MINI PROJECT – II

(2021-22)

IMAGE SEGMENTATION

MID TERM REPORT

Submitted By:

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Branch/Section:

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Submitted To:

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Contents

Abstract

Image segmentation plays an important role in a pre-processing phase of images having as objective a partition of the **image** into components or regions of interest for a more detailed analysis of one or more of these regions

INTRODUCTION

Image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as image objects). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image (see edge detection). Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color , intensity, or texture. Adjacent regions are significantly different with respect to the same characteristic(s).When applied to a stack of images, typical in medical imaging, the resulting contours after image segmentation can be used create 3D reconstructions with the help of interpolation algorithms like marching cubes.

EXISTING SYSTEM

We use image segmentation so that we can group certain pixels together based on certain criteria. How the result of this grouping is used depends on the application.

I work in the field of digital pathology wherein the images are of tissue, captured using microscopes/digital slide scanners. The goal is to analyse these images and calculate certain measurements (like count, area, intensity etc) of certain biological entities (like nuclei) recorded in the image.

(1) Locating and delineating objects of interest.

(2) Making measurements from the delineated objects

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USE OF THE PROJECT

The objective of the Image Segmentation to separate the image into two parts based on some criteria. Typically we're interested in some sort of either edge or region detection. Examples: Given a picture of a college campus, pull out the building outlines Given a picture of a magazine page, distinguish photos from text Given a picture of a check, find the part where they wrote the amount as a number. The most common use is probably feature detection and processing. If you know what the building outline is you can use that to recreate a 3-D model of the building and/or texture that model. If you know where the check amount is, you can pretty reliably use Optical Character Recognition to convert that image into a number.

FUNCTIONAL SPECIFICATION

You would have probably heard about object detection and image localization. When there is a single object present in an image, we use image localization technique to draw a bounding box around that object. In the case of object detection, it provides labels along with the bounding boxes; hence we can predict the location as well as the class to which each object belongs.

Image segmentation results in more granular information about the shape of an image and thus an extension of the concept of Object Detection.

We segment i.e. divide the images into regions of different colors which helps in distinguishing an object from the other at a finer level.

