Mr. Kai Yi (William)

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EDUCATION

09/2015-06/2019 **Xi'an Jiaotong University (XJTU, Project 211 & 985 University of China)**

Major: Software Engineering **GPA:** 86.34/100 (2/18)

Expected Degree: Bachelor of Engineering

PUBLICATIONS

Paper **Kai Yi**, Shitao Chen, Nanning Zheng, et al. Cognition-based Deep Learning: Progresses and Perspectives. The 14th International Conference on Artificial Intelligence Applications and Innovations (accepted).

Paper Tiannan Dong, **Kai Yi**, Nanning Zheng, et al. Affine LBG Algorithm for Codebook Training of Univariate Linear Approximation. 2018 IEEE Global Conference on Signal and Information Processing (accepted).

Paper **Kai Yi**, Zhiqiang Jian, Nanning Zheng, et al. Knowledge-based Recurrent Attentive Neural Network for Traffic Sign Detection. IEEE Transactions on Image Processing (TIP) (in review).

Paper **Kai Yi,** Nanning Zheng, et al. Knowledge-based Hierarchy Associative Memory Model with Chaos Control. International Conference on Machine Learning 2019 (in preparation).

Paper Liang Zhao, **Kai Yi**, Ling Feng, et al. Detecting Adolescent Periodic Stress via Micro-blog. The ACM International Joint Conference on Pervasive and Ubiquitous Computing 2018 (in preparation).

RESEARCH EXPERIENCES

03/2018-present **Graph Theory Applied to Biological Network Alignment** **Participant**

(under supervision of Prof. Wayne Hayes from University of California at Irvine)

- Objective: to explore a new biological network alignment method based on protein topological structure.
- My responsibilities: closely study Graphlet and its alignment methods for biological network, design experiments, build models and test the effects of models.
- Achievements: a new model-based biological network alignment method has been designed according to the basic properties of Graphlet and the variational inference of Bayesian.

03/2018-present **Detecting Adolescent Periodic Stress via Micro-blog** **Participant**

(carried out in the Institute of Social Psychology of XJTU under supervisions of Liang Zhao & Feng Yu)

- Objective: to formulate a stress-relief scheme and improve the mental health status of adolescents after analyzing the Weibo data of adolescents and obtaining their event-driven stress cycles.
- My responsibilities: analyze the related data, build models, design and participate in the experiments.
- Achievements: the continuous periodic analysis methods were studied and a stress-cycle detection model specific to event sources was built based on probabilistic graph model & WARP algorithm.

01/2018-present **Study on Artificial Intelligence (AI) System Based on Brain Cognition** **Participant**

(carried out in the Institute of Artificial Intelligence and Robotics under supervision of Nanning Zheng)

- Objective: to establish a more robust AI system by drawing from human cognitive mechanisms of memory, attention, knowledge evolution and inference, etc.
- My responsibilities: analyze the related data, build models, design and participate in the experiments.
- Achievements: a self-learning network based on causal relationship and probabilistic graph model was designed and implemented; a small object detection method of KB-RANN was designed based on the related principles of human cognition; and a new codebook training method of A-LBG specific to non-linear optimization was designed based on affine transformation.

10/2017-present **Associative Memory Model with Chaos Neural Network** **Participant**

(carried out in the Institute of Artificial Intelligence and Robotics under supervision of Nanning Zheng)

- Objective: to build a system which can receive ground truth information and deal with multitasks while being slightly modified and training only a few samples.
- My responsibilities: design the network structure, complete network definition processes, write codes and present the achievements of the project.
- Achievements: a chaotic attractor equation & a network evolution equation of the high-order discrete Hopfield neural network were derived based on OGY linear control law; a new method of super pixel feature extraction was proposed based on Bayesian inference; and a new algorithm for accurate object detection for sparse small samples was raised based on cognition of the olfactory system of fruit fly.

07/2017-03/2018 **Real-Time Accurate 3D Object Detection for Autonomous Driving** **Participant**

(carried out in the Institute of Artificial Intelligence and Robotics under supervision of Nanning Zheng)

- Objective: to build a real-time 3D object detection system for autonomous driving.
- My responsibilities: thoroughly studied the state-of-the-art of 3D detection methods; tested the methods on Nvidia TX 2 and PX 2; explored new real-time and highly precise detection algorithms; and applied them in autonomous driving.
- Achievements: a new fusion method-Calibration Fusion Net was raised to fuse LIDAR and GRB images; a new end-to-end process was proposed by using the regression-based detection method; and the system's accuracy was reached up to 51.46% with 32.5fps per image.

