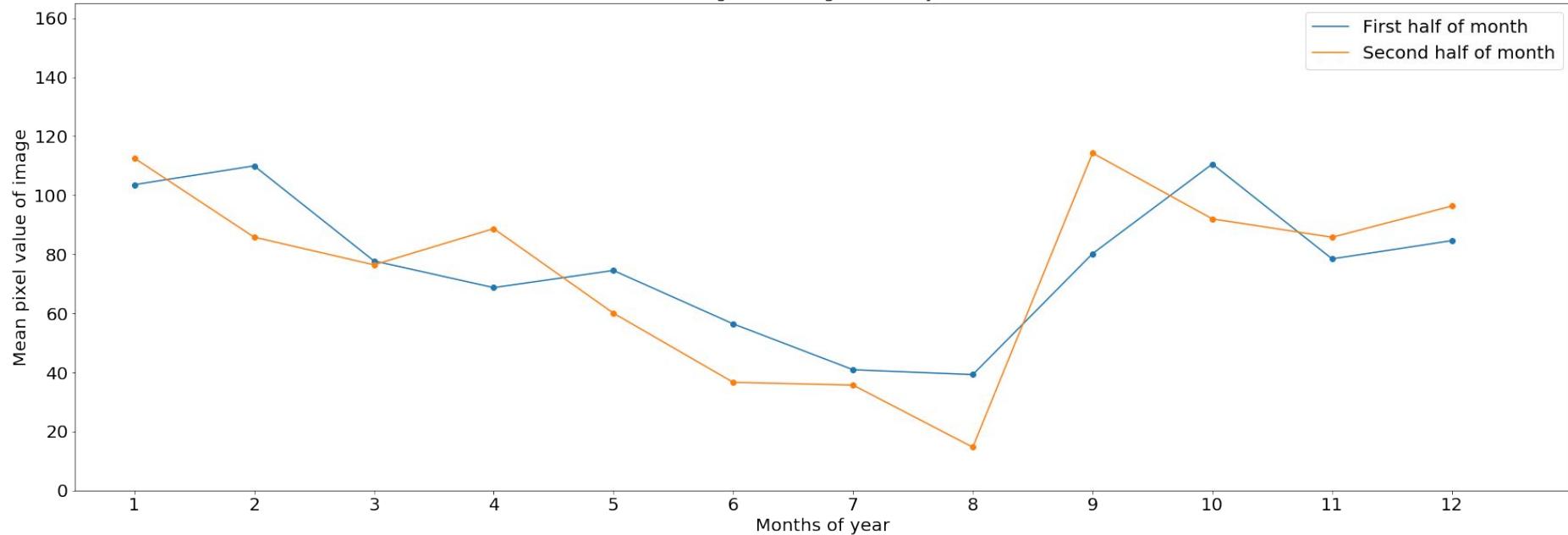
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Image Analysis