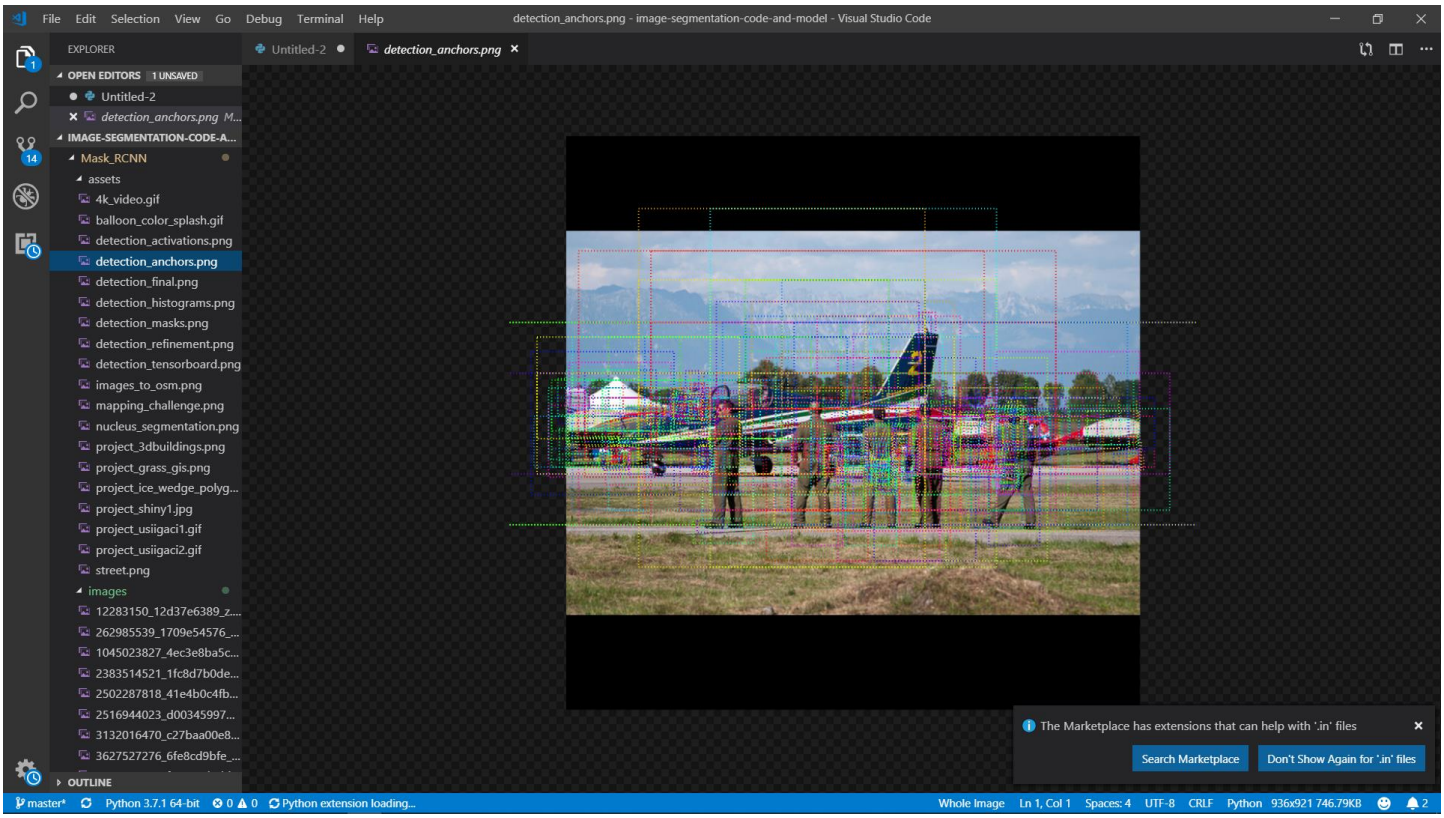
Software Specification:

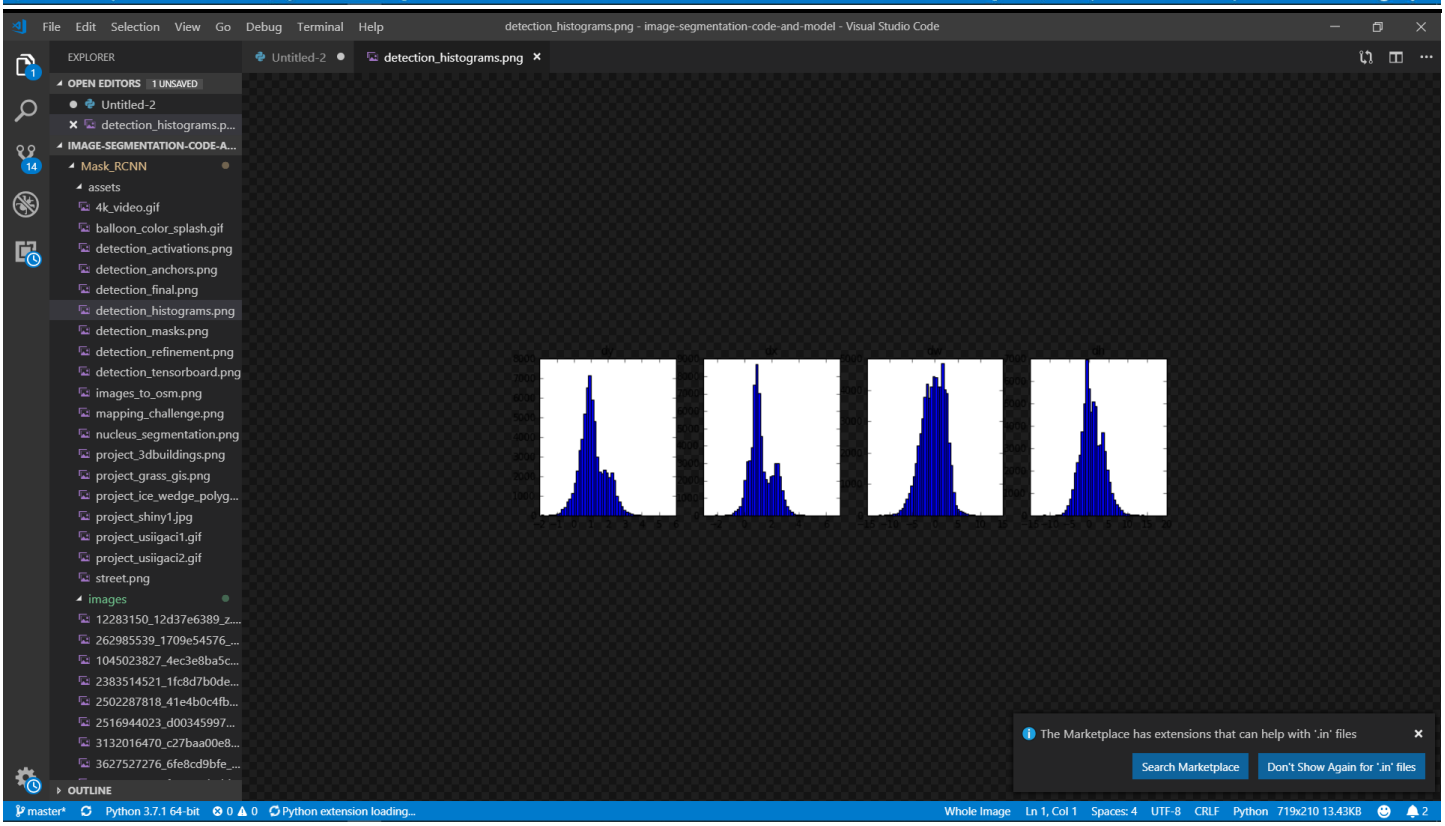
- Language Used : Python , machine Learning
- Database : SQL
- User Interface Design : Jupiter Notebook, Visual Studio Code

