

# Muhammad Usama Saleem

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## INTERESTS

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Deep learning, Machine Learning, Data Mining, Natural Language Processing, Software Engineering

## EDUCATION

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### Lahore University Of Management Sciences

Sept. 2017 –Present

*Bachelors in Computer Science(LUMS)*

Relevant coursework

- Deep Learning, Machine Learning, Advanced Programming, Applied Probability, Computer Vision, Data Mining, Big Data Analytics, Speech Processing, Data Science, Big Data in Economics, Software Engineering, Algorithms, Network Security

## EXPERIENCE

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### Research Assistant

June 2020 – Present

*Lahore University Of Management Sciences(LUMS)*

*Project on countering deepfake misinformation*

- Focused on minimizing the spread of misinformation in low digital-literacy population by countering deepfakes with Dr.Agha Ali Raza(LUMS) at CSaLT lab)
- Investigated factors influencing belief formation in illiterate people when they are exposed to deepfake audio and video clips
- Generated Urdu transcriptions by using our Cali-Urdu speech recognition model
- Designed text-to-speech systems for generating fake audios of politicians and journalists
- Reduced computational complexity by shifting towards real-time voice cloning
- Used PyTorch and Tensorflow to built deep learning based models

### Research Assistant

August 2020 – Present

*University of IOWA & Lahore University Of Management Sciences(LUMS)*

*Project on investigating the compliance with COPPA in browser-based games*

- Investigated the compliance of gaming websites with COPPA at the TPI lab with Dr.Fareed Zaffar(LUMS)
- Discovered pornographic material being exposed to underage users and collection of personally identifiable information (PII) being utilized for targeted advertising
- Used burpsuit, and selenium library to collect cookies, responses and requests of website
- Developed a program for web-based games that keeps an automated check system

### Co-Researcher

Jan 2019 – Sept 2019

*Lahore University Of Management Sciences(LUMS)*

*Project on recommender system based on enhanced ripple-net algorithm*

- Improved a recommender system by combining the knowledge of collaborative filtering and knowledge graph advised by Dr.Imdadullah Khan(LUMS) at Data Analytics Lab
- Performed literature review for finding the automatically meta-paths on knowledge graph
- Introduced non-uniform sampling, and explored more in depth effective rated items that increased 3.0% accuracy and AUC over an existing state of the art method
- Used tensorflow and pytorch for implementation
- Evaluated model performance on MovieLens1M and Book-Crossing dataset

### Teaching Assistant

*Lahore University Of Management Sciences(LUMS)*

- Worked as a teaching assistant for graduate courses including Deep Learning, Machine Learning, Data Science and Speech Processing

## PROJECTS

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### Undergraduate Research Thesis

Sept. 2020 – Present

*Project on classification, and evasion of encrypted traffic fingerprinting*

- Designed a system for real-time android app classification by fingerprinting the encrypted network traffic under the supervision of Dr.Fareed Zaffar
- Discovered vulnerabilities in existing techniques with an extensive literature review
- Incorporated discriminating features to capture the overall distribution from different angles of the same app
- Implemented several Transformer models in PyTorch and Tensorflow for experimental replication
- Designed robust defenses by obfuscation of network traffic to prevent adversaries from fingerprinting apps
- Plan to work on fingerprint applications on smartphones in one go as well as using a semi-supervised approach to classify unseen apps

### Machine Learning Projects

- Analysis of HR data to improve employee retention and satisfaction
- Cross-view image retrieval using CNNs
- Developed object detection model for traffic monitoring
- Designed classification models to classify different speeches and gender of individuals

## TECHNICAL SKILLS

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**Languages:** Python, C/C++, Haskell, R, GoLang, Vue.js, Node.js , SQL, HTML/CSS

**Tools:** Burpsuit, Frida, Git, VS Code, Visual Studio, PyCharm, Adobe Xd

**Libraries:** Pytorch, Tensorflow, TRAX, Keras, Pandas, Selenium, NumPy, Matplotlib, Open-CV

## AWARDS & HONORS

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- \* Winner of Data Science competition - AIGuru at international level
- \* Dean's Honor Roll from 2019-2020
- \* Winner of Robotics Competition at LUMS
- \* PKR 3.0 Million Scholarship from LUMS