Harvesting and sowing trend for year 2018



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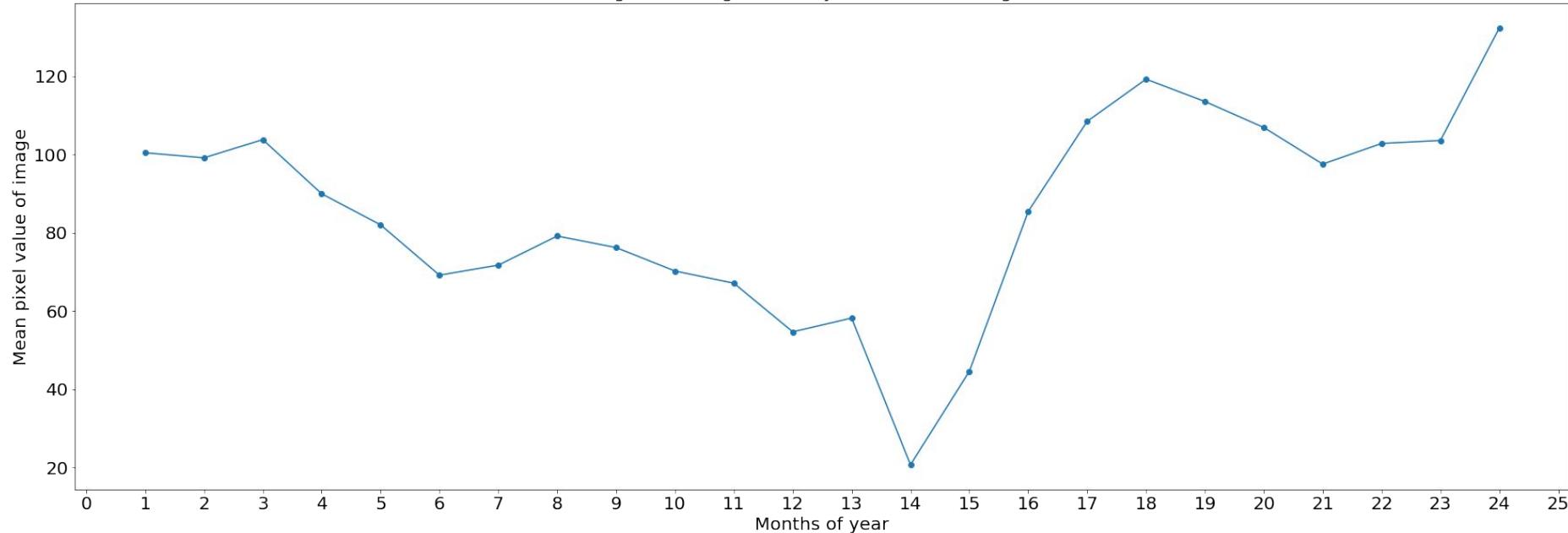
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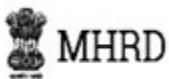


Image Analysis

Harvesting and sowing trend for year 2017 both image combined



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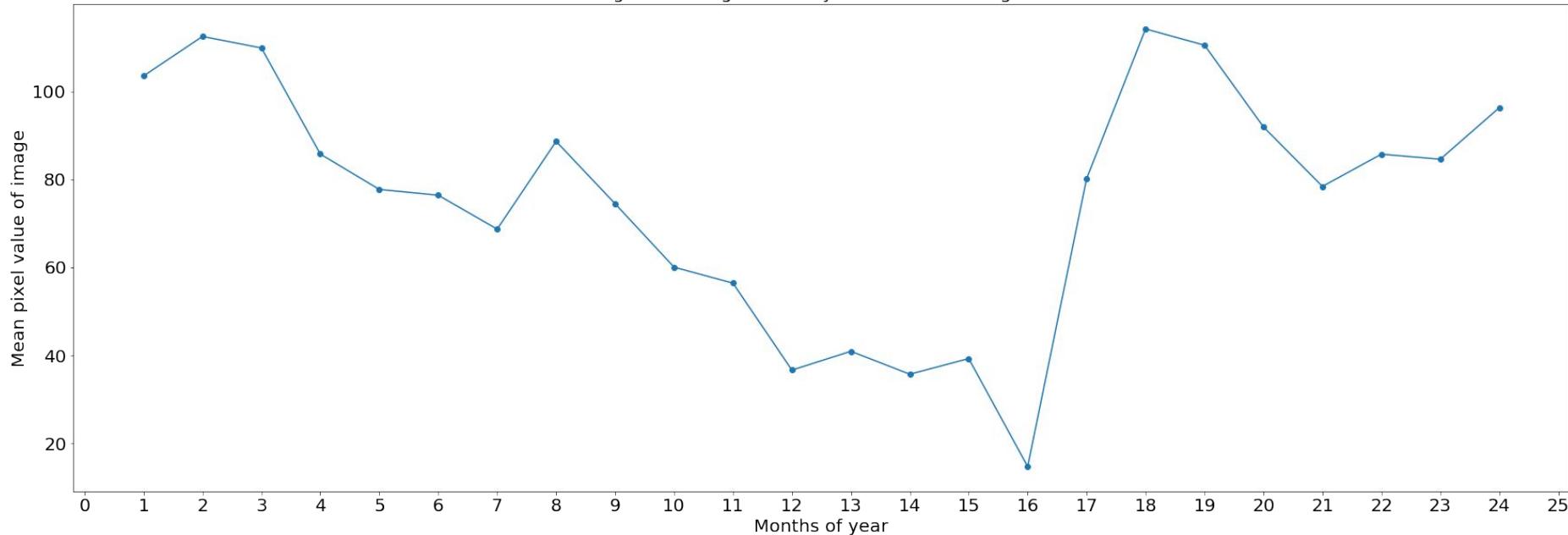
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Image Analysis

