Final assessment of the module “Research Methodology”

First name: Haozhe

Last name: TANG

Topic: Image Segmentation for Marketing

Supervisor: TLICHE Youssef

Topic and Research Question

1. Topic: I am studying Image Segmentation for Marketing Situations;

2. Question: because I want to find out how could we separate objects from the image with background and only remain the product itself,

3. Significance: in order to help my reader understand the algorithm (from the aspects of: image basics, using situations, mathematical formulas, algorithm structure, experiments and comparisons); the convenience it offers to the market; the strength of the proposed algorithm etc.

Related Literature

Academic article n° 1

Authors: Debesh Jha∗‡, Pia H. Smedsrud∗†§, Michael A. Riegler∗§, Dag Johansen‡, Thomas de Lange†§, Pa ̊l Halvorsen∗¶, Ha ̊vard D. Johansen‡

Year: 2019

Title: ResUNet++: An Advanced Architecture for Medical Image Segmentation

Name of the journal: IEEE International Symposium on Multimedia (ISM)

Relevant information given in the article (relevant = related to your research question)

- Semantic Segmentation
- Deep learning models (CNN, DCNN)
- Computer Aided Detection (CAD) system
- UNet and ResUNet models
- Image segmentation accuracy metrics (MSE, RMSE etc.)

Academic article n° 2

Authors: Shervin Minaee, Yuri Boykov, Fatih Porikli, Antonio Plaza, Nasser Kehtarnavaz, and Demetri Terzopoulos

Year: 2022

Title: Image Segmentation Using Deep Learning: A Survey

Name of the journal: IEEE Transactions on Pattern Analysis and Machine Intelligence

Relevant information given in the article (relevant = related to your research question)

- Encoder-decoder models;
- Convolutional neural networks(CNN)
- Recurrent models
- Generative models
- Recurrent Neural Networks (RNNs) and the LSTM
- Image segmentation basic and principles
- Attention-Based Models
- Performance metrics (Pixel accuracy, Mean Pixel Accuracy(MPA), Intersection over Union (IoU) etc.)

Academic article n° 3

Authors: Haixia Zhang, Qingxiu Peng

Year: 2022

Title: PSO and K-means-based semantic segmentation toward agricultural products

Name of the journal: Future Generation Computer Systems

Relevant information given in the article (relevant = related to your research question)

- K-means based clustering segmentation algorithm
- Partical Swarm Optimization (PSO) image segmentation algorithm
- CIE color space
- Typical image segmentation method types

Research Hypotheses or Proposals

Hypothesis/Proposal 1: Accomplish the image segmentation algorithm;

Hypothesis/Proposal 2: It works well on the image datasets (training/validation/testing);

Hypothesis/Proposal 3: It works better than (or approach) the mainstream image segmentation algorithms nowsadays.

Research Methodology

The approach(es) I choose to use to test my hypotheses and answer my research question(s): 1. Image segmentation metrics; 2. Comparison among the results getting from different algorithms; (quantitative data) 3. Datasets researches (apply the algorithms on different datasets) -> qualitative research

The justification of my choices

- The advantage of the image segmentation algorithms should be revealed from the metrics data;
- Different structures of algorithms should be compared with the same metrics to prove its strength;
- The algorithm should work good on multiple and different kinds of datasets simultaneously.