Zhixuan LIU

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Education

Carnegie Mellon University, School of Computer Science **2022.8 – present**

Robotics Institute, Master of Science in Robotics

- Relevant Coursework: Machine Learning, Computer Vision.
- Conducting research in image and video generation area.

The Chinese University of Hong Kong, Shenzhen **2018.9 – 2022.6**

Bachelor of Engineering in Computer Science and Engineering

- Cumulative GPA: 3.72/4.0, major GPA: 3.88/4.0
- Awards and Honors: 2022 Presidential Award for Outstanding Student (Top 0.5%), University Entrance Half Scholarship, Dean's List of School of Data Science (2019 - 2022), School Academic Scholarship (2019-2022 for Top 2% students).
- Undergraduate Teaching Assistant for Mechanics in 2019 spring, for C++ in 2021 fall, for Data Mining in 2022 spring.
- Relevant Coursework: Data Mining, Computer Graphics, Convex Optimization, Linear Algebra, Statistics, Parallel Computing, Operating System, Data Structure, Software Engineering, Database System.

Publications

1. Peter Schaldenbrand, **Zhixuan Liu**, Jean Oh, "*StyleCLIPDraw: Coupling Content and Style in Text-to-Drawing Translation*", 2022 IJCAI. https://www.ijcai.org/proceedings/2022/688
2. Peter Schaldenbrand, **Zhixuan Liu**, Jean Oh, "*StyleCLIPDraw: Coupling Content and Style in Text-to-Drawing Synthesis*," 2021 NeurIPS Workshop on Machine Learning for Creativity and Design. https://arxiv.org/abs/2111.03133
3. **Zhixuan Liu**, Peter Schaldenbrand, Jean Oh, "*Gander: A Comprehensive Machine Learning Media Synthesis Platform & Style-CLIPDraw: A Style-Transferred Text-to-Drawing Synthesis Method*," 2021 CMU RISS Working Papers Journal, pp. 189-195. https://riss.ri.cmu.edu/research_showcase/working-papers-journals/
4. Kaiwen Xue, **Zhixuan Liu**, Jiaying Li, Xiaoqian Ji and Huihuan Qian, "*SongBot: An Interactive Music Generation Robotic System for Non-musicians Learning from A Song*," 2021 IEEE International Conference on Real-time Computing and Robotics (RCAR), 2021. https://ieeexplore.ieee.org/document/9517454

Research Experiences

Bot Intelligence Group (BIG) at Carnegie Mellon University **2021.8 – 2022.6**

Research Intern supervised by Dr. Jean Oh and PhD student Peter Schaldenbrand *Virtual*

- Added artistic control to image synthesis ML models using CLIP and VGG16.
- Designed a text-to-drawing synthesis model StyleCLIPDraw, which is accepted by NeurIPS 2021 workshop with more than 200 stars on GitHub (https://github.com/pschaldenbrand/StyleCLIPDraw) and many shares on Twitter.
- Find evaluation methods for StyleCLIPDraw and anticipate to submit a full conference publication in IJCAI 2022.
- Conduct research focused on natural language to video generation.

Carnegie Mellon's Robotics Institute Summer Scholars (RISS) Program **2021.6 – 2021.8**

Summer Research Intern supervised by Dr. Jean Oh and PhD student Peter Schaldenbrand *Virtual*

- Designed the user interface of "Gander" – a machine learning competition website for generated media outputs, by interviewing potential users; and implemented some of the web pages.
- Implemented state-of-the-art code metrics such as FID socre that measure the performance of media outputs generated by Generative Adversarial Networks (GAN) for Gander website.
- Designed "Style-CLIPDraw", an algorithm that generates a drawing based on natural language input and a style image.
- Paper Link (published in CMU RISS 2021 Journal) , Video Link, Poster Link

Shenzhen Research Institute of Big Data (SRIBD) **2021.1 – 2021.6**

Research Assistant under Prof. Baoyuan Wu *Shenzhen, China*

- Participated in building federated learning (e.g. a distributed training model) based machine learning training platform and create various python script to process medical datasets by leveraging machine learning algorithms such as fedavg.
- Conducted a backdoor defense research in Artificial Intelligence security area by reading relevant journals and papers and replicated the corresponding experiments using Faster R-CNN, RNN, and GANs.

Shenzhen Institute for Artificial Intelligence and Robotics for Society (AIRS) **2020.4 – 2020.12**

Research assistant under Prof. Huihuan (Alex) Qian *Shenzhen, China*

- Leveraged Probabilistic Graphical Model and Markov Chain Model to realize an automatic music composition robot.
- Implemented the controlling modules in Python and optimized hyperparameters by using crowdsourcing algorithm.
- Published the paper "*SongBot: An Interactive Music Generation Robotic System for Non-musicians Learning from A Song"* as the second author in IEEE RCAR 2021.

Projects and Presentations

Ancient Chinese IDE in course - C++ Programming Paradigms **2020.4 – 2020.6**

- Worked as a project leader, use C++to design and implement an IDE including code editor, compiler, linker, assembler, simulator, and GUI which compiles and executes ancient Chinese language.

Database Management System for Intelligent Farm in course – Database System **2021.2 – 2021.5**

- Worked as a group leader, used MySQL to design the database system, used HTML+CSS+JS to implement the front-end UI design, used PHP to link the front-end to local database, used some APIs to do the data visualization.
- Used Long Short-Term Memory and CNNs to predict crop yields of farms based on time series.

Energy Consumption Prediction of Users in Pecan Street in course – Data Mining **2021.2 – 2021.4**

- Conducted Gaussian Process Regression model on the 16-week electricity consumption data, and predict the electricity consumption of users in the next week with uncertainty tolerance.
- Designed and found the best kernel functions; adjusted hyper parameters by using the Gaussian Regression package in PyTorch.

Skills and Interests

Languages: TOEFL: 111 (MyBest Score), Chinese (Mandarin)

Frameworks: PyTorch, NumPy, OpenGL, OpenCV, Pandas, Django, Qt

Programming Language: python, C/C++, Java, MATLAB, MySQL, HTML, CSS, JavaScript, PHP

Other Interests: UI design for app and web, music and arts, intersection between machine learning and arts