Mukta Ubale

PASSIONATE ABOUT SCIENCE, TECHNOLOGY, & SOCIETY

/ ALL ABOUT ME

Early career biological data scientist, supported by strong multidisciplinary academic foundations and collaborative experiences in various computational biology teams. Eager to leverage data-driven technology to advance drug discovery, disease prediction, and precision health. Seeking positions that provide hands-on experience innovating and integrating novel and data-intensive software programming tools in order to accelerate biomedical scientific discovery.

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/ SKILLS

Artificial Intelligence & Data Science

TensorFlow · MLPs · PyTorch · Pandas · Excel · CNNs · GPUs · Conda/Mamba · Colab · Jupyter · MATLAB · Rest API

Software Engineering & Development

R & R-Studio · Python · C++ · HTML/CSS · Git · GitHub & Version Control · OpenCV · Visual Studio Code · XCode · Swift · Docker · Java · Linux

Biotechnology & Bioinformatics

BASH (Unix) · R-Statistics · FASTA · NumPy & Sci-Py · BLAST · GSEA

/ EDUCATION HISTORY

Harvey Mudd College - Class of 2024
Joint Major of Math, Computer Science, and Biology

- President of 5C Women in Computing Machinery Club (ACM-W)
- Tutoring & Grading Assistant for Biostatistics, Data Structures & Program Development, and Abstract Algebra Courses
- Lab Assistant for Molecular Biology Lab (BSL-2 Certified)

Relevant Coursework:
Neural Networks, Data Structures & Program Development, Programming for Science & Engineering, Computation in Microbiology, Biostatistics, Mathematical/Computional Biology, Molecular Genetics, Abstract Algebra I

/ WORK EXPERIENCE

> Software Engineer & Deep-Learning Researcher — Lawrence Livermore National Labs | August 2023 to Present

- Studying empirical **scaling laws of scientific machine-learned models** to test and verify hypothesis that neural networks display an overall model error performance that obeys a **power-law relationship** to dataset size and total number of model parameters (relevant research)
  - Developing open-source software tool to output model-specific convergence curves and determine optimal simulation data, computational power requirements, and model parameters needed to produce a deep neural network with a degree of precision and accuracy for an arbitrary scientific machine learning project

> Software Engineering Intern — CellectGen | May 2023 to August 2023

- Developed a mobile Application using **Flutter** and **Dart** programming in order to integrate the quantifiable measures of tissue destruction biomarkers provided from CellectGen's saliva-based test technology into an analytics platform that visualizes a patient's longitudinal clinical and disease activity data; main features implemented include:
  - **Firebase API** development to securely manage and connect clinician and patient data, allowing for a stronger real-time database
  - Object detection using **Google ML kit and TensorFlow** to automatically and precisely capture pixel densities correlating from test strips
  - Real-time **image processing** (using Dart's Image package) of scans to **calculate concentration of MMP-8 enzyme** and determine levels of active disease/tissue destruction

> Machine Learning Research Assistant — Harvey Mudd College Bee Lab | August 2022 to June 2023

- Explored new methods for estimating flower density on images of plants extracted from **UAV** dataset
- Researched pre-existing **deep learning** architectures used for **Object Counting** and **Density Mapping** to shortlist potential models based on specific features of raw dataset and ground-truth annotations
- Implemented a **Faster R-CNN** object detection model to determine the density of flowers of plants, increasing accuracy by 20%
- Developed **segmentation** models using **SegNet** to compare algorithms by performance metrics and establish optimal model

> Junior Data Scientist — Cytokinetics | July 2022 to November 2022

- Worked 1-on-1 with **RNA-seq** team to develop an gene expression data analysis application using **Jupyter Notebook**
- **Independently researched asymptotic behaviors** of Next-Generation-Sequencing software algorithms in order to determine most effective data structures to reduce costs and computational and storage requirements

> App Developer and Project Manager — Lotus Integrative Health & Nursing | April 2021 to August 2021

- Effectively collaborated with international professional dev team for currently expanding biotech and functional healthcare start-up
  - Worked directly with fertility/women's health companies to conduct research to enhance data collection and user experience
  - Developed and presented prototype app to assist women with their gynecologic health using **Swift** and **XCode**
  - Communicated with CEO and CTO to develop business plan and offer feedback to international software development team

/ OTHER WORK & PROJECTS

> AI-Based AT1R Docking Research Intern
Western College of Health Sciences | April 2023 to Sept 2023

- Generated mutated human & opossum Angiotensin II receptor protein using AlphaFold and examined their docking capabilities with various ARBs using AutoDockFR and NAMD and VMD for visualization

> Data Structures/Program Development Tutor & Grader
Harvey Mudd College | August 2021 to May 2023

- Tutored students 1-on-1 on how to use **Docker and C++** to maximize time, memory space and bandwidth efficiency of different software and machine learning algorithms

> Clinical DNA Sequencing Lab Assistant
Harvey Mudd College | September 2021 to April 2022

- Assisted upperclassmen in BioMakerspace with to prepare specific plasmids and perform biochemical reactions using **Opentrons machinery** and E. Coli K12 genome

> Laboratory Assistant
The Tech Interactive | June 2018 to March 2020

- In charge of preparing agar plates, maintaining a clean environment, storing E. coli and DNA, developing strong lab safety and sterility skills; and built strong scientific communication skills while using the **Anatomage Table** to teach virtual dissection labs