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

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

Team No. : T9
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Organisers MHRD MIC Persistent | Platinum Partner aws

Table of contents

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.

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.

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 :-

Image Analysis

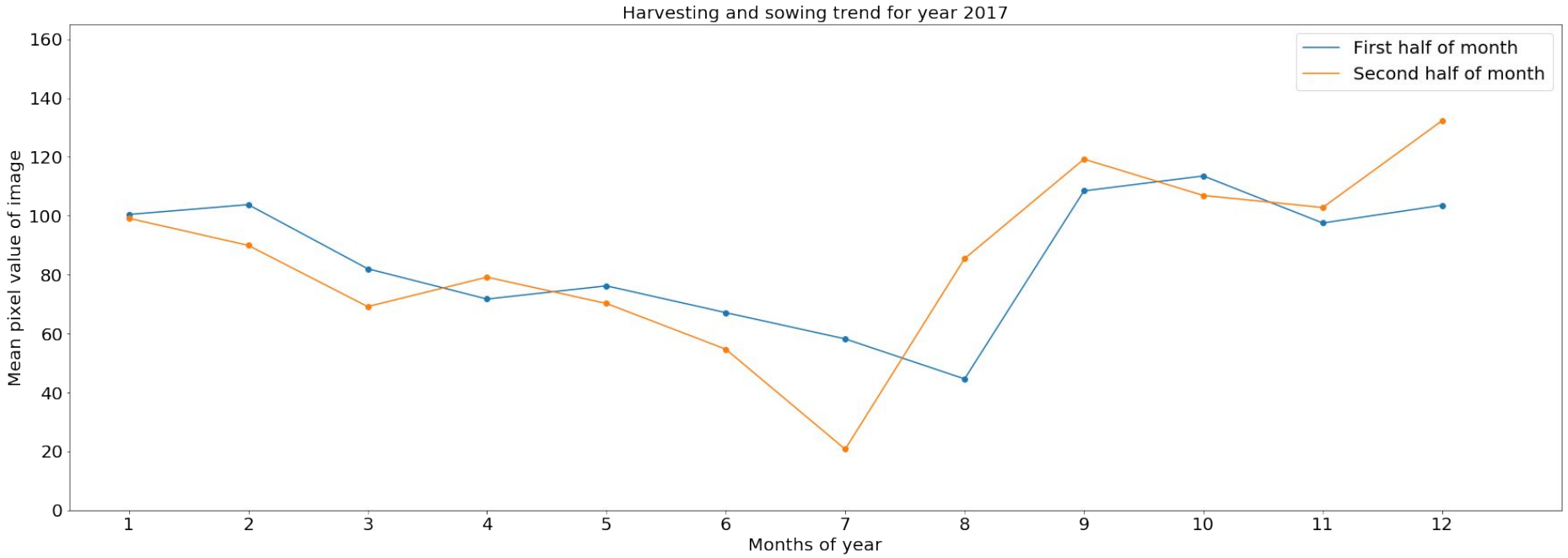


