

# EASWARAN SUBRAMANIAN

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## SUMMARY

As a dedicated professional and master's in Machine Learning student at Tübingen University, I am driven by the challenge of creating and scaling advanced AI systems. I am skilled in Python, SQL and have hands-on knowledge in building ML Models, automating workflows and translating complex data in meaningful insights across different domains.

My 3+ years of work experience in data science and machine learning has led me to a strong interest in MLOps, operationalising generative AI and predictive modeling, and I am focused on leveraging my skills to make a tangible impact by bringing cutting-edge models to life.

## TECHNICAL SKILLS

**Programming:** Python (Pandas, NumPy, Flask), PHP, SQL, Java

**ML & Data:** Pytorch, scikit-learn, LangGraph, CNN, NLP, LLM, PostgreSQL, MySQL

**Data Visualisation:** matplotlib, seaborn, plotly, W&B

**Tools:** JIRA, Microsoft Excel (VLOOKUP, Macros, Pivot Table), VS Code, Jupyter

**Deployment:** Docker, AWS (EC2 + S3), Git, API Integration

**Languages:** English (C2), German (A1), Tamil (Native)

## EXPERIENCE

**Tübingen Institute for Medical Education**, Tübingen, Germany

Nov 2023 - Jul 2024

Research Student - Programming and Web Interface

- Created a web interface to analyse survey data from over 200 final-year medical students and nurses, providing educational insights.
- Built an admin page with PHP and JavaScript and managed data storage and retrieval using MySQL.
- Developed interactive data visualisations using a library like Chart.js and Plotly to present complex survey results in an intuitive format.
- Implemented a secure user authentication system with session management to protect sensitive survey data and ensure access was restricted to authorised personnel using PHP and MySQL.

**Sony B.V. Stuttgart Technology Center**, Stuttgart, Germany

Mar 2023 - Aug 2023

Working Student - Machine Learning Engineer

- Supported the R&D with building a custom Neural Architecture Search (NAS) framework in PyTorch, running over 20 comparative experiments to validate a projected performance increase of up to 20%.
- Optimised the end-to-end machine learning pipeline by developing efficient data preprocessing scripts and conducting systematic hyper-parameter tuning to find optimal network configurations.
- Managed the project's codebase using GitLab for version control, where I contributed to refactoring modules for improved efficiency and authored technical documentation for new components.

**Verloop.io**, Bengaluru, India

Mar 2022 - Sep 2022

Data Analyst

- Applied NLP techniques, including topic modeling and sentiment analysis, to analyze and categorize thousands of user queries, identifying key customer pain points and behaviour patterns.
- Designed and built interactive dashboards using Matplotlib to provide the Customer Success team with real-time insights into chatbot performance and customer satisfaction KPIs.
- Developed and automated reporting pipelines in Python, which reduced the time required for weekly report generation by 70%, freeing up the team to focus on proactive customer engagement.
- Collaborated closely with the Customer Success and Product teams to present actionable findings, directly influencing the refinement of chatbot conversation flows and user experience strategy.



**Quantum AI Systems, Hyderabad, India**

*Jan 2021 - Feb 2022*

Machine Learning Intern

- Implemented and compared ConvLSTM and LRCN deep learning models for video classification, developing a data preprocessing pipeline with OpenCV and training the networks using TensorFlow and Keras.
- Adapted the models for a customer service use case and deployed the final solution into a user-friendly web interface using Flask.

**Tiger Analytics, Chennai, India**

*Jan 2020 - Nov 2021*

Senior Data Analyst

- Supported a large-scale pricing strategy project for a major fast-food client, delivering optimal menu price recommendations that drove a projected 10-15% increase in revenue across more than 15 global markets.
- Developed and implemented a price optimisation model using Conjoint Analysis to simulate customer choice and forecast the impact of price changes on key business metrics like sales, revenue, and gross margin.
- Utilised the COBYLA (Constrained Optimisation by Linear Approximation) algorithm to solve complex, non-linear optimisation problems, balancing the objective of revenue maximisation against critical business constraints such as price ceilings and sales volume limits.
- Authored and refactored the project's analytical codebase in Python, enhancing its efficiency and scalability to handle diverse market data and complex modeling requirements.
- Conducted extensive scenario modeling and sensitivity analysis to evaluate hundreds of potential pricing strategies, providing the client with a clear understanding of the trade-offs between different business outcomes.
- Synthesised complex analytical findings into actionable market-level insights, leading communication and presenting strategic recommendations to senior client stakeholders and internal leadership teams.

## EDUCATION

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**Tübingen University, Baden-Württemberg**

*Oct 2022 - present*

*Masters in Machine Learning*

Relevant Coursework: Deep Learning, Computer Vision, Probabilistic Machine Learning, Virtual Humans, Understanding LLMs, Automated Machine Learning and Hyper-parameter Optimisation

**Vellore Institute of Technology, Tamil Nadu, India**

*Jun 2016 - Jul 2020*

*Bachelor of Technology in Electronics and Communication Engineering*

Relevant Coursework: Advanced Micro-controllers, Data Structures and Algorithms, Machine Learning, Neural Networks, Applied Linear Algebra, Business Analytics

## RECENT PROJECTS

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**Masters Thesis: Reproducing the Hypencoder (in-progress)**

- Investigating and reimplementing the Hypencoder framework, a novel Information Retrieval model that uses a hypernetwork to dynamically generate a query-specific neural network for more expressive relevance scoring.
- Implementing and analysing a graph-based greedy search algorithm to assess the trade-offs between retrieval speed and accuracy when compared against a traditional search approach on a large-scale document corpus.
- Investigating potential improvements to the model's architecture by modifying the provided codebase. The primary experiment focuses on adapting the q-net to accept multi-vector document representations instead of a single vector, aiming to enhance performance on complex and hard retrieval tasks.

**AI Agent Robustness Testing Framework**

- Developed an automation framework to systematically evaluate the robustness of a ReAct-style LLM agent, testing its performance against various data corruption scenarios like shuffled column headers, missing values, etc.
- Engineered and refined the agent's prompts to improve its reasoning and tool-using capabilities, enabling it to correctly interpret corrupted data schemas and still answer questions accurately.
- Built the agent's architecture using the LangGraph library to create a cyclical graph of nodes representing the agent's state, and used Pandas for all data manipulation and analysis within the agent's tools.