Changling (Xavier) Li

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RESEARCH INTERESTS

Machine Learning, Reinforcement Learning, Multi-agent Systems, Robotics, Computer Vision

EDUCATION

Colby College, Waterville, ME, USA
B.A. Computer Science, Astrophysics 2018 - 2022
GPA: 3.96/4.00

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

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

RESEARCH EXPERIENCE

Multi-agent Reinforcement Learning for Energy Efficient Trajectory Planning
Department of Computer Science, Colby College January 2021 - Present
PI: Professor Ying Li

- Modified deep Q-learning Network model (DQN) to multi-agent DQN and assess the model with OpenAI Gym.
- Formulated case-specific reward function and create scalable environment for drones' trajectory planning.
- Trained the model with 9 agents and the trajectories of the drones are visualized and analyzed.
- Presented academic poster at 2021 Colby College Undergraduate Research Retreat.

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 using Panda, Numpy, Matplotlib 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 random 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

Identification of Independent Moving Object in Curvilinear Self-motion
Department of Computer Science, Colby College October 2021 - Present
PI: Professor Oliver W. Layton

Comparison of Collaborative and Competitive Environment for Multi-Agent Reinforcement Learning
Department of Computer Science, Colby College September 2021 - Present
PI: Professor Ying Li

POSTERS PRESENTATION

1. Changling Li, Jiyao Chen, Ying Li, *Reinforcement Learning for Energy-Efficient Trajectory Planning of Drone Networks*, 2021 Colby College Undergraduate Research Retreat.

PUBLICATIONS

1. Under Construction...

TEACHING EXPERIENCE

Department of Computer Science, Colby College Spring 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, familiar with data structure and algorithms.
- *JavaScript*: Intermediate level experience with full stack website development.

PROJECTS

Chinese Digital Humanities Platform
- A public digital platform providing access to digital Chinese magazine database and an interface to analyze the digital humanities data.
- Designed and implemented the full stack website.
- Performed OCR for text recognition for both simplified and traditional Chinese.
- A news report on this project will be published on the school official website in December.

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 (2020 and 2021 - 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 - Present
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
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Hannen(Hannah) Wolfe

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Oliver W. Layton

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