Harvesting and sowing trend for year 2018 both image combined



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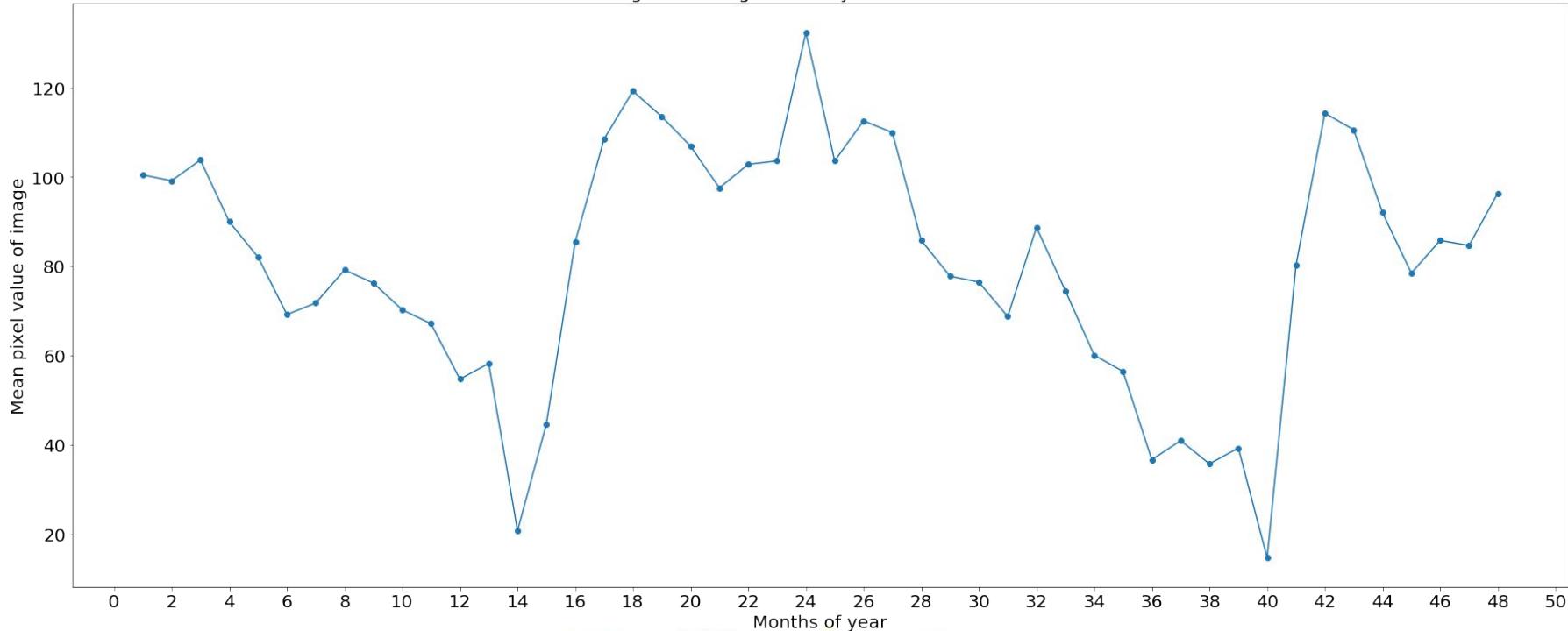
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Image Analysis

