

Lili Liu

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Objective: Data Engineer (Full-time).

SKILLS

- Python, C Language, Assembly language, Linux shell script and SQL.
- Data structures, Machine Learning and Deep Learning.
- Tensorflow, Pytorch and Caffe.(CPU&GPU)
- OpenCV, Scikit-learn, Numpy, Git, Spark and Hadoop.

EDUCATION AND RESEARCH EXPERIENCE

- **Concordia University** Montreal, Canada
Thesis Master, Computer Science *Sep. 2018 – Dec. 2020*
Hand-drawn image analysis Research Assistant, CENPARMI Research Lab
 - Created an automatic personality predict system by aligning the **Machine Learning** and **Image processing** algorithms into hand-drawn sketches for **table segmentation** and **features extraction** [1].
 - Increased the average classification accuracy from 91.89% to 94%(Top-1) and 98%(Top-5) by transferring the pre-trained **Inception-V3** trained on ImageNet to the sketches dataset for categories classification [2].
 - Created the first intelligent system for drawing-based psychologist test by communicating with technical and non-technical coworkers and designing novel algorithms in needed.
- **Beijing University of Technology** Beijing, China
Master of engineer, Computer Technology. *Sep. 2015 – Jul. 2018.*
Time series EEG data classification Research Assistant, Key Laboratory of Trust Computing
 - Proposed a novel signal selection and combination strategy for EEG data by using **PCA** to extract the most representative electrodes from the complex multi-channel EEG signals and then decompose the selected channels with **EMD** to improve the classification accuracy [3].
 - Proposed to combine the temporal and spatial characteristics of the multi-channel EEG signals to generated spectral images and feed into Deep Neural Network for data augmentation(G) and classification (D and **SVM**) [4].
 - Optimized the architecture in second contribute by simplifying two elements (Discriminator in GAN and SVM) and modifying the last layer of GAN and the correspondent loss function, lead to an end-to-end **semi-supervised GAN** structure with a high accuracy of 98%.

PROJECTS

- **Google Hash Code 2021 - Traffic Signaling** Remote, Canada
Qualification round, First Round and Extended Round *25th Feb. 2021-Ongoing*
 - Designed and optimized algorithms for the real world city traffic problems released by Google Map.
 - Optimized the schedule of traffic lights to minimize the total amount of time spent in traffic, and help as many cars as possible reach their destination before a given deadline.

- **Random-forest K Nearest Neighbors (RKNN)** Montreal, Canada
Implement new approaches: RKNN and RKNN-FS Winter, 2019
 - RKNN simulates the mechanism of Random Forest, and replaces decision tree in forest with KNN classifiers.
 - RKNN-FS: Apply the idea on feature selection with KNN. RKNN Feature Selection algorithm (RKNN-FS) is a feature selection approach which aims at ranking features in before feeding them into a classifier where only the top N features are used.
 - Evaluate theses two methods on Kaggle Heart Disease and Gland Disease datasets.
- **Multi-images stitched into Panorama** Montreal, Canada
Implement algorithm to stitch multiple single images into panorama. Winter 2019
 - Detect interest points from each image pair.
 - Match the interest points between two images.
 - Compute the homography between the images using RANSAC
 - Align and stitch the photographs together using the computed homography matrix.
 - Blend the correspond images to create a panorama.

INTERN

- **AI Research and Development Engineer** Beijing, China
Vimicro company April 2017 –July 2018
 - Implemented the **Fully Connected Layer** of Neural Network with **C and Assembly language** and assembled on Neural-network Processing Unit (NPU, microchip hardware of Vehicle detection camera) as part of company product.
 - Proposed to use sparse matrix property for reducing the space complexity on our hardware and brings about 30% performance improvement.
 - Experienced with **CNNs, LSTMs/RNNs, GAN, Inception-V3** and in charged of holding regularly Deep learning paper sharing session with our team.

PUBLICATION

- [1] **Liu, Lili**, Graziella Pettinati, and Ching Y Suen. Computer-aided Wartegg drawing completion test. In *International Conference on Pattern Recognition and Artificial Intelligence*, pages 575–580. Springer, 2020.
- [2] **Liu, Lili**, Graziella Pettinati, and Ching Y Suen. Wartegg drawing completion test. In *Ingence*, pages 575–580. Springer, 2020.
- [3] Lijuan Duan, Song Cui, **Liu, Lili**, and Yuanhua Qiao. A novel eeg signal recognition method using modified optimal electrodes recombination strategy. In *International Conference on Intelligent Science and Big Data Engineering*, pages 601–613. Springer, 2018.
- [4] **Liu, Lili**, Lijuan Duan, Ying Xiao, and Yuanhua Qiao. A novel seizure prediction method based on generative features. In *International Conference on Intelligent Science and Big Data Engineering*, pages 672–682. Springer, 2018.