Addi Ait-Mlouk, Ph.D.

Associate Professor (Docent) in Artificial Intelligence & Data Science

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Google Scholar: scholar.google.com/citations?user=nvgiplcAAAAJ

About

- Addi Ait-Mlouk is an Associate Professor (Docent) of Artificial Intelligence and Data Science at the University of Skövde, Sweden. His research centers on federated and decentralized machine learning, deep learning, and natural language processing, with applications spanning privacy-preserving healthcare, industrial manufacturing, and knowledge graphs. He has led and contributed to national and EU-funded projects, published in venues including TheWebConf, ECIR, and CCGrid, and supervises doctoral and master's students across Sweden and Morocco.

Employment History

09/2022 – Present

- **Associate Professor (Docent)** of Artificial Intelligence and Data Science, University of Skövde, Sweden.
  Promoted to **Docent** (Associate Professor), 2024.
  Group: Skövde Artificial Intelligence Lab (SAIL).
  Director, M.Sc. programme in Data Science (2023–2024).
  Co-investigator on the EU Horizon Europe *ProcTwin* project; leads research on federated and decentralized machine learning for industrial manufacturing.
  Supervises 3 doctoral students; co-founded two international conferences (FLICS, HAXD) and the GAI summer school.

09/2020 – 09/2022

- **Postdoctoral Researcher** in Computer Science, Uppsala University, Sweden.
  Group: HellanderLab, Computational Science and Engineering.
  Project: *Scalable federated machine learning*.
  Co-authored **FEDn**, an open-source framework for production-grade federated learning (CCGrid 2022, Rank A); developed FedQAS for privacy-aware machine reading comprehension.

09/2018 – 08/2020

- **Postdoctoral Researcher** in Computer Science, Umeå University, Sweden.
  Group: Deep Data Mining Group (DDM).
  Project: *Privacy-aware federated database infrastructure for heterogeneous analysis of micro-data.*
  Built the WINFRA and KBot platforms for semantic retrieval and knowledge-graph question answering; published at TheWebConf'19 (Rank A*).

09/2017 – 07/2018

- **Assistant Professor** of Computer Science, Private University of Marrakech, Morocco.
  Taught undergraduate database administration and web development; responsible for lectures, labs, projects and examination.

07/2013 – 12/2017

- **ERP (Odoo) Consultant**, Sublimaroc, Casablanca, Morocco.
  Delivered enterprise information systems for industrial clients (Python/Odoo), providing the applied industry grounding that supports current work on AI for manufacturing.

Education

01/2014 – 03/2018 ■ **Ph.D. in Data Mining**, Cadi Ayyad University, Marrakech, Morocco.
Thesis title: *Data Mining and association rules quality analysis in big data: Application on road safety.*
Fields: Data Mining, Machine Learning, Big Data, Multiple-Criteria Decision Analysis.

09/2011 – 07/2013 ■ **M.Sc. in Information Systems Engineering**, Cadi Ayyad University, Faculty of Science Semlalia, Marrakech, Morocco.

09/2008 – 07/2011 ■ **B.Sc. in Software Engineering**, Faculty of Science and technology, Errachidia, Morocco.

Research Funding & Projects

01/2025 – 12/2029 ■ **ProcTwin** — Integrated modelling for sustainable and optimized steel manufacturing processes.
Funder: European Union, Horizon Europe [Grant agreement no. 101178721]
Total budget: **EUR 4,825,924**
Role: **Co-PI**

2022 – 2026 ■ **Select-ML** — Advancing the university's research and education within Artificial Intelligence.
Funders: KK-stiftelsen (Knowledge Foundation) and University of Skövde
Total budget: **SEK 4,724,790**
Role: **Principal Investigator (PI)**

2021 ■ **SNIC AI/ML 2021** — Federated Learning for large models.
Awarded computing allocation (SNIC national cloud resources). Role: Principal applicant.

■ **UPPMAX 2021/2-4** — Federated NLP with FEDn.
Awarded computing allocation (SNIC/UPPMAX cloud resources). Role: Principal applicant.