Harvesting and sowing trend for year 2017 & 2018 combined



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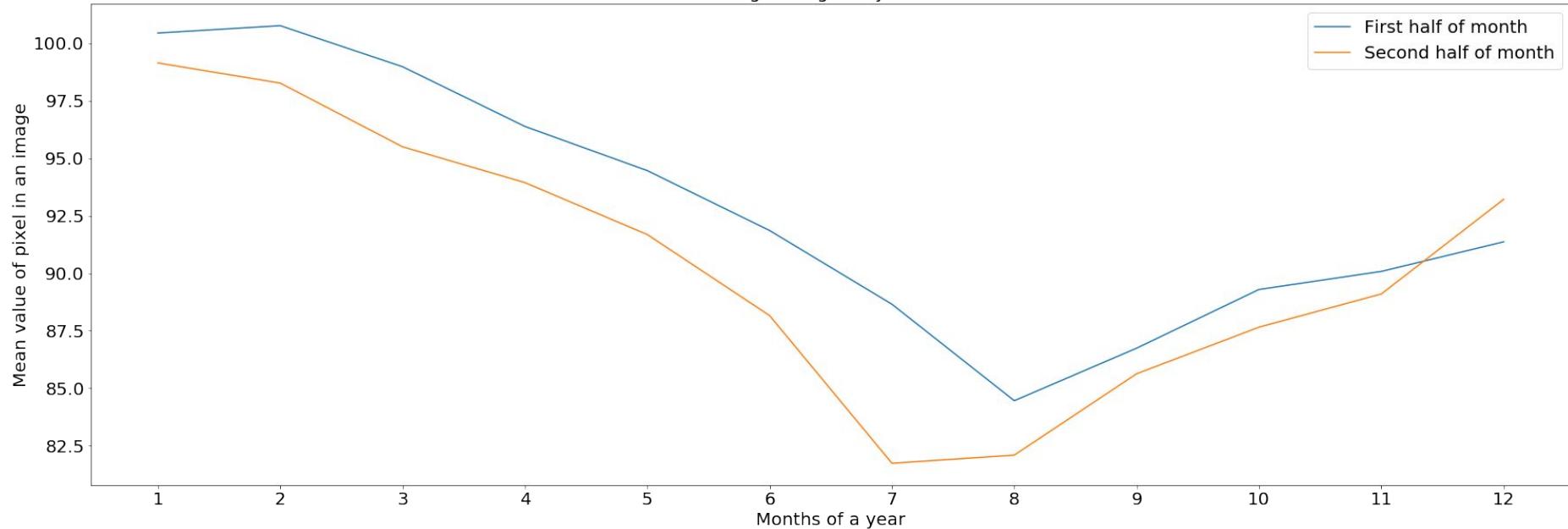
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Image Analysis

Moving average for year 2017



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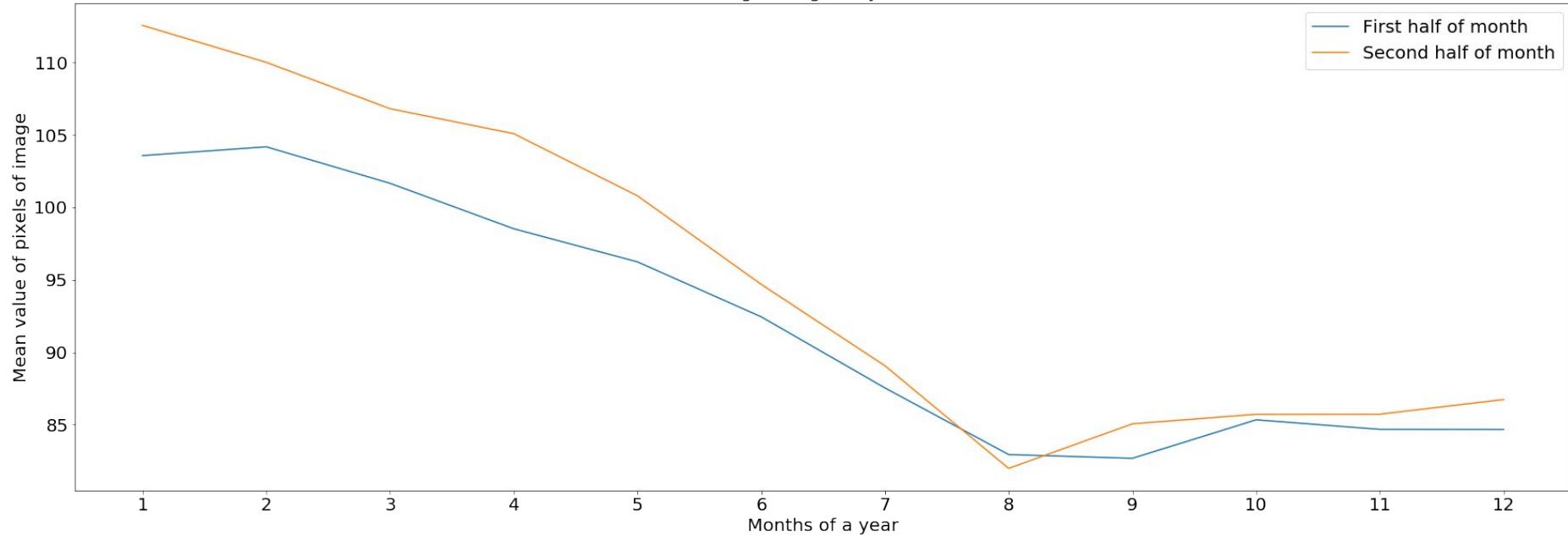
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Image Analysis

