
SUMMARY OF QUALIFICATIONS

- **Specialization:** 3D Semantic Segmentation, Vision, 3D Point Cloud Capture and Compression (PCC), Point Cloud Denoising, Low Latency Visual Communication, Deep Learning, Machine Learning, Wireless Networks (LTE & 5G), 3GPP RAN, OFDM, MAC Protocols, mmWave Wireless Directional Communication, and IEEE 802.11.
- **Technical Skills:** Python (Tensorflow, Keras, PyTorch, Caffee), [Knet](#) (Machine Learning library for [Julia](#)), R, Java, C/C++, MATLAB, \LaTeX , VHDL, Assembly Language (MIPS), Django, HTML, CSS, PHP, and Cadence.

EDUCATION

- **Ph.D. Computer and Electrical Engineering** Aug. 2016 - present
 - *University of Missouri-KC* (Jan. 2018 - present) *Kansas City, MO*
 - *University of South Florida* (Aug. 2016 - Dec 2017) *Tampa, FL*
- **M.Sc. Electrical Engineering** Sep. 2013 - July. 2015
 - *Koc University* *Istanbul, Turkey*
- **B.Sc. Electrical Engineering** Sep. 2008 - July. 2013
 - *Lahore University of Management Sciences (LUMS)* *Lahore, Pakistan*
- **Erasmus Mundus Exchange Program in Electrical Engineering** Sep. 2011 - July. 2012
 - *Politecnico de Torino* *Turin, Italy*

EXPERIENCE

- **HERE Technologies** Berkeley, CA
 - *Summer Internship* *June 2018 - Aug. 2018*
 - *Extended Internship* *June 2019 - Dec. 2019*
 - **3D Semantic Segmentation:** Summer internship work at [HERE technologies](#) on 3D semantic segmentation for large-scale outdoor LiDAR point cloud data. The goal was to accurately annotate large amount of point cloud data in an automated manner. We created a scalable 3D semantic segmentation technique that processed millions of points per point cloud obtaining exceptional segmentation results. We leveraged the fact that our deep 3D segmentation model results were better than the ground truth to improve the annotation technique for 3D semantic segmentation.
 - **2D Facade Segmentation and Portal Detection:** Performed 2D building facade segmentation to measure the location of windows and portals for large scale labelling of buildings in 3D maps.
 - **2D Building Tracking, Segmentation, and Instant Segmentation:** Implemented a deep learning based 2D building segmentation model and used it to clean street level imagery (SLI). Performed multi-frame building tracking and instant level segmentation on the cleaned SLIs. A network similar to DeepLab was used for segmentation and Mask-RCNN implementation was used for instant based segmentation.
- **University of Missouri-KC** Kansas City, MO
 - *Research Assistant* *Jan. 2018 - Present*
 - **3D Point Cloud Denoising using Deep Learning:** Created a two stage residual deep learning solution for point cloud outlier removal as well as denoising. Achieving state-of-the-art results.
 - **Mobile Edge Low Latency Point Cloud Communication for Autonomous Driving:** Working with [Dr. Zhu Li](#) on low latency point cloud communication. Registering infrastructure based and vehicle-based LiDAR point clouds into one map. Created an error resilient and scalable point cloud source coding that is layered for different quality of service requirements. We provide joint source-channel coding for robustness to different channel conditions while providing low latency adaptive random network coding for V2V as well as V2I communication. We provide mobile edge computing solution for point cloud processing like registering point cloud submaps into a larger map and differentiating the static background in the point cloud from the dynamic map. Exploring deep learning base solutions for point cloud segmentation.

- **Video Deduplication with Scalable Hash using Deep Learning Feature Aggregation with Triplet Loss:** Working with [Dr. Zhu Li](#) on content-based cache service for DASH video streaming. Using deep learning with triplet loss to create a scalable index/hash of every frame of a hundred hour long video. Then given few consecutive frames of the video, we were able to retrieve the video segment from the large portion of the video. This proposal works with different resolutions of video frames.
- **Deep Super Resolution Networks for SIFT point repeatability:** Using deep learning to super-resolve low resolution images into high resolution images while maintaining SIFT key points features using the DoG filter in the loss function.

University of South Florida

Tampa, FL

Research Assistant

Sep. 2016 - Dec. 2017

- **5G and Beyond:** Worked with [Dr. Huseyin Arslan](#) in [Wireless Communications & Signal Processing Group](#). Worked on OFDM, Waveform design, Flexible PHY layer for next-generation cellular networks, 3GPP RAN, Resource Allocation, and Packet Scheduling in Multi-Numerology 5G networks.
- **Machine Learning in Wireless Communication and Network Science:** Worked with [Dr. Kwang-Cheng Chen](#) on wireless network parameter estimation and channel estimation using Support Vector Machines, Hidden Markov Models, Expectation Maximization and Gaussian-Mixture Bayesian Learning.
- **Market Trend Prediction for Cryptocurrency using Machine Learning:** Worked with [Dr. Yasin Yilmaz](#). We employed Random Forest, Naive-Bayes, Artificial Neural Network, Extreme Learning Machine techniques among others to predict the future stock price of different cryptocurrencies including bitcoin.

Koc University

Istanbul, Turkey

Research Assistant

Sep. 2013 - Aug. 2016

- **mmWave technology in Next Generation WiFi Networks:** Worked under [Dr. S. Coleri Ergen](#) on different projects and publications in mmWave communication. The work was done on directional MAC protocols, Beamforming, Wireless Sensor Networks, and Directional communication.
- **Human Activity Recognition using Wearable Sensors by Deep Convolutional Neural Networks:** Worked with [Dr. Deniz Yuret](#) to design a Convolutional Neural Network for Human Activity Detection using accelerometers and gyroscopes sensors from your cell-phone or wearable device. The results achieved 95% classification accuracy over 10 classes.

PUBLICATIONS

A. Akhtar, B. Kathariya, Z. Li, "Low Latency Scalable Point Cloud Communication"
IEEE International Conference on Image Processing (ICIP), Taipei, Taiwan. 2019.

A. Akhtar, J. Ma, R. Shafin, J. Bai, L. Li, Z. Li, L. Liu, "Low Latency Scalable Point Cloud Communication in VANETs using V2I Communication"
IEEE International Conference on Communications (ICC), Shanghai, China. 2019.

A. Akhtar, H. Arslan, "Downlink Resource Allocation and Packet Scheduling in Multi-Numerology Wireless Systems"
IEEE Wireless Communications and Networking Conference (IEEE WCNC), 2018.

A. Akhtar, S. Coleri Ergen, "Directional MAC Protocol for IEEE 802.11ad WLANs"
Ad-Hoc Networks, 2018.

A. Akhtar, S. Coleri Ergen, "Efficient Network Level Beamforming Training for IEEE 802.11ad WLANs"
International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS 2015) in Chicago, Illinois, US. July 2015.

RELEVANT COURSEWORK

- **Algorithms:** Algorithms, Data Structures.
- **Multimedia:** Image and Video Analysis, Multimedia Communications.
- **Data Science:** Advanced Data Analytics, Network Science, Machine Learning, Supervised Learning.
- **Systems Engineering:** Information Theory, Random Processes, Distributed Computing Systems, Heuristic Methods.
- **Wireless Communication:** OFDM: Waveform Design, Wireless Communication Lab, Digital Communication Systems, Mobile and Personal Communications, Wireless Sensor Networks, Mobile Broadband Communication.