**Abdelrahman Abdelkader**

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**EDUCATION**

**University of Rochester Rochester, NY**

*B.S. in Computer Science, Minor in Electrical Engineering May 2021*

* GPA: 3.6 out of 4.00; Dean’s List 5 out of 7 semesters
* Dean’s Scholarship Award for Academic Achievement
* Discover Grant for Undergraduate Summer Research
* Advanced Coursework: *Computer Vision, Data Mining, Artificial Intelligence, Computer Networks, Database Systems, Advanced Cryptography, Computer Security, Computer Organization, Logic Design, Circuits I & II, Embedded Systems and Microcontrollers, Advanced Data Analysis, Computer Networks, Robotics, Design and Analysis of Efficient Algorithms.*

**Research Interests**

Multimodal Learning, Computer Vision , Medical AI, Secure Machine Learning, Co-Learning, and NLP.

**Publications**

**Using AI to measure Parkinson Severity at Home**

Nature npj Digital medicine 2023[[Paper]](https://www.nature.com/articles/s41746-023-00905-9) [[Demo]](https://urchin-app-5y33n.ondigitalocean.app/)  
*Md. Saiful Islam, Wasifur Rahman****, Abdelrahman Abdelkader*** *et al.*

**A User-Centered Framework to Empower People with Parkinson’s Disease**

The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT 2023)

Wasifur Rahman**,Abdelrahman Abdelkader** et al.

**Auto-Gait: Automatic Ataxia Risk Assessment with Computer Vision on Gait Task Videos**

The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT 2022) [[Paper]](https://dl.acm.org/doi/abs/10.1145/3580845)

Wasifur Rahman,Masum Hasan,Md Saiful Islam,Titilayo Olubajo,Jeet Thaker, **Abdelrahman Abdelkader** et al.

**PARK: Parkinson’s Analysis with Remote Kinetics Tasks**

Affective Computing and Intelligent Interaction (ACII) 2023 Demo Track

*Md Saiful Islam, Sangwu Lee,* ***Abelrahman Abdelkader****, Sooyoung Park, Eshan Hoque*

**EXPERIENCE**

**University of Rochester Rochester, NY**

*Medical Machine Learning Researcher July 2021 – Present*

* Develop early fusion models to diagnose PD through analysis of a speech and facial task and achieved AUC of 0.80.
* Extracted medically relevant features from task-specific videos using Mediapipe and OpenFace.
* Train deep learning and tree-based models to predict audio and facial tremors and achieved MAE of 0.25.
* Automated data collection and standardization for data from 7 study protocols containing 30k+ videos.
* Published 3 research papers in top journals, including npj Digital Medicine and IMWUT.

*Secure Aggregation Research Assistant, Cryptography Research Group May 2020 – March 2021*

* Developed a Rust server-client architecture to implement a Secure Aggregation Machine Learning platform.
* Assisted in implementing a library for FFT in 128-bits large prime fields to compute packed secret sharing efficiently.

*Head Teaching Assistant January 2020 – May 2021*

* Lead weekly TA meetings for organizing study sessions, proctoring exams, and grading projects and assignments.
* Support students’ learning of complex topics such as data visualization, data pre-processing, frequent pattern mining, classification methods, cluster analysis, outlier detection, heuristic search, and automated reasoning.
* Taught Artificial Intelligence, Data Mining, Data Structures & Algorithms, and Intro to CS courses.

**Cloud AI Solutions Toronto, Canada (Remote)**

*Backend Engineer Intern January 2022 – February 2022*

* Worked in a cross-border team to create AI based solution.
* Implemented integration with Azure and AWS from extractions services via implementing universal secure REST API that is back-end agnostic.

**MACHINE LEARNING PROJECTS**

**ArXiv Vectors | Python, Pinecone |** [[demo]](https://arxiv.fly.dev/)

* Deployed an LLM embedding based vector search service for arXiv papers from 2010 to now.
* Indexed over 200K+ arXiv documents for vector embedding search.
* Improved search latency by 300% to achieve  < 1 second search latency.

**INDEPENDENT PROJECTS**

**Work-Out Assistant | TensorFlow Spring 2021**

* Built a machine vision model to detect incorrect posture while working out to limit exercise-related injuries.
* Incorporated state-of-the-art data augmentation methods to overcome small-data bottleneck.

**Studying Transposable Elements (TEs) | Python, R Spring 2020**

* Applied Frequent Pattern Mining to study the association between different Transposable Elements.
* Predicted the insertion sites of TEs based on their target site duplication using Support Vector Machines.

**Joystick-Controlled Robot | C Fall 2020**

* Assembled a 2-wheel robot using a PIC32 microcontroller, Raspberry Pi, gamepad, and gearmotors.
* Implemented SPI and UART communication protocols to direct the robot movements.

**CAMPUS LEADERSHIP ACTIVITIES**

**University of Rochester Rochester, NY**

*President & Publicity Chair, Student Association for the Development of Arab Cultural Awareness August 2018 – Present*

* Lead weekly executive board meetings and develop semester-long plans for cultural and social events.
* Organized the largest benefit dinner led by a UofR student organization hosting more than 300 guests.