Image Analysis

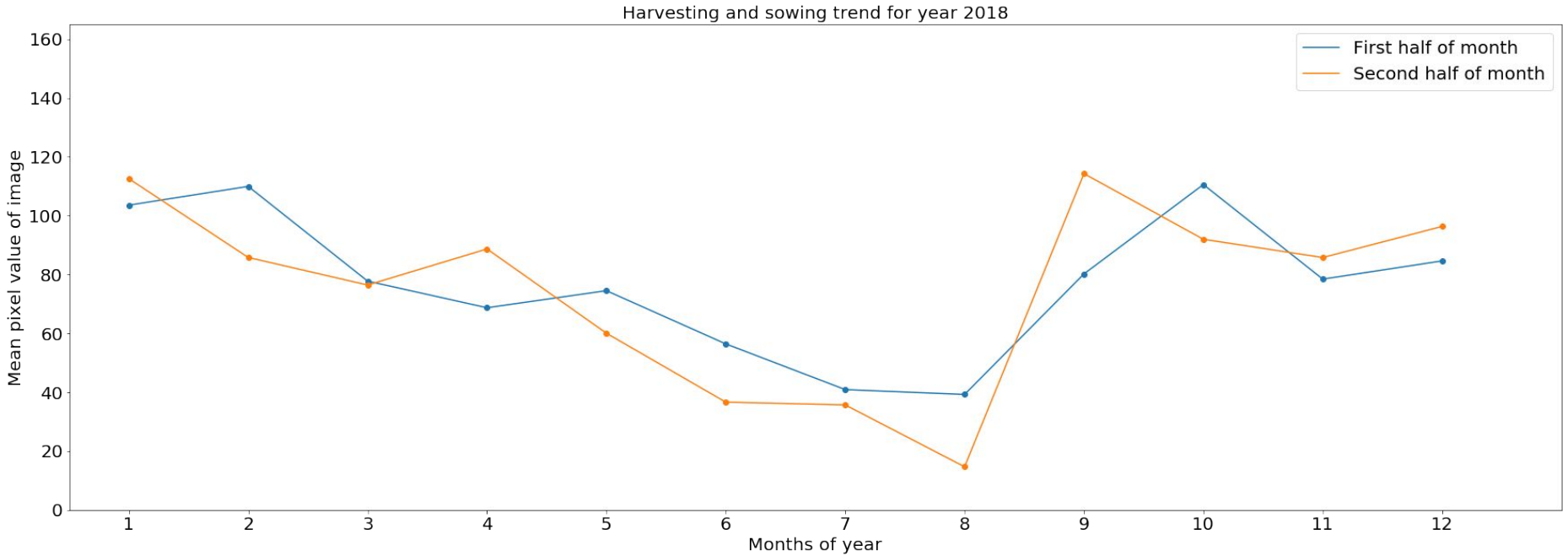


Image Analysis

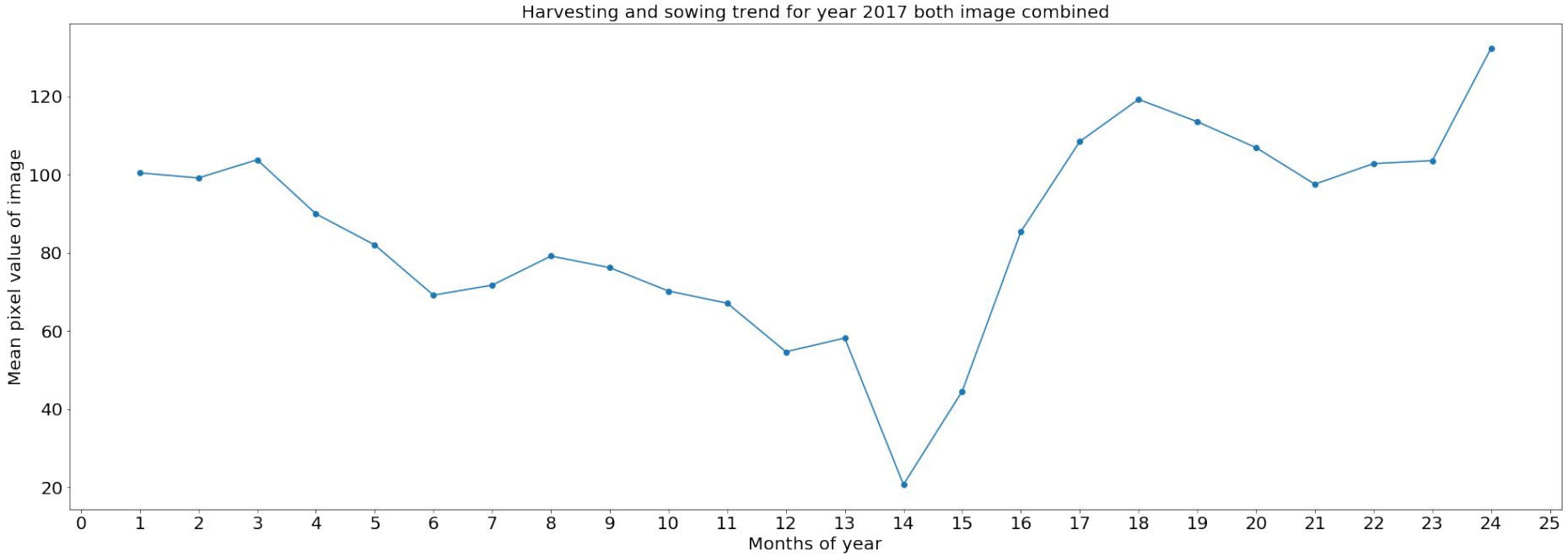


Image Analysis

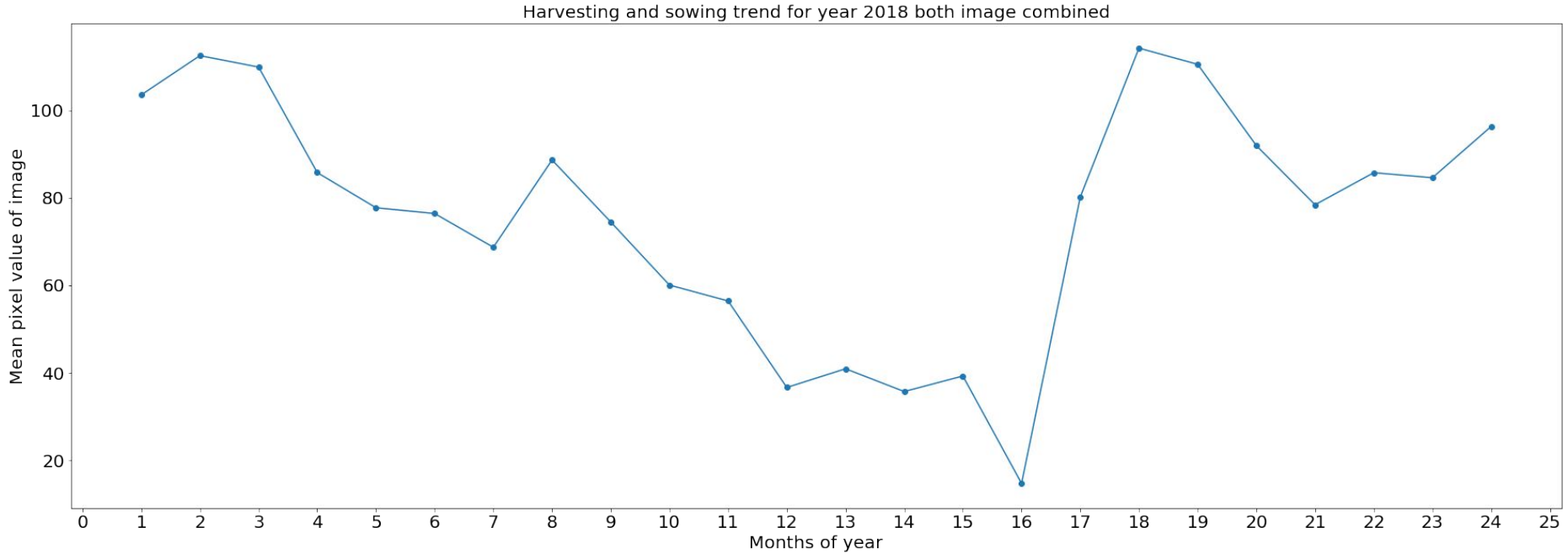
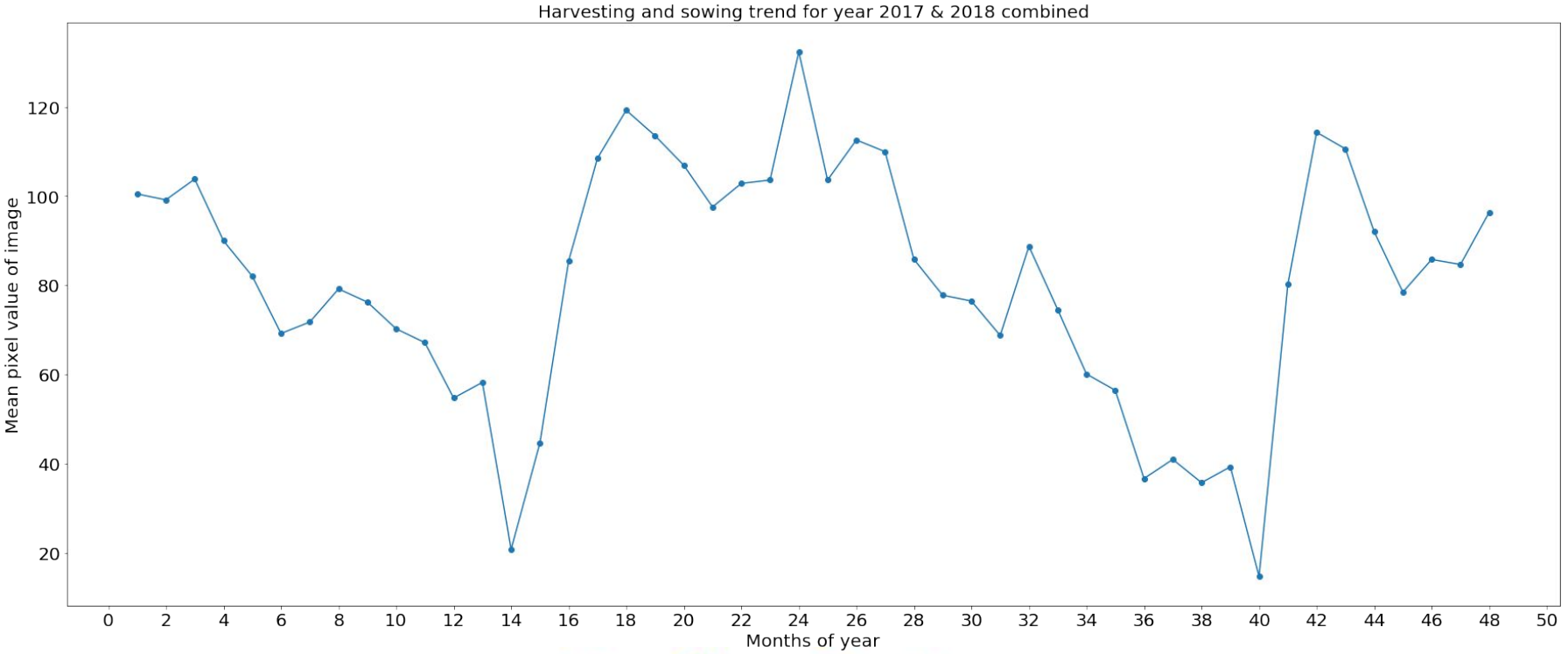


