Nicholas Moy

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Skills

- **Python:** Pytorch, OpenCV, Pandas, Ultralytics, Pickle, Scikit-learn, Tensorflow, Numpy, Jupyter Notebook, matplotlib, MATLAB
- **Machine Learning/Data Science**: Pytorch, YOLO, Scikit-learn, Neural Networks, Gaussian discriminant analysis, decision trees, ensemble learning, regression, Batch/Stochastic Gradient Descent
- **Java:** Spring, Maven, IntelliJ, Eclipse, grep/regex
- **Julia**: Solving differential equations
- **SQL**: MySQL, database management
- **Web Development:** AWS, HTTP, Rest API
- **Languages**: English, Spanish (conversational)

Education

UC Berkeley 2017-2021

BA in Mathematics ❖ Major GPA: 3.71
❖ Overall GPA: 3.615

- ***Departmental Honors:*** For performance in undergraduate and graduate classes
- ***Math Classes:*** Multivariable Calculus, Linear Algebra, Discrete Structures, Abstract Algebra, Real Analysis, Galois Theory, Algebraic Geometry, Complex Analysis, Number Theory, Set Theory, Graduate Algebra, Graduate Real Analysis, Representation Theory
- ***CS Classes:*** Introduction to Programming (Python, Scheme, SQL), Data Structures (Java), Machine Learning (Python)

UC Irvine 2022-2023

Masters in Mathematics ❖ GPA: 3.89

- ***Graduate Math Classes:*** Partial Differential Equations, Differential Geometry, Algebraic Geometry, Complex Analysis, Set Theory, Computational Partial Differential Equations, Methods in Applied Math

Work Experience

- **University Teaching Assistant:** Taught discussion sections for Undergraduate Calculus classes at UC Irvine **9/22-12/23**
    - Developed public speaking and communication skills from giving lectures
    - Helped write/grade quizzes/midterms
- **Intern at IOS App Startup Vaptales:** Contributed to backend development for startup social media app **8/21-12/21**
    - Communicated with both frontend and backend teams to coordinate features properly
    - Used Java Spring framework for web development
    - Used MySQL for database management with AWS

- Used Postman application for testing

Personal/Academic Projects

- **Tennis Image Analyzer:** Used YOLO and Resnet50 Neural networks to analyze positions and velocities of players/ball in a tennis match from image/video. **2024**
  - Written in Python
  - Uses YOLO object detection model and Pytorch Resnet50 neural network
  - Uses reference points to predict coordinates of players and ball on court
  - Libraries used: Ultralytics, Pytorch, Opencv, Pickle, Pandas
- **Verlet Integration:** Wrote a game/physics simulation using Verlet Integration **2024**
  - Uses SDL2 and OpenGL
  - Written without GLUT, GLEW, or GLFW for the purposes of learning basic OpenGL and the graphics pipeline
- **Trip Finder**: Built application to find shortest road path between two google map locations **2020**
  - Implemented both Dijkstra and A* pathfinding algorithms
- **Decision Trees**: Wrote implementations of decision tree and random forest models in python **2020**
  - Used Jupyter notebook to write and test models on Spam (75% acc.) and Titanic (77% acc.) datasets
  - Used gini impurity to calculate splits in each decision tree
- **Neural Networks**: Wrote implementations of feedforward, recurrent, and convolution NN in python **2020**
  - Used Jupyter notebook to train and run predictions on Higgs dataset with 70% accuracy
  - Utilized numpy to manually calculate tensor derivatives for backpropagation
- **Finite Difference Schemes to solve Discrete PDEs:** Wrote implementations of finite difference schemes for various second order PDEs such as the poisson equation **2023**
  - Also used Neural Networks to solve the poisson equation by approximating the second derivative of our discrete guessed solution and taking the mean squared error of its difference with the given function