Siwei Mai

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EDUCATION

State University of New York at Buffalo *Aug. 2018 - June 2020*

- **M.Sc** in Computer Science & Engineering (Thesis Graduation) GPA: 3.6/4.0
  Advisor: Prof. Mingchen Gao
  Research Interest: Machine learning, Bioinformatics

Nanjing University of Finance and Economics (NUFE) *Sep. 2014 - June 2018*

- **B.Eng.** in Computer Science & Technology (major) GPA: 3.31/4.0
  Advisor: Prof. Beiwei Zhang
  Research Interest: Machine learning, Computer vision

- **B.Econ.** in Finance (minor)

RESEARCH INTEREST

Machine Learning, Computer Vision, Medical Imaging Informatics.

RESEARCH EXPERIENCE

Master's Thesis, State University of New York at Buffalo *Sep. 2019 - May 2020*

- **Few-shot Feature Space Learning for Congenital Retinal Diseases Recognition**

- The goal of the research is to recognize a rare congenital retinal disease, Hereditary Macular Degeneration, based on Optical Coherence Tomography (OCT) images, whose main manifestation is the confusion and adhesion of the layers of the retina.
- The challenge of using machine learning models to recognize rare diseases comes from the limited number of collected data and cramped distinction from the abnormal samples.
- To address this problem, we propose to learn a discriminative feature space for the OCT images, on which many classifiers can be applied for various tasks. We formulate this problem as a few-shot learning task as only very limited samples are available. The Siamese training strategy with the triplet loss is employed to maximize the inter-class distance and minimize the intra-class distance.
- There are 58 pretreatment samples in our dataset, half of which are lesion samples. Numerous experiments were conducted on our dataset to demonstrate the validity of the proposed method. Compared to the baseline of 64%, the accuracy of our model is about 96%.

CSE676 Deep Learning, State University of New York at Buffalo *Jan. 2019 - May 2019*

- **Line Sketch Colorization with Hint** (Paper Link)

- Sketch colorization is a more difficult task compares to black-white photo colorization since the line sketch does not contain much local texture. Such a task is related to a huge amount of demand in the animation industry, yet recent researches haven't proposed any acceptable model for the real producing scenario.
- In this project, we implement several generative adversarial network (GAN) models to improve the pipeline including condition GAN (cGAN) and Wasserstein GAN with gradient penalty (WGAN-GP).
- In order to achieve the general orientation of the coloring, we design and propose innovative color hints as additional constraints on the input. The Color hint is a representation of the approximate distribution of colors. In pre-training the generator, color hints are formed from Gaussian blurred color images plus random white noise. By doing this to simulate the coloring habits of a realistic painter.

Bachelor's Thesis, Computer Vision Lab, NUFE *Sep. 2017 - Mar. 2018*

- **Gesture Recognition Algorithm and Implementation Based on Deep Learning**

- A multilayer convolutional neural network was constructed to achieve real-time recognition of gesture digits 0 to 5, and the input was captured as RGB images from Kinect.
- The model is built to take advantage of the technologies and strengths of GoogleLeNet and VGGNet, but realizes performance advantages beyond them.
- Improvements in the network architecture allow real-time recognition as close to 30 frames per second as possible, which takes the lightweight and accuracy into account. As well as overcoming the need to recognize gestures at different angles and in different lighting conditions. (demo video)
Achievement: Outstanding undergraduate thesis award, Jiangsu Students' Innovation and Entrepreneurship Training Program First Prize.

Undergraduate Student, Computer Vision Lab, NUFE *Nov. 2016 - Apr. 2017*

- **Gesture Recognition based on DTW algorithm for Depth Images**

- In order to circumvent the noise and interference caused by RGB images, we decided to do real-time detection using depth information from gestures.
- Firstly, we record the example grayscale images of the depth images of the three gestures of rock-paper-scissors. And then, comparing them in real-time by Dynamic Time Warping (DTW) algorithm, with the shortest Euclid distance as the inferred result.
- Further, by extracting the five fingers of the hand and the center of the palm as six feature points can better identify features while reducing the computational.
- In the team, I am responsible for the pre-processing of depth images and participate in the writing and optimization of DTW algorithms.

AWARDS AND SCHOLARSHIPS

Excellent Undergraduate Graduation Thesis , NUFE	*Oct. 2018*
Third Prize in Lanqiao Cup Programming Competition , NUFE	*May 2017*
The Mathematical Contest in Modeling —— Honorable Mention , COMAP	*Apr. 2017*
Third Prize Scholarship in NUFE of First Semester in 2016-2017 , NUFE	*Mar. 2017*
First Prize of Robot Raiders Contest in the Makeblock Cup the 7th Jiang Su Robot Match	*Nov. 2016*
Third Prize of Unmanned Vehicle Contest in the Makeblock Cup the 7th Jiang Su Robot Match	*Nov. 2016*
Excellent Student Leader in the College of Information Engineering , NUFE	*May 2016*

SKILLS

Programming Languages: Python, Java, C, LaTeX
Platforms: Linux, Mac, Windows
ML Framework: Pytorch, Tensorflow, Keras

EXTRA-CURRICULUM ACTIVITIES

Student Reporters of College Newspaper, NUFE *Sep. 2014 - June 2016*

- Interviewed and published some college events report on the college paper.