Moving average for year 2018



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Approaches

- Deep Neural Networks for Fine tuning.
 - a. Aim was to predict month from Image.
 - b. Inception model used with Dense(1024)->Dropout(0.4)->Dense(12) as additional layers.
 - c. Each Image cropped in 100 equal parts and ImageDataGenerator used to augment the data.
 - d. Trained for 40 epochs.
 - e. Overfitting led to poor results.
- Decompression of tif images
 - a. Various softwares were used to get high resolution RGB image.

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Working method

- Mean Calculation method
 - Mean of RGB values of each pixel are calculated.
 - The mean gives an idea of which crop season is going on.
 - That gives a threshold value to calculate a pixel's information.
 - Higher the mean -> Lower the crop density
 - Lower the mean -> Higher the crop density.

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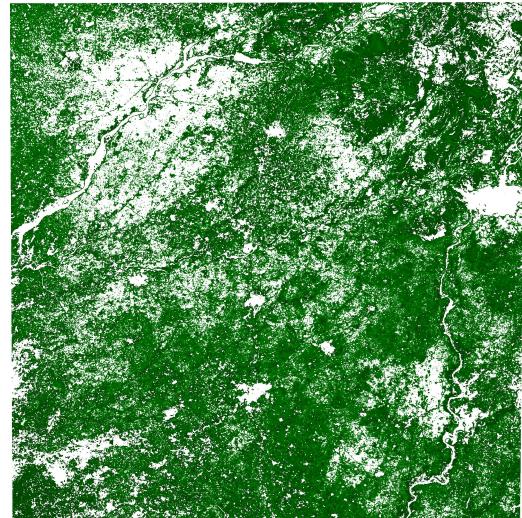
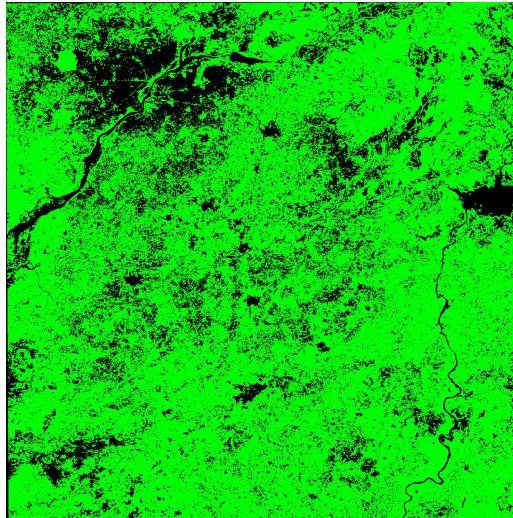
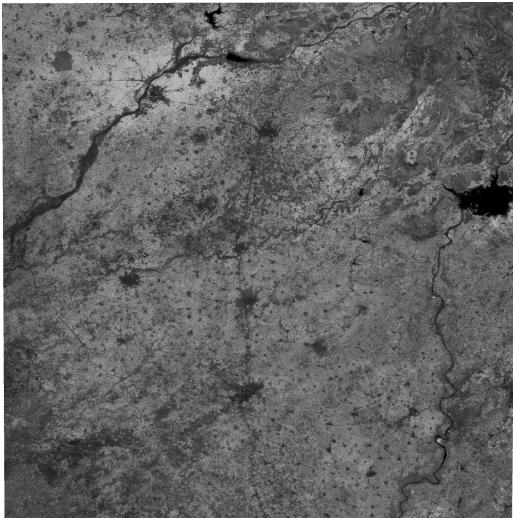


