Using Gaussian mixture models for image segmentation

Image segmentation is the process of partitioning a digital image into multiple image segments. The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyse. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. Nowadays, image segmentation finds many applications in Object detection, Face recognition, and Traffic control systems.

Objective: To do the image segmentation task, we are planning to use our **probabilistic models like GMM**. People have explored the field of image segmentation using GMM, and one of the significant issues was feeding the spatial information to our GMM model. Many people have come up with different ideas, like using some complex distributions and feeding the spatial information to our Model. One of the practical and exciting approaches we found was that instead of taking the direct image, we take a saliency map of the image and then feed it to our Model. This paper talks about the same. So we decided to try to implement this paper and explore more into this field under the supervision of **Professor S. R. Mahadeva Prasanna.**

Paper Abstract: The Gaussian mixture model (GMM) is a versatile technique for image segmentation and classification. However, GMM does not take into account the spatial information, which is one of its main limitations. Without considering the image content, several authors introduced global spatial information from neighbouring pixels into GMM. The human visual system-based saliency map approach increases the image regions with high perceptive information. In this paper, we propose a new model that extends the traditional GMM with image content-based spatial information derived from saliency maps. The proposed approach has a number of benefits, including being simple to integrate into the Expectation Maximisation algorithm for parameters estimation, which has a little impact on computational cost. Results of experiments presented to the general audience. Berkeley database results show that, in terms of accuracy and computational time, the suggested method performs better than the state-of-the-art methods.

Team members:

1. Chidaksh Ravuru (200010046)
2. Sudeshna Merugu (200010050)
3. Prarthan R Talwar (200020032)
4. Shivam Pradip Tirmare (200020045)