

**Ananth Mahadevan**

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## Profile

Postdoctoral researcher and data scientist with strong expertise in algorithmic data science, machine learning, and scalable pipeline design. Experienced in deploying and managing machine learning workflows on cloud and high-performance computing resources, with proven ability to bridge cutting-edge research with practical applications to deliver reliable and scalable ML infrastructure. Passionate about applying scientific rigour to deliver robust systems in fast-paced environments.

## Skills

**Programming Languages:** Python, C/C++, Shell, R

**Machine Learning:** PyTorch, TensorFlow, JAX, CUDA, scikit-learn, NumPy, Pandas

**Graph and Network Tools:** NetworkX, PyTorch Geometric, SNAP

**Database and Big Data:** Apache Spark, MongoDB, Neo4J, MariaDB, Dagster, Elasticsearch

**Cloud Infrastructure:** Docker, OpenShift, OpenStack, Terraform

**Miscellaneous:** Excellent troubleshooting and debugging skills

## Education

- **University of Helsinki** Helsinki, Finland  
*PhD in Computer Science* Aug 2020 - Dec 2024
  - Doctoral Researcher in Algorithmic Data Science group
  - Supervisor: Prof. Michael Mathioudakis
  - **Thesis Topic:** Scaling and Maintaining Machine Learning Pipelines
- **Aalto University** Otaniemi, Finland  
*Master of Science in Machine Learning, Data Science and AI* Sep 2018 - May 2020
  - Full Tuition Scholarship Student
  - **Thesis Topic:** Vote Prediction Models for Signed Social Network
- **R.V College Of Engineering** Bangalore, India  
*Bachelor of Engineering in Computer Science and Engineering* Aug 2014 - May 2018
  - 3<sup>rd</sup> rank in department
  - **Thesis Topic:** Extract-Transform-Load of Financial Transaction Tax data using Elasticsearch

## Work Experience

- **VILMA Research Software Engineer** Helsinki, Finland  
*University of Helsinki* Jan 2025 - present
  - Working in the *Virtual Laboratory for Molecular Level Atmospheric Transformations (VILMA)* Centre of Excellence
  - Developing a **data science pipeline** for analyzing molecular data
  - Building interfaces and GUIs for the **virtual laboratory** and facilitating scientific research
- **HPC-HD Project Researcher** Helsinki, Finland  
*University of Helsinki* May 2022 - Dec 2024
  - High Performance Computing for the detection and analysis of Historical Discourses (HPC-HD)
  - Collaboration between University of Helsinki, Aalto University and University of Turku
  - Implemented an **end-to-end data science pipeline** for analyzing millions of digitized historical documents
  - Utilized Apache Spark to scale up to 6× more raw data, and Dagster for workflow orchestration

- Managed machine learning workloads and distributed data processing using CSC cloud resources

- **Doctoral Researcher** Helsinki, Finland  
*University of Helsinki* Aug 2020 - Dec 2024
  - Conducted research on Scaling and Maintaining Machine Learning Pipelines
- **Teaching Assistant** Helsinki, Finland  
*University of Helsinki* Jan 2021 - Mar 2021
  - Worked with *Prof. Michael Mathioudakis* for the Network Analysis Course
  - Created and graded five assignments
  - Conducted four tutorials on advanced graph learning concepts
- **Research Assistant** Otaniemi, Finland  
*Aalto University* May 2019 - May 2020
  - Worked with *Prof. Aristides Gionis* and *Bruno Ordozgoiti* in the Data Mining Group
  - **Wikipedia RfA Project**: predicting voter behaviour in Wikipedia elections networks
  - **Diversified Item Selection Project**: implemented and scaled up experiments
- **Teaching Assistant** Otaniemi, Finland  
*Aalto University* Sep 2019 - Dec 2019
  - Worked with *Prof. Aristides Gionis* on the Algorithmic Methods of Data Mining course
  - Created three assignments and arranged exercise sessions
  - Managed and graded the course project on balanced graph clustering
- **Summer Thesis Worker** Bangalore, India  
*Goldman Sachs* Jan 2018 - May 2018
  - Worked in the **Client Experience Engineering** team on **client email prioritization**
  - Used **Conditional Random Fields** (CRFs) to tag and remove *disclaimers* from client emails
  - Performed **sentiment analysis** and Named Entity Recognition(NER) on emails
  - Platforms Utilized: pycrfsuite, sklearn, Protobuf, spaCy, Stanford CoreNLP
- **Summer Analyst** Bangalore, India  
*Goldman Sachs* May 2017 - July 2017
  - Worked in the **Tax Operations Technology** team
  - Imported large volume tax from DB2, Sybase IQ databases to **Elasticsearch** cluster
  - Set up, maintained and optimized multi-node Elasticsearch cluster in production environment

## Hobbies and Extracurricular Activities

### Parliamentary Debating

- **President** of Helsinki Debating Society (HDS) : Sep 2020 – Jan 2023
- **Finnish Debate Champion 2019** at FINDA University Championship 2019, Finland

## Publications

- Ananth Mahadevan, Michael Mathioudakis, Eetu Mäkelä, and Mikko Tolonen. Text reuse in large historical corpora: insights from the optimization of a data science system. *International Journal of Data Science and Analytics*, pages 1–13, 2025
- Ananth Mahadevan and Michael Mathioudakis. Cost-aware retraining for machine learning. *Knowledge-Based Systems*, 293:111610, 2024
- Ananth Mahadevan, Michael Mathioudakis, Eetu Mäkelä, and Mikko Tolonen. Optimizing a data science system for text reuse analysis. *arXiv*, 2024
- Yann Ryan, Ananth Mahadevan, and Mikko Tolonen. A comparative text similarity analysis of the works of bernard mandeville. *Digital Enlightenment Studies*, 1:28 – 58, 2023

- David Rosson, Eetu Mäkelä, Ville Vaara, Ananth Mahadevan, Yann Ryan, and Mikko Tolonen. Reception reader: Exploring text reuse in early modern british publications. *Journal of Open Humanities Data*, Apr 2023
- Ananth Mahadevan, Arpit Merchant, Yanhao Wang, and Michael Mathioudakis. Robustness of sketched linear classifiers to adversarial attacks. In *Proceedings of the 31st ACM International Conference on Information & Knowledge Management, CIKM '22*, pages 4319–4323, 2022
- Arpit Merchant, Ananth Mahadevan, and Michael Mathioudakis. Scalably using node attributes and graph structure for node classification. *Entropy*, 24(7), 2022
- Ananth Mahadevan and Michael Mathioudakis. Certifiable unlearning pipelines for logistic regression: An experimental study. *Machine Learning and Knowledge Extraction*, 4(3):591–620, 2022
- Bruno Ordozgoiti, Ananth Mahadevan, Antonis Matakos, and Aristides Gionis. Provable randomized rounding for minimum-similarity diversification. *Data Mining and Knowledge Discovery*, 36(2):709–738, March 2022