Image Analysis



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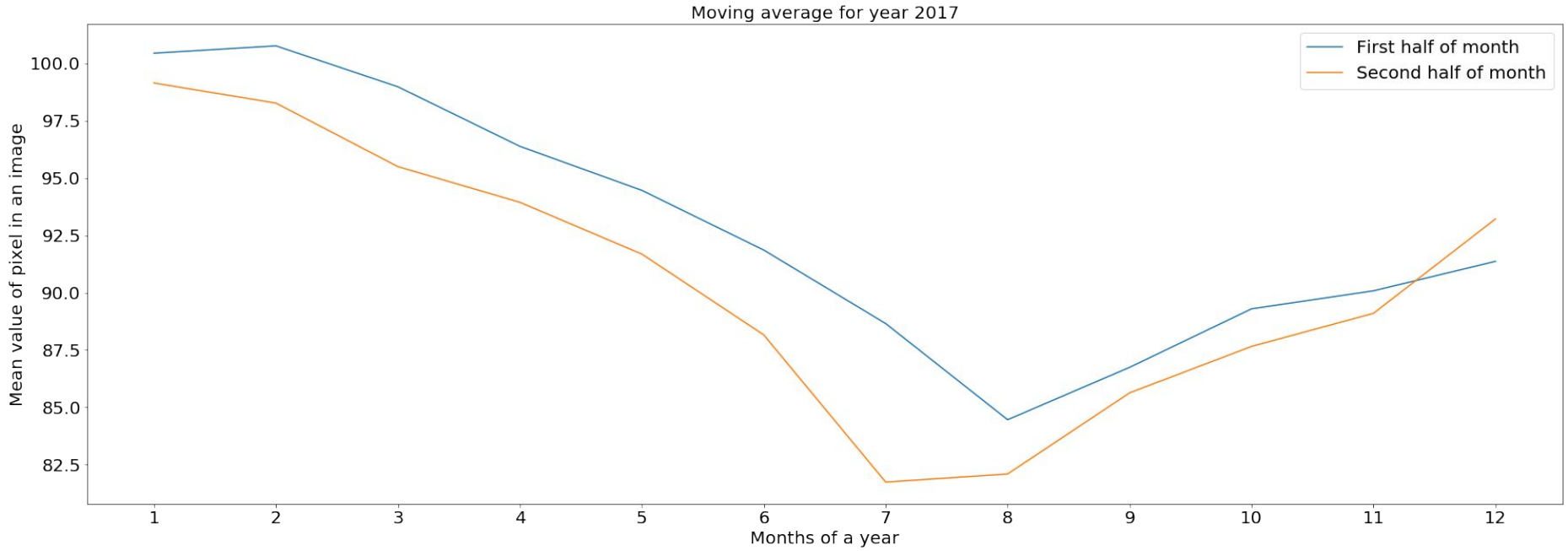
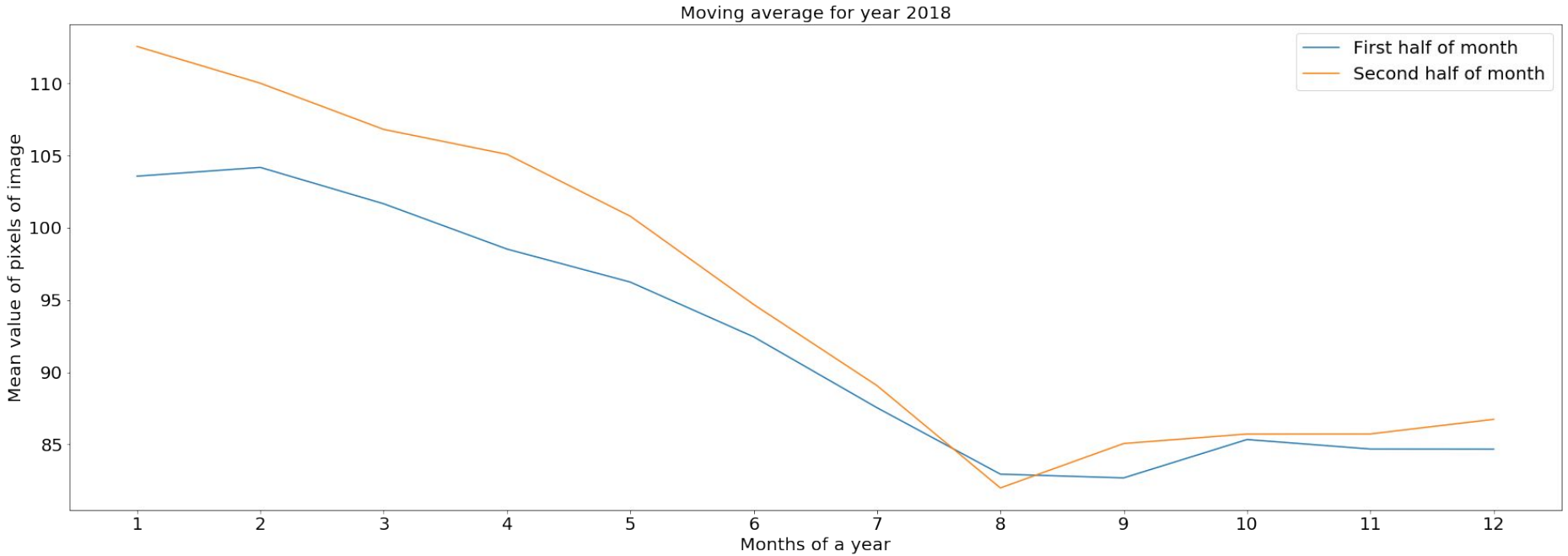


