




Raja Hasnain Anwar

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TECHNICAL SKILLS

Programming: Python, C/C++, Java, JavaScript, PHP, SQL, MATLAB, R.

Technologies: Flask, Django, Selenium, Hibernate, Spring, Tornado, SQLAlchemy, jQuery, Node.js, React.js, MySQL, MongoDB, Git, Docker, AWS, Kubernetes, GCP, Kafka, Spark.

Tools: Android Studio, Visual Studio, Oracle, Travis CI, Docker, Matlab, Tableau, PowerBI.

DS / ML / AI: OpenCV, Scikit-learn, Pandas, Numpy, NLTK, Keras, Tensorflow, PyTorch.

EDUCATION

University of Massachusetts Amherst

Amherst, MA, USA

Ph.D. in Electrical and Computer Engineering

Transfer in, Sep 2023 – Present

Teaching: ENG 191: First Year Seminar (Cybersecurity & AI)

The University of Arizona

Tucson, AZ, USA

Ph.D. in Management Information Systems

Jan 2021 – May 2023, Transfer out

Teaching: Penetration Testing, Ethical Hacking, and Social Engineering; Fundamentals of Cloud Computing

National University of Sciences and Technology (NUST)

Islamabad, Pakistan

B.S. in Computer Science

Sep 2016 – Jun 2020

Capstone Project: Multimodal Face2Voice: A novel learning paradigm called deep shared latent space learning with a penalization that eliminates branching in multimodal training. The model's capability is demonstrated by mapping between a person's facial features and voice.

PUBLICATIONS

- **Anwar, R. H.**, et. al., "In Wallet We Trust: Bypassing the Digital Wallets Payment Security for Free Shopping," *USENIX Security 2024*.
- Islam, M. R., **Anwar, R. H.**, et. al., "Characterizing Encrypted Application Traffic through Cellular Radio Interface Protocol," *IEEE MASS 2024*.
- **Anwar, R. H.**, et. al., "Redefining the Driver's Attention Gauge in Semi-Autonomous Vehicles," *MSWiM 2023*.
- **Anwar, R. H.**, et. al., "Detecting Privacy Threats with Machine Learning: A Design Framework for Identifying Side-Channel Risks of Illegitimate User Profiling," *AMCIS 2023*.
- **Anwar, R. H.**, et. al., "Keeping eyes on the road: the role of situated IS delegation in influencing drivers' situational awareness," *ICIS 2021 TREOs*.

EXPERIENCE

University of Massachusetts Amherst

Amherst, MA, USA

Graduate Research Assistant

Sep 2023 – Present

- Identified side-channels in the 5G control plane, achieving over 95% accuracy in user application and activity recognition over encrypted traffic (*IEEE MASS'24*).
- Developed a GPU side-channel attack for model classification with over 90% accuracy against major visual and LLM models in PyTorch (under review).
- Led an empirical study on in-flight WiFi paywall security, tunneling attacks, and user DoS, across major US-based ISPs and airlines (under review).

Kaiser Permanente

Pleasanton, CA, USA (Remote)

Data Science Intern

Jun 2023 – Aug 2023

- Revamped a classification pipeline to accurately identify at-risk patient groups, resulting in a remarkable 20% increase in accuracy.
- Employed spline-based feature transformation models to handle nonlinear features like patient age groups.
- Integrated SHAP value generation for in-depth analysis of the production model's behavior against sensitive features, i.e., gender, age, & race.
- Successfully integrated the developed AI models into a live system by the end of the internship.

The University of Arizona

Graduate Research Associate

Tucson, AZ, USA

Jan 2021 – May 2023

- Led systematic testing of financial systems and EMV protocol with a focus on credit card transaction policy compliance ([USENIX Security'24](#)).
- Developed novel side-channel attacks on typing behavior, achieving 80% accuracy in user profiling and text classification ([AMCIS'23](#)).
- Designed a novel driver's attention-gauging and alert mechanism for semi-autonomous to improve takeover time in emergencies by 75x ([MSWiM'23](#)).

TUKL-NUST R&D Center

Research Assistant

Islamabad, Pakistan

Apr 2017 – Jun 2020

- Built an Android app to scan vehicle registration plates using an OCR and display the owner's details from a public database. This app is a part of the RoadwayIntel vehicle surveillance project in the city of Islamabad.
- Gathered 120 hours of video dataset for fish detection and tracking in the wild, used for population estimation.
- Automated image superimposition to generate 20 images per document extraction sample by augmenting foreground and background settings.
- Unified text mining and personally identifiable information (PII) detection pipelines to mask private information from public judicial archives with 70% accuracy.

Hochschule RheinMain

Research Assistant

Wiesbaden, Germany

Jun 2019 – Aug 2019

- Generated a dataset with over 1,000,000 entity pair data points from raw English and German Wikipedia texts for entity relation extraction.
- Architected an LLM pre-training pipeline that leverages context similarity as an entity relation estimator to automate 100% of labeling.

VisionX Technologies

Machine Learning Engineer

Islamabad, Pakistan

Jun 2018 – Jun 2019

- Engineered an OCR and heuristical information extraction pipeline to digitalize hand-written tabular property records with 85% accuracy.
- Developed a web tool to visualize and correct extracted data improving pipeline efficiency by 50%.
- Reproduces multiple solutions from Kaggle's CDiscount Classification challenge and designed hierarchical deep learning models for large-scale visual recognition and classification.

Al Jazeera

Machine Learning Engineer

Remote

Aug 2018 – Dec 2019

- Implemented and trained a key frame extraction model to summarize videos and select top visuals making headlines generation 70% faster.
- Designed and trained an image captioning model for 70% faster on-demand news headlines generation from key frame visuals.
- Integrated real-time audio transcription services for Arabic and English in a live stream with a 5-second delay.
- Developed a large-scale sentiment analysis system to monitor real-time trends from news and social media in English and Arabic.
- Automated multimedia search with an audio matching tool for automatically retrieving audio/video samples using a 10-second audio query.
- Developed a large-scale faces-in-the-wild recognition tool for identifying celebrities from live streams.

HONORS & AWARDS

2024 – Teaching Fellowship: Selected by [College of Engineering](#) at the University of Massachusetts Amherst.

2023 – USENIX Grant: Received travel grant to attend [NSDI'23](#) in Boston, MA, USA.

2023 – POWDER RENEW: NSF-funded workshop on POWDER wireless emulator at [UofU](#).

2022 – Colosseum Young Gladiator: NSF-funded master class on Colosseum wireless emulator at [NEU](#).

2021 – Nunamaker-Chen Scholarship: Selected by [MIS department](#) at The University of Arizona.

2020 – Summer@EPFL: Selected for prestigious [summer internship programme](#) (2% acceptance rate).

2020 – Huawei UG Star Researcher: Received for best undergraduate research project.

2019 – DAAD Research Fellow: Selected for German Academic Exchange Service (DAAD) research fellowship.