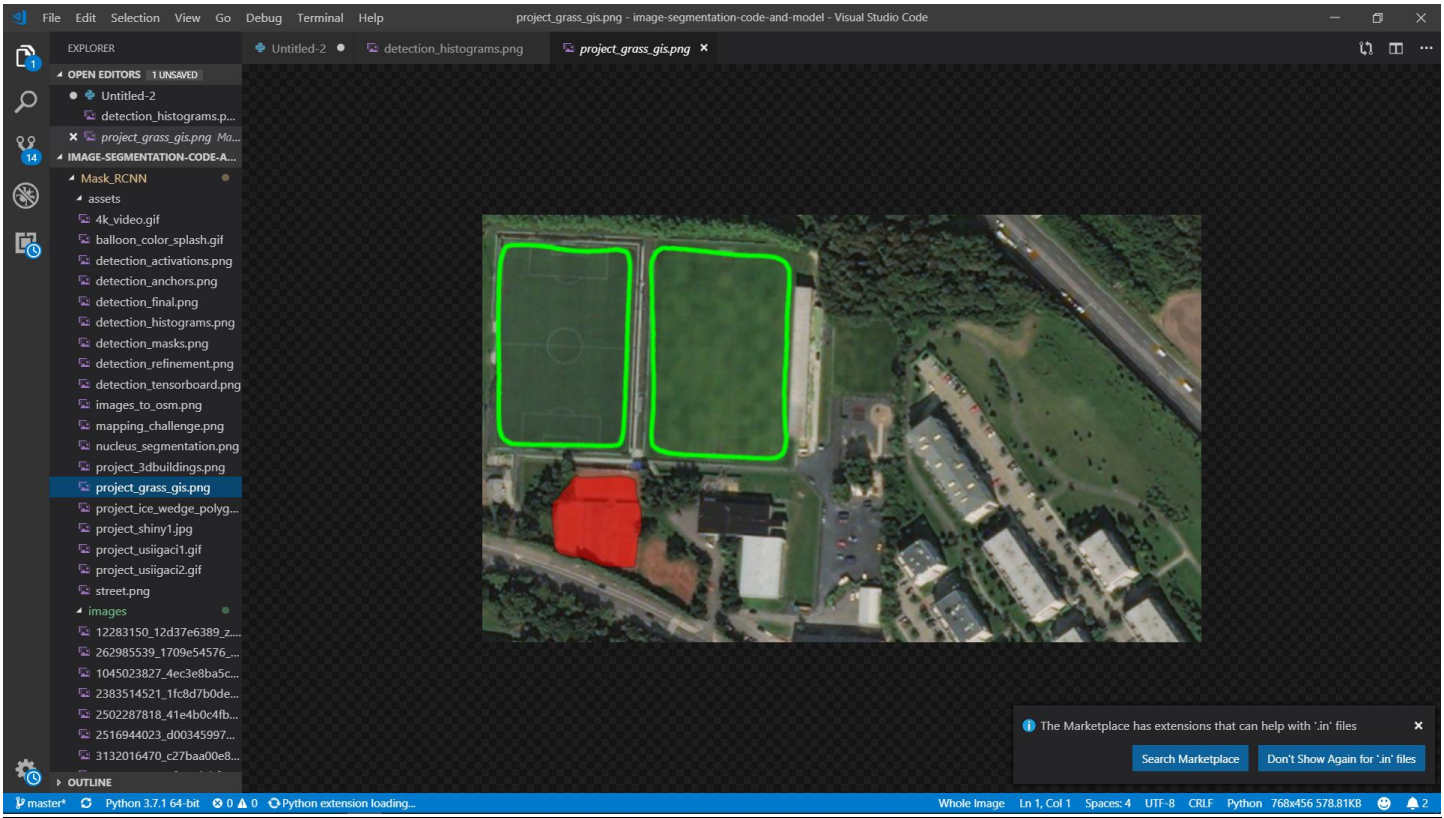
Hardware Requirements:

- Processor : 64-bit, four-core, 2.5 GHz minimum per core
- Operating System : Windows 10,
- RAM : 8GB
- Hard disk : 1024 GB
- Display : 1280 x 768 screen resolution

