ABDELRAHMAN ABDELKADER

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EDUCATION

Hajim School of Engineering & Applied Sciences, University of Rochester **Rochester, NY**
Master of Science in Computer Science (A STEM-Certified Program) | Cumulative GPA: 4.0/4.0 **Dec 2025**
Awards: Dean's List | Merit Scholarship Full Tuition Recipient
Relevant Coursework: Large Language Models, OS, Data Science at Scale, Parallel and Distributed Systems, Natural Language Processing

Hajim School of Engineering & Applied Sciences, University of Rochester **Rochester, NY**
Bachelor of Science in Computer Science, Minor in Electrical Engineering | GPA: 3.6 /4.0 **May 2021**
Leadership: President & Publicity, Student Association for the Development of Arab Cultural Awareness
Relevant Coursework: Computer Vision, Data Mining, DB Systems, Advanced Cryptography, Computer Security, Logic Design, Circuits I & II, Embedded Systems, Advanced Data Analysis, Computer Networks, Robotics, Algorithms

PROFESSIONAL EXPERIENCE

DataCicada **Rochester, NY**
ML Engineer Intern **June 2025 – July 2025**
- Designed modality-agnostic VAE to compress high-dimensional single-cell data into unified embeddings, streamlining downstream tasks
- Enabled embedding alignment via contrastive projection heads, boosting efficiency of active-learning annotation workflows
- Outperformed baseline (simple RNA+ATAC concatenation) on classification tasks by ~8% accuracy using fused representations

University of Rochester *(ROC HCI Lab)* **Rochester, NY**
AI/ML Engineer **Jan 2023 – Aug 2024**
- Developed multimodal models for Parkinson's detection, achieving 88% accuracy, enabling non-invasive diagnostic healthcare analytics
- Optimized deep learning models via hyperparameter tuning with Weights & Biases, boosting performance and reducing training time
- Led development of fusion models for Parkinson's detection using semi-supervised speech embeddings, achieving 85% accuracy
- Co-authored peer reviewed papers (AAAI, npj Digital Medicine) detailing model development, evaluation, and research insights
- Led drafting of an FDA De Novo application for a novel Parkinson's screening tool, ensuring regulatory compliance and data privacy standards

Software Engineer **Jan 2022 – Jan 2023**
- Developed a modular React-Firebase framework for structured participant data collection, session tracking, and cloud-based storage
- Designed incremental ETL pipeline for GCP/Cloudflare R2, automating manual video extraction and cutting processing time by 96%
- Conducted studies on remote Parkinson's screening across demographics and medical history, supporting future deployment and patient safety
- Designed and executed a custom 10TB Dropbox-to-Box migration using API scheduling, ensuring HIPAA compliance saving $10,000
- Conducted system testing and validation of full-stack data collection workflows across browsers and participant types

PUBLICATIONS

A Novel Fusion Architecture for PD Detection – (Abdelrahman Abdelkader, *Tariq Adnan, Md. Saiful Islam,)*
- Under Review, Nature Parkinson's Disease [Paper] [Demo]

Using AI to measure Parkinson Severity at Home – ***(****Md. Saiful Islam, Wasifur Rahman,* **Abdelrahman Abdelkader)**
- Nature npj Digital medicine 2023 [Paper] [Demo]

Accessible, At-Home Detection of Parkinson's Disease via Multi-task Video Analysis – ***(****Islam, .. ,* **Abdelrahman Abdelkader)**
- AAAI 2025 [Paper] [Demo]

User-Centered Framework to Empower People with Parkinson's Disease – (*Wasifur Rahman,* **Abdelrahman Abdelkader)**
- The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT 2023) [Paper]

MACHINE LEARNING PROJECTS

ArXiv Vectors | Python, Pinecone, OpenAI embeddings | [demo]
- Deployed semantic search using Pinecone and OpenAI embeddings for 200K+ CS papers, optimizing data representation and RAG workflows
- Improved search latency by 300% to under 1 second, enhancing user experience for research paper discovery
- Created efficient indexing for vector embeddings, reducing storage by 40% while maintaining search accuracy

Token-Based Hand Pose Representation | Python, PyTorch, Transformers, MediaPipe
- Built token based model for hand movement analysis on 500GB dataset, enabling fine-grained gesture recognition
- Pre-trained encoder for occlusion-robust pose estimation, achieving 75% accuracy on partially visible hand gestures

RADAR: Reddit Arabic Dialect Analysis Repository | Python, PyTorch, Hugging Face
- Built RADAR, a Reddit-sourced corpus of ~500k cleaned comments across five Arabic dialects, overcoming keyword bias in existing datasets
- Fine-tuned AraBERT for five-way dialect classification, achieving 83% accuracy / 0.83 macro-F1, more than doubling zero-shot baseline
- Engineered an end-to-end pipeline (data scraping, cleaning, toxicity filtering, and model evaluation) enabling reproducible Arabic NLP research

SKILLS

- **Programming Languages:** Python, C/C++, Rust, R, Java
- **ML/DL:** PyTorch, TensorFlow, Hugging Face, MediaPipe, OpenFace, Weights & Biases, scikit-learn
- **LLM Tools:** Pinecone, OpenAI APIs, prompt engineering
- **Data Engineering:** ETL pipelines, Google Cloud Platform, S3 Buckets
- **Tools & Libraries:** Git/GitHub, Statistical Analysis (Pandas, NumPy, SQL) Data Visualization (Matplotlib, seaborn)