2019 ■ **Knut and Alice Wallenberg Foundation** — Travel grant (**SEK 30,000**) for TheWebConf 2019 (WWW), San Francisco, USA.

Research Publications

Journal Articles

- Fatiha Ait Baali, Chaima Lhasnaoui, **Addi Ait-Mlouk**, Tarik Agouti. Federated Learning for Large Language Models: Opportunities, Challenges, and Open Research Directions. *Machine Learning* 115(9):202, 2026. https://doi.org/10.1007/s10994-026-07142-7
- Thomas Heitz, Ning He, **Addi Ait-Mlouk**, Daniel Bachrathy, Ni Chen, Guolong Zhao, Liang Li. Investigation on eXtreme Gradient Boosting for cutting force prediction in milling. Journal of Intelligent Manufacturing 2025. https://doi.org/10.1007/s10845-023-02243-9
- Sadi Alawadi, **Addi Ait-Mlouk**, Salman Toor, Andreas Hellander. Toward efficient resource utilization at edge nodes in federated learning. Progress in Artificial Intelligence 2024. https://doi.org/10.1007/s13748-024-00322-3

Research Publications (continued)

- **Addi Ait-Mlouk**, Sadi Alawadi, Salman Toor, Andreas Hellander. FedQAS: Privacy-Aware Machine Reading Comprehension with Federated Learning. Appl. Sci. 2022, 12, 3130. https://doi.org/10.3390/app12063130
- Brahim Ait Ben Ali, **Addi Ait-Mlouk**, Soukaina Mihi, Ismail El Bazi, Nabil Laachfoubi (2022) Arabic Named Entity Recognition on Social Media based on BiLSTM-CRF using an attention mechanism. Journal of Intelligent and Fuzzy Systems (JIFS).
- **Addi Ait-Mlouk**; Vu, X.-S.; Jiang, L. (2020) WINFRA: A Web-Based Platform for Semantic Data Retrieval and Data Analytics. Mathematics 2020, 8, 2090. https://doi.org/10.3390/math8112090
- **Addi Ait-Mlouk**, Lili Jiang (2020) KBot: A knowledge graph based chatbot for natural language understanding over linked data. IEEE Access, vol. 8, pp. 149220-149230, 2020. doi: 10.1109/ACCESS.2020.3016142.
- **Addi Ait-Mlouk**, T. Agouti (2019) DM-MCDA: A web-based platform for data mining and multiple criteria decision analysis: A case study on road accident. SoftwareX (2019) 100323. https://doi.org/10.1016/j.softx.2019.100323.
- Marzak B, **Addi Ait-Mlouk**, El Moumni S, Benlahmar E, Talea M. (2018) Stable routing protocol based on fuzzy logic system in vehicular ad hoc networks. Int J Commun Syst. 2018;e3587. https://doi.org/10.1002/dac.3587.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2017) An improved approach for association rules mining using multi-criteria decision support system: A case study in road safety. European Transport Research Review, Vol.9, No.3, pp. 1-13, https://doi.org/10.1007/s12544-017-0257-5.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2017) Application of big data analysis with decision Tree for road accident. Indian Journal of Science and Technology, Vol. 10, No. 29, pp. 1-10, DOI: 10.17485/ijst/2017/v10i29/117325.
- **Addi Ait-Mlouk**, Kamsa, I., Gharnati, F., Agouti, T. (2017) Intelligent transport system for road safety based data mining approach. International Journal of Control and Automation, Vol.10, No.8, pp.13-22.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2017) Mining and prioritization of association rules for Big Data: Multi-criteria decision analysis approach. Journal of Big Data.
- Raja Mouachi, **Addi Ait-Mlouk**, Fatima Gharnati and Mustapha Raoufi(2017) A Choice of Symmetric Cryptographic Algorithms based on Multi-Criteria Analysis Approach for Securing Smart Grid. Indian Journal of Science and Technology, Vol. 10, No. 39, pp. 1-9, DOI:10.17485/ijst/2017/v10i39/119856.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2017) Multi-criteria decisional approach for extracting relevant association rules. Int. J. of Computational Science and Engineering, Vol. 15, No.3/4, pp. 188–200.
- **Addi Ait-Mlouk**, Gharnati, F. Agouti, T. (2016) Multi-Agent Based Modeling for Extracting Relevant Association Rules Using a Multi-Criteria Analysis Approach. Vietnam Journal of Computer Science, Vol.3, N.4, pp 235–245.

