

Luke Howlett

Data Analyst | Expert in Satellite Navigation and Data Science



Professional Summary

I am a versatile Data Analyst who prides himself on resourcefulness and a strong ability to get things done. With a background in the complex technical field of GNSS, I have honed my skills in applying mathematical, statistical, and machine learning techniques to solve real-world problems. I excel at converting complex data into actionable insights and am highly proficient in Python, leveraging its powerful libraries to analyse, visualise, and interpret large datasets. Driven by a problem-solving mindset and strong analytical skills, I support data-driven decision-making and strategy development.

Current Job

CHC Tech LTD 2020 - Present

- **Lead Member of a small R&D Team:** Took charge of a multitude of diverse tasks within a small R&D team, demonstrating exceptional flexibility and resourcefulness when it comes to getting things done.
- **Data Engineering and System Deployment:** Designed, built, automated, and deployed sophisticated data pipelines and systems, significantly improving efficiency and optimising processes.
- **Comprehensive Data and Scientific Analysis:** Utilised statistical analysis and machine learning techniques to model and interpret GNSS data. Helping to better understand satellite dynamics and improve our companies' services.
- **Competency in a Technical Field:** GNSS is complex. You have to understand satellite orbit dynamics, wave propagation, coordinate transformations and other advanced concepts. I studied these and then successfully applied this knowledge to solve real world problems. I am more than capable of doing this in another field.
- **Research Implementation and Innovation:** Translated cutting-edge techniques from research papers into functional code, bridging the gap between theoretical research and practical application to drive innovation.

- **A Great Team Member:** Collaborated with prestigious organisations such as NASA and Imperial College London, contributing to significant projects and research initiatives. Participated in European business trips, networked at industry conventions, and engaged in critical collaborative meetings with key companies in the field.
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Technical Skills

Core Competencies:

- **Data Engineering:** Building automated data processes. Sourcing data from SQL or real-time data streams and processing it on cloud platforms.
- **Data Analysis:** Applying a wide range of analytical methods to extract deep insights and solve real-world problems.
- **Data Visualisation:** Expert in creating diverse visualisations, from simple, intuitive charts to advanced, highly informative plots, tailored to the audience.
- **Interactive Dashboards:** Developing accessible and user-friendly tools that enable clients and team members to explore the data themselves. (Dash, Streamlit, ChartJS)

Development Tools:

- **Programming languages:** Expert in Python and utilising its' open source packages, skilled in front-end web technologies.
- **SQL:** Proficient in SQL for querying, managing, and optimising relational databases like MySQL and PostgreSQL.
- **Docker:** Experienced in containerising applications with Docker, enabling consistent and scalable deployments.
- **Linux:** Knowledgeable in Linux, using its open-source capabilities to optimise server performance and reduce hardware and operational costs.
- **AWS/ GCP:** Experience deploying cloud solutions on services like EC2, S3 and Cloud Run.
- **Version Control:** Proficient in Git for version control and collaboration.

Domain Knowledge:

- **Mathematics (BSc.) & Statistics:** Strong foundation in advanced mathematical and statistical principles. Linear Algebra, probability theory.
- **GNSS/ PNT:** In-depth understanding of satellite navigation and positioning technologies.

- **Data Streaming and IoT:** Handling real-time data processing and integration of IoT systems.

Soft Skills:

- **Project Management:** Experienced leading technical projects, understanding the requirements, creating detailed plans, and delivering before the deadline.
 - **Team Collaboration:** I pride myself on my value as a team member, a great communicator who has experience working with many different kinds of people internationally.
 - **Problem Solving:** A curious mind and a logical thinker, I enjoy solving problems in and out of work.
 - **Leadership:** Capable of guiding teams to success, a great teacher and someone you can rely on.
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About Me

- Voted the happiest and most charming member of the office.
 - Dedicated to continuous learning and professional development.
 - Passionate about emerging technologies and their applications.
 - Eager to create a positive global impact through my work.
 - An engineer at heart, taking a systematic approach to everyday life.
 - Very motivated to work hard and build a promising future for myself.
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What I am looking for

- I am seeking my next challenge, a role that will push me to grow both as an engineer and as a person.
 - I want to work with a team of people that enjoy their work and are driven to build great things.
 - I am eager to engage in interesting projects that are going to have a positive impact in the world.
 - Aspiring to eventually transition into a technical project management role, where I can leverage my creative-generalist ideas to lead innovative projects and drive strategic success.
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Projects

GNSS Library

- **Description:** Developed a comprehensive code library of plotting tools, algorithms, and reusable functions accumulated over the years.
- **Technologies:** Python, NumPy, Pandas, Matplotlib
- Significantly reduces development time by avoiding the need to rewrite code for common GNSS data processing tasks.
- Facilitated collaboration by providing a standardised toolkit use across multiple Projects.

