T M TARIQ ADNAN

Researcher in Healthcare Analytics

+1 (585) 303 6643 • tadnan@ur.rochester.edu • [Google Scholar] [GitHub] • Rochester, NY, USA

Research Interest

Multimodal ML and longitudinal modeling for digital health. I develop scalable video/audio models for Parkinsons screening and severity estimation, and LLM-driven disease management, emphasizing robustness, real-world validation, and translational deployment.

Work Experience

- **University of Rochester** — Rochester, NY, USA
  Graduate Research Assistant, Department of Computer Science — Aug 2022 – Present
- **Bangladesh University of Engineering and Technology (BUET)** — Dhaka, Bangladesh
  Assistant Professor (on leave); Lecturer, CSE — Jul 2018 – Aug 2022

Education

- **University of Rochester** — Rochester, NY, USA
  Ph.D. in CS (AI in Healthcare; in progress) • M.Sc. in CS (4.0/4.0) — Aug 2022 – Present
- **Bangladesh University of Engineering and Technology (BUET)** — Dhaka, Bangladesh
  M.Sc. in CSE (3.92/4.0) • B.Sc. in CSE (3.95/4.0; ranked 3rd of 150) — Oct 2013 – Feb 2021

Publication Venues

New England Journal of Medicine AI • Nature Communications Medicine • npj Parkinson's Disease • AAAI IMWUT • ACII • SNAM • Information Systems

Technical Skills

- **Languages**: Python (primary), C/C++, Java, R, SQL
- **ML**: Multimodal (vision/speech), longitudinal modeling, calibration & uncertainty, SHAP, DPO, RLHF
- **Frameworks**: PyTorch, TensorFlow, scikit-learn, HuggingFace, vLLM, LangChain
- **Vision/Speech**: OpenCV, MediaPipe, OpenFace, Whisper, WavLM
- **Data/Systems**: Spark, PostgreSQL, Pandas, NumPy, Docker, AWS

Research Experience

Personalized LLM Assistant for PD Management (In Progress). Preference-aligned LLM system integrating longitudinal digital biomarkers, medication states, and lifestyle context for continuous at-home monitoring and personalized guidance.

Multimodal Digital Biomarkers for Longitudinal PD Severity (In Progress). Longitudinal modeling of kinematic, acoustic, and facial signals to estimate MDS–UPDRS III severity and medication ON/OFF effects, with calibrated outputs for clinical tracking.

Digital Biomarkers in LRRK2 Carriers (In Progress). Motor digital biomarkers distinguishing PD, prodromal PD, and non-carriers in genetically at-risk populations.

PARK: Remote Multimodal AI Screening for PD (Nature Communications Medicine 2026). PD screening from webcam video and speech across 1,865 participants; achieved AUROC up to 0.87 with performance comparable to movement disorder specialists in unsupervised settings.

Accessible At-Home PD Detection via Multi-task Video Analysis (AAAI 2025). Built a 3,306-video dataset (845 participants) and developed *UFNet*, achieving 93% AUROC using webcam-only inputs; released a live screening demo.

Facial Micro-Expression Analysis for PD Screening (NEJM AI 2025). Facial action unit-based micro-expression modeling achieving 88% accuracy across international clinical cohorts.

Speech-Based PD Detection (npj Parkinsons Disease 2025). Speech-based PD screening using Wav2Vec2 and ImageBind fusion, reaching 89% AUROC with strong external robustness.

User Study on Remote PD Screening (IMWUT 2024). User study on AI-driven screening communication identifying factors that improve trust and autonomy.

Additional Research. Distributed influence detection in social networks (SNAM 2022, 12.5% accuracy gain, 175× speedup); geo-distributed PCA for big data (Information Systems 2021, 10× scale, 2.9× faster).