Conference Proceedings

- **Addi Ait-Mlouk**, Omar Ait-Mlouk, F. A. Baali and C. Lhasnaoui, "FedRecall: Gradient History Replay for Cold-Start Clients in Federated Learning," 2026 2nd International Conference on Federated Learning and Intelligent Computing Systems (FLICS), Valencia, Spain, 2026, pp. 457-461, doi: 10.1109/FLICS70075.2026.11621925.
- **Addi Ait-Mlouk** and Omar Ait-Mlouk, "LLM-Simulated Users for Rapid Usability Evaluation of Decision Support Tools," 2026 2nd International Conference on Human-AI Interaction and Experience Design (HAXD), Valencia, Spain, 2026, pp. 237-242, doi: 10.1109/HAXD70072.2026.11620802.
- C. Lhasnaoui, **Addi Ait-Mlouk**, T. Agouti and M. Sadgal, "Bridging AI and Privacy: Federated Learning for Leukemia Diagnosis," 2024 2nd International Conference on Federated Learning Technologies and Applications (FLTA), Valencia, Spain, 2024, pp. 79-84, doi: 10.1109/FLTA63145.2024.10840066.

Research Publications (continued)

- Chaima Lhasnaoui, **Addi Ait-Mlouk**, Tarik Agouti, Mohammed Sadgal. Decentralized Diagnosis: Privacy-Preserving Brain Tumor Classification with Federated Learning. KDD 2024 Workshop - Artificial Intelligence and Data Science for Healthcare, Barcelona, Spain, 25 August – 29 August 2024
- Morgan Ekmefjord, **Addi Ait-Mlouk**, Sadi Alawadi, Mattias Åkesson, Desislava Stoyanova, Ola Spjuth, Salman Toor and Andreas Hellander, "Scalable federated machine learning with FEDn" 2022 IEEE/ACM 22nd International Symposium on Cluster, Cloud and Internet Computing (**CCGrid**), 2022, pp. 21-30.**[Rank: A]**
- **Addi Ait-Mlouk**, Lili Jiang (2020) A Web-based Platform for Mining and Ranking Association Rules. The 42nd European Conference on Information Retrieval (**ECIR 20**), April 14-17, Lisbon, Spain. **[Rank: A]**
- Xuan-Son Vu, **Addi Ait-Mlouk**, Erik Elmroth, Lili Jiang (2019) Graph-based Interactive Data Federation System for Heterogeneous Data Retrieval and Analytics. **The 30th TheWebConf'19 (formerly WWW)**, May 13-17, 2019. San Francisco, California, U.S. **[Rank:** A^***]**
- **Addi Ait-Mlouk**, Xuan-Son Vu, Erik Elmroth, Lili Jiang (2019) Improving RDF data through semantic association rules mining. The 31st annual workshop of the Swedish Artificial Intelligence Society (SAIS 2019), June 18-19, Umeå, Sweden.
- Xuan-Son Vu, **Addi Ait-Mlouk**, Erik Elmroth, Lili Jiang (2019) Privacy-concerns in the Era of AI and Social Network Sites. The 31st annual workshop of the Swedish Artificial Intelligence Society (SAIS 2019), June 18-19, Umeå, Sweden.
- Lili Jiang, Xuan-Son Vu, **Addi Ait-Mlouk**, Anders Brändström and Erik Elmroth (2019) Privacy-aware Data Federation Infrastructure. The 31st annual workshop of the Swedish Artificial Intelligence Society (SAIS 2019), June 18-19, Umeå, Sweden.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti,T. (2017) Application of big data analysis with decision Tree for road accident. 3rd International Conference on Green Computing and Engineering Technologies, August 8-10. Killaloe, County Clare, Ireland.
- **Addi Ait-Mlouk**, Kamsa, I., Gharnati, F., Agouti,T. (2017) Intelligent transport system for road safety based data mining approach. 3rd International Conference on Green Computing and Engineering Technologies, August 8-10. Killaloe, County Clare, Ireland.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2017) An Approach Based on MapReduce and Decision Tree to Improve Road Safety in Morocco. International symposium on data engineering and information systems (DEIS'2017), May 19-20, 2017, Marrakech, Morocco.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2016) Mining Traffic Accident from Big Data: The case study of Morocco. The First International Conference of High Innovation in Computer Science (ICHICS'2016), June 01-03, 2016, Kenitra, Morocco.
- **Addi Ait-Mlouk**, A. Tarik and G. Fatima (2016) An approach based on association rules mining to improve road safety in Morocco. International Conference on Information Technology for Organizations Development (IT4OD), Fez, 2016, pp. 1-6.doi: 10.1109/IT4OD.2016.7479311
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2015) Association Rules Mining based On Electre Tri Method. The 4th International Conference on Software Engineering and New Technologies (ICSENT'2015), December, 20-24, 2015, Istanbul, Turkey.
- **Addi Ait-Mlouk**, A. Tarik, G. Fatima and D. Badi (2015) A choice of relevant association rules based on multi-criteria analysis approach. 5th International Conference on Information and Communication Technology and Accessibility (ICTA), Marrakech, Morocco, 2015, pp. 1-6. doi: 10.1109/ICTA.2015.7426886
- Aznaoui, H., **Addi Ait-Mlouk** (2015) Classification of routing Protocol in WSNs. The 4th International Conference on Software Engineering and New Technologies (ICSENT-2015), December, 20-24, 2015, Istanbul, Turkey.

