Hongquan Zhang

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EDUCATION BACKGROUND

South China Normal University **Undergraduate** Sept. 2014 - June 2018
School of Mathematical Science
Major: Information and Computing Science **GPA:** 3.51

The Chinese University of Hong Kong **Postgraduate**
Department of Computer Science and Engineering
Major: M.Sc. in Computer Science

WORK EXPERIENCE

Guilin Zhishen Information Technology Co. Ltd Apr. 2019 - Present
Position: Algorithm Engineer
Responsibilities:

- used C++, python, tensorflow, oepncv and g2o graph optimization module to work on SLAM(Simultaneously Location And Mapping);
- Studied the SLAM algorithm: Epipolar Geometry, Bundle Adjustment, Vocabulary Tree, etc.;
- Studied deep learning methods: DeepVO, VINet;
- Researched on one of state-of-the-art algorithms of monocular VO(Visual Odometry) SLAM: ORBSLAM, and did experiment to improve the performance;
- Studied quaternion kinematics and its calculation rules, Lie Algebra, IMU(Inertial Measurement unit);
- Studied VIO(Visual Inertial Odometry) SLAM, researched on one of state-of-the-art algorithms of VIO SLAM: VINS, analysed its code structure in detail, utilized the estimated pose to improve business application of company's product;
- Studied object detection algorithms, Fast RCNN, Faster RCNN, ssd, yolo, etc.;
- Researched on omr(optical music recognition), adopted ssd-retinanet-resnet-50 scheme and trained on DEEPSCORES datasets by tensorflow(GPU);
- processed the music score image, estimated the staves, stems, bar lines and beams, utilize the prediction to produce musicXML.

Guangdong Hong Cheng Cloud Big Data Co. Ltd May 2018 - Feb. 2019
Position: Computer Vision Engineer
Responsibilities:

- Used python, tensorflow, mxnet, sklearn, oepncv to research on face recognition, super resolution, image enhancement, significance detection, fuzzy detection;
- Researched on mtcnn face detection algorithm, insightface recognition algorithm and experimented on MS-Celeb-1M, tried to design a loss function to improve performance;
- Studied super-resolution models such as EDSR, SRGAN and SRResNet, which are used for restoration of fuzzy images and super-resolution of clear images;
- Studied and adopted the saliency model to obtain the significant heat map of the image, unified it with MTCNN face detector, SVM, K-means to choose the main character's face in the image;
- Studied the fuzzy detector to determine whether the picture is fuzzy, used two resNet-18 networks to train two fuzzy discriminators respectively, took the previous layer of softmax as the feature vector, unified them with proper weight, adopted ROC curve to searched the threshold and assessed the model.

KingPoint Data Technology Co. Ltd Apr. 2018 - May 2018

Position: Big Data Research and Development Intern

Responsibilities:

- In order to solve router image classification task, we used python, tensorflow, sklearn and oepncv, preprocessed image dataset, made image enhancement and used tensorflow and sklearn to train machine learning model and deep learning model to solve the problem of image classification;
- Analysing image classification task above, we found that some attachments on router, like paper and advertisements, destroyed the integrity. We adopted SSD object detection algorithm to detect the attachment, and DCGAN image generation algorithm to recovered the field under the attachments. The accuracy in this classification task improved by 4% to 11%.

South China University of Technology, Institute of Public Policy Feb. 2017 - June 2017

Position: Research Assistant

Responsibilities:

- Used Python and SPSS to conduct data preprocessing and data analysis on the questionnaire data, and heat map analysis, logistic regression, decision tree and some key factors were analyzed and verified, wrote report to analysed some society phenomenon.

AWARDS AND HONORS

Individual:

- Awarded the third prize of “Teddy Cup” Data Mining Competition in June 2017;
- Awarded the S prize of American Mathematical Modeling Competition in April 2017;
- The provincial undergraduate innovation project was successfully concluded in February 2017;
- Awarded the second prize of Mathematical modeling Competition of South China Normal University in 2017;
- Awarded the third prize of National College Student Mathematical Modeling Competition in September 2016;
- Individual Scholarship of South China Normal University in 2017 academic year;
- Awarded the first prize of the “Youth Research Cup” Research Competition in 2016 academic year;
- Awarded second prize of Industry Analysis Competition in 2016 academic year;
- Awarded second level scholarship of Excellent Student in 2016;
- Awarded Outstanding Student Cadre in 2016 academic year.

