Forest Fire Detection from Satellite Imagery

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Project Guide

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Contents

Project Introduction

- Forest fire is a major concern as it causes huge damage to environment. Forest fire detection and coming up with optimal solution is a challenge.
- The satellite imagery from Planet.com will help in monitoring the surface bed of earth.
- Imagery of the entire land surface of earth at 3-5 meter resolution are available and a coarse-resolution imagery from Landsat(30 meter pixels) or MODIS (250 meter pixels).

Literature Survey on Project

Literature Survey on Project

Summary of Literature Survey

1. CNN finds many applications but all of them evolve around image classification and instance segmentation problem in machine learning.
2. Algorithm that was proved to be the best is Mask R-CNN for masking the objects found in the image.

Seminar Topics

1. Pawan Phalak - GoogleNet(Smoke Detection with Noise Filteration)
2. Durgendra - Mask R-CNN(Masking over detected patches)
3. Vighnesh - Resnet-50(Train an eye in sky)
4. Veer Abhimanyu - CNN(Patches Detection Pseudo Color Image Processing for infrared forest fire detection)

Seminar Topic-2 Objectives

1. Detecting patches in field where heat-maps give high temperature readings.
2. Detecting nearby local areas to find the sensitivity of incident.
3. Providing an optimal solution recover the fire.

Mask RCNN

- A convolutional neural network (CNN) is mainly for image classification. While an R-CNN, with the R standing for region, is for object detection.
- Mask RCNN is a deep neural network aimed to solve instance segmentation problem in machine learning or computer vision. In other words, it can separate different objects in a image or a video. You give it a image, it gives you the object bounding boxes, classes and masks.

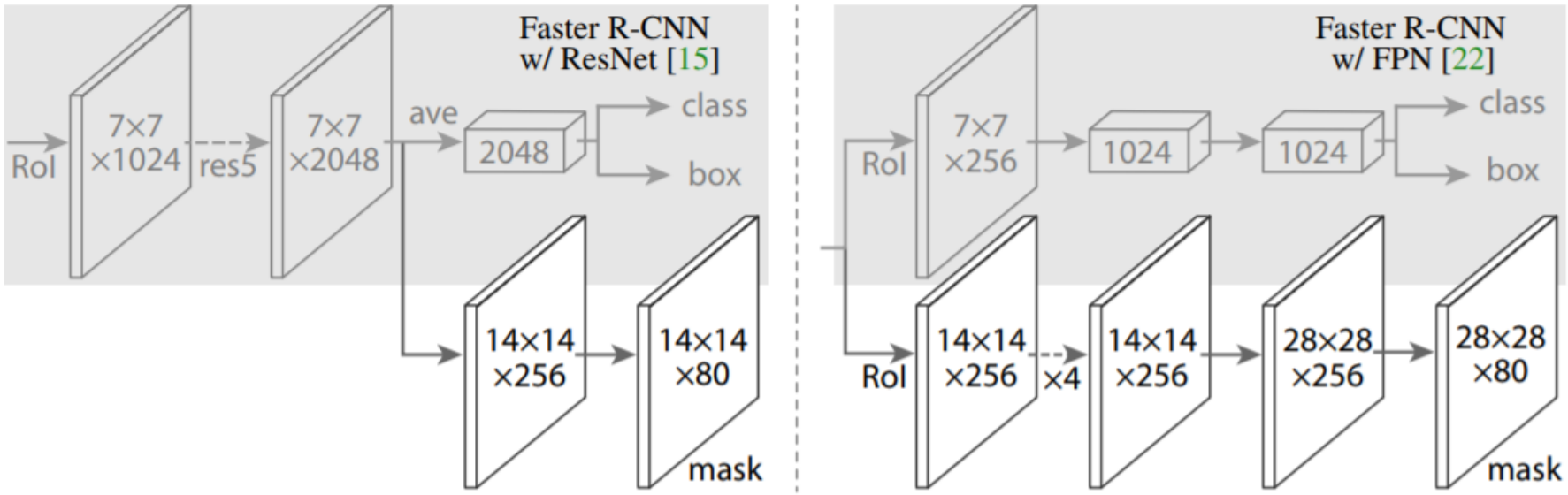
Mask RCNN

Facebook AI Research [7]

