

# KAI MALLOY

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## EDUCATION

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### University of California, Irvine

Graduation: Jun. 2021

Bachelor of Science in Computer Science

Specialization in Intelligent Systems

*Relevant Coursework:* Machine Learning and Data Mining, Algorithms for Probabilistic and Deterministic Graphical Models, Applications of Probability in Computer Science, Design and Analysis of Algorithms

**GPA:** 3.82/4.00

## AWARDS AND RECOGNITIONS

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### Information and Computer Science Honors Program

Sept. 2020 - Present

### Summer Undergraduate Research Program Grant

Jun. 2020 - Sept. 2020

### Deans Honors List

Sept. 2017 - Present

### Japanese Chamber of Commerce Northern California Scholarship

May 2016

## RESEARCH AND PROFESSIONAL EXPERIENCE

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### DataLab Group at UC Irvine

Mar. 2020 - Present

*Undergraduate Researcher*

*Irvine, CA*

- PI: Prof. Padhraic Smyth, Graduate Mentor: Casey Graff
- Exploring high resolution spatio-temporal learning based models with California wildfire satellite data to improve wildfire prediction accuracies
- Created multiple models utilizing recurrent and convolutional neural networks
- Built a dynamic visualization tool for analyzing various satellite data at incremental timesteps

### Calit2 at UC Irvine

Jan. 2020 - Mar. 2020

*Undergraduate Researcher*

*Irvine, CA*

- PI: Prof. Bill Tomlinson
- Analyze various sustainability issues and implement IT solutions that can address the problems
- Launched a Q&A platform with machine learning to aid in answering questions for the tree planting project that coincides with the Trillion Trees Initiative
- Proposed sustainability project ideas to the team

### Apple

Jan. 2019 - Jul. 2019

*iPhone Quality Engineer Intern*

*Cupertino, CA*

- Compiled large amounts of iPhone Failure Analysis data and find trends by experimenting with different means of visualization
- Designed and developed two full scale applications from scripts as a lasting and user-friendly tool for other teammates
- Optimized a parsing/visualization task that took 10 minutes to run by Apple employees down to 5 seconds with my Python script
- Presented data to teammates weekly and decided on further avenues of research as well as ways to refine the data visualization through multiple iterations

**Givsum***Special Projects Intern*

Mar. 2018 - Jun. 2018

*Irvine, CA*

- Design and brainstorm features for improving user experience for the company website while incorporating feedback from teammates
- Implement a calendar view of volunteer events from scratch as a test feature for the company website

**LEADERSHIP ACTIVITIES**

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**The Green Initiative Fund***Commissioner*

Sept. 2020 - Present

*Irvine, CA*

- Work with the TGIF student board and the Internal VP of Associate Students to fund projects from undergraduate students that promote sustainability at UC Irvine
- Advocate and spread awareness of sustainability practices on campus
- Facilitate and record weekly board meetings to decide which projects to fund
- Manage projects that have been approved by the board

**TEACHING EXPERIENCE**

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**6D Discrete Mathematics***Learning Assistant*

Mar. 2020 - Jun. 2020

*Irvine, CA*

- Assisted professor Sandy Irani during lecture and discussion to answer student questions
- Proposed and managed an alternate solution for online students in different time zones to receive lecture participation points
- Held office hours two times a week for student questions

**AppJam+***Mobile Application Mentor*

Sept. 2018 - Dec. 2018

*Placentia, CA*

- Taught programming concepts through mobile application development to middle school students in Orange County
- Managed a class of 30 students and their group projects from concept to completion: brainstorming, refining the app idea, splitting up tasks, creating and maintaining a schedule, teaching and advising
- Prepare students for a final showcase to show their completed mobile app

**Java & AP Computer Science***Private Tutor*

Jun. 2015 - Present

*Irvine, CA*

- Teach fundamental programming concepts learned in Java/AP Computer Science courses to high school students as a private tutor
- Pinpoint difficulties in student's comprehension to assist with programming assignments for their classes

**Rivet Learning***Python Instructor*

Jun. 2017 - Aug. 2017

*San Jose, CA*

- Managed multiple summer camp classes to teach programming with Python
- Created a curriculum from scratch, consisting of fundamental programming exercises and simple games
- Taught students of various skill levels and catered lessons accordingly

**TECHNICAL SKILLS**

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| <b>Programming Languages</b>             | Python, Java, C, C++   |
| <b>Web Development</b>                   | HTML, CSS, JavaScript  |
| <b>Machine Learning</b>                  | Pytorch, Tensorflow  |
| <b>Data Processing and Visualization</b> | NumPy, Pandas, Matplotlib, Seaborn, PyQtGraph, R             |
| <b>GUI Building</b>                      | Tkinter, PyQt  |
| <b>Other</b>                             | Linux, Git, MIPS (Assembly), L <sup>A</sup> T <sub>E</sub> X |

## SELECTED PROJECTS

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### **Spatiotemporal Active Wildfire Modeling using Recurrent Neural Networks**     Sept. 2020

*Datalab Group at UC Irvine*

Existing empirical, simulation based models and machine learning models for forecasting wildfires lack integration of high temporal resolution weather and fire spread data. Through this project, I explore how the use of recurrent and convoluted neural networks capture the temporal aspects of a wildfire. The data used is the California wildfire data from the past 8 years and the models are trained using PyTorch, a python library for machine learning. The evaluation of the model is performed through comparison to a baseline convolutional neural network.

### **Starcraft Win/Loss Estimation Model With Skill Assessments**     Jun. 2020

*CS 179: Algorithms for Probabilistic and Deterministic Graphical Models Final Project*

In this project, I used Starcraft Win/Loss data sourced from a Kaggle Competition to analyze how well a graphical model can fair in predicting game outcome through assigning skill estimates to each player. The model constructed a table of win probabilities given two players and performs loopy belief propagation to infer player's skills. I also explored how fast a new player's skills can be estimated, strategically holding out certain players from the validation dataset and adding them in incrementally.

### **Classifying the Wine Quality Dataset**     Dec. 2019

*CS 178: Machine Learning and Data Mining Final Project*

Using the Wine Quality dataset from the UC Irvine Machine Learning repository, I conducted a classification experiment using two models: random forest and support vector machines. To combat overfitting, I implemented k-fold cross validation and compared the results of the two models after tweaking the hyperparameters. Random forest outperformed the SVM model with higher accuracy and lower mean squared error.

## LANGUAGE SKILLS

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**Bilingual: fluent in Japanese (spoken, written), English**