Image Analysis



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.

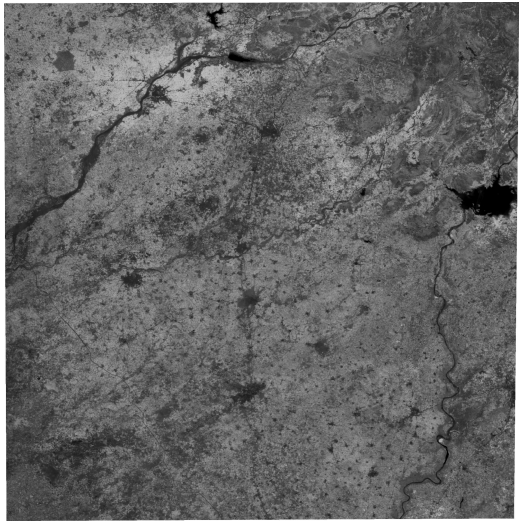
Working method

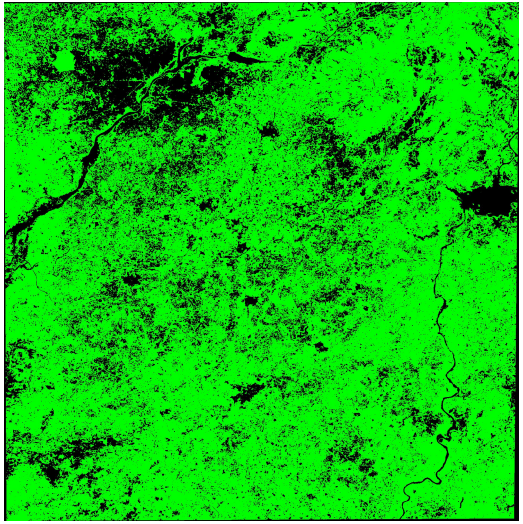
- Mean Calculation method
  - Mean of RGB values of each pixel are calculated.
  - The mean gives an idea of which crop season is going on.
  - That gives a threshold value to calculate a pixel's information.
  - Higher the mean - > Lower the crop density
  - Lower the mean - > Higher the crop density.

