Changling (Xavier) Li

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RESEARCH INTERESTS

Multi-agent Reinforcement Learning, Multi-agent Systems, Cooperative Autonomous Robots, Ethics in Multi-agent Systems.

EDUCATION

Colby College, Waterville, ME, USA
B.A. Computer Science, Astrophysics   2018 - 2022
GPA: 3.98/4.00

- Relevant Course: Neural Networks, Computer Vision, Interactive System, Real-World Database Design, Data Structure and Algorithms, Data Analysis and Visualization, Analysis of Algorithms, Data Science in Astrophysics, Programming Languages, Computer Organization.

Li Po Chun United World College, Hong Kong
IB Diploma: 41/45   2016 - 2018

RESEARCH EXPERIENCE

Energy-Aware Multi-Agent Reinforcement Learning for Collaborative Execution in Mission-Oriented Drone Networks
Department of Computer Science, Colby College   January 2021 - Present
PI: Professor Ying Li

- Created DQN network and formulated case-specific reward function.
- Created scalable simulation environment for drone networks.
- Presented academic poster at 2021 Colby College Undergraduate Research Retreat.
- Conference paper currently under review.

Random Drawing Generation with Recurrent Neural Network
Department of Computer Science, Colby College   January 2020 - May 2021
PI: Professor Hannen(Hannah) Wolfe

- Created core workflow for data processing and animation to investigate the correlation between eye focusing and drawing.
- Modified LSTM neural network and implemented poly-simplification algorithm to improve training efficiency.
- Monitored the training process with TensorBoard and generated sketches with the trained model.
- This project will be employed as a tool in Colby College Art Department.

Generation of Euler Diagram with Given Abstract Description
Department of Mathematics, Colby College   Spring 2019
PI: Professor Nora Youngs

- Analyzed and documented 10+ relevant research paper.
- Developed theorems with proofs on generating Euler Diagram with given abstract description.

ON-GOING RESEARCH PROJECT	Comparison of Collaborative and Competitive Environment of Multi-Agent Reinforcement Learning for drone networks
	Department of Computer Science, Colby College September 2021 - Present
	PI: Professor Ying Li
	Evaluate the Effect of Ethics on the Performance of Multi-agent Systems
	Department of Computer Science, Colby College February 2022 - Present
	Identification of Independent Moving Object in Curvilinear Self-motion
	Department of Computer Science, Colby College October 2021 - Present
	PI: Professor Oliver W. Layton

PUBLICATIONS

3. Under Construction...

2. Under Construction...

1. Y. Li, **C. Li**, J. Chen, and C. Roinou. Energy Energy-Aware Multi-Agent Reinforcement Learning for Collaborative Execution in Mission-Oriented Drone Networks. (currently under review)

POSTERS PRESENTATION

1. **C. Li**, J. Chen, Y. Li, Reinforcement Learning for Energy-Efficient Trajectory Planning of Drone Networks, *2021 Colby College Undergraduate Research Retreat.*

TEACHING EXPERIENCE

Department of Computer Science, Colby College   Fall 2019 - Present
Teaching Assistant
- CS 353: Interactive System.
- CS 251: Data Analysis and Visualization.
- CS 231: Data Structure and Algorithm.
- CS 152: Computational Thinking: Science.
- CS 151: Computational Thinking: Visual Media.

Department of Physics, Colby College   Fall 2019 - Spring 2021
Teaching Assistant
- PH 241: Modern Physics I.
- PH 242: Modern Physics II.

SKILLS

- *Python*: Extensive expertise in the language and its usage for data analysis, visualization and machine learning.
- *Java*: Proficient in OOD, data structure and algorithms.
- *C, C++*: Built Arduino applications, computer vision programs using openCV, familiar with data structure and algorithms.
- *JavaScript*: Intermediate level experience with full stack website development.

PROJECTS   Better Housing Lottery System

- A room selection website targeting at student users.

- Designed accessible features and implemented the full stack website.

- Ran user testing with clients and adopted agile for team development.

Chinese Digital Humanities Platform

- A public digital platform providing access to digital Chinese magazine database and an interface to analyze the digital humanities data.

- Helped design and implement the full stack website.

- Performed OCR for text recognition for both simplified and traditional Chinese.

- The school recently interviewed and published the relevant work on the official news website.

Advocacy for Incorporation of Data Ethics in Computer Science Education.

- Researched on the cases of racial biases in AI and its correlation to the traditional education system.

- Collaborated with Education department and created a zine to discuss its causes from the perspective of education system.

- Distributed the zines to professors of computer science department to advocate the incorporation of data ethics as part of the education principle.

Cookies

- A prototype of communicational robots with simple information transmission and emotion representation to help people stay connected during pandemic.

- Wired the circuit on Arduino board and connected microphone, LED light, Bluetooth, rumble motor, and motion sensor.

- Implemented the visual representation of emotion perceived by microphone and the motion representation of user's gesture perceived by motion sensor.

Shadow Puppet

- A role-playing maze computer game.

- Designed the game concept and method of playing as part of a team.

- Built physically realistic character control using Pygame and led the visual art design using Photoshop and Illustrator.

- Evaluated game experience and debugged the program which contribute to the finish of final version of the game.

Simple CPU Construction

- Creation of simple CPU with a ROM for computer memory, a RAM for data memory, and a separate ALU circuit using VHDL.

- Achieved general mathematical calculation functionality.

HONORS PRIZES

1. UWC Davis Scholar
2. Dean's List F'18, S'19, F'19, F'21 (2020 and S'21 - cancelled due to COVID-19)

| **SERVICE** | WatervilleCreates!, Waterville, ME | September 2021 - Present |

3D Printing Volunteer

- Develop and lecture 3D printing workshops to local artists.
- Cooperate with artists and performers for collaborative artworks.

The Bridge, Colby College   February 2019 - September 2021

Co-Leader & Logistician

- Cooperate with academic departments and external organizations to develop partnerships for LGBTQIA+ events.
- Organize yearly Transgender November and Pride Month with partners and negotiate on funding.

Coral Monitoring, Li Po Chun UWC   September 2016 - June 2018

Co-Leader & Data analyst

- Led group planning sessions for scuba diving and cooperated with 20+ students to collect data weekly.
- Processed and analyzed the collected numerical data of corals and contributed to coral watch online dataset.
- Partnered with World Wildlife Fund to deliver environmental education to thousands of students in Hong Kong.

REFERENCES

Ying Li

- Colby College
- Assistant Professor, Department of Computer Science
- 5852 Mayflower Hill, Waterville, ME 04901
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Hannen(Hannah) Wolfe

- Colby College
- Assistant Professor, Department of Computer Science
- 5550 Mayflower Hill, Waterville ME, 04901
- O/C: (207) 859-5858
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Oliver W. Layton

- Colby College
- Assistant Professor, Department of Computer Science
- Postdoctoral Researcher, Rensselaer Polytechnic Institute
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