



# Graph Theory Innovative Work Proposal - Image Segmentation Using MaxFlow Augmenting Paths Algorithm

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## Image Segmentation

In [digital image processing](#) and [computer vision](#), 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.


## Applications

Some of the practical applications of image segmentation are:

- [Content-based image retrieval](#)
- [Machine vision](#)
- [Medical imaging](#), including [volume rendered](#) images from [computed tomography](#) and [magnetic resonance imaging](#).
  - Locate tumors and other pathologies
  - Measure tissue volumes
  - Diagnosis, study of anatomical structure
  - Surgery planning
  - Virtual surgery simulation
  - Intra-surgery navigation
- [Object detection](#)
  - [Pedestrian detection](#)
  - [Face detection](#)
  - Brake light detection
  - Locate objects in satellite images (roads, forests, crops, etc.)
- [Recognition Tasks](#)
  - [Face recognition](#)
  - [Fingerprint recognition](#)
  - [Iris recognition](#)
- [Traffic control systems](#)
- [Video surveillance](#)
- [Video object co-segmentation and action localization](#)

## Implementation

The problem of Image segmentation can be divided mainly into 3 sub-problems of unsupervised, semi-supervised and supervised image segmentation and there are several



algorithms for all of these sub problems and also many algorithms which are highly domain specific.

For the innovative work I want to implement the Max Flow Augmenting paths graph based segmentation algorithm for semi-supervised models.

In this model the user will provide an image and will mark foreground and background seeds in the provided image, Using the MaxFlow Augmenting paths algorithm I will detect the foreground and background in the image.