Research Publications (continued)

- H. Aznaoui, S. Raghay, L. Aziz and **Addi Ait-Mlouk** (2015) A comparative study of routing protocols in WSN. 5th International Conference on Information and Communication Technology and Accessibility (ICTA), Marrakech, Morocco, 2015, pp. 1-6.
- **Addi Ait-Mlouk**, A. Tarik and G. Fatima (2015) Comparative survey of association rule mining algorithms based on multiple-criteria decision analysis approach. 3rd International Conference on Control, Engineering and Information Technology (CEIT), Tlemcen, Algeria 2015, pp. 1-6. doi: 10.1109/CEIT.2015.7233078
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2015) Evaluation of association rules extraction algorithms. International Conference on Networked Systems (NETYS'2015), May 13-15, 2015. Agadir, Morocco.
- **Addi Ait-Mlouk**, Gharnati, F., Agouti, T. (2015) On selecting interestingness measures for association rules extraction based on ELECTRE TRI method. 1er forum de la recherche scientifique, June 2015. Marrakech, Morocco.

Chapters

- **Addi Ait-Mlouk**, Ait-Mlouk M., El Mazouri FZ., Dey A., Agouti T. (2022) Fuzzy Set Theory-Based Approach for Mining Spatial Association Rules: Road Accident as a Case Study. In: AI and IoT for Sustainable Development in Emerging Countries. Lecture Notes on Data Engineering and Communications Technologies, vol 105. Springer, Cham. `https://doi.org/10.1007/978-3-030-90618-4_17`

Research Software

mcdakit
- Python library for multi-criteria decision analysis. Lead developer.
  17 ranking methods (TOPSIS, VIKOR, PROMETHEE, ELECTRE, SPOTIS and others), AHP weighting, rank-reversal-free ranking and weight sensitivity analysis. Apache-2.0.
  `https://github.com/aitmlouk/mcdakit`

Decentrai
- Open-source framework for hierarchical federated learning. Lead developer, University of Skövde. Release forthcoming.
  Clients, regional coordinators and a global orchestrator; 18 aggregation algorithms, differential privacy and LoRA fine-tuning of language models.

