LEVI KEAY

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Levi is a Data Scientist, Geospatial Analyst, and Image Processing Specialist with strong Python programming skills, education in Higher Math and Physics and training in Machine Learning techniques. He has demonstrated outstanding written and verbal communication skills.

Levi learned analytic and computational skills while earning his BSc in Physics, working with a variety of data sources – from microphone audio data to the magnetization of superconductors. His experience as a Research Assistant in UBC's remote sensing research lab gave him an appreciation for the power of imagery. Levi led the research and development of a Python package which applies timeseries analysis to new remotely sensed imagery datasets and is first author of the corresponding research paper (under review).

Comfortable and experienced working across environments of GIS, Python, and MATLAB, and quick to learn new software and coding languages, Levi can script, automate, and optimize methods of analyzing data from a range of sources, and wants to use these skills to help your company efficiently provide value.

SKILLS

Technical Skills:

- Geospatial analysis: ArcGIS Pro/ArcPy, QGIS, GDAL, Rasterio, Shapely
- Computer vision: OpenCV, Scikit, SciPy
- Machine Learning: PyTorch, Keras
- Data visualization: Matplotlib, Plotly, Adobe Suite
- Computation: Numpy, Multiprocessing, Threading, H5PY
- MATLAB

Advanced Math and Physics:

- Partial Differential Equations, Vector Calculus
- Computational Physics
- Electromagnetism and Quantum Mechanics
- Advanced Classical Mechanics
- Statistical Mechanics
- Signal Processing: Fourier Analysis, Wavelet Transform
- Experiment design and hypothesis testing

WORK HISTORY

Research Assistant | CubeSat Imagery Specialist | Sept. 2020 – May 2022

Integrated Remote Sensing Studio - UBC Faculty of Forestry, Vancouver, BC, Canada

- Levi designed and implemented algorithms using Python to flag and date forest harvest using CubeSat optical sensor data. Levi is first author of the manuscript under review detailing the methods and results of the Python package he designed
- Demonstrated his ability to communicate scientific results and procedures through technical writing and descriptive figures using Python, ArcGIS Pro, and Adobe Illustrator
- Implemented open-source Python libraries for geospatial operations (GDAL, Rasterio, Shapely, AROSICS), timeseries analysis (Numpy, Ruptures, SciPy), and image processing (PIL, OpenCV, matplotlib)
- Tested and optimized code performance using Numpy, Multiprocessing and Threading, reducing processing time by 839%

Fulltime Internship | Monitoring Forest Change with Satellite Imagery | May 2020 – Sept. 2020

Integrated Remote Sensing Studio - UBC Faculty of Forestry, Vancouver, BC, Canada

- Levi used Planet's Python API to automate downloads of CubeSat imagery to the in-house server
- Processed and performed quality control regarding radiometric calibration of PlanetScope Satellite Imagery
- Wrote and edited funding applications and reports, securing critical research grants

Teaching Assistant | Experimental Physics Lab Course Material Creator | Aug. 2020 – Dec. 2020

Faculty of Physics and Astronomy – UBC, Vancouver, BC, Canada

- Levi designed a Python interface for audio hardware for the purpose of at home Physics experiments (measure Johnson/Thermal Noise in resistors) during pandemic-necessitated transition to online learning
- Utilized open-source libraries, learning quickly to use them from their documentation (PyAudio, Numpy, Threading)
- Clearly documented the solution and tested it on multiple computer operating systems to ensure full portability and troubleshot all issues prior to product release
- Corresponded with hardware manufacturers regarding technical product attributes

Alpine Ski Coach | U14 Assistant Coach | Sept. 2014 – June 2022

Grouse Mountain Tyee Ski Club – North Vancouver, BC, Canada

- Levi directed on snow and dryland training sessions for teams of 30-40 athletes aged 12-13 to improve athletic abilities specific to alpine ski racing
- Collaborated with other coaches to set and maintain a safe training environment, and used efficient radio communication
- Showed desire for continued improvement by pursuing coach education, certification, and professional-development activities
- Contributed to the development of Key-Performance-Indicators relating to athlete, coach, and club well-being and performance

Highschool Ultimate Frisbee Coach | Junior Team Head Coach | Feb. 2019 – June 2019

St. Johns School – Vancouver, BC, Canada

- Levi planned and led team practices around the objective of athlete development, skill acquisition and team-play in the sport of Ultimate Frisbee for the Junior Division Team (grade 8 – 10)
- Deliberated to foster a fun, inclusive, and competitive team culture
- Engaged in conflict resolution, following school procedures and athlete-coach relation best practices
- Effectively delegated and coordinated tasks among support staff and team captains

PUBLICATIONS

- Keay, L., Mulverhill, C., Coops, N.C., McCartney, G. (2022). *Automated forest harvest detection with a normalized PlanetScope imagery time series.* Manuscript under review.

EDUCATION

- BSc. in Physics, University of British Columbia: 2022
- Machine Learning Specialization by Stanford University and Deeplearning.AI on Coursera: 2022
- Alpine Canada Development Level Coaching Certification: 2021

PROJECTS

Portfolio Website Design | Personal Learning | July 2022

Building a static website using Jekyll to host a project portfolio

- Levi attended extra-curricular workshops to learn how to build static websites using Jekyll, Ruby and GitHub pages
- Independently learned basic HTML and CSS coding to customize functionality and aesthetic of the website
- Published concise descriptions of past works using Markdown to combine text, pictures, animations, tables, and links
- Demonstrated proper GitHub procedures, made useful contributions to the template's open-source Repo through pull-requests

See it in action : https://levikeay.github.io/Project_Site/

Musical Note Identifier (Back-End Development) | McGill Physics Hackathon 2021 | Nov. 2021

Identifying musical note classes from a live-time microphone audio stream

- Levi prototyped, debugged and deployed back-end Python software to stream audio from the operating device's microphone and determine musical note classes
- Demonstrated knowledge of time-frequency analyses and trade-offs between temporal and pitch resolutions, and optimized the implementation of Short Time Fourier Transform (STFT) based on application conditions
- Collaborated with team members on software, using version control (GitHub) and working within a tight project timeline
- Researched and implemented open-source Python libraries for Audio recording and analysis (PyAudio, Librosa)
- Assisted with the development of the GUI using PyQT5

View our Hackathon submission : https://devpost.com/software/musical-note-identifier

Positron Emission Tomography Image Quality Study | 4th Year Experimental Physics Project | Oct. 2021

Characterizing the relationship between PET system parameters and image quality

- Levi designed experiments to quantify aspects of image quality such as image blur, SNR and resolution
- Demonstrated an ability to quickly gain understanding of technical lab equipment, observing safety procedures
- Wrote Python scripts to analyze new data types and extract image quality metrics
- Used the Inverse Radon Transforms to convert sinogram data into useable images of radiation distributions

Check out my write-up : **https://levikeay.github.io/Project_Site/blog/PET**

Building Distributed Mode Loudspeakers | Hobby Project | Nov. 2020

Constructing and configuring a stereo sound system

- Levi designed and constructed a stereo sound-system using unconventional sound production technology (DML speakers)
- Tuned speaker panels speakers to achieve flat frequency response using both physical design measures and DSP
- Improved his knowledge of acoustics, frequency analysis, and audio hardware and software through an iterative design process
- Sourced materials both online and locally, optimizing for cost and performance

See my build : https://levikeay.github.io/Project_Site/blog/DML_build