Xiaoyuan Liu (刘啸远)

Undergraduate in Computer Science

Email: lxy9843@sjtu.edu.cn
Tel: (+86) 132 6229 0218
Home Page: https://littleround.cn/about/

EDUCATION

Shanghai Jiao Tong University **Shanghai, China**
Honors Bachelor of Science (B.Sc. Hons) in Computer Science Sept. 2016 ~ June 2020 (Expected)

- Member of **ACM Class**, which is an elite CS program for top 5% talented students
- Average score: 90/100

HONORS AND AWARDS

The 32nd China's National Olympiad in Informatics (NOI) Silver Medal 2015
KoGuan Encouragement Scholarship (**Top 0.3%**, SJTU) 2017
Zhiyuan Honorary Scholarship 2016, 2017, 2018
Academic Excellence Scholarship 2017, 2018, 2019
Outstanding Student Cadre (**Top 0.8%**, SJTU) 2018

RESEARCH EXPERIENCE

Visiting Student Researcher **Berkeley, CA, USA**
University of California, Berkeley, advised by Prof. Dawn Song July 2019 ~ Dec. 2019 (Expected)

- LASER: **L**earning to **A**utomate **S**ocial **E**ngineering **R**esistance
  - Proposed the design and development of an automated attack detection and attacker identification system, able to incorporate human feedback and continuously learn from its own deployment.
  - Lead the Berkeley LASER team to develop a phishing email analyzer that can detect more than 70% of phishing emails utilizing their meta-data, body part and attachment features.
  - Designed a distributed framework and to integrate dockerized system components. Specified a set of RESTful APIs, provided a python SDK and wrote detailed documentation to support the code integration for collaborators from other universities.
  - Managed the code maintenance and the deployment on k8s infrastructure. Communicate with the DARPA evaluation team on behalf of LASER team.
- Cyber threat intelligence analysis and automated log auditing
  - Proposed a log auditing system that can detect suspicious behavior based on the analysis of up to date natural language security reports written by human experts.
  - Developed a relation extraction component which convert text from security related articles into structural representations. This representation can be used to generate queries using specific DSL to search malicious behavior in the graph database of system log.
- Text-to-SQL generation
  - Improved the performance of natural language to SQL generation by introducing meta learning training method.
  - Introduced a new Text-to-SQL evaluation methodology to measure the adaptability of model for unseen database schemas.
- Language models and its robustness
  - Integrated language models like word2vec, glove, BERT, RoBERTa and related network components like CNN, LSTM in a consistent framework.
  - Measured the robustness of trained language models by testing it on a relevant domain with distributional shift on different tasks like sentimental analysis, sentence similarity, QA, etc.

Undergraduate Researcher **Shanghai, China**
Shanghai Jiao Tong University, advised by Prof. Kai Yu July 2018 ~ June 2020 (Expected)

- Reinforcement Learning for Dialogue Management
  - Proposed a novel structured actor-critic approach to implement structured deep reinforcement learning (DRL), which not only can learn parallelly from data of different dialogue tasks but also achieves stable and sample-efficient learning.
  - Developed a multi-domain dialogue environment by combining existing single-domain user simulators while maintain the consistency of the dialogue.
- Speech Tone Classification
  - Built a classifier for tones of single Chinese characters. By analyzing the f0/energy sequences using a set of well-designed rules, achieved an accuracy above 99% in a multi-class classification setting.
  - Won first place in kaggle competition hold by AISPEECH.

TEACHING EXPERIENCE

Lead Teaching Assistant *C++ Programming (A)* Fall 2017
Lead Teaching Assistant *Data Structures* Spring 2018
Student Instructor *Principle and Practice of Computer Algorithms* Summer 2018

SELECTED PROJECTS

RL Framework for Image Classification Fooling ■ Python 2018
Reinforcement Learning, Model Robustness

- Coursework of *"Frontiers of Computer Science"*
- Prove that it is possible to fool image classifiers **in the black box settings** using reinforcement learning techniques.

Reinforcement Learning in the Card Game Dou Di Zhu ■ Python 2019
Hierarchical Reinforcement Learning, Backend

- Coursework of CS492 *"Reinforcement Learning"*, won **first** place in class.
- Investigated the popular Chinese card game Dou Di Zhu, which is an imperfect information game with randomness.
- Implemented several rule-based baseline agents which have human-compatible performance.
- Show that a hierarchical reinforcement learning agent using summary actions can benefit from the ability of making high-level decisions and outperform all baselines.

Mx* Compiler ■ Java 2018
Assembly Language, Code Generation and Optimization, ANTLR

- Coursework of *"Compilers"*
- Developed a compiler that compiles C-and-Java-like language (Mx*) to NASM.
- Implemented optimizations like constant replacement, function inline and loop unrolling.

QuPlayground ■ JavaScript 2018
Quantum Computing, Simulation, UI Frontend

- Coursework of *"Quantum Information Science"*
- Built a quantum computation simulator from scratch with almost no dependency.
- Designed a convenient and intuitive GUI using GoJS to help user construct and demonstrate their quantum circuits. Examples include Bell test, quantum teleportation and Shor algorithm.

Toy ML System ■ C++, Python 2017
Machine Learning System, CUDA Programming, Dynamic Library

- Designed a TensorFlow-like machine-learning system which support simple operators including matmul, dropout, softmax & relu, conv2d & max_pool with autograd.
- Supports optimizers like vanilla gradient descend and ADAM. Utilizes a carefully written multi-thread C++ dynamic library to accelerate the computation of convolution and max pooling operation.

RISC-V CPU ■ Verilog 2018
Computer Architecture, Tomasulo, FPGA Programming

- Designed a RISC-V CPU that supports RV32I Base Integer Instruction Set V2.0 (2.1~2.7).
- Designed a modified Tomasulo structure to support superscalar with arbitrary number of ALUs.

Chinese Land Battle Chess AI ■ C++ 2016
Game Theory (Minimax), Alpha-beta Pruning, Genetic Algorithm

- Built a rule-based AI for Chinese Land Battle Chess. Adapted techniques like alpha-beta pruning, beam search and time estimation to guarantee the searching time for each step within 1 second limit.
- Used genetic algorithm to screen for a better initial arrangement of the chess pieces.
- Won **second** place in the round-robin tournament in class.

ACTIVITIES

Student Council Vice President 2018

- Led more than 30 volunteers to host the official welcome party for more than 300 freshmen.
- Organized more than ten events of different sizes.

Head of the Department of Culture and Sports, Student Union 2017

SKILLS AND INTERESTS

Languages: Mandarin (Native), Japanese (Beginner)
Programming: C++ / Python / Java / JavaScript / Verilog / MATLAB / Pascal
Technical experience:

- Web: Django / Flask / Express / Koa / Jade (Pug) / Swagger
- System & Database: Mininet / Docker / Kubernetes / Jenkins / MySQL / MongoDB / Redis
- Other: LaTeX / Markdown / Wireshark / Qt / Wayland & Weston / Vivado

Interests: Photography, Badminton, Image & Video Editing