Name: Murad Mustafa Badarna **Date: 12.2025**

CURRICULUM VITAE

1. Personal Details

Permanent Home Address: Al-Berki neighborhood, Street no. al-alaqsa 5, Arraba village (North Israel)
Current Office Address: The Max Stern Yezreel Valley College, Emek Yezreel
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2. Higher Education

A. Undergraduate and Graduate Studies

Period of Study	Name of Institution and Department	Degree	Year of Approval of Degree
2015-2018	University of Haifa Information Systems	PhD	2018
2010-2014	University of Haifa Computer Science	MSc	2014
2004-2007	University of Haifa Information Systems	BA	2007

3. Academic Ranks and Tenure in Institutes of Higher Education

Dates	Name of Institution and Department	Rank/Position
2020- Present	The Max Stern Yezreel Valley College Information Systems	Senior Lecturer (Proposed Rank)
2020- Present	Braude College	Teaching Fellow
2019 -2018	The Max Stern Yezreel Valley College Information Systems	Teaching Fellow
2018- Present	University of Haifa Information Systems	Teaching Fellow
2015-2017	University of Haifa Information Systems	Research student
2011-2014	University of Haifa Information Systems	Teaching Fellow
2009-2010	University of Haifa Information Systems	Research assistant on the "GPS mapping to the problem of hazard detection on roads" project (EU funded)
2007-2010	University of Haifa Information Systems	Research student
2006-2009	University of Haifa Information Systems	Research assistant for data stream mining

4. Offices in Academic Administration

2022- Present	Third-Year Student Affairs Advisor
2022-2023	Head of the Software Track Program – Department of Information Systems The Max Stern Yezreel Valley College
2020- Present	Teaching Committee, Department of Information Systems, The Max Stern Yezreel Valley College

5. Scholarly Positions and Activities outside the Institution

Dates	Committee member, reviewer and editorial board
2025-Present	The Journal of Supercomputing
2025-Present	Scientific Report
2023 – Present	International Journal of Data Science and Analytics
2023—Present	Neural Processing Letter
2023 - Present	Journal of Big Data
2020 - 2022	IEEE Transactions on Pattern Analysis and Machine Intelligence
2019 - Present	Neurocomputing Journal

6. Participation in Scholarly Conferences

a. **Active Participation**

Date	Name of Conference	Place of Conference	Role	Subject of Lecture/Discussion
2024	8th International Conference on Mathematical Models & Computational Techniques in Science & Engineering	Turkey	Oral Presentation	Dynamic Emerging Pathways in Entrance and Exit Detection: Integrating Deep Learning and Mathematical Modeling
2023	INTERNATIONAL CONFERENCE ON MATHEMATICS, STATISTICS AND APPLIED SCIENCE - (ICMASTAS-23)	Turkey	Oral Presentation (Co-presenter)	Emerging Pathways in Entrance and Exit Detection: Integrating Dep Learning and Mathmatical Modeling
2023	2nd World Conference On Artificial Intelligence, Machine Learning and Data Science (WCAIMLDS-Paris-2023	Paris,France	Oral Presentation	Enhanced Entrance and Exit Detection in Dynamic Environments using Object Detection and Linear Regression
2022	Conference on Artificial Intelligence, Machine Learning and Data Science World Forum	online	Oral Presentation	Dealing with Imbalanced Data Sets Using Active Learning Techniques

2022	Global Webinar on Artificial Intelligence, Machine Learning, and Data Science	online	Oral Presentation	K-Means Clustering Algorithm for Mixed Data
2019	DEXA	Linz, Austria	Oral Presentation	K - Means Based One-Class SVM Classifier
2011	ICDM	Vancouver, BC, Canada	Oral Presentation	Detecting Mean Changes in Data Streams

7. Invited Lectures\ Colloquium Talks

Date	Place of Lecture	Name of Forum	Presentation/Comments
2023	Online	3thd Word Data Congress	**Keynote Speaker:** Unsupervised Methods to Deal with Unsupervised Mixed Data
2023	Online	Artificial Intelligence, Machine Learning and Data Science World Forum	presentation on "Dealing with Imbalanced Data Set Using Active Learning Techniques"
2020	The Max Stern Academic College Of Emek Yezreel	Departmental Seminar	Presentation: Internet Of Things
2017	Wix Auditorium in The Weizmann Institute of Science, Rehovot Israel	Metro450 Conference for Semiconductor Metrology	Presentation: Selective sampling trees
2017	Applied Materials company, Rehovot Israel	Metro450 Seminar	Presentation: Selective Sampling and Active Learning
2016	Department of Information Systems, University of Haifa	Information Systems Seminar	Presentation: The Importance of Pen Motion Pattern Groups for Semi-Automatic Classification of Handwriting into Mental Workload Classes.

