**LITERATURE SURVEY**

**Statistical Machine Learning**

**Image Processing**

**By-Aryan Raj Chaudhary[E23CSEU0607], Rohan Kumar Singh[E23CSEU0627],**

**Kunal Kumar Singh[E23CSEU0639]**

**1. Image Segmentation Using Deep Learning: A Survey**  
**Authors**: Shervin Minaee, Yuri Boykov, Fatih Porikli, Antonio Plaza, Nasser Kehtarnavaz, Demetri Terzopoulos  
**Publisher**: N/A (Journal or Conference not mentioned)  
**Year**: 2020  
**Summary**:  
This paper provides a comprehensive review of image segmentation approaches using deep learning. Image segmentation is a fundamental task in image processing and computer vision, with wide-ranging applications such as scene understanding, medical image analysis, robotic perception, video surveillance, augmented reality, and image compression. The paper reviews a broad spectrum of pioneering works in semantic and instance-level segmentation, including methods such as fully convolutional pixel-labeling networks, encoder-decoder architectures, multi-scale and pyramid-based approaches, recurrent networks, visual attention models, and generative models in adversarial settings. The authors discuss the similarities, strengths, and challenges of these models, evaluate commonly used datasets, report on performance results, and suggest promising future research directions.

**2. A Survey on the New Generation of Deep Learning in Image Processing**  
**Authors**: Licheng Jiao, Jin Zhao  
**Publisher**: IEEE Access  
**Year**: 2019  
**DOI**: 10.1109/ACCESS.2019.2956508  
**License**: CC BY 4.0  
**Summary**:  
This survey discusses the advancements in deep learning techniques applied to image processing. The paper covers the new generation of deep learning methods and their role in addressing key challenges in various image processing tasks. The authors focus on innovations in architectures, training techniques, and applications, offering a comprehensive overview of the state-of-the-art deep learning models used for tasks such as object detection, image classification, segmentation, and enhancement. The paper also highlights the evolution of deep learning from traditional methods to modern architectures and explores their effectiveness in real-world image processing applications.

**3. Survey of Supervised Learning for Medical Image Processing**  
**Authors**: Abeer Aljuaid, Mohd Anwar  
**Publisher**: SN Computer Science  
**Year**: 2022  
**Volume**: 3, Article Number 292  
**Published**: 17 May 2022  
**Summary**:  
This survey article explores the application of supervised learning techniques in medical image processing. It focuses on various supervised learning methods and their effectiveness in solving challenges related to medical image analysis, such as image classification, segmentation, and detection. The paper provides an overview of recent advancements in supervised learning algorithms and discusses their applications in medical imaging tasks, including the identification of diseases, organ segmentation, and treatment planning. The authors also discuss the benefits, limitations, and future directions for research in this field.***4. Related Articles and Research Papers***

1. In June 2023, the College of Technology published a research article titled ‘**Advances in Artificial Intelligence for Image Processing’** by Sampath Boopathi, Binay Kumar Pandey, and Digvijay Pandey.
2. The paper ‘**An Unsupervised Monocular Image Depth Prediction Algorithm Using Fourier Domain Analysis**’, by Lifang Chen and Xiaojiao Tang (SPR-2021-12-0186), is dedicated to image depth estimation, which is an important method to understand the geometric structure in a scene in various artificial intelligence products such as, for example, driverless cars, and home service robots.
3. The paper ‘**An improved segmentation technique for multilevel thresholding of crop image using cuckoo search algorithm based on recursive minimum cross entropy**’, by Arun Kumar, Anil Kumar, Amit Vishwakarma, and Heung-No Lee (SPR-2022-02-0031), investigates the efficient crop segmentation widely used for the analysis of crops in agriculture.
4. The paper ‘**Multi-Graph Convolutional Clustering Network**’ by Boyue Wang, Yifan Wang, Xiaxia He, Yongli Hu, and Baocai Yin (SPR-2022-01-0004) deals with clustering, which is a fundamental topic in the ML and data mining areas, which aims to group the similar samples into the same clusters.
5. The paper ‘**The Analysis of Completely Perturbed Model Based on RIP via Orthogonal Least Squares**’ by Haifeng Li and Hao Ying (SPR-2022-01-0009) deals with compressed sensing (CS), which has a goal of recovering the original signal. In CS, we usually deal with a linear model. The linear model is replaced in real-world applications with the so-called perturbed model.