Bishoy M. Galoaa

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EDUCATION

Northeastern University   *Boston, MA*
Candidate for Master of Science in Electrical and Computer Engineering   *May 2025*
Concentration: Machine Learning
Cumulative GPA: 3.5
Relevant Coursework: Advanced Computer Vision, Advanced Machine Learning, Verifiable Machine Learning, Machine Learning for Small Datasets, Advances in Deep Learning

The American University in Cairo   *Cairo, Egypt*
Bachelor of Science in Electronics and Communications   *May 2020*

TECHNICAL SKILLS

Programming Languages & Tools: Python, C++, SQL, Git, Docker, Linux

Machine Learning Frameworks: PyTorch, TensorFlow, scikit-learn, OpenCV, Transformers, Hugging Face

Core Competencies: Computer Vision, Deep Learning, Multi-object Tracking, Object Detection, Medical AI, LLMs, MLOps

PROFESSIONAL EXPERIENCE

ACLab Northeastern University   *Boston, MA*
Graduate Research Assistant   *September 2023 - Present*

- Engaged in comprehensive research on multi-subject tracking utilizing both single and multi-camera setups
- Collaborating closely with Prof. Sarah Ostadabbas in her research lab to derive innovative solutions and methodologies
- Actively contributing to the research team's efforts, leading to enhanced tracking techniques
- Developing my thesis under the guidance of Prof. Sarah Ostadabbas, delving deeply into subject tracking complexities and advancements

Northeastern University   *Boston, MA*
Course Development Assistant   *January 2025 - Present*

- Collaborated with Prof. Sarah Ostadabbas to develop EECE7398 "Machine Learning for Small Datasets" course content for Coursera platform
- Structured and organized technical course materials for effective online learning delivery, including programming assignments and quizzes
- Created and refined video scripts and supplementary materials to communicate complex ML concepts to diverse global audience

ACLab Northeastern University   *Boston, MA*
Computer Vision Researcher Co-op   *July 2024 - December 2024*

- Developed and implemented single-camera and multi-camera multi-object tracking algorithms, improving tracking accuracy and efficiency in various environments

- Researched and proposed novel evaluation metrics for state-of-the-art (SOTA) algorithms, enhancing the precision of performance assessments

- Utilized both small and large datasets to validate and refine tracking models, ensuring robustness and scalability in real-world applications

NAIL Northeastern University *Boston, MA*
Graduate Research Assistant - Prof. Michael Everett and Prof. Max Shepherd *September 2023 - Present*

- Collaborated with Prof. Michael Everett and Prof. Max Shepherd on developing novel ML approaches to classify assistable vs non-assistable ankle motions using deep learning architectures (AE, VAE, GAN, Transformers) and attention mechanisms, improving exoskeleton control efficacy

- Designed and implemented comprehensive data collection protocols from diverse subjects for human motion analysis, incorporating uncertainty quantification to enhance model reliability

- Engineered an end-to-end testing framework for evaluating human motion anomaly detection, including metrics for assessing assistability classification performance in real-world scenarios

MGB Orthopedic Oncology Department *Boston, MA*
Graduate Research Assistant - Dr. Santiago Lozano-Calderon *December 2023 - Present*

- Conducted comprehensive data analysis on the SEER dataset, National Cancer Database, and external validation datasets, focusing on calculating cancer survival probabilities to support clinical research and patient care strategies

- Deployed the models on www.mgbmskoncology.org/

- Developed a microRNA multi-modal diffusion model to generate novel drug candidates tailored to modulate microRNA-mRNA interactions in Ewing Sarcoma (ESOS), personalized based on individual patient molecular profiles

- Utilized advanced machine learning algorithms and Large Language Models (LLMs) to enhance cancer prognosis and survival analysis

BMC ENT Oncology Department *Boston, MA*
Graduate Research Assistant - Dr. Anand K. Devaiah *January 2023 - Present*

- Collaborated on pioneering research focusing on developing a machine learning solution for optimizing treatment protocols in salivary gland cancer

- Conducted extensive data analysis using the SEER dataset to collect, train, and validate models, ensuring high fidelity to established cancer treatment guidelines

- Enhanced the model's performance by addressing demographic biases, ensuring equitable and effective clinical outcomes across diverse patient populations

- Deployed the optimized treatment models on cancercloudai.org

Electrical and Computer Engineering Department, Northeastern University *Boston, MA*
Teaching Assistant, Verifiable Machine Learning Course *Fall 2023*

- Collaborated closely with Prof. Michael Everett to deliver instructional support for the Verifiable Machine Learning course

- Facilitated student learning by providing expert guidance on intricate coding assignments and challenges within the machine learning domain

- Leveraged deep knowledge of Python, PyTorch, and TensorFlow to enhance students' comprehension and practical skills

Northeastern University D'Amore-McKim School of Business *Boston, MA*
Data Science Graduate Research Assistant *September 2022 - September 2023*