8. Research Grants

a. Grants Awarded

Role in Research	Co-Researchers	Topic	Funded by/ Amount	Year
Student and Co-Researcher	Prof. Ilan Shimshoni Dr. Loai Abdalla University of Haifa	Selective Sampling for trees and forests: Academic/industrial project	MAGNET program of the Ministry of Industry and Commerce.	2015-2017

			Applied Materials Company 45,000 $	
Research assistant	Dr. Ran Wolf University of Haifa	the "GPS mapping to the problem of hazard detection on roads" project	EU Horizon fund 10,000$	2009-2010

9. Scholarships, Awards and Prizes

- 2010: a scholarship for student excellence given by the graduate studies authority, University of Haifa.
- 2003-2009: a scholarship provided by the "Maginton for sensors networks" foundation.

10. Teaching

a. Courses Taught in Recent Years

Year	Name of Course	Type of Course Lecture/Seminar/ Workshop/High Learn Course/ Introduction Course (Mandatory)	Degree	Number of Students
2023-current	Design and development of Internet based systems	**Lecture**	**BSc**	**70**
2023-	Design and development of Android Apps	**Lecture**	**BSc**	**70**
2023	Advanced Systems Programming	**Lecture**	**BSc**	**50**
2023	Advanced Programming	**Lecture**	**BSc**	**35**
2022-current	System Design and Analysis	**Lecture**	**BSc**	**130**
2021	Seminar on IoT technologies	**Seminar**	**BSc**	**25**
2020	Development of IOT systems	**Lecture**	**BSc**	**25**
2020	Advances Programming	**Lecture**	**BSc**	**35**
2018	Machine learning and data mining	**Lecture**	**BSc**	**35**
2019-current	Object Oriented Programming	**Lecture**	**BSc**	**35**
2017-current	Developing Application for Android	**Lecture**	**BSc** & **MSc**	**45**

2016-2017	Software Design & Programming	**Lecture**	**BSc**	**60**
2015-2016	Introduction to Programming Languages	**Lecture**	**BSc**	**50**
2015-2016	Development of Internet based applications	**Lecture**	**BA**	**40**
2015	Technical assistance for final software projects	**Workshop**	**BA**	**50**

11. Miscellaneous

1. Poster about Selective sampling for trees and forests presented at the AI Week, Tel Aviv University, Israel 2019.
2. Planning a full learning-program for the following subjects:
   a. Development of applications for Android Design (The Max Stern Yezreel Valley College), 2020
   b. Implementation of IoT Systems (The Max Stern Yezreel Valley College), 2020
3. Presentation about Under sampling method for imbalanced datasets at Research Exhibition, The Max Stern Yezreel Valley College, Israel 2021.
4. Poster about Exploring the Effectiveness of ChatGPT in Improving Students' Programming Skills: A Comprehensive Research Study at Research Exhibition, The Max Stern Yezreel Valley College, Israel 2024

12. Professional Experience

Algorithm Development and Implementation

- Spearheaded the integration of cutting-edge artificial intelligence (AI) and business intelligence (BI) technologies within organizational infrastructures to drive innovation and efficiency.

Project Management and Team Leadership

- Directed integrative projects supporting new processes and product development initiatives.
- Managed full-cycle project planning, including budgeting, interfacing with planning teams, and execution oversight.
- Provided professional mentoring and technical training for engineers, technicians, and new managers to foster organizational growth and capacity building.

Industry Positions

- **Senior Developer**, Spreo Company (2013–2017)
  - Developed machine learning algorithms and Android applications.
  - Served as a full-stack web developer, contributing to comprehensive system designs.
- **Co-founder and Head of R&D**, iDRiSi.Tech (2018–2020)
  - Established the company's R&D department and led innovative technology projects.
- **Head of AI R&D Department**, xBiDa.tech (2020, Part-Time 30%)
  - Manage AI research initiatives, focusing on applied machine learning and deep learning solutions for real-world applications.

