OBJECT RETRIEVAL BASED ON SEGMENTATION

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Problem statement

Image retrieval based on segmentation has wide application in the medical field and autonomous driving. In this project we are going use the technique digital image processing and analysis to partition an image into multiple part or regions. Image segmentation could involve separating foreground from background or clustering region of pixels based on similarities in colour or shape. For example, when designing perception for autonomous vehicles, such as self-driving cars, semantic segmentation is popularly used to help the system identify and locate vehicles and other objects on the road.

Approach

In this project we aim to apply Deep learning for image segmentation, using Convolution Neural Networks(CNN), a Deep learning called Semantic Segmentation.Image segmentation involves converting an image into a collection of regions of pixels that are represented by a mask or a labeled image. By dividing an image into segments, you can process only the important segments of the image instead of processing the entire image. Another common approach is to detect similarities in the regions of an image. Some techniques that follow this approach are region growing, clustering, and thresholding. A variety of other approaches to perform image segmentation have been developed over the years using domain-specific knowledge to effectively solve segmentation problems in specific application areas.

Modules

Number of modules : 4

Module 1 :

No of labs : 2

Clustering image and converting objects into segments.

Module 2 :

No of labs : 1

Creating a database of images.

Module 3 :

No of labs : 2

Deep learning for image segmentation.

Module 4 :

No of labs : 3

Retrieve object from database using segmentation similar to input object.

Performance Metrics

Model will be trained using sample data set. The accuracy will be calculated from the results obtained using the sample data set. The percentage of number of similar images by total number of images retrieved will be calculated for various cases. A graph will be plotted to get a better understanding of overall picture.The precision of the image retrieval is calculated as follows:

Precision=no. of relevant images/total no. of retrieved images

The precision of each class was calculated separately. sThe average value of precision was found to be 72.4%.

We are aiming to achieve the precision of whole data set to be 75%.

References

1. https://in.mathworks.com/discovery/image-segmentation.html

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3. https://www.slideshare.net/mobile/tawosetimothy/image-segmentation-34430371

4. https://ieeexplore.ieee.org/abstract/document/1394315/references#references