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Final Result 01-2017

3047377



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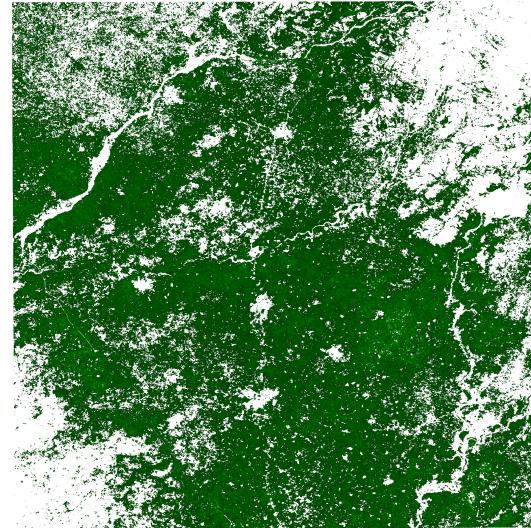
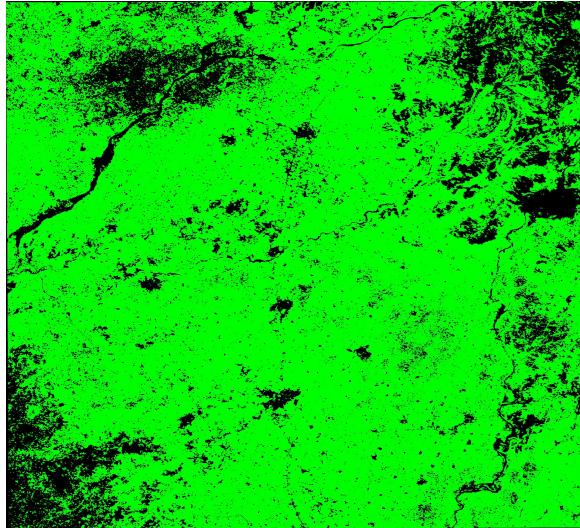
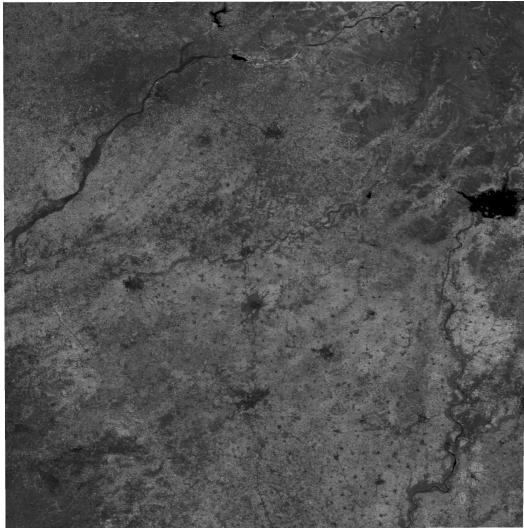


