Nibraas Khan

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Education

Vanderbilt University, PhD in Computer Science, Disseration: xAI for Wearable Systems: Predicting Behaviors, Monitoring Cognition, and Enhancing Performance — Expected May 2025

Vanderbilt University, MS in Computer Science — August 2020 – May 2023

Middle Tennessee State University, BS in Computer Science — August 2017 – May 2020

Experience

Research Assistant, Vanderbilt University – Nashville, TN — August 2020 – Present

- Engineering a sports analytics platform with IMUs, insole sensors, and ML, automating biomechanical concept extraction for LLM-generated feedback. Applied to 100+ athletes, improving technique retention by 30%.
- Designing an explainable AI system for behavioral prediction in Autism Spectrum Disorder, integrating automatic concept recognition across 25 participants, achieving a 90% accuracy.
- Developing ML pipelines for gait analysis in Mild Cognitive Impairment, using automatic concept recognition on 50+ biomechanical features from 30 participants to identify gait differences between MCI and non-MCI.
- Collaborating with Vanderbilt's venture team to explore commercialization, conducting 50+ customer discovery interviews. Currently filing 2 patents and securing $100K in funding to advance market viability.
- Built web and mobile apps with React Native, interfacing with 5+ bluetooth devices (100Hz), 2 TCP sensors (100Hz), and 1 audio sensor to deliver ML predictions in real time, sending feedback directly to an Apple Watch.
- Developed a commercialization-ready data-labeling and analytics platforms, streamlining dataset curation and currently in process of being sold to other labs.
- Created interactive dashboards for clinical, non-technical teams, visualizing real-time sensor data and ML predictions across 100+ sessions, improving stakeholder transparency and reducing analysis time by 40%.

Co-Founder, JumpStart – Nashville, TN — January 2023 – Present

- Co-founded a nonprofit mentoring 20+ students across 5+ universities, developing 3+ production-ready apps with AWS, React, and DevOps, achieving 100% client satisfaction.
- Equipped students with real-world experience in full-stack development, cloud computing, and agile workflows, helping them secure internships and full-time roles.
- Our students went on to secure full-time roles in full-stack development, game development, and academia.

Projects

Algorithmic Trading — April 2020 – Present

- Engineering momentum-based trading algorithms on QuantConnect, utilizing Python for backtesting and achieving a 15% simulated return over a 6-month period through parameterized equity strategies.
- Building and optimizing mean-reversion models using statistical methods like Bollinger Bands and implemented multithreading to improve execution efficiency by 30%.
- Developing an automated portfolio rebalancing pipeline with QuantConnect's API, integrating machine learning models for volatility forecasting and real-time asset allocation adjustments.

Funding

Grants: NIH (Social Robotics) - $3.13M, NSF (Compression Tech, Pending) - $2M, NSF (AI for Behavior Prediction) - $1.1M, NSF I-Corps (Pending) - $50K, Microgrant - $2.5K

Technologies

Languages: Python, JavaScript, Typescript, C++, SQL, MATLAB, Swift, C#
Technologies: TensorFlow, PyTorch, Scikit-learn, React, QuantConnect, Docker, Git, Pandas, NumPy, SciPy, OpenCV, AWS, Jupyter Notebooks