PUBLICATIONS

A. Ph.D. Dissertation

The Thesis titled "Toward Automatic Classification of the Cognitive Mental Classes Using Handwriting Analysis: Challenges and Applications". Submitted on 30.04.2018 at University of Haifa. It consists of 92 pages, written in English.
Supervisors:
Prof. Ilan Shimshoni (Head of Information department, University of Haifa)
Prof. Gil Luria (Head of Human Services department, University of Haifa),
Prof. Sara Rosenblum (Head of Department of Occupational Therapy, University of Haifa)
The thesis was published in the Cognitive Computation Journal (see **Articles in Refereed Journals**. Paper #**2** in the list).

B. Articles in Refereed Journals

H-index: Web of Science = 6; Google Scholar = 4
Citations: Web of Science (without self-citations) = 31; Google Scholar = 60
Journal ranking (Q) of each manuscript were taken from Web of Science Clarivate JCR Database (https://jcr.clarivate.com/jcr/home?Init=Yes&SrcApp=IC2LS) and from Scimago Journal Rank (https://www.scimagojr.com). Impact Factor of each manuscript was taken from Web of Science Clarivate JCR Database (https://jcr.clarivate.com/jcr/home?Init=Yes&SrcApp=IC2LS). The number of citations of each manuscript was taken from Google Scholar.

Published

1. **Badarna**, M. M., & AbedAllah, L. C. (2024). Active down-sampling method for KNN when dealing with imbalance dataset. *Advances in Artificial Intelligence and Machine Learning, 4*(3), 157
DOI : https://doi.org/10.54364/aaiml.2024.43157
(5-YR IF= N/A , 3-YR IF= N/A, Q N/A)
Role in the publication: I was involved in all phases of the research, including writing the paper.

2. AbedAllah, L., Hijazi, M., & Badarna, M. (2024). Dynamic emerging pathways in entrance and exit detection: Integrating deep learning and mathematical modeling. *WSEAS Transactions on Systems*.
DOI : https://doi.org/10.37394/23202.2024.23.37
(5-YR IF= N/A , 3-YR IF= N/A, Q4 in artificial intelligence)
Role in the publication: I was involved in all phases of the research, including writing the paper.

3. AbedAllah, L., **Badarna**, M., Khalifa, W., & Yousef, M. (2021). MultiKOC: Multi-one-class classifier based K-means clustering. *Algorithms, 14*(5), 134
DOI : https://doi.org/10.3390/a14050134
(5-YR IF= 1.9 , 3-YR IF= N/A, Q3 in artificial intelligence)
Role in the publication: I was involved in all phases of the research, including writing the paper.

4. **Badarna**, M., & Shimshoni, I. (2019). Selective sampling for trees and forests. *Neurocomputing, 358*, 93–108.
Doi: https://doi.org/10.1016/j.neucom.2019.04.071
(5-YR IF= 6.0 , 3-YR IF= N/A, Q1 in artificial intelligence)
(Badarna Murad, main author contribution for all part of manuscript, Shimshoni: supervisor)
Role in the publication: I was involved in all phases of the research, including writing the paper.

5. **Badarna**, M., Shimshoni, I., Luria, G., & Rosenblum, S. (2018). The importance of pen motion pattern groups for semi-automatic classification of handwriting into mental workload classes. *Cognitive Computation, 10*(2), 215–227. Doi: https://doi.org/10.1007/s12559-017-9520-2
(5-YR IF= 4.1 , 3-YR IF= N/A, Q1 in artificial intelligence)
(Badarna Murad, main author contribution for all part of manuscript, Shimshoni, Luria, Rosenblum : supervisors)
Role in the publication: I was involved in all phases of the research, including writing the paper.
6. **Badarna**, M., & Wolff, R. (2014). Fast and accurate detection of changes in data streams. *Statistical Analysis and Data Mining: The ASA Data Science Journal, 7*(2), 125–139.DOI: https://doi.org/10.1002/sam.11216
(5-YR IF= 1.8 , 3-YR IF= N/A, Q2 in artificial intelligence)
(Badarna Murad, main author contribution for all part of manuscript, Wolff: supervisor)
Role in the publication: I was involved in all phases of the research, including writing the paper.

In process
7. AbdAllah, L., & **Badarna**, M. (2025). K-means clustering algorithm for mixed data using multidimensional scaling. *WSEAS Transactions on Systems*.Accepted for publication.
(5-YR IF= N/A , 3-YR IF= N/A, Q4 in artificial intelligence)
Role in the publication: I was involved in all phases of the research, including writing the paper.

