Rahul Wankhede

HPC Software Developer, ExxonMobil
+91-9004670747 *github.com/rahulwankhede*
rwankhede042@gmail.com
rahul.wankhede@exxonmobil.com
rahulw@alum.iisc.ac.in

WORK EXPERIENCE

ExxonMobil Services & Technology Pvt Ltd *[Jun '24 - Present]*

HPC Technical Software Engineer

- As a software developer on a scrum team, I develop and support seismic imaging applications while collaborating with researchers to commercialize prototype code and optimize applications for better HPC system utilization and throughput. I also work with the HPC systems team and geoscientists to guide future hardware and system upgrade decisions.
- Responsibilities include feature development for in-house and proprietary software for subsurface imaging in Python and C++, porting tools between them, parallelizing them using CUDA, MPI, and OpenMP, running regression tests, automating tasks using bash scripts, peer-reviewing code, monitoring release pipelines, and much more.

Wells Fargo India Solutions Pvt Ltd *[Aug '22 - May '24]*

Software Engineer

- Responsibilities included developing apps for use by other software developers. Worked on an app that tracked the cloud migration journey for all apps in the organization. Developed APIs using Spring framework for CRUD operations on MongoDB, to be served to frontend application.
- Tech stack also required working on JUnit for creating unit tests, Github for version control, SonarQube for enhancing code quality, and Jenkins for deployment automation.

setlmint.com *[Nov '17 - Jan '18]*

Software Development Intern

- Built a custom, real-time, chat interface for vendors and customers in the setlmint web application in the development environment in Ruby on Rails.
- Picked up various competencies, including but not limited to Ruby, SQL, JavaScript, the MVC architecture, and a host of ruby gems such as JQuery, Jbuilder, and Action Cable in a span of two months.

RESEARCH EXPERIENCE

Accelerating Estimation of Perfusion Maps in Contrast X-ray CT *[May '20 – April '22]*

under the guidance of Prof Phaneendra Yalavarthy, IISc Bangalore

- Worked on reducing the processing time for the generation of data from a computed tomography (CT) scan to obtain images of blood flow in the brain.
- Generating these images faster will lead to less waiting time between acquiring a scan and diagnosis of the type of stroke, ensuring better patient outcomes.
- Devised an algorithm that uses multiple CPU and GPU cores to obtain a speedup of 8x over the traditional algorithm. Implemented in C++ using the OpenMP and CUDA frameworks.

ACADEMIC DETAILS

Examination	Degree / University	Institute	Year	CPI/%
Post Graduation	M.Tech (Res) in Computational Science	IISc Bangalore	2021	7.93
Graduation	B.Tech in Aerospace Engineering	IIT Bombay	2017	5.54
Intermediate (XIIth)	Maharashtra State Board (HSC)	Dharampeth Sc., Nagpur	2010	77.00
Matriculation (Xth)	Central Board of Secondary Education (CBSE)	Montfort School, Nagpur	2008	82.00

TECHNICAL SKILLS

- **Languages**: Proficient in **C**, **C++**, **Python**, **Java**, Prior Experience in **Ruby**, **JavaScript**, Familiarity with **R**
- **Databases**: Prior Experience in **MySQL**, Familiarity with **PostgreSQL** and **NoSQL** (MongoDB)
- **ML Frameworks**: Prior Experience in **scikit-learn**, Familiarity with **PyTorch** and **TensorFlow**
- **Tools**: Comfortable with the linux **terminal**, **bash**, **vim**, **git**, **LaTeX**, **MATLAB/Simulink**

KEY (ACADEMIC & COURSE) PROJECTS

MPI Collective Communication Optimization *[Feb '20 – March '20]*

- Implemented a part of the paper "Optimization of Collective Communication Operations in MPICH" by Thakur, Rabenseifner, and Gropp, IJHPCA 2005.
- Wrote code that chooses, depending on the message size, one of two algorithms to collectively communicate data between multiple processors using the Message Passing Interface.

Sorting on a GPU *[Jan '20 – Feb '20]*

- Learned how to sort a large array faster using a non-traditional algorithm on a GPU as part of a course on Parallel Programming.
- Implemented the Bitonic Sort algorithm [$O(\log^2(n))$ complexity] in CUDA C to achieve a speed-up of 19x over serial Quicksort.

Big Data Analytics using Apache Spark *[Oct '19 – Nov '19]*

- Wrote PySpark scripts to answer highly specific and interesting questions on the MovieLens dataset (27M ratings on 28K movies by 280K users)
- Used the Hadoop framework (HDFS, YARN and MapReduce) to run the script on a compute cluster, and Spark RDD API's to reduce the data to a manageable size before post-processing in simple Python.

Computational Fluid Dynamics with Python *[Jan '17 – April '17]*

- Learned how to solve differential equations that define fluid flow using Python as part of a course on Computational Fluid Dynamics.
- Ran simulations of fluid flow using methods such as Successive Over-Relaxation (SOR) and Forward Time Central Space (FTCS) schemes on a general NxN grid in numpy.

Gauging Aeroelastic Response of a 2-D Wing using MATLAB *[March '16 – April '16]*

- Studied the response of an airplane wing when subjected to a certain maneuver at different speeds and altitudes.
- Solved the differential equations involving the aerodynamic forces on the wing using the weighted error minimization (point collation) method in MATLAB.

SELECTED COURSEWORK

- Introduction to Scalable Systems, Parallel Programming, Numerical Methods, Numerical Linear Algebra, Medical Imaging
- Machine Learning (Coursera), Reinforcement Learning (Coursera), Machine Learning A-Z (Udemy), Deep Learning (Udacity)

ACHIEVEMENTS & EXTRA-CURRICULAR ACTIVITIES

- AIR 673 (99.3 %ile) among 1 lakh students who appeared for the GATE Computer Science exam held in 2019.
- Social Media Manager for CDS Open Day 2020 and Event Co-Ordinator for the events "Sci-Tech Quiz" and "Blind Coding".
- Published an article on "Flipped Classrooms" in InsIghT (IIT Bombay Student Magazine)
- Institute Spelling Bee 1st Runner Up 2015, IIT Bombay.