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Final Result 03-2017

2963395



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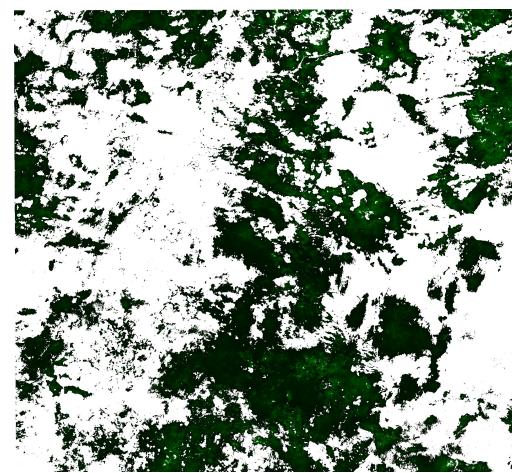
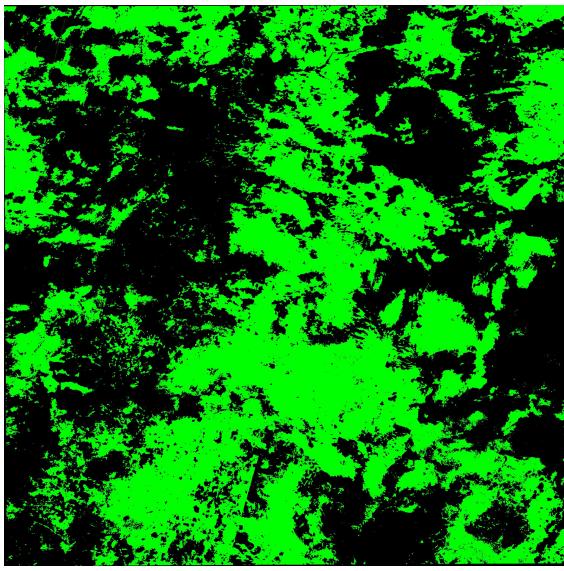
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Final Result

07-2017

4150103



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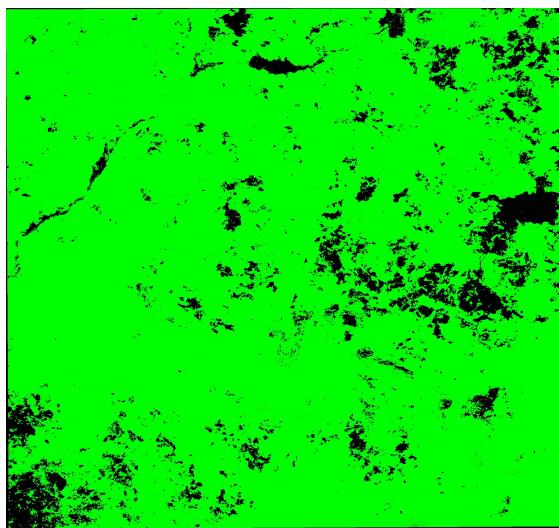


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Final Result 08-2017

3896431



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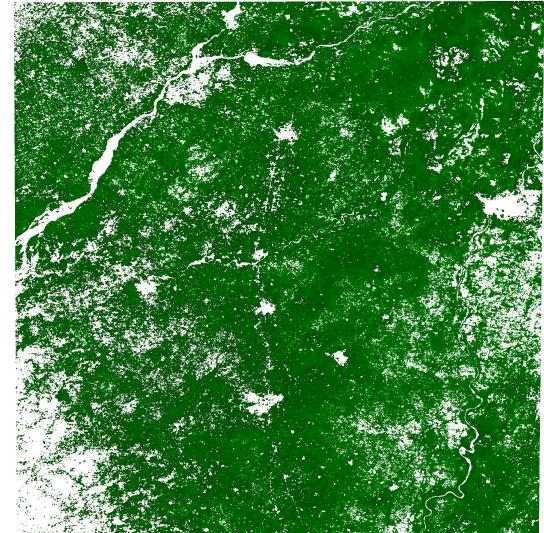
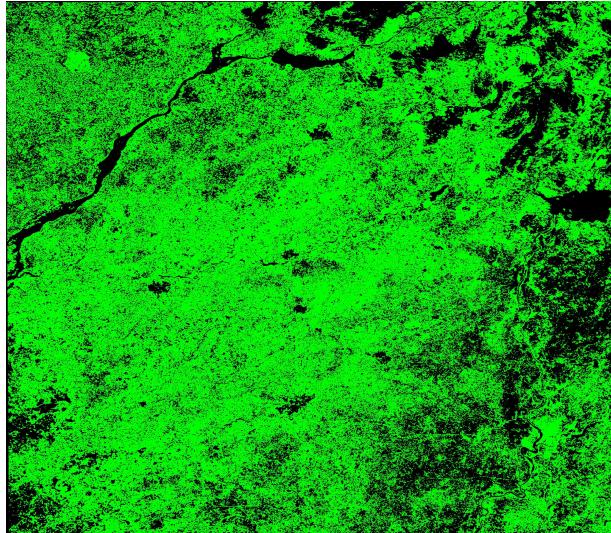
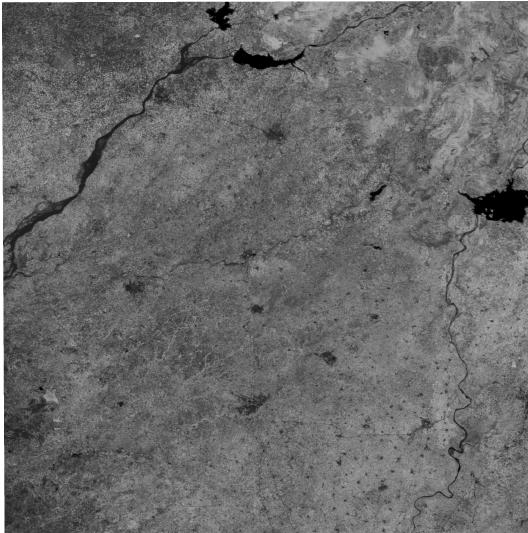