ICHC Data Platform

- **Description:** Engineered a 24/7 automated data transfer system for recording, formatting, and processing GNSS data from Imperial College antennas.
- **Technologies:** AWS EC2, AWS S3, Python
- **Impact:** Enabled real-time data streaming to IGS Data Archives, contributing to CHC Tech LTD's membership in the International GNSS Service (IGS).

Satellite Position Tracker

- **Description:** Built a tool to calculate both historical and live positions of GPS satellites by applying Kepler's laws of orbital motion. Seamlessly integrated to data sources, enabling the tracker to transform satellite broadcast parameters into precise positional data.
- **Technologies:** Python, NumPy, FTP, TCP/IP
- **Impact:** Provided my team with higher precision positioning data than what is available publicly online, enhancing the accuracy of GNSS analyses and supporting critical project decisions.

Satellite Position Webapp

- **Description:**
 - **Developed** a Streamlit-based web application that visualises GPS satellite positions on an interactive, real-time map.
 - **Integrated** with the Satellite Position Tracker to fetch live and historical positional data, enabling seamless updates and dynamic data representation.

- **Implemented** advanced data visualisation techniques using libraries such as Plotly and Mapbox to create intuitive and responsive map interfaces.
- **Enhanced** user experience by incorporating interactive features like zoom, pan, and clickable satellite markers for detailed information.
- **Technologies:** Streamlit, Python, Plotly, Mapbox API, Docker, GitHub
- **Impact:**
 - **Increased accessibility** of complex satellite data, allowing team members and stakeholders to easily monitor and analyse satellite movements in real-time.
 - **Improved decision-making** by providing a user-friendly interface that visualises data trends and satellite trajectories, supporting both operational and strategic initiatives.
 - **Boosted team collaboration** by offering a centralised platform for data visualisation, reducing the time required to interpret and share satellite information.
 - **Facilitated training and onboarding** by providing an intuitive tool for new team members to understand satellite tracking processes and data.

LAMBDA Optimisation Algorithm

- **Description:**
 - **Engineered** a sophisticated tool to estimate electromagnetic cycles between GPS satellites and receivers, crucial for achieving high-precision GNSS positioning.
 - **Mastered advanced linear algebra** and statistical methodologies through in-depth study of research literature, informing the development of robust algorithms.
 - **Implemented** the Least Squares Ambiguity Decorrelation Adjustment (LAMBDA) method in Python, leveraging libraries such as NumPy and SciPy for efficient computation.
- **Technologies:** Python, NumPy, SciPy
- **Impact:**
 - **Enhanced** the team's theoretical knowledge and practical understanding of ambiguity resolution in GNSS positioning through hands-on implementation and collaborative learning.
 - **Facilitated** knowledge sharing and skill development, enabling team members to apply advanced linear algebra and statistical techniques in subsequent projects.

- **Strengthened** the foundation for future high-precision GNSS initiatives by providing a comprehensive framework for ambiguity resolution, supporting ongoing research and development efforts.

Satellite Angle Calculator

Description:

- **Optimised** an open-source Python tool to calculate the azimuth and elevation between a ground position and a celestial object, leveraging advanced matrix operations with NumPy for enhanced computational efficiency.
- **Refactored** the calculation processes by **vectorizing operations** and **eliminating unnecessary loops**, significantly improving performance and scalability.
- **Contributed** to the open-source community by improving the efficiency of a publicly available tool, facilitating broader adoption and application in various GNSS projects. **Impact:**
- **Increased** the tool's performance by over **50%**, enabling faster and more efficient calculations for real-time and large-scale satellite tracking applications.
- **Enhanced** user experience by providing quicker results, supporting time-sensitive analyses and decision-making processes within the team.
- **Contributed** to the open-source community by improving the efficiency of a widely-used tool, facilitating broader adoption and application in various GNSS projects.
- **Demonstrated** expertise in code optimisation and parallel processing, showcasing the ability to improve existing systems for better performance and reliability.

Group Chat Dashboard

- **Description:**
 - **Developed** a comprehensive web application for analysing group chat data, providing deep insights into user behavior.
 - **Implemented** a Markov chain-based guessing game that simulates chat members' message patterns, enhancing user engagement and demonstrating predictive modeling capabilities.
 - **Designed** intuitive data visualisations and interactive dashboards using libraries such as Plotly and Streamlit, enabling users to explore chat dynamics effortlessly.

- **Deployed** the application on Google Cloud Platform (GCP) using Docker containers, ensuring scalability, reliability, and seamless access for users.
- **Technologies:** Python, Streamlit, Plotly, Docker, Google Cloud Platform (GCP), GitHub
- **Impact:**
 - **Fostered** fun conversations and deeper connections between friends by visualising the way we interact with each other.
 - **Showcased** ability to integrate data science techniques with web development, creating versatile and user-friendly tools.
 - **Demonstrated** proficiency in deploying scalable web applications, supporting both professional projects and personal interests.