Zekai Chen, Ph.D.

CONTACT INFORMATION

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RESEARCH INTERESTS

I am a Ph.D. student in Computer Science at George Washington University. I am interested in Machine Intelligence and Data Mining, specifically some of the problems I find interesting are time series forecasting, multi-task machine learning, neural network compression for sequence modeling and mobile computing. My research experience includes: multi-task time series forecasting, model compression, video representation learning and data mining.

EDUCATION

George Washington University, **Computer Science Department**, Washington, D.C., USA

Ph.D. Computer Science, 08/2019

- Advisers: Professor Xiuzheng(Susan) Cheng
- Areas of Study: Machine Intelligence and Cognition, Deep Learning, Model Compression, Sequence Modeling
- Research Projects:
  - We are the first to design a shared attention architecture based on Transformer for multi-task time series forecasting. The final work has been submitted to ICDM 2020.
  - Develop a multi-task multi-step time series forecasting model based on the Dirichlet process so that it has the function of clustering tasks with similarity. The final work has been revised and submitted to TKDE (previously accepted by SIGKDD2020 workshop).

George Washington University, **Department of Statistics**, Washington, D.C., USA

M.S. Statistics, 08/2016 to 12/2017

- Advisers: Professor Reza Moderres and Professor Judy Wang
- Areas of Study: Statistical Learning, Machine Learning, Data Mining, Deep Learning, High-dimensional Inference
- Research Projects:
  - Compared 6 latest high dimensional inference approaches which have appeared in top statistical journals to provide researchers in this field with an empirical conclusion of which penalized method could perform better inference.
  - Extracted distorted DNA fragmentations from AFM diagnostic images. Developed machine learning method to automatically detect the DNA object and did the features analysis. Constructed AI-assisted cancer diagnosis system based on deep learning models. Recalled the panel DNA projections into a real 3D space.
- Selected Coursework: Machine Learning (Teaching Asst), Mathematical Statistics, Linear Regression, Data Mining, Nonparametric/Graph Regression, Statistical Computing

Shanghai University, **Department of Mathematics**, Shanghai, China

B.S. Applied Mathematics, 08/2012 to 07/2016

- Advisers: Professor Qingwen Wang
- Topics: Linear Algebra, Matrix Factorization

Professional Experience

Lu Lab (Systematical Neuroscience), Washington, D.C., USA

Research Associate **03/2018 to 08/2019**

- Hosts: Dr. Hui Lu, Dr. Yuanlei Yue, Dr. Pan Xu and Jet Su at Lu Lab.
- I worked on calcium imaging video analysis ranging from source signal extraction to neural activity analysis. I developed behavior auto-detection tool for rodent animals and also pipeline to process machine learning analysis for cell type definition and circuit function coding of brains. CNN, LSTM, Varational Auto-Encoder are most involved models.

IBM, GCC, Shanghai, China

Information Analyst Intern **06/2015 to 06/2016**

- Use BI tools such as Cognos and QMF to acquire data from corresponding database, providing foundations for business analysis.
- Explore the possible data metrics that have values to the business, to better describe facts and changes, progress and trends, identify challenges and opportunities, and uncover particular business rules and principles.
- Leverage analytical skill and critical thinking capabilities to help the functional teams and business owners develop business strategies, improve decision making, adjust business operation and enhance overall business outcomes.
- Form up regular communications and maintain relationships with the business focus from worldwide to increase mutual understanding, provide timely supports on problem solving, information query, etc.

Selected Publications

Chen, Z., E, J., Zhang, X., Sheng, H., Cheng, X., *Multi-Task Time Series Forecasting with Shared Attention*, ICDM, 2020 (submitted)

Zhang, X., Chen, Z. (equal contribution), et, al. *Multi-Task Multi-Step Time Series Forecasting with Stick-breaking Variational Autoencoders*, TKDE, (submitted)

Yue, Y., Xu, P., Liu, Z., Chen, Z. (co-first author), et al. *MeCP2 deletion impaired layer 2/3-dominant dynamic reorganization of cortical circuit during motor skill learning*, bioRxiv, doi: https://doi.org/10.1101/786822, 2019

Chen, Z., Zhu, S., and Djavanshir, R., *Predicting Brand Advertisement Consumption on Facebook by Model Comparison*, Journal of Global Business Management, Vol. 13, Num. 2, 2017.

Awards and Grants

- Computer Science, Graduate Merit Awards. 2019
- Computer Science, Graduate Tuition Scholarship, 2019
- Meritorious Winner of The Mathematical Contest in Modeling, 2014
- Scholarship for Academic Innovation, 2014
- Honorable Winner of The Mathematical Contest in Modeling, 2013

Programming Languages

Over 10000 lines: Python, MATLAB, R, MySQL, Bash, LaTeX
Over 1000 lines: C, C++, Go, Javascript, Mathematica

Certifications

Neural Networks and Deep Learning, deeplearning.ai October, 2017

References **Prof. Xiuzheng(Susan) Cheng**, Professor, George Washington University, cheng@gwu.edu