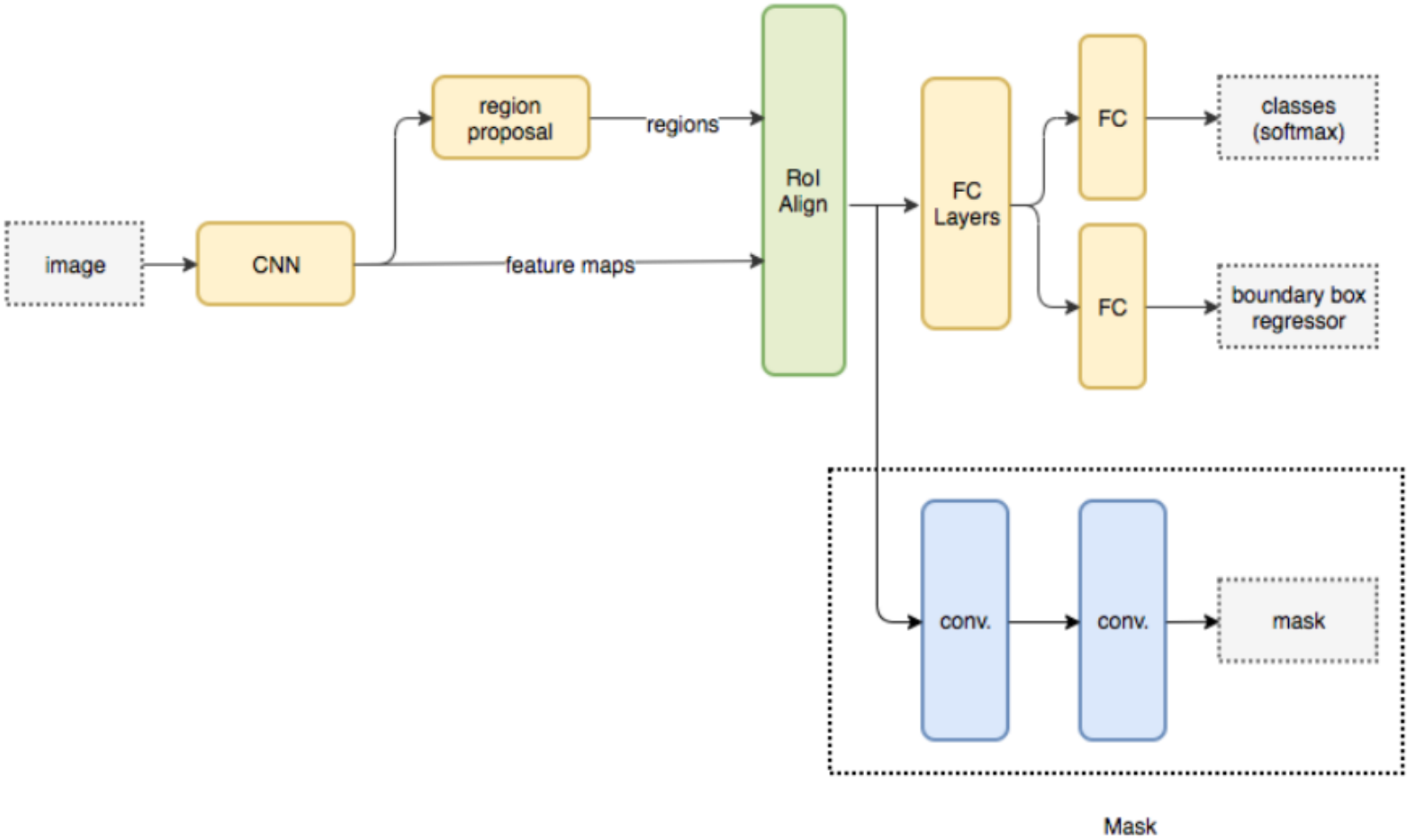
Mask RCNN Working

- Mask R-CNN extends Faster R-CNN to pixel-level image segmentation. The key point is to decouple the classification and the pixel-level mask prediction tasks. Based on the framework of Faster R-CNN, it added a third branch for predicting an object mask in parallel with the existing branches for classification and localization. The mask branch is a small fully-connected network applied to each RoI, predicting a segmentation mask in a pixel-to-pixel manner.

Mask RCNN Working



Mask RCNN Working



Conclusion

- This algorithm is used in forest fire detection.
- Areas prone to fire can be masked using mask RCNN and respective measures will be taken to reduce the possibility of fire.
- Mask RCNN outperforms all existing single mode entries on every task.

Thank You !