

Yumna Anwar

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EDUCATION

University of Iowa | *PhD*
Computer Science
• GPA: 3.98

Iowa City, IA
2019 - Present

University of Minnesota | *MS*
Computer Science
• GPA: 3.92

Duluth, MN
2017 - 2019

Institute of Business Administration | *BS*
Computer Science
• GPA: 3.58
• Dean's Award

Karachi, Pakistan
2013 - 2017

WORK EXPERIENCE

University of Maryland, Baltimore County
Research Scientist

May 2024 – Present
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 data from wearable devices to enhance data quality and ensure it is ready for model development.
- Designed, trained, and optimized deep learning models in tensorflow for sleep detection using PPG, gyroscope, accelerometer, and temperature sensor data.

University of Iowa
Research Assistant

August 2019 – Present
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)
Senior Research Student Worker

June 2023 – Dec 2023
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

Interests Deep learning (Tensorflow, keras, pytorch), Database management, Reinforcement learning, multi-armed bandit, Dashboarding, Web development, Natural language processing, signal processing.

Languages and platforms Python(Tensorflow, keras, pytorch, scikit-learn), Apache TVM, R, Visual Basic, Matlab, Java, C, HTML, CSS, PHP, Swift, Objective-C, Jade, Node.js, JavaScript, MySQL, SQL server, Oracle, Talend, SSIS, PowerBI, Tableau.

Grad course work Deep learning, Regression & ANOVA in Health Sciences, Privacy and Anonymity, Design and Analysis of Algorithms, Advanced Data Structures, Advanced computer security, General Robotics, Machine learning, Natural language processing.

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.