JACOB D KROL

Computational Biologist ~ Software Engineer

Lab website
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SUMMARY

A scientific programmer specializing in machine learning (ML) with significant experience in front and back-end web development, High Performance Computing (HPC), and devops.

SKILLS

Languages: R, Python, Bash/Shell, JavaScript, HTML, Perl, C, Java.

Technologies: Git, GitHub, PyTorch, Scikit-learn, Slurm (HPC), PBS Torque (HPC), tidymodels, numpy, tidyverse, matplotlib, ggplot2, R Shiny, Docker, Singularity, LaTeX, SQL.

PROJECTS

R,Shiny,Docker, Slurm,Bash — **MolEvolvR: web-app for protein characterization via molecular evolution** — **jravilab/molevolvr1.0**
Frontend, backend, and devops for the application. Co-primary first author publication.

R,Docker — **amR: R package for bacterial drug-resistance classification (ML) models** — **jravilab/amR**
R data files for drug resistance classification models, feature engineered omics datasets (training data) with supporting classes and functions. Publication in-prep.

Python,Docker,CLI — **Aibou: a python package for a turn-based, quick-time-event, CLI game** — **jakekrol/aibou**
A monster battle game a CLI user-interface and AI to play against. Quick time key press events are good dexterity training! Hosted on PyPI; installable via pip.

R,Shiny — **Company website for Krol Building** — **jakekrol/kRol_building**
Image showcase, mission statements, and contact information for Krol Building Company. Deployed to shinyapps.io free hosting platform.

EDUCATION

9/2023 - 12/2023 — **Graduate (non-degree seeking) 4.0/4.0** — **University of Colorado Anschutz Medical Campus**
BIOS 7747: Machine Learning for Biomedical Applications, graduate course offered by the Colorado School of Public Health (funded by employee benefits)

9/2020 - 8/2022 — **Bachelor of Science, Neuroscience 3.89/4.0** — **Michigan State University**
Undergraduate research experience. Notable coursework: neural engineering, cognitive science, linguistics, genetics, statistics

9/2017 - 5/2020 — **Math and Science transfer program 3.52/4.0** — **Washtenaw Community College**
Notable coursework: Java programming, calculus

11/2023 - present — **Mathematics for Machine Learning Specialization (certificate)** — **Coursera**
Three course specialization: linear algebra, multivariate calculus, and principle component analysis (PCA). Free registration as CU Anschutz employee.

EXPERIENCE

11/2022 – present — **Information Sciences Professional** — **University of Colorado School of Anschutz School of Medicine**

- Machine learning prediction and statistical inference of drug-resistance across bacterial pathogens
- Extensive hyperparameter tuning, model performance evaluation, and model selection to build ensemble classification models for drug classes.
- Developed and containerized a feature engineering pipeline (annotation, clustering, and pangenomics) for genomic sequences and executed on HPC to generate training data from thousands of bacterial isolates.

`R / Python / Bash / Docker / Git / Shiny / HPC / Slurm`

5/2022 – 11/2022 — **Student Research Assistant** — **Michigan State University**

- Developed machine learning models to predict plant virus hosts' and taxonomy using omics data.
- Feature engineering omics datasets and statistical inference of features: Fisher's exact and Principle Component Analysis

`Python / Scikit-learn / Pandas / Numpy / Matplotlib / Jupyter`

MACHINE LEARNING EXPERIENCE

convolutional neural networks, artificial neural networks, random forests, logistic regression, gradient boosting machines, adaboost, k-nearest-neighbors, OPTICS, DBSCAN, hierarchical clustering, k-means, linear/non-linear regression