Group:

- I was the core member of TipDM Data Mining Club in 2016, and the chairman of this club in 2017. During this period of time, we cooperated with TipDM Intelligent Technology Co. Ltd and HighJet Computer Technology Co. Ltd, did research on data visualization and visitors flow prediction;
- In 2017, cooperating with Dream Creation Technology Co. Ltd and School of Mathematical Science in South China Normal University, I formed a team, established Dream Creation Club and served as a organizer and president. During that time, we established a platform for students to learn data mining and machine learning in enterprise projects, as well as invited well-known engineers to give lectures and organize internship;
- I served as a monitor in 2014, and a grade vice-deam in 2015, as well as the secretariat of the badminton association of South China Normal University in 2015.

RESEARCH EXPERIENCE

Used numpy to implement deep learning framework numpy-net Jan. 2019 - Feb. 2019

- Conducted in-depth research on the principle of neural network and deep learning, derived its algorithm principle with mathematics, and independently implement a deep learning framework called numpy-net, only by using basic matrix operation via numpy and designing appropriate data structure;
- The numpy-net supported layers like fully connected, convolution, pooling, batch normalization, dropout, and residual block was designed to fulfill with residual network. It also contained optimiers like Momentum, AdaDelta, Adam. We also used numpy-net to constructed LeNet, AlexNet(without LRN), VGG16, ResNet18. MNIST was used in the test, and the accuracy of LeNet achieved 97.11%;
- The project featured a keras-like coding style, custom operation and automatic analytic gradient computation, users could also defined their operation;
- github: https://github.com/horcham/numpy-net.

Nanyang Technological University: Entrepreneurship and Innovation Program. Aug.2017

- Organized a team to explore the development of an intelligent toothbrush and wrote a business plan. I played professional expertise, from the perspective of computer vision and machine learning. We found it possible to adopt sensors and a camera to analyse of oral diseases via image segmentation algorithm, like U-Net, and further determine other index of body, like heart status, blood sugar state, etc..

Kaggle: Plant Seedlings Classification Dec. 2017 - Apr. 2018

- Given the training set of color pictures of 12 kinds of flower seedlings, adopted models to make classification, and did experiment to unify neural network with traditional machine learning method(Net+X);
- Considering that the background of images influenced the accuracy to some degree, I designed mask to remove the background and convert it to grayscale, get the gray image, used mathematical morphology method to remove noise. Bootstrap was used to divide training set and verification set;
- Tensorflow was used to build fully connected network, LeNet, AlexNet, VGGNet and InceptionV3 as candidate net, and a new model Net+X was constructed (weight was fixed after training net, and traditional classifier, like SVM, random forest, was used to replace the softmax layer and train the classifier). It was a two-stage model. The experiment showed that in this dataset, the accuracy of Net+SVM and Net+Random Forest are improved by 0.2%-14.6% and 1.1%-8.5% respectively, compared with Net+softmax. Among them, VGGNet+230 CART had the highest accuracy of 70.32%.

Self-developed module zystock for stock data acquisition and deep learning and machine learning modeling May 2019 - Present

- Used python design a crawler by BeautifulSoup and Selenium to obtain stock data, preprocessed, computed 26 stock data indicators like MA, MACD, BOLL, etc.;
- Mxnet was utilized to implement some common models fitted for this task, designed proper data structure for convenient modeling for stock data, as well as methods for stock back-testing and deduction.;
- github: https://github.com/horcham/StockPrediction.

Organized machine learning note Aug. 2017 - Dec. 2017

- Latex was adopted to write a machine learning book PDF, which covered linear regression, logistic regression, Fisher Discriminant Analysis, multi-class learning, family of exponential functions, decision trees, support vector machines, regularization and model metrics, etc.;
- Used numpy to implemented algorithms, which involveed LSC, FDA, Logistic Regression, SVM, decision tree, neural network, KNN, KMEANS, GMM, PCA, MDS, Random Forest, etc., and applied them to MNIST, Spectral Classification and other datasets.;
- github: https://github.com/horcham/ML_node.

ADDITIONAL INFORMATION

Professional Skills:

- Proficient in Linux(ubuntu), proficient in python, C++, Matlab, can use them implement common machine learning algorithms;
- Proficient in common deep learning algorithms and their algorithm details, able to build a deep learning framework only with numpy and implement AlexNet, VGGNet,ResNet and other models on this framework;
- Proficient in TensorFlow, mxnet, sklearn, implement AlexNet, VGGNet, Inception, ResNet and other models, and apply them to image classification;
- Proficient in face recognition, image super-resolution, significance detection, image fuzzy recognition, image enhancement, object detection, and SLAM have certain accumulation and research;
- Familiar with computer vision related algorithms, proficient in opencv;
- Have a solid mathematical foundation, and can derive common machine learning algorithms.

English Level: CET-4, CET-6, IELTS 6.5(Listening 7.5, Reading 6.5, Writing 6.5, Speaking 6.0)
Interest: swimming, traveling, badminton