Xiao Zhou

MCS 138, 111 Cummington Mall, Boston, MA 02215
zhouxiao@bu.edu • +1 (857) 250-5629 • http://cs-people.bu.edu/zhouxiao/

EDUCATION

Boston University, Boston, Massachusetts, USA

- Ph.D. candidate in Computer Science — Sep 2016 – Present
  - Adviser: Prof. Peter Chin
  - Co-Adviser: Prof. Vijaya B. Kolachalama
- B.A. in Mathematics — Sep 2012 – May 2016
- B.A. in Computer Science — Sep 2012 – May 2016

RESEARCH INTEREST

Adversarial-structured networks, medical image processing, pattern recognition, code processing, robotics

PROGRAMMING SKILLS

Python, Java, C/C++, Matlab, ATS
JSP, HTML & CSS, Latex
Pytorch, Keras/Tensorflow, PostgreSQL/MySQL, OpenCV, Theano

TEACHING EXPERIENCES

Boston University, Boston, Massachusetts, USA

- CS 111: Introduction to Computer Science I — 2016 – 2019
- CS 591SA2: Graph Theory and Computational Topology for the Internet Age — Summer I 2017/2018
- CS 542: Machine Learning — Summer II 2017/2018
- CS 660: Graduate Introduction to Database Systems — Fall 2019

PUBLICATIONS

JOURNALS

[1] Shangran Qiu, Prajakta S Joshi, Matthew I Miller, Chonghua Xue, Xiao Zhou, et al. **Development and Validation of an Interpretable Deep Learning Framework for Alzheimer's Disease Classification**. *Brain*, May 2020.

[2] Shan Huang, Xiao Zhou, and Sang Chin. **Application of Seq2Seq Models on Code Correction**. *Frontiers in Artifical Intelligence*, Jan 2021.

[3] Xiao Zhou, Shangran Qiu, Prajakta S. Joshi, Chonghua Xue, Ronald J. Killiany, Asim Mian, Sang P. Chin, Rhoda Au, Vijaya B. Kolachalama. **Enhancing Magnetic Resonance Imaging Driven Alzheimer's Disease Classification Performance Using Generative Adversarial Learning**. *Alzheimer's Research & Therapy*, Feb 2021.

CONFERENCES

[1] Xiao Zhou, Chengchen Wang, Yiteng Xu, Xiao Wang and Peter Chin. **Domain Specific Inpainting With Concurrently Pretrained Generative Adversarial Networks**. *IEEE/GlobalSIP2017*, Montreal, Québec, Canada, Nov 2017.

[2] Xiao Zhou, Xiao Wang and Peter Chin. **Learning in Parrondo's Paradox**. *International Conference on Game Theory*, Stony Brook, NY, USA, Jul 2018.

PRESENTATIONS

- Annual Evans Department of Medicine Research Days @ Online
  Presented the accepted paper: Enhancing of the AD classification performance using generative adversarial learning
- IEEE/GlobalSIP presentation @ Montreal, Quebec, Canada
  Presented the accepted paper: Domain Specific Inpainting with Concurrently Pre-trained GANs
- BU research talks @ Metcalf Ballroom, George Sherman Union
  Presented the progress about programming language correction project.

RESEARCH & PROJECTS

Deep Competitive Framework on 3D Reconstruction — Feb 2021 – Present

We are working to propose a GAN-based model that is able to generate missing components, based on few of 2D slices, to reconstruct 3D objects. There could be various potential challenges in this work before we have satisfying result, such as the delicate balance between the two competitive models. However, we have already proposed different ways to tackle them. The expected results should be better or on par with benchmark results of peer works.

Risk-based Phenotyping of Neuroimaging Patterns in Alzheimer's Disease — May 2020 – Present

We modified and compared various deep learning models for handling 3D MRI scans to predict the survival risks for individuals with mild cognitive impairment. These models achieved high performance compare to the benchmark model using CSF biomarkers. Our model also provides potential applications in various ways.

Real-time Prediction of Crimes by Mixed Spatio-Temporal Neural Networks Mar 2017 – Present

We propose a deep-learning-based approach, which combines various methods in neural networks to handle the spatial temporal prediction problem. The model is trained on a dataset about crime information in Los Angeles at a scale of hours in block-divided areas. The results of experiments on this dataset demonstrates the proposed model's ability in predicting potential crimes in real time.

Enhancing of the Alzheimer's disease classification performance using generative adversarial learning May 2019 – Feb 2021

- Paper published in Alzheimer's Research & Therapy

  Mainly working on improving clarity and details of images produced through magnetic resonance imaging (MRI). A neural network based on DCGAN's structure is trained to supplement additional information to an 1.5 Tesla image, by learning from its corresponding 3 Tesla image. The results reflect effective improvements in: numerical loss, classification accuracy, and viewing quality. (TO update)

Application of Seq2Seq Models on Code Correction Sep 2016 – Jan 2021

- Paper published in Frontiers in Artificial Intelligence

  Apply and compare the performance of different recurrent neural network structures in program correction. Various approaches and structures have been applied and tested. The latest results show that the code correction is handled better when pyramid structure is applied in the network.

Development and validation of an interpretable deep learning framework for Alzheimer's disease classification Sep 2019 – Mar 2020

- Paper published in Brain

  Applied a fully convolutional network that delineates Alzheimer's disease signatures from multi-modal inputs of MRI, age, gender, and Mini-Mental State Examination score. The model performed consistently good across various datasets and exceeded the diagnostic performance of a multi-institutional team of practicing neurologists. This framework provides a clinically adaptable strategy to generate neuroimaging signatures for AD diagnosis, and a generalizable approach for linking deep learning to pathophysiological processes in human disease.

Supervised Learning on Parrondo's Paradox Mar 2017 – Feb 2018

- Paper published in International Conference on Game Theory

  Proposed a supervised leaning framework that maps playing history directly to the decision space using multiple layer perceptron (MLP). Our results show that it learned to combine two individually-losing games to have a positive expectation 6 times better than random strategy.

Domain Specific Inpainting with Concurrently Pre-trained GANs Feb 2017 – Jul 2017

- Paper published in IEEE/GlobalSIP 2017

  Mainly work on recovering noised or cropped images by training a neural network based on DCGAN's and WGAN's structures. Various approaches have been used including the generative model using deep neural network. The results reflect improvements in both numerical loss and classification accuracy.

REFERENCES

Professor Peter Chin

Research professor in department of computer science
Boston University
MCS 138, 111 Cummington Mall, Boston, MA 02215
spchin@cs.bu.edu

Professor Vijaya B. Kolachalama

Assistant professor in department of medicine
Boston University
Evans 636, 72 East Concord Street, Boston, MA 02118
vkola@bu.edu