Cooper J. Nicolaysen

Refshalevej 155B - Copenhagen - +45 52 65 77 51 - <u>cooperslink@gmail.com</u>

Education:

University of Copehenhagen | Niels Bohr Institute (MS) | 2021 - 2023
Masters in Quantum Mechanics
High Energy Theory and Cosmology
Machine Learning Certificate

Oregon State University (BS) | 2017 - 2021 | GPA: 3.5
Bachelor of Science in Physics
Bachelor of Science in Mathematics

Experience:

Machine Learning on Climate Change Data Research | Niels Bohr Institute 2022 - 2023
- Use various machine learning algorithms to train a model on examining satellite images of rainforests and savannahs to identify specific patterns and climate tipping points in the local ecosystem
- Developed on Computerome, Denmark's National Life Science supercomputer, for large data structures and processing times

Pulsar Timing Arrays Research | Oregon State University Physics Thesis: 2021
- Recreated pulsars gravitational waves in Matlab to understand how different NASA solar system models would affect specific variables used in Pulsar Timing Arrays.
- Created plots using Python to graphically understand the patterns formed, relating them to previously known laws on gravitational wave frequency ranges
- Presented to peers using Latex to write the thesis and separate presentation

Math Learning Center Tutor and Learning Assistant | Oregon State University: Sep. 2018 - June 2020
- Tutored 30+ students a week in Algebra, Calculus, Linear Algebra, Trigonometry, Modern Algebra, and Analysis
- Plan and create lessons for individual students to specialize their learning
- Sit in during lectures and provide insights to help a student answer any questions on their coursework, providing additional resources to the professor's comments
- Organized with other learning assistants to develop better plans for individual courses to insure the maximize the pedagogical value

Incompressible Navier-Stokes Research | Oregon State University: 2019 - 2020
- Understand derivation and simplifications of the 3-dimensional Incompressible Navier-Stokes Equations
- Develop a method for solving the NS equations for a simplified case in 2-dimensions using Fourier transforms, differential equations, and vector calculus.
- Presented findings at a conference at Oregon State University using a poster made in Latex

Projects and Relevant Classes:

Tensorflow Chess AI | Machine Learning Final | Niels Bohr Institute: 2022
- Developed a chess board dataset using algorithms with chess-python API to develop random board states up to a certain moves, each board was then split into 3 dimensions and given an evaluation using the Engine Stockfish
- Used tensorflow to compile a model that can evaluate a chess board state using convolutional neural networks with various hyperparameters to optimize accuracy.
- Created a best-move picker with a MiniMax algorithm developed to maximize the AIs advantage out of a list of potential legal moves.

Applied Machine Learning | Niels Bohr Institute: 2022
- General overview of infrastructure used to build models and inspect data
- Classroom exercise on classification and regression through various methods; decision trees, neural networks.
- Introduced loss functions, preprocessing of data, cross validation, and applications of various clustering algorithms.
- Worked with higher dimensional data representing particle collisions at CERN's LHC accelerator to classify electrons, run regression for electrion energy, and presented unsupervised clustering.

Skills:

- Coding Languages: Python, MatLab, Mathematica, Latex, Excel (5 Years)
- Interfaces: Anaconda, Overleaf, Mathematica
- Python APIs: PyTorch, NumPy, Scikit, Tensorflow, Pandas, Keras, Matplotlib
- Problem solving, creativity, and ability to work in groups
- Quick learner and able to meet individual project deadlines on time