FEDn
- Scalable, production-grade framework for federated machine learning. Co-author.
  Published at IEEE/ACM CCGrid 2022 [Rank: A].
  `https://pypi.org/project/fedn/`

FedQAS
- Privacy-aware machine reading comprehension over federated learning. Lead author.
  Applied Sciences 12(6):3130, 2022.

KBot
- Knowledge-graph-based multilingual chatbot for natural language understanding over linked data. Lead author.
  IEEE Access 8:149220–149230, 2020.

WINFRA
- Web-based platform for semantic data retrieval and analytics over heterogeneous federated sources. Lead author.
  Mathematics 8(11):2090, 2020.

DM-MCDA
- Web-based platform for data mining and multiple-criteria decision analysis. Lead author.
  SoftwareX 10:100323, 2019 — peer-reviewed software publication.

Supervision & Examination

Ph.D. supervision

2025 – 2029
- **Abed Al Bakkour** — University of Skövde, Sweden
  Distributed AI in the steel industry.

11/2024 – 11/2027
- **Fatiha Ait Baali** — Cadi Ayyad University, Morocco
  Federated Fine-Tuning of Large Language Models for Domain-Specific Applications: Balancing Personalization and Privacy.

11/2023 – 11/2026
- **Chaima Lhasnaoui** — Cadi Ayyad University, Morocco
  Enabling Federated Learning on the Edge for Enhanced Privacy in Medical Imaging.

Ph.D. examination

04/2024
- **Ali Bemani** — University of Gävle, Sweden
  Role: External Examiner
  Collaborative Predictive Maintenance for Smart Manufacturing: From Wireless Control Systems to Federated Learning.

M.Sc. supervision & examination

2021 – 2024
- Supervised and examined **30+ master's theses** in data science, federated learning and applied machine learning at the University of Skövde and Uppsala University. Topics included privacy-aware object detection with decentralized AI, federated learning frameworks, real-time defect detection in metal products, graph neural network aggregation, and cloud-based real-time video processing.

Teaching Experience

08/2022 – Present
- **University of Skövde, Skövde, Sweden**.
  Level: Master (and Bachelor, where noted).
  Role: Course responsible — lectures, labs, seminars, mini-projects and examination.
  Data Science and Data Mining taught annually to master's cohorts of **35–40 international students**; **5–8 degree-project students** supervised or examined per year.
  Official course evaluation reports available upon request.
  Courses:
  - *Data Mining (7.5 credits)*
  - *Data Science (15 credits)*
  - *Degree project in IT with a focus on data science A2E (30 credits)*
  - *Degree project in IT with a focus on Data Science A1E (15 credits)*
  - *Project in Data Science A1F (15 credits)*
  - *Java Programming (7.5 credits) - Bachelor level*

03/2021 – 05/2022
- **Uppsala University, Uppsala, Sweden**.
  Level: Master.
  Role: Responsible for lectures, labs, seminars and mini-project.
  Courses:
  - *Data Engineering II (7.5 credits)*
  - *Applied Cloud Computing (10 credits)*

Teaching Experience (continued)

2019 – 2020 ■ **Umeå University, Umeå, Sweden**.
Level: Master.
Role: Guest Lecturer.
Courses:
- *Machine Learning (7.5 credits)*

2017 – 2018 ■ **Private University of Marrakech (UPM), Marrakech, Morocco**.
Level: Bachelor.
Role: Responsible for lectures, labs, mini-project and examination.
Courses:
- *Database administration (DBA Oracle 11g)*
- *Web development*

2014 – 2017 ■ **Cadi Ayyad University, Marrakech, Morocco**.
Level: Bachelor.
Role: Responsible for labs and examination.
Courses:
- *Programming C/C++*
- *Advanced Excel*

2016 – 2017 ■ **Trainer, IT & Business Consulting, Casablanca, Morocco**.
Role: Responsible for training (lectures and labs).
Courses:
- *Information system -Odoo development /Python*
- *Data Science with R and Python*

Online teaching

2018 – 2024 ■ **Mentor and degree project examiner**, OpenClassrooms.com.
Role: Mentor and Examiner across five professional tracks — *AI Engineer, Machine Learning Engineer, Data Scientist, Python Application Developer,* and *Junior Web Developer*.