Implementation details with screenshots



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project_grass_gis.png - image-segmentation-code-and-model - Visual Studio Code
EXPLORER
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detection_histograms.png
project_grass_gis.png
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balloon_color_splash.gif
detection_activations.png
detection_anchors.png
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project_usiigaci1.gif
project_usiigaci2.gif
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Don't Show Again for '.in' files
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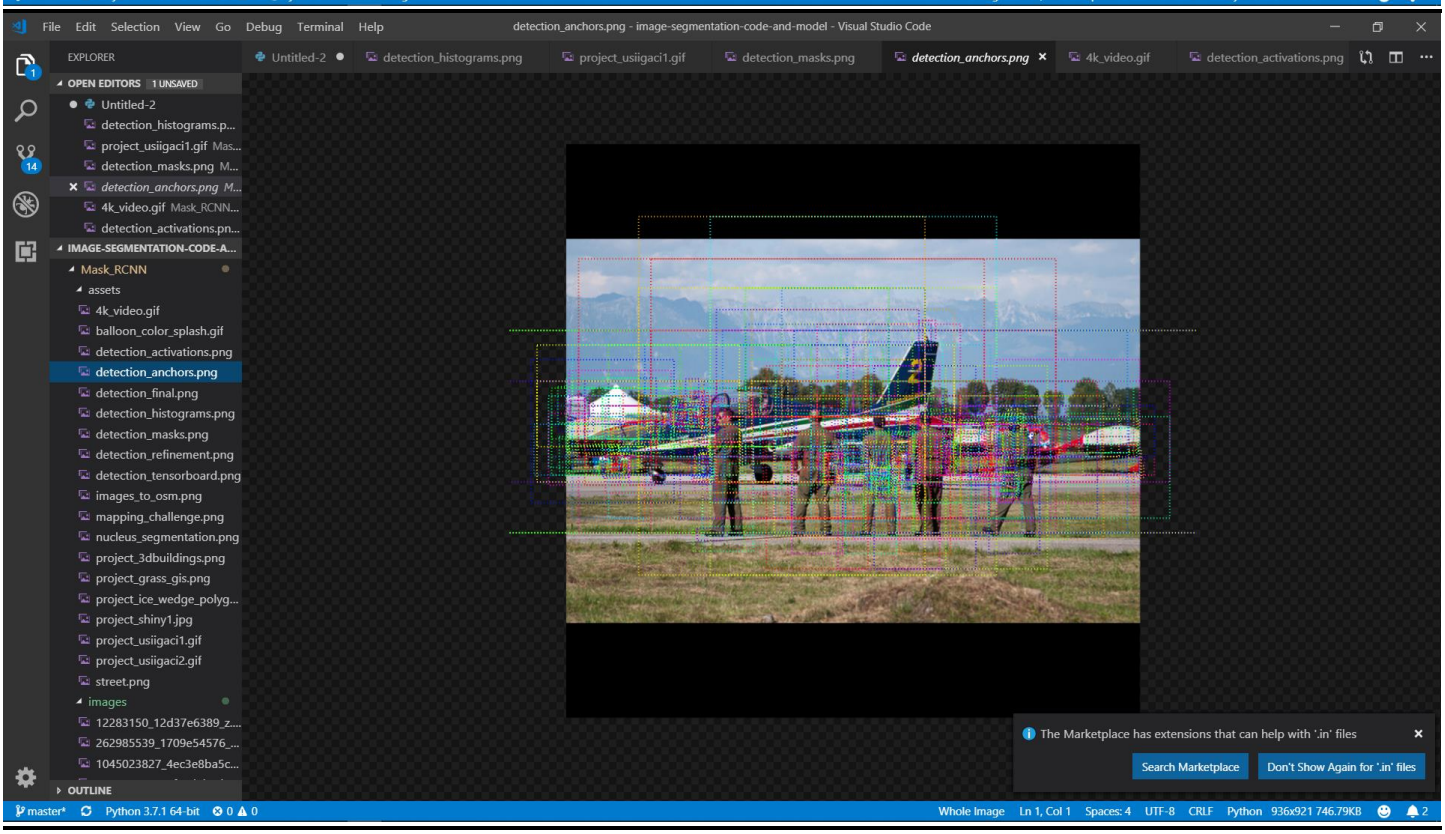
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detection_anchors.png - image-segmentation-code-and-model - Visual Studio Code