- Developed an attention evaluation matrix for visual advertisements to predict the tune-in percentages

- Extracted multi-modal: textual, audio, visual features of +80,000 video advertisements

- Researched a self-attention layer for cross-modal features embeddings training

- Analyzed visual advertisement using CLAP and BERT Algorithms for textual, speech and Visual features

Valify Solutions *Cairo, Egypt*
Machine Learning Engineer *February 2020 - August 2023*

- Researched and implemented ML algorithms and tools for Arabic OCR, text detection, face recognition and fraud detection

- Trained OCR and text detection models with 95% accuracy

- Developed Automated Data Augmentation pipeline engines

- Designed a ML models deployment engine for high traffic usage, handling over 500,000 transactions per month

PUBLICATIONS

Accepted

- **B. Galoaa**, S. Amraee, and S. Ostadabbas, "Dragontrack: Transformer-enhanced graphical multi-person tracking for complex scenarios," Winter Conference on Applications of Computer Vision (WACV) 2025.

- S. Amraee, **B. Galoaa**, M. Goodwin, E. Hatamimajoumerd, and S. Ostadabbas, "Multiple toddler tracking in indoor videos," IEEE/CVF Winter Conference on Applications of Computer Vision Workshops (WACVW), Jan. 2024.

- Moezzi, S., Wan, M., Manne, S.K.R., Amal, M., Zhu, S., **Galoaa, B.**, et al., "Classification of Infant Sleep–Wake States from Natural Overnight In-Crib Sleep Videos." Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops. January, 2025.

- A. Girgis, **B. Galoaa**, A. Devaiah M.D., "A personalized predictive model for Salivary Gland Cancer using Artificial Intelligence." Accepted for publication at Combined Otolaryngology Spring Meetings (COSM) 2024.

- A. Girgis, **B. Galoaa**, A. Devaiah M.D., "A Novel Artificial Intelligence Model for Optimizing Treatment of Salivary Gland Malignancies." Accepted for publication at (AAO-HNSF) Annual Meeting 2024.

- P.A. Rizk, M.R. Gonzalez, **B.M. Galoaa**, A.G. Girgis, L. Van Der Linden, C.Y. Chang, S.A. Lozano-Calderon, "Machine Learning–Assisted Decision Making in Orthopaedic Oncology." Accepted for publication.

- **B.M. Galoaa**, A.G. Girgis, M.R. Gonzalez, S.A. Lozano-Calderon, "Advancing Prognostics in Oncology: Machine Learning Models for Predicting 2-Year and 5-Year Survival Rates in Patients with Undifferentiated Pleomorphic Sarcoma," Accepted for Poster Presentation CTOS 2024.

Under Review

- **B. Galoaa**, S. Amraee, and S. Ostadabbas, "More Than Meets the Eye: Enhancing Multi-Object Tracking with Softmax Splatting and Optical Flow," Conference on Computer Vision and Pattern Recognition (ICML) 2025.

- **B. Galoaa**, "Cognitive Learning through Hierarchical Prototypes and Dynamic Focus" (ICML) 2025.

- **B. Galoaa**, U Nandi, S. Amraee, and S. Ostadabbas, "UniTrack: A Differentiable Graph-Based Loss Function for Multi-Object Tracking" Conference on Computer Vision and Pattern Recognition (ICCV) 2025.

- **B.M. Galoaa**, A.G. Girgis, M.R. Gonzalez, S.A. Lozano-Calderon, "Advancing Prognostics in Oncology: Machine Learning Models for Predicting 2-Year and 5-Year Survival Rates in Patients with Undifferentiated Pleomorphic Sarcoma," submitted for review.

- J.O. Werenski, S. Rampam, M.R. Gonzalez, **B. Galoaa**, A.G. Girgis, S.A. Lozano-Calderon, "Development and External Validation of Machine Learning Algorithms for Survival Prediction in Synovial Sarcoma," submitted to Musculoskeletal Tumor Society (MSTS) 2024.

COURSE PROJECTS—NORTHEASTERN UNIVERSITY

Advanced Computer Vision   *Fall 2023*

- Investigated and tested the efficiency of Hyper-Realistic synthetic data for autopilot cars

Advanced Machine Learning   *Spring 2023*

- Investigated the Performance and Feasibility of the Forward-Forward Algorithm in Bayesian Linear Networks for Local Layer Training in order to make Real-Time learning a possible solution

AWARDS

COE Outstanding Graduate Student Award   *Spring 2024*
College of Engineering, Northeastern University

- Awarded for outstanding academic and research achievements as a graduate student in the College of Engineering at Northeastern University

Best of Scientific Orals Award   *Fall 2024*
Scientific Oral Presentations, AAO-HNSF 2024 Annual Meeting & OTO EXPO

- Recognized for delivering one of the best scientific oral presentations at the American Academy of Otolaryngology-Head and Neck Surgery Foundation (AAO-HNSF) Annual Meeting & OTO EXPO 2024