Yumna Anwar

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EDUCATION

University of Iowa | *PhD* — **Iowa City, IA**
Computer Science — 2019 - 2025
GPA: 3.98

University of Minnesota | *MS* — **Duluth, MN**
Computer Science — 2017 - 2019
GPA: 3.92

Institute of Business Administration | *BS* — **Karachi, Pakistan**
Computer Science — 2013 - 2017
GPA: 3.58 Dean's List

WORK EXPERIENCE

Solventum — **Summer 2025**
AI/Machine Learning Intern — St. Paul's, MN

- Worked on the Oral Care Automation Team in the Dental Solutions division
- Training, fine-tuning, and evaluating deep learning models for generating embeddings of 3D objects (point clouds) using PyTorch.
- Focused on minimizing reconstruction error to ensure downstream AI models retain maximal awareness of the geometric structure of dental 3D scans.

University of Maryland, Baltimore County — **May 2024 – May 2025**
Research Scientist — Baltimore, MD

- Collaborating on a U.S. Department of Defense project, utilizing proprietary data for developing and analyzing sleep stage classification models for identifying various sleep disorders, crucial for improving diagnosis and treatment.
- Conducted signal processing on raw wearable data (PPG, gyroscope, accelerometer, temperature) to enable high-quality model inputs.
- Designed, trained, and optimized deep neural networks in TensorFlow for sleep detection, incorporating time-series modeling and sensor fusion strategies.

University of Iowa — **August 2019 – Present**
Research Assistant — Iowa City, IA

- Designed, trained, optimized and deployed deep neural network models in pytorch and tensorflow for noise suppression with low latency for embedded devices (hearing aid devices).
- Designed and developed an Android app to interact with PHL (Portable Hearing Laboratory) device running open Master Hearing Aid, enabling real-time gain configuration for user studies.
- Designed and developed a cough detector for clinic waiting rooms using deep learning techniques using tensorflow to identify and estimates the number of patients who report cough as a symptom during their clinic visit as a surveillance tool for respiratory disease outbreak.
- Developed a recommendation system for optimizing hearing aid configurations based on patients' feedback and auditory context, using a multi-arm bandit algorithm.

Minnesota Department of Transportation (MnDOT) **June 2023 – Dec 2023**
Senior Research Student Worker Maplewoods, MN

- Collected moisture content and surface issues data as part of Road Doctor research.
- Developed a user-interface and dashboard using streamlit to analyze ground-penetration radar data for visibility into scale of road issues throughout the state.
- Trained deep neural networks for detecting and classifying road cracks and other surface issues using video data for efficient road maintenance.

University of Minnesota **August 2017 – July 2019**
Research Assistant Duluth, MN

- Designed and conducted an IRB study to collect Electrodermal activity (EDA) and heart rate variability (HRV) data using wearable sensors while participants are confronted with different emotionally evocative pictures and audios.
- Investigated affects of psychological changes (mood) on physiological responses in humans to develop a predictive model for psychological changes that could be used to monitor patients with bipolar disorder.
- Conducted a survey to investigate acceptance of robot assistance amongst elderly in a nursing homes.
- Developed a nurse conversational agent using Choregraphe software and NLP, implemented on Softbank's Pepper robot. This agent serves as the foundation for deploying robots in multiple elderly care facilities across Minnesota.

Afiniti **Karachi, Pakistan**
Analyst software engineer April 2017 - August 2017

- Used SQL Server for data storage, analysis, mining, transformation and management of clients call centre data.
- Developed ETL scripts for efficient and optimised setup of processes (Tools: Talend and SSIS), to ensure correct and timely loading and availability of data for AI modelling.

Toyota Indus Motors **Karachi, Pakistan**
Data science intern May 2016 - August 2016

- Developed dashboards for production downtime for real-time analysis of delays in the production chain.
- Employed Microsoft Visio to map business processes, resulting in clear and efficient flow charts that improved process understanding and workflow management.

TEACHING EXPERIENCE

University of Iowa **August 2019 – May 2020**
Teaching Assistant Iowa City, IA

- Courses: discrete structures, cryptography

University of Iowa **August 2022 – Present**
Tutor Iowa City, IA

- Subjects: Python, SQL, Data Structures, Algorithms and C language.
- Offering one-on-one mentorship to help students improve academic performance.
- Providing assignment support and exam preparation assistance.

University of Minnesota **August 2017 – May 2019**
Teaching Assistant Duluth, MN

- Courses: Visual Basic, machine learning, data structures.
- Led lab sessions in Visual Basic and Machine Learning, aiding 150 students in building programming foundations.
- Provided assignment support and exam preparation assistance.
- Collaborated with faculty to develop teaching materials.
- Offered one-on-one mentorship to help students improve academic performance.

SKILLS

- **Languages & Frameworks:** Python (TensorFlow, PyTorch, scikit-learn), R, Java, C, Visual Basic, HTML, CSS, JavaScript, Swift, Objective-C
- **Tools:** Apache TVM, SQL Server, MySQL, Oracle, Talend, SSIS, Power BI, Tableau, Streamlit, AWS
- **AI/ML Techniques:** Deep Learning, 3D Embeddings, Autoencoders, Signal Processing, Time-Series Classification, Reinforcement Learning, Multi-Armed Bandits, Transfer Learning, NLP
- **Specialized Applications:** Point Cloud Modeling, Mesh Reconstruction, Noise Suppression, Biomedical Signal Analysis, Edge/Embedded ML Deployment

PUBLICATIONS

Google Scholar Link

- Audio-Based Cough Detection in Clinic Waiting Rooms Yumna Anwar, Sean M. Mullan, Octav Chipara, Alberto M. Segre and Philip Polgreen.; IEEE-ICHI 2022, June 2022.
- Personalising over-the-counter hearing aids using pairwise comparisons Vyas, Dhruv, Ryan Brummet, Yumna Anwar, Justin Jensen, Erik Jorgensen, Yu-Hsiang Wu, and Octav Chipara. Smart Health 23 (2022): 100231.
- Framework to Predict Bipolar Episodes: Sensor fusion of electrodermal activity, heart rate variability and sleep patterns Khan, A. Anwar, Y, (2018).; Intellisys IEEE, London, September 2018.
- Assistive Technologies for Bipolar Disorder: A Survey Yumna Anwar and Dr. Arshia Khan, "" International Journal of Advanced Computer Science and Applications (IJACSA), 10(4), 2019.
- Robots in Healthcare: A review Khan, A. , Anwar, Y. (2019) Computer Vision Conference; Las Vegas, April 2019.
- Wearable sensors and a multisensory music and reminiscence therapies application: To help reduce behavioural and psychological symptoms in person with dementia Imtiaz, D., Anwar, Y, Khan, A. (2019)- accepted for publication Elsevier Journal of Smart and Connected Health.

AWARDS

2022 **Best student paper award** for paper titled "Audio-Based Cough Detection in Clinic Waiting Rooms".

2018 **Summer research fellowship award** from Department of Computer Science at the University of Minnesota Duluth.

2016 **Dean's Honors list** of BS. Computer Science at IBA (Institute of Business Administration, Karachi).

VOLUNTEER

2018 **Women in Computing:** Student representative at university of Minnesota Duluth.

2018 **LEGO Robotics Club for elementary students:** Mentored elementary students at Congdon Park Elementary to program and code LEGO robots.

2015 **Aiesec Denizli:** English language instructor at a summer camp for High school students in Denizli, Turkey.