

Day 2: Foundations in ML and climate modeling

Instructor: Candace Agonafir, PhD

Candace Agonafir has a Ph.D. in Civil Engineering from the City College of New York, a M.S. in Industrial Engineering from NYU, and a B.S. in Physical Science with a concentration in Physics and a minor in Catholic Theology from St. John's University. Her research involves utilizing regression and machine learning methodologies to provide invaluable information towards advancements in urban flooding detection, prediction and prevention.

Description

Deep learning is a powerful AI approach that uses multi-layered artificial neural networks to deliver state-of-the-art accuracy in tasks such as object detection, speech recognition, and language translation. Using deep learning, computers can learn and recognize patterns from data that are considered too complex or subtle for expert-written software. During Day 2, you will learn the basic structures of neural networks and employ techniques with examples in the Jupyter notebook. Specifically, the exercises involve the creation of neural network-based climate models with the machine learning toolbox, Tensorflow.

General Learning Goals

1. Become familiar with the background and methodology of neural networks. Understand the statistical applications involved.
2. Select and implement appropriate machine learning methods to solve real-world climate problems.
3. Effectively create predictive machine learning models utilizing Python-based coding and popular machine learning libraries.
4. Produce visualizations, do calculations, and present results using software.

Schedule

The schedule for the day is below.

	Time	Topic	Notes
AM	8:30 – 9:30	Breakfast and Check in	
	9:30 -10:30	Introduction to Neural Networks	PPT slides will be provided
	10:30 – 10:45	Break	
	10:45 – 11:00	NN continued	
	11:00 – 12:00	Lab: Using Neural Networks for emission prediction and temperature prediction.	Jupyter notebook.

PM	12:00 – 1:00	Lunch	
	1:00 – 1:45	Convolutional Neural Networks	PPT slides will be provided
	1:45 – 2:00	Break	
	2:00 – 2:45	Lab: Using CNN to forecast global temperature	Jupyter
	2:45 -3:15	Discussion on Recurrent Neural Networks	PPT slides will be provided
	3:15-3:30	Break	
	3:30 – 4:15	Lab: LSTM Model	Jupyter
	4:15 – 5:00	Final Thoughts: Graph Neural Networks	