Ziliang(Samuel) Zhong

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EDUCATION

New York University   New York/ Shanghai
Ph.D in Data Science supervised by Prof. Shuyang Ling   *May 2021- Present*

New York University   New York/ Shanghai
Double Major in Mathematics and Data Sciecne, Major GPA 3.96   *Sep. 2017 – May 2021*

RESEARCH EXPERIENCE

Procrustes Matching: information theoretical bound and algorithm   Jun. 2021 – Present
New York University Shanghai, supervised by Prof. Shuyang Ling.   *Shanghai, China/ New York, NY*

- We did a thorough literature review on Procrustes Matching and Graph matching(a highly related topic). We reviewed 30+ related papers from top journals and conference including ICML, SIGGRAPH, SIAM Journal on Optimization, etc.

Community detection in Directed Network   Sept. 2020 – Present
New York University Shanghai, supervised by Prof. Shuyang Ling.   *Shanghai, China*

- Most current theoretical conclusions on network science were drawn under the assumption of undirected networks (like Stochastic Block Models). However, directed networks (like Stochastic co-Block Models) are more practical in the real world. In this project, we tried to extend some conclusions (like threshold of connectivity and recovery conditions) from undirected networks to directed networks.
- We proved the threshold for strong connectivity in directed Erdos-Renyi graph with a novel method, using combinatorial analysis and second moment methods. We have proved the upper bound for exact recovery in stochastic co-block model using likelihood ratio and the ongoing work is to prove this is a tight information-theoretic bound by showing that spectral clustering algorithms such as DI-sim could achieve this bound on stochastic co-block models.
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Cancer image classification based on DenseNet model   Jan. 2020 – Jul. 2020
New York university   *New York, NY*

- Diagnosis based on computer vision establishes methods for medical images. However, the performance of traditional models like ResNet and VGG19 still need to be improved especially in identifying metastatic cancer in small image patches.
- In this project, we propose a novel metastatic cancer image classification model based on DenseNet Block, which can effectively identify metastatic cancer in small image patches by reusing shallow layers' features which have more low-level detailed information. We also conducted data augmentation to increase the diversity of the images.
- The experiments indicated that the Auc Roc Score of our model (0.971) is better than that of ResNet34 (0.9633) and VGG19 (0.9473).

Facial expression recognition with VGG19 and OpenCV   Mar. 2019 – May. 2019
New York University Shanghai, supervised by Prof. Keith Ross   *Shanghai China*

- Facial expression recognition is among the most common application of computer vision. The goal of our project is to classify the expression of a person through a video stream in a real-time way.
- We first used OpenCV module to read the raw video stream from a camera. Frame extraction and data augmentation are then done on the fly. The augmented image crops will be sent to a convolutional neural network (VGG19 pretrained on FER2013). Final detection and recognition results will show at our designed software interface.
- Project Presentation

PUBLICATIONS

Z. Zhong, M. Zheng, H. Mai, J. Zhao, X. Liu, "Cancer image classification based on DenseNet model", Journal of Physics: Conference Series (Vol. 1651). The 2020 2nd International Conference on Artificial Intelligence Technologies and Applications (ICAITA 2020) doi: 10.1088/1742-6596/1651/1/012143.

Preprints and Manuscripts

Z. Zhong, M. Zheng, H. Mai, J. Zhao, X. Liu, "Cancer image classification based on DenseNet model", Journal of Physics: Conference Series (Vol. 1651). The 2020 2nd International Conference on Artificial Intelligence Technologies and Applications (ICAITA 2020) doi: 10.1088/1742-6596/1651/1/012143.

Skills

Languages: Chinese Mandarin(native), English(proficient)
Programming languages:: Python(tensorflow, pytorch), Matlab, R, MySQL