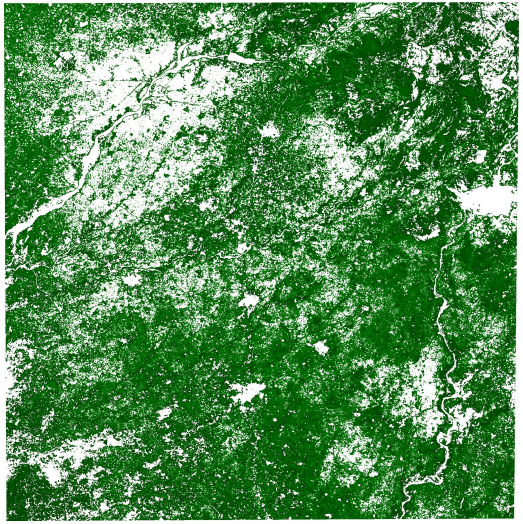
Final Result

01-2017

3047377



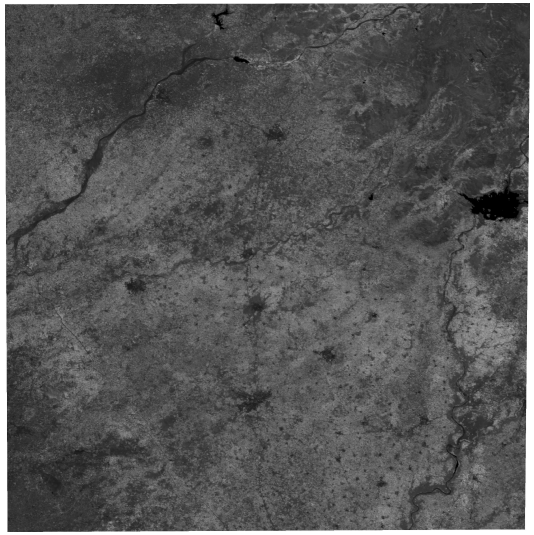


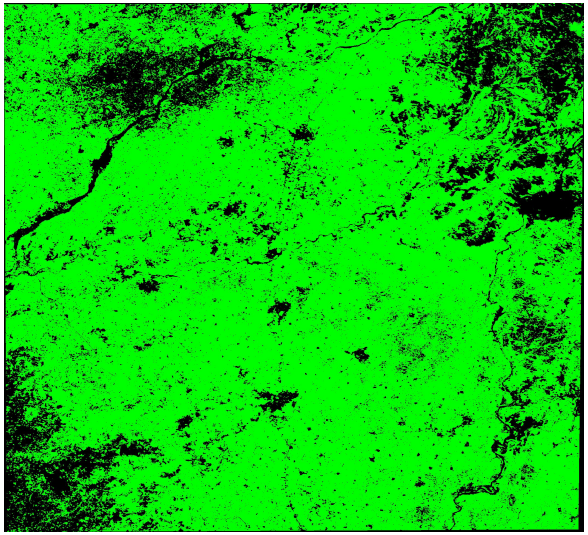


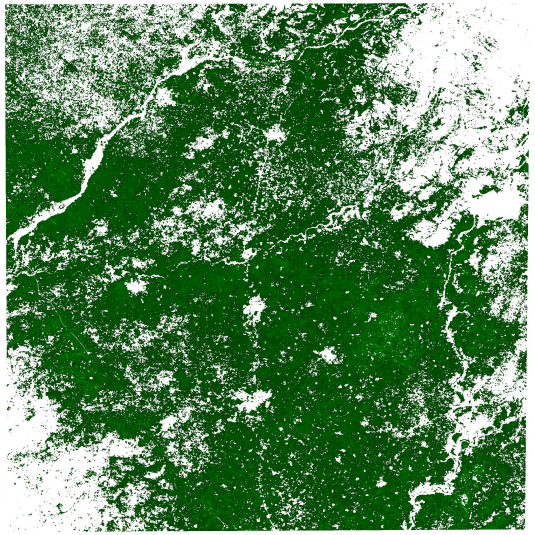
Final Result

03-2017

2963395

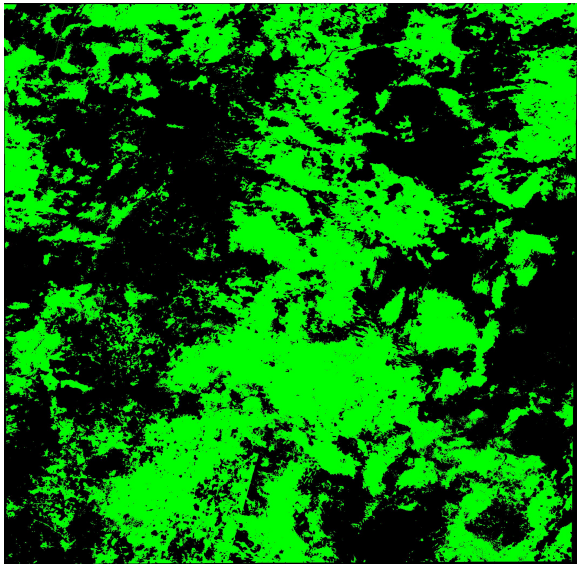


