NOAH GRAYSON LUNA

Email: nluna@berkeley.edu | **Github:** https://github.com/ngrayluna | **Website**: https://ngrayluna.github.io/

SUMMARY OF QUALIFICATIONS

Recent M.S. Graduate from Top-tier University with experience developing and implementing Deep Neural Networks, processing and handling time-series data, developing algorithms, statistical analysis, high performance computing, scientific analysis, international collaborative research, and professional work-experience at a renowned seismological laboratory. Seeking opportunities to propel data-driven research using various Machine Learning models, implement new algorithms for computer efficiency, and master software used for industry in a collaborative environment.

Developed Understanding in:

Machine Learning Deep Neural Networks Transfer Learning Python Pandas TensorFlow Keras Version Control
Processing Data Time-Series Data Data Analysis Statistics Scientific Programming
Quick Learner Team Player Self-motivated Communication

EDUCATION

Master of Science in Geophysics Graduated: August 2019
Joint degree from Ludwig-Maximilians-University &
Technical University of Munich

Bachelor of Arts in Geophysics Graduated: December 2014
University of California, Berkeley

ONGOING ML PROJECTS

Denoising Seismic Data with Deep Neural Network Autoencoders

Improve the signal to noise ratio (SNR) of broadband seismic stations in California using a Deep Learning approach.

- We are using denoising autoencoder architectures to remove noise from seismic data.
- To do this, we are downloading seismic data with high SNR from Northern California and adding noise from the stations with low SNR

Collaborator: Dr. Qingkai Kong, Assistant Data Science Researcher at UC Berkeley Seismology Lab & Berkeley Divisions of Data Science

Chatbot developed from LSTM Network interfaced with GUI

Chatbot is trained on upvoted answers and their associated parent (original question) from Stack Overflow. The user interface is developed using Python's Kivy library.

- Used SQL to query the Stack Overflow database to get desired data from mass data dump.
- Workflow completed thus far: downloaded data, pre-processed data, built model, and trained a few models.
- Next steps: limit the vocabulary to allow the LSTM to learn with smaller dataset and create Kivy GUI.

COMPLETED ML PROJECTS

Identifying Seismic Waves with Convolutional Neural Networks

Demo on how to apply deep neural networks to seismic data. The demo demonstrates one approach of how to train a DNN to identify the first phase in a seismic wave caused by an earthquake.

- Created walk-through demo of how to train a CNN to identify the first seismic phase generated by an earthquake using real seismic data.
- Demo includes how to download, pre-process, build model (using Keras), and how to train the model.

COMPLETED ML PROJECTS [Continued]

Single Station Location with 4 DoF Seismometers with Convolutional Neural Networks

Identify phase arrivals found in recorded time-series recordings for future single station earthquake locations.

- Our data set consists of rotational and translational motions (6 Degrees of freedom). 6Dof can be used to earthquakes using a single seismic station.
- Dataset consists primarily of synthetic waveforms generated by an online database of source functions.
- Given the success in their in the field of computer vision and time-series data, we chose CNN.

PROFESSIONAL EXPERIENCE

Assistant Scientist, Ludwig Maximilians University 01.2018 – 01.2019

Converted ideas from seismology into tangible machine learning products. Worked with an international team of post docs, professors, and PhD students to host a workshop about machine learning in the field of seismology.

Machine Learning Speaker for Munich Earth Science School Conference

- Presented a talk and held a Python Jupyter Notebook programming session on recurrent neural networks to professors, post-docs, and Ph.D students from around the world.
- Developed Jupyter Notebooks on Recurrent Neural Networks for programming session.

Student Aid - Earthquake Rupture Simulation of the ’94 NorthRidge Event on HPCs

- Ran simulations using pre-existing mesh, velocity, and rupture parameters using SiesSol software on high performance computers.
- Analyzed synthetics created from simulation with real recorded strong ground motion data.
- Based on discontinuous Galerkin method. We took advantage of tetrahedral elements of varying sizes in order to handle complex geographic geometries.

Research Associate, UC Berkeley Seismology Lab 25.06.2015-21.09.2017

Provided immediate support to IT, Operational, and Engineering Staff of the Berkeley Seismological Laboratory and its various seismic networks. Aided in web development tasks.

Seismic Data Analysis

- Provided timely and accurate information to state and federal agencies, media, and the public by reviewing results for fit and robustness of the automated moment tensors produced by the lab.
- Remotely re-centered and calibrated inertial masses of Streckeisen Broadband Seismometers (STS-1 and STS-2).

Berkeley Seismological Laboratory Website

- Developed web pages for the Berkeley Seismology Lab
- Updated and created new webpage for the California Integrated Seismic Network (CISN) using Bootstrap library framework.

TECHNICAL SKILLS

- Intermediate to advance in Python3.
- Frequently uses libraries necessary for machine learning, scientific programming, and working with time-series data such as: Sklearn, Keras, Tensorflow, Pandas, NumPy, SciPy, Matplotlib, and ObsPy.
- Some experience with SQL
- Uses GitHub for version control of code and MLFlow to track Machine Learning lifecycle.
- Experience using High-Performance Computers (HPC)
- Operating system of choice is Mac OS X and Linux.
- Currently learning C++

PUBLIC SPEAKING/SEMINAR TALKS ON ML

"Applications of Deep Neural Networks in Seismology" 23.07.2019
Master Thesis Defense, Ludwig Maximilian University of Munich

"Recurrent Neural Networks: The Why, What, and How?" 17-22.02.2019
Munich Earth Science School hosted by the Ludwig Maximilian University of Munich.

"Deep Artificial Neural Networks as a Tool for the Analysis of Seismic Data" 14.05.2018
Paper Review for Seismology Group Meeting, Ludwig Maximilian University of Munich

ACCOMPLISHMENTS/OTHER

Utmost Recognition, Science Workshop on Machine Learning in Geophysics 03.2019
Recognition for teaching at the Munich Earth Science School on Machine Learning

First place in Informative Speech at Paul Winter's Invitational 11.2011
First place in the Paul Winter's Speech and Debate Invitational Tournament at the University of the Pacific for Novice Informative Speech.

ONLINE CLASSES CURRENTLY AUDITING FOR SELF-IMPROVEMENT

Algorithms Specialization Offered by Stanford via Coursera
Auditing this course in order to improve efficiency (both memory and time-wise) of code.
Topics covered: Divide & Conquer, Sorting and Searching, and Randomized Algorithms, Graph Search, Shortest Path, and Data Structures, Greedy Algorithms, Minimum Spanning Trees, and Dynamic Programming, NP-Complete Problems

Deep Learning Specialization Offered by deeplearning.ai via Coursera
Taking this course for review only.
Topics covered: Neural Networks, Deep Learning, How to Improve Deep Neural Networks (hyperparameter tuning, regularization, and optimization), Structuring Machine Learning Projects, CNN, Sequence Models