04/2017-present **Compressed Neural Network on Mobile Devices** **Participant**

(carried out in the Institute of Artificial Intelligence and Robotics under supervision of Nanning Zheng)

- Objective:to build a compressed neural network and make it possible to use deep learning in mobile set.
- My responsibilities: look closely into and implement the most popular network frameworks such as AlexNet, GoogleNet, VGGNet, ResNet, etc.; study the state-of-the-art neural network compression methods such as low-rank factorization and sparsity, pruning and weight sharing; test the actual performances of the related algorithms on TX2; and design my own framework to optimize and accelerate the 2D detection algorithm such as SSD.
- Achievements: a new approach based on the state-of-the-art neural network compression method such as depth-wise convolution was proposed; and the SSD (a regression-based detection method) was transplanted to TX2 via TensorRT, which has made SSD more than twice as fast as the original one.

01/2017-03/2018 **Personalized Speech Synthesis for Health Care (National Undergraduate Innovation Project) Leader**

(carried out in the Software Innovation Laboratory of XJTU under supervision of Yulong Zhang)

- Objective: to relieve old people's loneliness by imitating and synthesizing their children's voices.
- My responsibilities: designed, implemented and controlled progresses of the project, assigned tasks to other team members, and submitted the project for review; established and maintained the deep learning platform; designed voice generalization and text to speech (TTS) based on wavenet and iFlytek API; compressed & optimized machine learning algorithms, and transplanted them into android equipment based on Android NDK and Tensorflow API.
- Achievements: applications of machine learning in mobile devices and latest lightweight neural networks such as MobileNet and ShuffleNet were thoroughly studied, and the App of "DeepCamera" was designed and built based on Android NDK, TensorFlow and Computer Vision API, etc.

09/2016-01/2017 **Intelligent Natural Language Processing System (NLP) for China Mobile** **Participant**

(carried out in the Ministry of Education Key Lab for Intelligent Networks under supervision of Jing Tao)

- Objective: to provide a precise NLP system for the query service of China Mobile.
- My responsibilities: investigated the status quo of researches on text understanding and conversational system; and assisted in developing the intelligent Q & A system of China Mobile.
- Achievement: a precise NLP system based on the classic QA framework was built.

09/2016-01/2017 **Deep Reinforcement Learning for Object Tracking** **Participant**

(carried out in the Ministry of Education Key Lab for Intelligent Networks, supervised by Pinghui Wang)

- Objective: to design a deep reinforcement learning method for object tracking.
- My responsibilities: studied classic object tracking approaches such as Meanshift, Particle Filter, Kalman Filter, Correlation Filter, etc.; looked closely into the status quo of deep reinforcement learning; reviewed reference documents on applications of deep reinforcement learning in object tracking; and deepened understandings on frameworks of TensorFlow, Caffe and TensorLayer, etc.
- Achievements: an object tracking algorithm as well as some source codes were debugged and optimized, and a new analytical framework was designed.

EXTRACURRICULAR ACTIVITIES

12/2017-present **Technology Department, AI Club of XJTU** **Member**

- Train the green hands about basic AI knowledge;
- Teach the green hands how to build the operation environment of machine learning.

09/2016-06/2017 **External Affairs Department, Students' Union of Chung Ying College of XJTU** **Leader**

- Negotiated with several companies and earned more than 30,000 Yuan sponsorship for various activities;
- Established a long-term partnership with China Telecom and BoBi Pizza, etc.;
- Assisted in organizing the eighth general election of the Students' Union of Chung Ying College.

08/2016-07/2018 **Academic Counseling Center, Chung Ying College of XJTU** **Volunteer Tutor**

- Compiled the book-"Small Learning Assistant for Linear Algebra";
- Finished part of the book-"Small Learning Assistant for Advanced Mathematics";
- Answered questions and explained concepts of Discrete Mathematics, Advanced Mathematics, Algorithm Design & Analysis and Python Programming for the freshmen and sophomore, respectively.

06/2016-05/2017 **App Group, E-eyes Net Office, Club Activities' Center of XJTU** **Leader**

- Trained members about Android basics, concurrency control, database design, and UI design, etc.;
- Led members to design and upgrade the E-eyes screen from 1.0 to 2.0.

04/2016-12/2016 **News Club of XJTU** **Member**

- Accomplished over 8 press releases on the homepage of XJTU website;
- Assisted in operating the mobile phone newspaper of XJTU and successfully contributed two articles.

09/2015-02/2017 **Department of Arts and Literature, Students' Union of XJTU** **Leader**

- Directed and organized the 2016 New Year Party and the 2015 XJTU Star Competition.

HONORS &AWARDS

2016-2017 Outstanding Leader of the Students' Union (top 2%) and Social Activities Award (top 1%) of XJTU

2015-2017 National Encouragement Scholarship (top 1%) and Excellent Student Award (top 5%) of XJTU

2015-2016 Best Debater of Quarter Finals and the Fourth Place in the Debate Contest of Chung Ying College of XJTU

ADDITIONAL INFORMATION

- Proficient in Python, TensorFlow, C++/C and Android
- Fond of long-distance running and reading classical German philosophy works