8. **Badarna**, M. (2025). CNN for tabular data sets. *Manuscript submitted for publication*. Neurocomputing.
(5-YR IF= 6.0 , 3-YR IF= N/A, Q1 in artificial intelligence)

9. Abdallah, L. K., **Badarna**, M. M., Mari, A., Sbeit, W., Ahmad, H. S., Yousef, M., & Khoury, T. (2025). Predicting fatty pancreas with machine learning: Integration of clinical, laboratory, and imaging features. *Manuscript submitted for publication*. Applied Sciences.
Role in the publication: I contributed to the conceptualization, formulated the research strategy, performed the empirical analysis and wrote several chapters of the manuscript (Materials and Methods, Results, Discussion). In addition, I read and approved the final manuscript.

C. Articles in Refereed Conference Proceedings

Published

1. **Badarna**, **M**., & AbedAllah, L. (2024). Enhanced entrance and exit detection in dynamic environments using object detection and linear regression. *Proceedings of the 2nd World Conference on Artificial Intelligence, Machine Learning and Data Science*, Paris. Role in the publication: I was involved in all phases of the research, including writing the paper.
2. AbedAllah, L., & **Badarna**, M. (2024). Emerging pathways in entrance and exit detection integrating deep learning and mathematical modeling. *Proceedings of the Computing Conference*, London, United Kingdom. Role in the publication: I was involved in all phases of the research, including writing the paper.
3. AbedAllah, L., & **Badarna**, M. (2024). Dynamic emerging pathways in entrance and exit detection: Integrating deep learning and mathematical modeling. *Proceedings of the 8th International Conference on Mathematical Models & Computational Techniques in Science &*

Engineering, Turkey. Role in the publication: I was involved in all phases of the research, including writing the paper.

4. **Badarna, M.,** & AbedAllah, L. (2024). Strategic sample selection with logistic regression. *Proceedings of the International Conference on Intelligent Systems and New Applications*. Role in the publication: I was involved in all phases of the research, including writing the paper.
5. AbedAllah, L., & **Badarna**, M. (2023). Enhanced entrance and exit detection in dynamic environments using object detection and linear regression. *Proceedings of the 2nd World Conference on Artificial Intelligence, Machine Learning and Data Science (WCAIMLDS)*, Paris, France. Role in the publication: I was involved in all phases of the research, including writing the paper.
6. **Badarna**, **M**., & AbedAllah, L. *(2023).* Emerging pathways in entrance and exit detection: Integrating deep learning and mathematical modeling. *Proceedings of the International Conference on Mathematics, Statistics and Applied Science* (ICMASTAS-23), Istanbul, Turkey. Role in the publication: I was involved in all phases of the research, including writing the paper.
7. AbedAllah, L., **Badarna**, **M**., Khalifa, W., & Yousef, M. (2019). K-means based one-class SVM classifier. *Proceedings of the 10th International Workshop on Biological Knowledge Discovery from Data (BIOKDD)*, Austria, 45–53 . Role in the publication: I was involved in all phases of the research, including writing the paper. *(acceptance rate 35%) DOI : https://doi.org/10.1007/978-3-030-27684-3_7*
8. AbedAllah, L., **Badarna**, **M**., Khalifa, W., & Yousef, M. (2012). Multi one-class classifier. *Proceedings of the 7th International Symposium on Health Information and Bioinformatics (HIBIT)*, Turkey. Role in the publication: I was involved in all phases of the research, including writing the paper.
9. **Badarna, M.**, & Wolff, R. (2011). Detecting mean changes in data streams. *Proceedings of the IEEE International Conference on Data Mining Workshops (ICDM Workshops)*, 568–572. Role in the publication: I was involved in all phases of the research, including writing the paper. DOI: https://doi.org/10.1109/ICDMW.2011.64

In process

10. Hartman, A., & **Badarna**, **M**. (2025). Teaching information technology for social goods. *Manuscript submitted for publication*. ACM GoodIT 2025, Germany. Role in the publication: I was involved in all phases of the research, including writing the paper
11. AbedAllah, L., Hijazi, M., & **Badarna, M**. (2025). Entrance and exit detection model for live-streaming cameras. *Manuscript submitted for publication*. 10th International Conference on Mathematical Methods, Computational Techniques and Simulation in Engineering, Turkey. Role in the publication: I was involved in all phases of the research, including writing the paper
12. AbedAllah, L., Bitar, N., & **Badarna, M**. (2025). Unpacking the impact of assessment transition: A comparative analysis of multiple-choice and open-ended formats in IS education. *Manuscript submitted for publication*. Role in the publication: I was involved in all phases of the research, including writing the paper