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Final Result 10-2017

2614671



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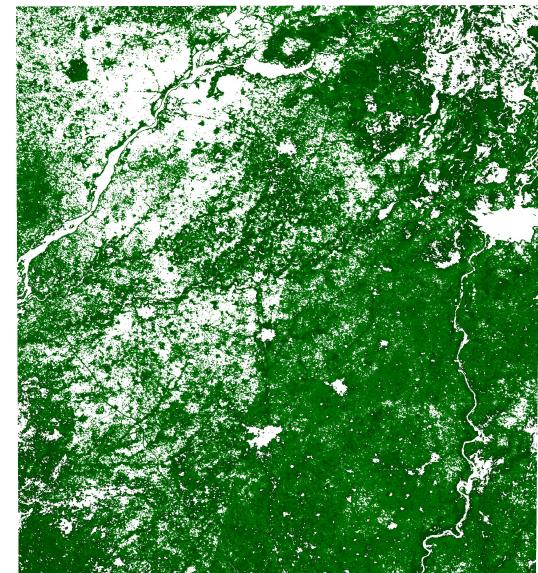
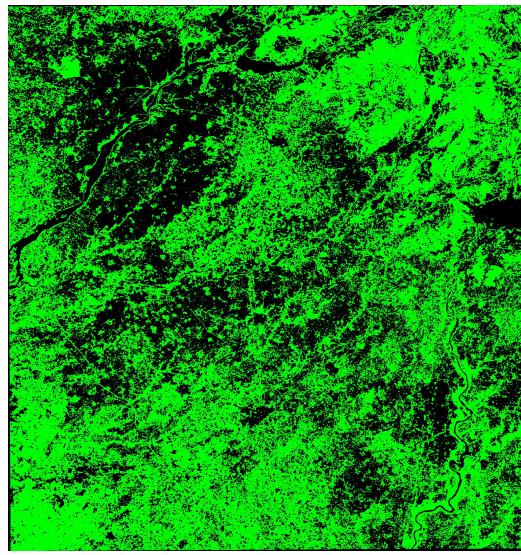
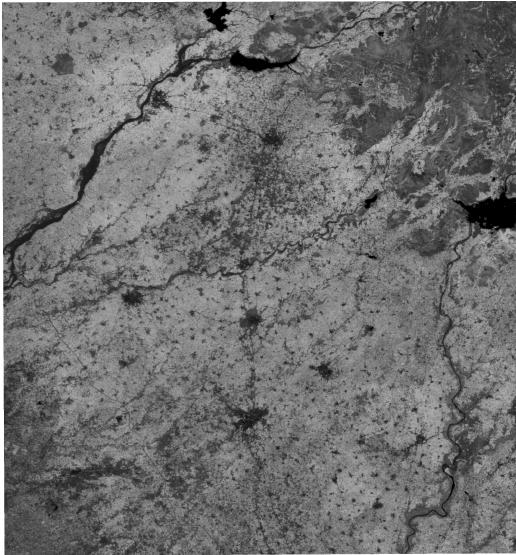


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Final Result 01-2018

3059253



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