Appilineni Kushal

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Skills

Mathematics	Probability, Differential Equations, Linear Algebra, Statistics, Network theory
Programming	Python (Packages: Pandas, Scikit-Learn, TensorFlow, PyTorch, NetworkX), MATLAB (Monte Carlo methods, stochastic porcesses, image processing), C++
Machine Learning	Regression (OLS, Ridge, LASSO), Clustering, SVM, Decision Trees, Stochastic Gradient Descent, Neural Networks

Graduate Research Tasks Undertaken

Bio-economic modelling Aug 2021 - present

- Developed a novel bio-economic fishery model, taking 3 new factors previously not considered
- Used super computing clusters to generate over 100 GBs of ecological networks data
- Analyzed time series of 400 fishery networks using statistical and interpolation methods
- Performed policy optimization over 10 ecological and economic factors for marine ecosystems
- Created public GitHub repository for code sharing and accessibility to our research
- Wrote a scientific paper highlighting our contributions and presented our work in ecology conferences.

Modelling pest regulation in forests June 2020 - present

- Developed spatial model for pests and their natual enemy, integrating previously unconsidered real-world spatial variations, used Monte Carlo methods to generate over 20GBs time series data
- Analyzed those time series data using tools from dynamical systems, emphasizing sensitivity to small spatial variations and modelling choices
- Used image processing tools to visualize and uncover new spatial patterns, previously unknown
- Wrote two scientific papers and presented our work in both physics and ecology conferences.

Forest fires and Machine learning March 2021 - June 2021

- Examined accuracy of diverse classifiers (K-means, SVM, Gradient Boosting, Neural Networks), in differentiating between natural and human-caused fire incidents.
- Highlighted the use of ML classifiers in identifying causes of unknown forest fires across US.
- Used clustering algorithms to detect new outliers in forest data.

Education

University of California, Davis
PhD in Applied Mathematics **Sept 2019 - July 2024 (expected)**

Indian Institute of Science, Bangalore
Bachelors and Masters in Physics **August 2013 - June 2018**

Scholastic Achievements

- Teaching award for outstanding contributions to the development of the core coursework for the Quantitative Biology major (2023)
- IIT-JEE (2013), All India Rank - 30 ($\sim$ 100 percentile, over 1.5 million students)
- Math, Physics and Chemistry Olympiads (2010-2013) ($\sim$ 99 percentile, over 1 million students)