Zhuohan Zeng

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EDUCATION

University of Massachusetts Amherst
M.S. in Computer Science (College of Information and Computer Sciences) Sep 2017 – Present

- GPA:3.95
- Selected coursework: Machine Learning, Artificial Intelligence, Neural Network, Reinforcement Learning

Sun Yat-Sen University
B.S. in Information and Computing Science (School of Mathematics) Sep 2013 – Jul 2017
B.S. in Biological Sciences (School of Life Sciences) Sep 2012 – Jul 2016

RESEARCH EXPERIENCE

Independent Study w/ Prof. Robert Kozma **UMass Amherst**
Robust Image Classification Using Spiking Neural network Oct 2018 – Dec 2018

- Implemented a spiking neural network (SNN) with spike-timing-dependent plasticity local learning rule.
- Performed diverse robustness test on multiple image classifiers (against information loss or noise). SNN retaining an accuracy of 53.5% (drop from 92.1%) while a two-layer convolutional neural network (CNN) has dropped to 26.3% (from 95.7%) when half of the pixels replace by the random value.
- Performed black-box adversarial attack (boundary attack) on SNN and other classifiers. The Average distance (in L2-metric) between adversarial and the original image of SNN is 2.76 times that of CNN.

Summer Research w/ Prof. Simon DeDeo **Carnegie Mellon University**
Emergent Complex Strategy via Interaction Jun 2018 – Aug 2018

- Implemented multi-agent competition environments with social dilemma reward constrain. Designed a framework of interaction between agents. Gradually adjust the interaction to increase the complexity of the system.
- Implemented a two-layer evolutionary process to enable agents to search for different directions in the strategy space.
- By mimicking ecological succession and introducing side effects, agents were trained to present complex gaming strategies that close to human level.

Bachelor's Thesis w/ Prof. Fangliang He **Sun Yat-Sen University**
Using Agent-based Model to Explore Network Stability Sep 2015 – Jun 2016

- Simulated ecosystem with Agent-based Model in Netlogo platform by modeling thousands of self-interested agents, and achieved dynamic balance with species competition and evolution.
- Performed ridge regression to calculate the parameter of the Lotka–Volterra equations in Matlab.
- Described the difference between Agent-based Model and system dynamics model on predicting ecosystem dynamics, and put forward an explanation.

SELECTED PROJECTS

Explore and Control Feature Correlation in Neural Networks **UMass Amherst**, Oct 2017 – Dec 2017

- Observed the several changing patterns of feature correlation in neural network training, such as high-level layer features have a higher variance of correlation.
- Proposed two approaches to control the correlation and achieved better results (training speed/accuracy) than baseline on fully connected and convolutional network.

Feature Identification of Dishes base on Yelp Reviews **UMass Amherst**, Oct 2017 – Dec 2017

- Extracted intuitive information such as flavor, ingredients and cooking style from Yelp academic dataset with phrases and keywords extraction techniques such as TextRank, RAKE, and TFIDF.
- Conducted sentiment analysis to distinguish positive and negative reviews with NLTK tools. Used POS tagging to focus non-proper nouns and adjectives and use word cloud plot to visualize key phrases.

Text-Graph matching algorithm——automatically choosing news auxiliary picture **SYSU**, Mar 2017 – Jun 2017

- Implemented graphic matching algorithm, including keyword extraction, word representation, and multi-label image classification using a convolutional network. Achieved accuracy of 17% and get 15/289 in the competition.
- Analyzed the information contained in each scale in one picture through a fuzzy matching algorithm to corresponding semantic information.