Eshwen Bhal

Data Scientist

Owls Barton Barn, Bryngwyn, Raglan, Monmouthshire, United Kingdom. NP15 2BN

+44 (0) 78414 09961 | eshwen.bhal@gmail.com | eshwen | eshwen-bhal-phd-714557195

Profile

I am a data scientist at an e–commerce and technology startup, involved in a diverse array of projects. With public-facing analytics, visualization, machine learning, and advanced Python programming, I have been able to provide powerful data-driven insights to the business. In a previous role, I developed a web scraping pipeline for the Consumer Price Index alternative data sources transformation. I completed a PhD in particle physics, searching for dark matter using big data from the Large Hadron Collider (LHC) at CERN. Aside from work, I partake in many activities such as taekwondo, weight lifting, hiking, and skiing.

Experience

Huboo Technologies

Bristol, United Kingdom

Data Scientist

Apr. 2022 – Present

- Member of the Innovation team at a fulfilment startup, providing novel, **data-driven solutions** to business problems.
- Overhauled internal and client analytics reporting to self-service **API-driven** platform. Greatly freed up developer resources.
- Developing **ML forecasting** API for automated replenishment of stock. Experimentation in **PyTorch** and **TensorFlow**, logged with **MLflow**. Deployment with Kubernetes on AWS.
- Optimised **SQL** queries for MySQL databases and Snowflake data warehouse, for data analysis and ETL.
- Built **CI pipelines** for automated code linting, formatting, testing, and documentation creation in **monorepo**.

Office for National Statistics

Newport, United Kingdom

Data Scientist

Feb. 2021 – Apr. 2022

- **Web scraped** prices of products from various retailers to vastly improve accuracy of Consumer Price Index.
- Built spiders with **Scrapy** in Python to reliably scrape thousands of products from dozens of websites.
- Introduced vital coding practices like **unit testing**, vectorisation, and automated documentation.
- Deployed spiders on **Google Cloud Platform**. Incorporated Docker, Terraform, and Kubernetes for optimal resourcing.

Education

University of Bristol

Bristol, United Kingdom

Doctor of Philosophy in Physics

2016 – 2021

- Thesis: **Searches for dark matter with a focus on invisibly decaying Higgs bosons using the full Run-2 dataset of the CMS experiment at the LHC** — *Under supervision of H. Flächer*
  - Explored various physics models in search of dark matter by analysing data from LHC's CMS experiment. Set **world leading limits** on Higgs boson decay to invisible states.
  - Executed novel, comprehensive **statistical analysis** with hypothesis testing on real and simulated data, meticulously documenting concepts, results, and code.
  - Composed robust, efficient code for Monte Carlo data simulation and perform analysis. Written predominantly in Python, leveraging modern data science tools and **distributed computing** to process **terabytes of data**.
- Long term attachment at world's largest particle physics laboratory **CERN** — *18 month placement abroad in Switzerland*
- **Calorimeter Layer-2 on call expert** and **Level-1 Trigger shifter** — *Additional responsibilities with CERN*
  - Developed and deployed software for subsystem of Level-1 Trigger to apply corrections and calibrations to data on the fly.

University of Exeter *Exeter, United Kingdom*

Master of Physics with Honours in Physics with Astrophysics *2012 – 2016*

- Grade: **First Class** — *77 % overall mark (4.0 GPA equivalent)*
- Dissertation: **Simulations of Exoplanet Light Curves** — *Under supervision of T. Harries*
  - Developed software in C to simulate photons interacting simple planetary atmospheres, producing light curves akin to data from telescopes. Visualised model planets with maps of density and composition.
  - Able to model more complex atmospheres for comparison to real exoplanets to infer their composition.
  - Utilised Monte Carlo random sampling for scattering of photons, and parallelisation to efficiently run the code over millions of them.

Skills

Data analysis

- Primary focus of my PhD concerned statistical analysis of multi-terabyte datasets collected by the CMS experiment from the LHC.
- Developed analysis software for dark matter searches and detector-effect calibrations in Python and C++, using modern data science tools and batch processing for optimal efficiency. Ability to analyse **billions of events** on timescale of 1 hour.
- Visualisation with ROOT, matplotlib, and plotly. Formal presentations of results with LaTeX, PowerPoint, and Jupyter Notebooks.

Software and computing expertise

- **High proficiency in Python** and use of data processing libraries, **NumPy and pandas**. Allows vectorised performant approach.
- Utilisation of **high performance computing** and parallel programming with HTCondor and various computing grids.
- Adept in cloud technologies like Google Cloud Platform, AWS, Docker, Terraform, Kubernetes.
- Additional expertise in LaTeX, git, bash, command line interface on Unix systems (Scientific Linux, CentOS, macOS).

Collaboration

- Belonged to, and worked alongside, several groups of around a dozen people as well as a **global research collaboration** of over 4,000 people.

Problem solving

- Principal component of any physics degree. As an undergraduate, conducted traditional pen-and-paper problem solving in many topics. As a PhD student, wrote code to **solve physics problems numerically** and analyse high energy particle physics data.
- In industry, solving complex business problems led by data. Created versatile and scalable web scraping pipeline to capture thousands of products each day. Introduced comprehensive unit testing to identify bugs.

Communication

- Presented formally in my PhD at all levels: regular working group updates, research group and collaboration-wide talks, and several **conference posters and talks**.
- Participated in **public outreach** at the CERN Open Days 2019 and @Bristol. **Taught computing** and maths to undergraduates.

Awards

2016	**Dean's Commendation,** in recognition of outstanding achievement in my fourth year	*University of Exeter*
2015	**Physics Award,** for being one of the three students with the highest marks in my third year	*University of Exeter*
2014	**Dean's Commendation,** in recognition of outstanding achievement in my second year	*University of Exeter*
2013	**Physics Award,** for being one of the three students with the highest marks in my first year	*University of Exeter*
2013	**Dean's Commendation,** in recognition of outstanding achievement in my first year	*University of Exeter*