D. Other Scientific Publications

Published

1. **Badarna**, **M.,** Hijazi, M., & AbedAllah, L. (2023). Emerging pathways in entrance and exit detection: Integrating deep learning and mathematical modeling. *Proceedings of the International Conference on Mathematics, Statistics and Applied Science (ICMASTAS-2023)*, Istanbul, Turkey. Role

in the publication: I was involved in all phases of the research, including writing the paper

2. AbedAllah, L., & **Badarna**, **M**. (2023). Unsupervised methods to deal with unsupervised mixed data. *Proceedings of the 3rd World Data Congress (Virtual)*. Role in the publication: I was involved in all phases of the research, including writing the paper
3. **Badarna**, **M.,** Hijazi, M., & AbedAllah, L. (2023). Emerging pathways in entrance and exit detection: Integrating deep learning and mathematical modeling. *Proceedings of the International Conference on Mathematics, Statistics and Applied Science (ICMASTAS-2023)*, Istanbul, Turkey.
4. AbedAllah, L., Hijazi, M., & **Badarna**, **M**. (2023). Enhanced entrance and exit detection in dynamic environments using object detection and linear regression. *Proceedings of the 2nd World Conference on Artificial Intelligence, Machine Learning and Data Science (WCAIMLDS-Paris-2023)*, Paris, France. Role in the publication: I was involved in all phases of the research, including writing the paper
5. **Badarna**, **M**., & AbedAllah, L. (2022). Dealing with imbalanced data set using active learning techniques. *Proceedings of Artificial Intelligence, Machine Learning and Data Science World Forum (Virtual)*. Role in the publication: I was involved in all phases of the research, including writing the paper
6. **Badarna, M**. (2011). Detecting change points in data streams. ***United States patent application*** *US20130262368A1*

F. Summary of Activities and Future Plans

Current Research Trajectory

My research journey has been shaped by a central pursuit: enhancing the efficiency and intelligence of learning systems. It began with a fundamental challenge—how to reduce the human effort required in building powerful supervised models. This motivation led me to develop selective sampling methodologies, which have proven instrumental in semi-automated handwriting classification and intelligent workload assessment.

Through these efforts, I addressed the pervasive issue of manual labeling in machine learning pipelines, proposing innovative ways to guide learning algorithms towards the most informative data. This early work naturally evolved into applying selective sampling to decision trees and Random Forests, improving their accuracy, robustness, and data-efficiency.

In parallel, I expanded my research into bioinformatics, collaborating on the development of novel methods for classifying biological datasets, particularly using K-Means Based One-Class SVM classifiers in MicroRNA gene analysis. These interdisciplinary experiences have shaped my appreciation for the intersection between computational innovation and real-world, domain-specific challenges.

Philosophy and Vision

My academic philosophy is rooted in the belief that learning systems must not only be accurate but also accessible, adaptable, and applicable across domains. I aim to bridge the worlds of data mining, machine learning, and practical application — building algorithms that not only perform well on benchmarks but also meaningfully impact fields like life sciences, healthcare, and human safety.

Future Research Agenda

Looking forward, my research will delve deeper into the confluence of deep learning and life sciences, guided by the following pillars:

- **Advanced Dimensionality Reduction**
  I plan to explore how deep neural networks can be leveraged for dimensionality reduction in high-dimensional biomedical datasets, addressing one of the major hurdles in personalized medicine and genomics. This involves designing novel

architectures that can preserve meaningful biological variation while simplifying data complexity.

- **Deep Learning for Live Video Stream Analysis**
  Another critical future direction is the application of deep learning techniques to video stream analysis, with a particular focus on human-centered safety applications. Real-time entrance and exit detection models, for instance, have transformative potential for public health, emergency response, and industrial safety. By developing smarter, faster, and context-aware video analysis models, I aim to contribute to the next generation of proactive safety systems.
- **Active Learning in the Era of Big Data**
  As data continues to explode in volume and complexity, active learning will remain a crucial tool. My future work visions extending active learning paradigms into unsupervised and semi-supervised contexts, particularly within massive biomedical and multimedia datasets, optimizing not only what we learn but how we learn it.

Long-Term Impact and Aspirations

In the long run, my mission is to build bridges between theoretical machine learning and real-world societal needs. Whether it's through safer public spaces, more personalized healthcare treatments, or more efficient learning models, I envision my research making a tangible difference.

By cultivating collaborations across disciplines—merging AI, data science, life sciences, and engineering—I aspire to foster solutions that are not just technologically advanced but humanistically meaningful.