Conference Leadership & Community Building

Co-founded international conferences

2025 – Present ■ **FLICS** — International Conference on Federated Learning and Intelligent Computing Systems.
Role: **Co-founder & Co-chair**; Publication Chair, FLICS 2026 (Valencia, Spain)
`https://www.flics-conference.org/`

■ **HAXD** — International Conference on Human-AI Interaction and Experience Design.
Role: **Co-founder & Co-chair**; Program Chair, HAXD 2026 (Valencia, Spain)
`https://haxd-conference.org/`

Conference Leadership & Community Building (continued)

Summer school

2026 – Present
- **GAI** — International Summer School on Generative AI.
  Role: **Co-founder & Organizer**; GAI 2026, Sapienza University of Rome, Italy
  `https://gai-school.org/`

Invited talks & expert panels

2026
- Invited speaker, GAI Summer School and FLICS.

2023 – 2024
- Invited speaker, International Conference on Federated Learning Technologies and Applications (FLTA 2023, FLTA 2024).

09/2024
- Invited speaker, International Conference on Computer Engineering and Artificial Intelligence, Khouribga, Morocco.
- Expert jury panel, Morocco IoT and AI Challenge, Marrakech, Morocco.

Editorial & Reviewing Service

Editorial board

Editor
- *Data in Brief* (Elsevier, ISSN 2352-3409)

Journal reviewing

- *Artificial Intelligence Review* (ISSN 1573-7462) • *IEEE Access* • *Cluster Computing* (ISSN 1386-7857) • *Journal of Big Data* (ISSN 2196-1115) • *Universal Journal of Computer Science* (ISSN 0948-695X)

Conference program committees & reviewing

2019
- ICDM — 19th IEEE International Conference on Data Mining
- FSDM — 5th International Conference on Fuzzy Systems and Data Mining

2018
- RTCSE — 3rd International Conference on Recent Trends in Computer Science and Electronics

2017
- ECML-PKDD — European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases
- AI — 30th Australasian Joint Conference on Artificial Intelligence
- DEXA — 28th International Conference on Database and Expert Systems Applications
- CSAE — International Conference on Computer Science and Application Engineering
- CSEIT — 4th International Conference on Computer Science, Engineering and Information Technology

Academic leadership

2023 – 2024
- **Director**, M.Sc. programme in Data Science, University of Skövde.

Pedagogical Training

- **19.5 ECTS** of formal higher-education teaching training (*högskolepedagogik*) at Uppsala University, exceeding the 15 ECTS normally required for formal teaching qualification (*behörighet för lärаranställning*) at Swedish universities.

Pedagogical Training (continued)

11/2021 – 12/2021 ■ **Curious about leadership - for future research group leaders**, Uppsala University, Uppsala, Sweden.

11/2021 – 11/2021 ■ **Supervising student presentations in theory and in practice**, Uppsala University, Uppsala, Sweden.

08/2021 – 10/2021 ■ **Academic Teacher Training Course 1**, Uppsala University, Uppsala, Sweden.

02/2020 – 04/2021 ■ **Supervising Doctoral Students, spring 2021**, Uppsala University, Uppsala, Sweden.

04/2020 – 05/2021 ■ **Assessment, grading and feedback**, Uppsala University, Uppsala, Sweden.

03/2020 – 05/2021 ■ **Supervising Students for Degree Projects**, Uppsala University, Uppsala, Sweden.

Languages

Arabic	■ Native / bilingual proficiency (C2)
Tamazight	■ Native / bilingual proficiency (C2)
French	■ Full professional proficiency (C2)
English	■ Full professional proficiency (C1–C2); language of research, teaching and supervision
Swedish	■ Basic proficiency, in progress
Spanish	■ Elementary (A2), in progress

Referees

■ Available on request.