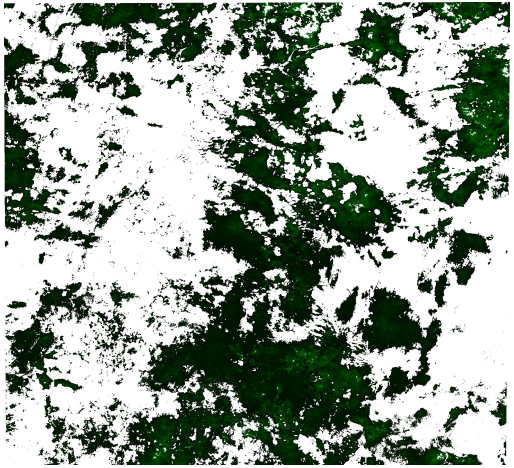




Final Result
07-2017

4150103

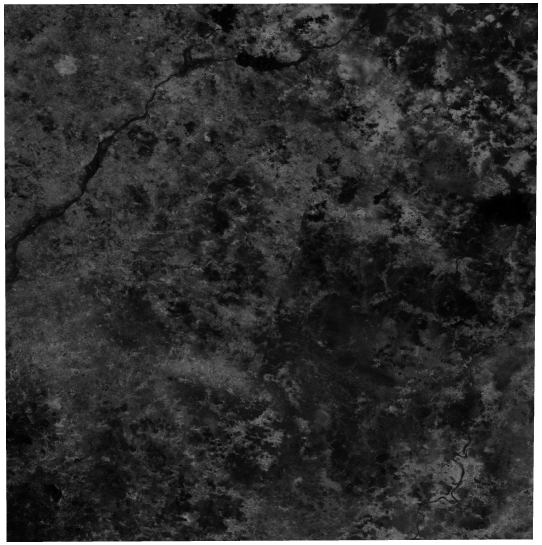


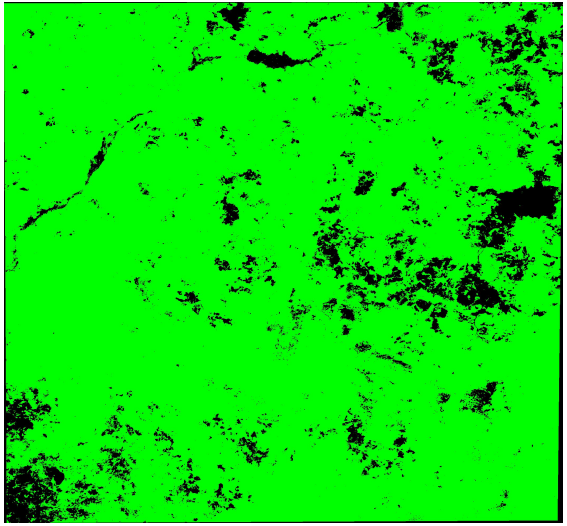


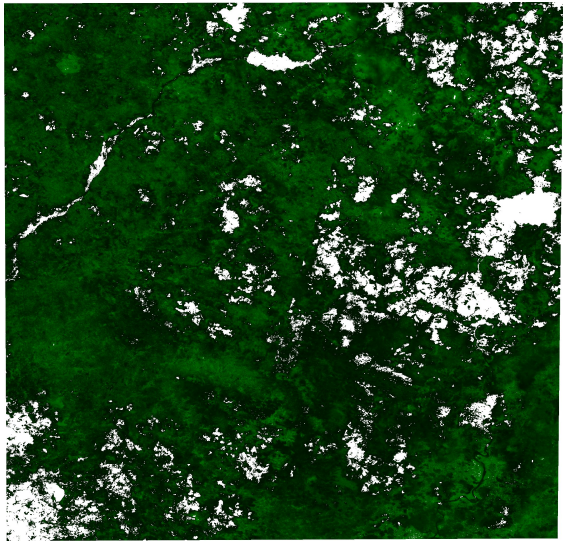
Final Result

08-2017

3896431



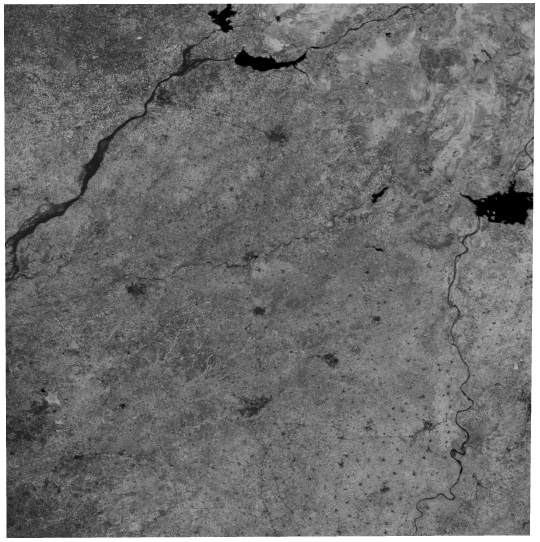


