XINYUAN WANG

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EDUCATION

University of California San Diego (UCSD) Sept. 2022 - Present
Master of Science in Computer Science and Engineering

- GPA: 4.00/4.00

Central South University (CSU), China Sept. 2018 – Jun. 2022
B.S. in Computer Science and Technology

- GPA: 90.97/100 (3.88/4.00)
- Awarded the School of Computer Science and Engineering Annual Scholarship (2018 - 2021)
- Awarded 2022 Outstanding Graduates of Central South University (Jun. 2022)

PUBLICATIONS AND PATENTS

Publications:

1. **Wang, X.,** Wang, R., Tao, M. & Zhang, L., (2021). "*Reduce the medical burden: An automatic medical triage system using text classification BERT based on Transformer structure*", ICBASE 2021
2. Zhou, F., Chen, Q., Cui, Y., **Wang, X**., Ma, H., Zhao, Y. & Li, X., (2020). "*A fast method for detecting minority structures in a graph*", VINCI 2020

Patents & Software Copyrights:

1. Interactive Family-building Software of Malicious Webshell Files V1.0. 2022SR0850594, 2022-06-27
2. A visual analysis and feature transfer method of internal feature importance in neural networks. 202110710164.3, 2021-06-25
3. Application layer malicious network traffic detection software based on the cascaded deep neural network. 2021SR0330731, 2021-01-02

RESEARCH EXPERIENCE

Generate Object-specific Image with Diffusion Model and RLPrompt Dec. 2022 - Present
Independent research advised by Prof. Zhiting Hu, Assistant Professor at UCSD

- Text-to-image generating model like Diffusion model has the ability to generate abundant different images with different objects in the training data. However, it doesn't have the ability to generate new images using a specific object/person/subject in a given image. This project aims to address this challenge by using a Reinforcement Learning method (RLPrompt) to search for the best hard prompt as an text identifier of the subject in several images. This identifier could be embedded in prompts or combined with other identifiers, thereby increasing flexibility and controllability during image generation.
- This project is still on-going advised by Prof. Zhiting.

Interpretable Object Detection via Deep Learning Dec. 2020 – Jul. 2021
Research Assistant to Professor Ying Zhao, Sub-Dean of the Department of Computer Science and Technology

- This project aimed to improve the interpretability of CNN by visualization and provide guidance for feature transferring of high-value features in CNN
- Proposed a method called Average Image Analysis to discuss the low-frequency information learned in the network, which quantifies the influence of the input on the neurons by calculating the cosine distance of guided-backpropagation neural visualization results and average image of data sets.
- This method quantifies gradient-based CNN visualization methods, provides more understanding of high semantic information in different depths in the network, and could give guidance to feature transfer in the subsequent step
- Software Copyright: "A visual analysis and feature transfer method of internal feature importance in neural networks", 2021-06-25
- Graduation Thesis: "The Research on The Interpretability Method of Deep Neural Network Based on Average Image", 2022-06-01

Automatic Medical Triage System Based on Natural Language Processing Jan. 2021 – Jun. 2021

- In line with solving practical medical problems, I assisted with researching medical triage issues in China and with my classmates, built an automatic medical triage system based on medical question answering data using Bidirectional Encoder Representation from Transformers
- Our system performs well when testing with 95% top-2 accuracy on 5 major disease data sets and 78.3% top-2 accuracy on 20 disease data sets, which is significantly higher than Sequence-to-Sequence models built by others

- Output paper: “Reduce the medical burden: An automatic medical triage system using text classification BERT based on Transformer structure”, ICBASE 2021

Detecting Malicious Webshells by Constructing Webshell Family Clusters Dec. 2021 - May 2022

Research Assistant to Professor Ying Zhao, Sub-Dean of the Department of Computer Science and Technology

- Webshells are malicious scripts in web servers. This project aims to detect malicious webshells by constructing webshell families according to the clusters of their program call sequences. The main method is composed of reducing the dimensionality of webshell code with Auto-encoders, clustering low-dimensional webshells and interactively constructing webshell families using Visualization techniques.
- I researched on text classification CNN, implemented and tested different CNN-based Auto-encoders and applied different clustering algorithms. I also merged dimensionality reduction and clustering into one model using Contrastive Dimensionality Reduction model.
- Software Copyright: “Interactive Family-building Software of Malicious Webshell Files V1.0”, 2022-06-27

EXTRACURRICULAR ACTIVITIES

- Psychological Student Committee member Dec. 2019 – Jun. 2022
- Student representative at the congress held at the School of Computer Science and Engineering Dec. 2020