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OUTLINE
The Marketplace has extensions that can help with '.in' files
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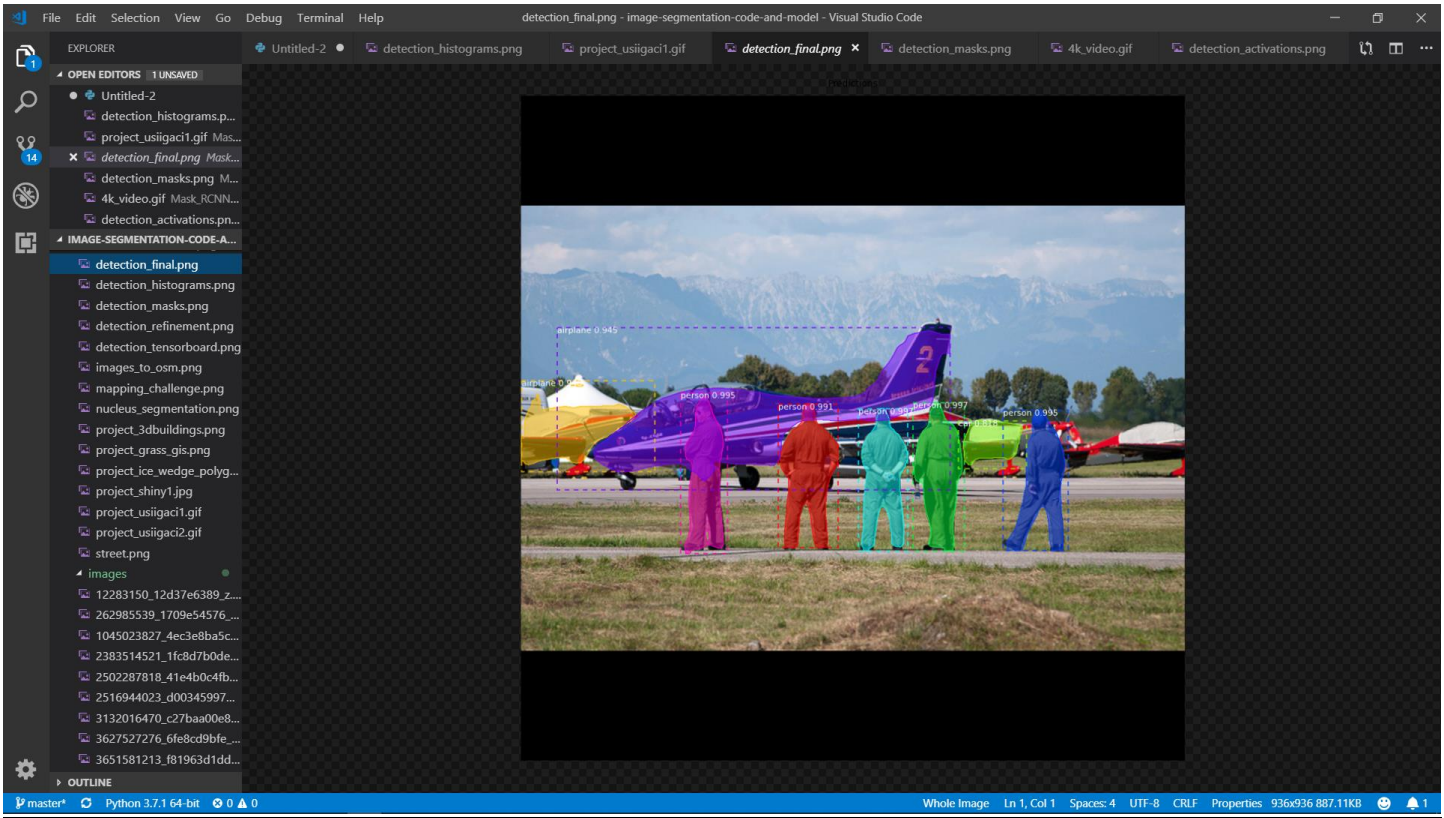
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detection_masks.png
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Python 3.7.1 64-bit
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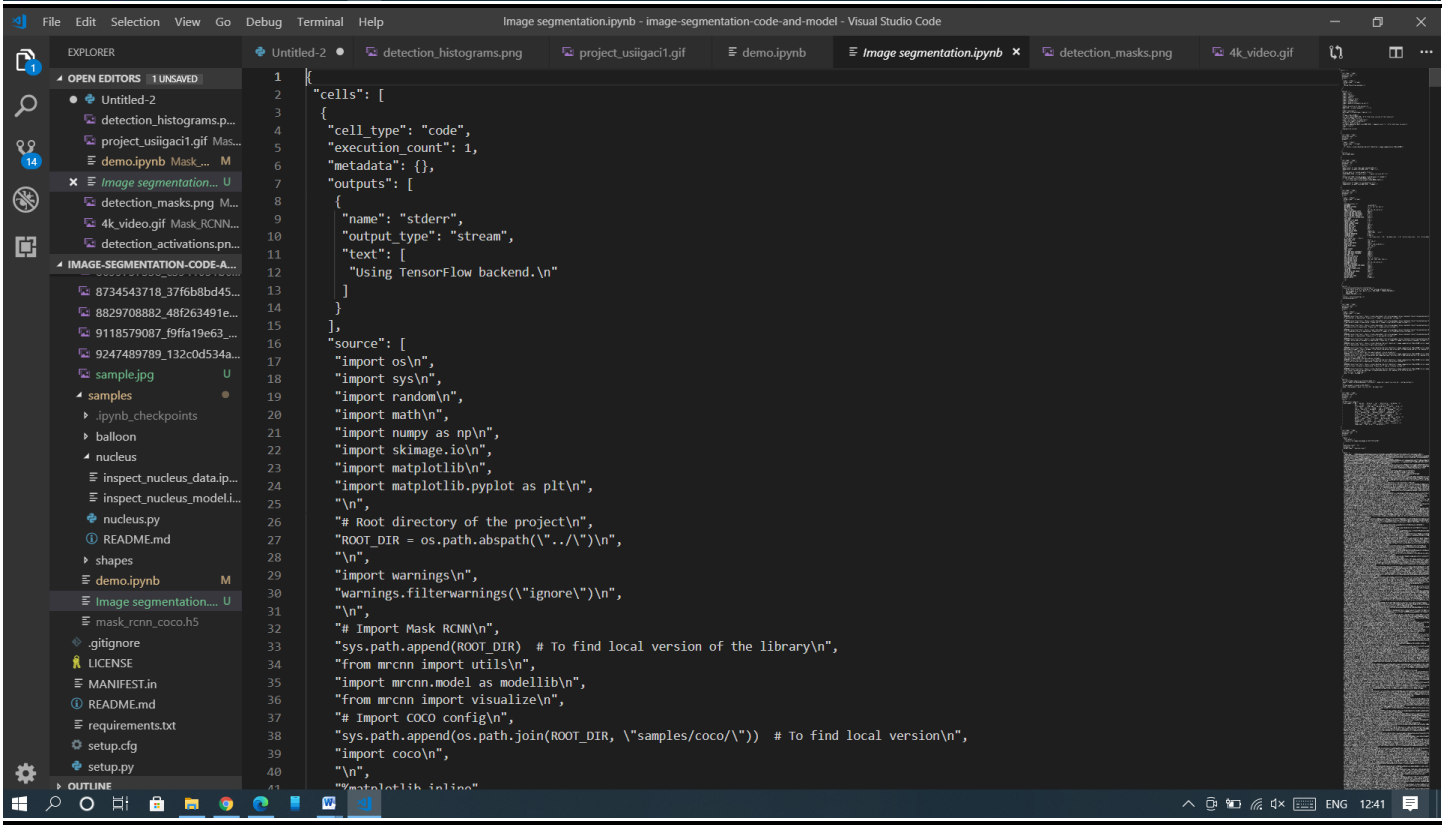
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Image segmentation.ipynb - image-segmentation-code-and-model - Visual Studio Code
EXPLORER
OPEN EDITORS 1 UNSAVED
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Image segmentation.ipynb
detection_masks.png
4k_video.gif
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balloon
nucleus
shapes
demo.ipynb
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ENG
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FUTURE SCOPE

The future of image processing will involve scanning the heavens for other intelligent life out in space. Also new intelligent, digital species created entirely by research scientists in various nations of the world will include advances in image processing applications. Due to advances in image processing and related technologies there will be millions and millions of robots in the world in a few decades time, transforming the way the world is managed. The future image processing applications of satellite based imaging ranges from planetary exploration to surveillance applications.

Progress till Date & The Remaining work

65% of the work is completed up to date and for the further work history the above screenshots are shown.