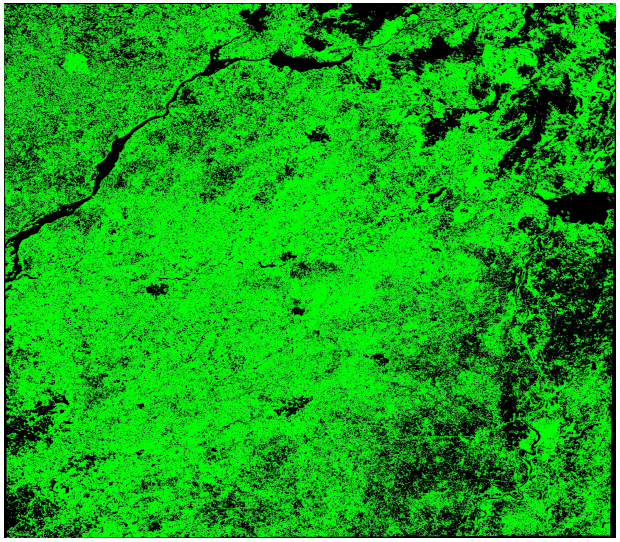


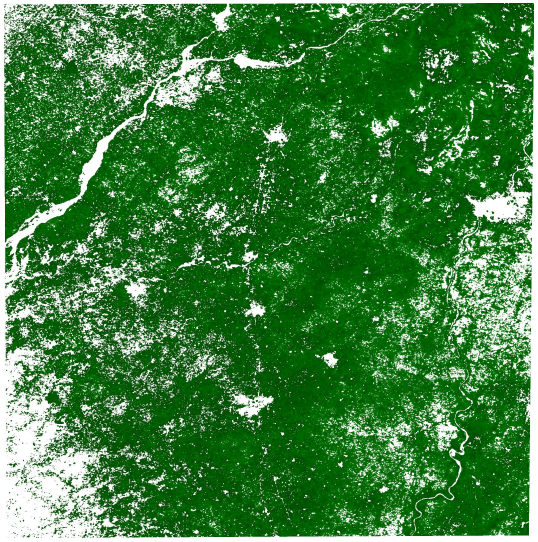
Final Result

10-2017

2614671

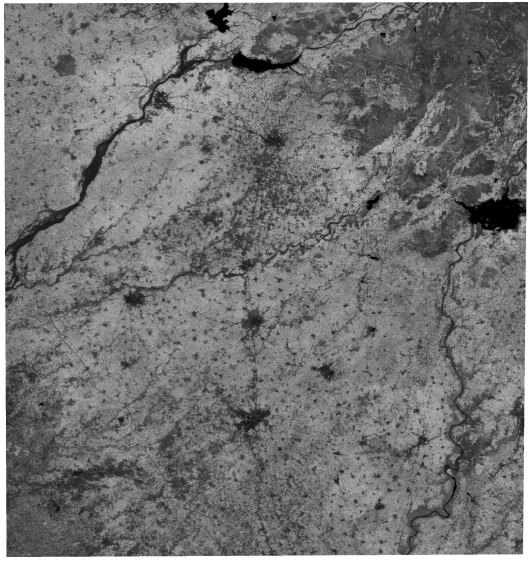


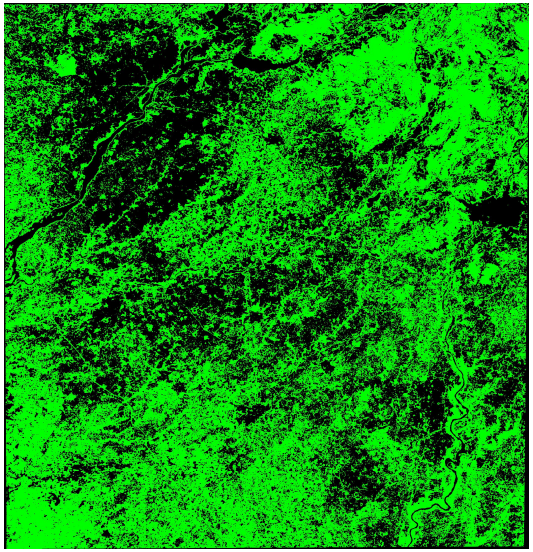


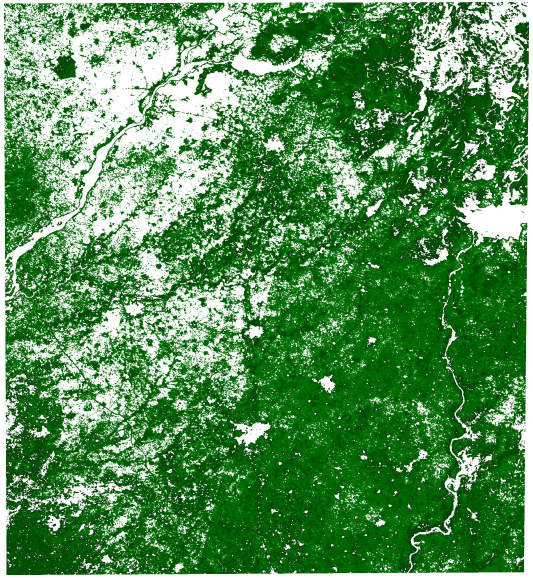


Final Result
01-2018

3059253








THANK YOU
Beach_waale