RISHABH SOLANKI

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SUMMARY

Physics Graduate with a strong background in numerical simulations, machine learning, and data analysis. Proficient in Python, MATLAB, and high-performance computing (HPC) techniques, with a specialization in developing and optimizing algorithms for handling large and complex datasets. Proven ability to leverage Linux and Git to streamline workflows and foster team collaboration. Proficient in parallel programming and familiar with GPU accelerated workflows.

EDUCATION

University of Massachusetts Dartmouth, Master of Science in Physics   Expected May 2023
GPA 4.0 Relevant Coursework: Linear Algebra, Computational Physics, Statistics, Applied Mathematics, and Data Structures.

University of Petroleum and Energy Studies, Bachelor of Science in Aerospace Engineering   2018
Minor in Math and Physics   India

EXPERIENCE

Graduate Research Assistant   September 2021 - May 2023
UMass Dartmouth   *MA, USA*

The research involved developing a new algorithm for analyzing white dwarf merger processes, focusing on reliability and stability improvements. Leveraging data science and mathematical techniques, the objective was to overcome limitations and refactor the previous algorithms, enhance the accuracy of predictions, and provide critical insights into astrophysical phenomena.

- Leveraging my understanding of GPU architecture and parallel computing techniques, I utilized warp-level programming, CUDA libraries, and SIMD (Single Instruction, Multiple Data) to optimize the performance of large-scale simulations of white dwarf mergers. These advanced techniques resulted in a significant enhancement in the speed and efficiency of our simulations, reducing computation time by 20% and enabling us to handle datasets that were 40% larger than before. This led to more accurate predictions and critical research insights, such as predictions for a new class of astrophysical objects.
- Faced with slow software release cycles, I streamlined code review, testing, and documentation processes, reducing our deployment time by 40%. I used best practices such as Test-Driven Development (TDD) and code reviews, and employed automation tools like Git for version control and PyTest for automated testing.
- To further enhance our operational efficiency, I leveraged Linux command line tools on VSCode to integrate and qualify software components, and automate routine tasks. This resulted in an 40% improvement in operational efficiency and fostered seamless collaboration across the team.

Quantitative Research Intern   August 2018 - September 2019
Instruments Research and Development Establishment   *Dehradun, India*

The project focused on reducing noise in sensor data from various adaptive optics systems by leveraging Gaussian processes and Bayesian inference techniques. This approach enabled more accurate real-time analysis of complex datasets, ultimately enhancing the performance of the adaptive optics systems.

- Designed and implemented a high-performance data processing pipeline using Java and MATLAB to facilitate real-time analysis of complex datasets in a multidisciplinary research environment.
- Collaborated with cross-functional teams to develop innovative solutions for data modeling, API integration, and predictive analysis, enhancing overall research productivity.

TECHNICAL PROJECTS

EnergyDash   November 2022 - January 2023

Developed a detailed electricity usage analysis code (available here) in Python using Tensorflow and Pandas to track usage in hourly intervals and identify consumption patterns. It also suggests usage optimization strategies and includes monitoring of solar panel energy production.

Time-Series Supernovae Classifier   December 2021 - August 2022

Utilized machine learning and numerical computing techniques in Python to successfully classify supernovae by reading FITS file data, extracting features and labels, and training and testing the classifier. This involved applying analytical skills to do system-level design and reliability testing.

Personal Website Design and Development June 2022 - May 2023

Created a comprehensive portfolio website ([available here](#)) to showcase personal projects and skills. Implemented using HTML, CSS, and JavaScript with emphasis on responsive design for optimal display across devices. Incorporated an interactive blog section to share insights and updates on my latest projects. Utilized Git for version control during development.

SKILLS

Technical Skills	Python, Java, SQL, Fortran, HTML, CSS, JavaScript
Frameworks	Numpy, Pandas, Tensorflow, Matplotlib, CUDA, GPGPU, A/B testing, PyTest
Software & Tools	Git, Linux, MATLAB, MPI, Visual Studio Code

EXTRA-CURRICULAR ACTIVITIES

- Member of Society of Physics Students, Hiker, Badminton player