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# Arsal Syed

## Education

Sept '17 - May '21 **PhD**, Electrical Engineering, University Of Nevada Las Vegas (UNLV).
Jan '14 - Dec '15 **MS**, Electrical Engineering, New York Institute of Technology (NYIT).
Aug '08 - July '12 **BS**, Engineering Science, Ghulam Ishaq Khan Institute (GIKI), Pakistan.

## Experience

Sep'17 - Present **Graduate Research Assistant, Realtime Intelligent Systems Lab, Las Vegas, NV**
- Developed architectures based on **GAN/Transformers** to predict pedestrian motion
- Incorporate scene information using pre-trained semantic segmentation models
- Model V2V interaction through Graph CNN helping in better AV motion forecasting.
- Designed experiments to evaluate scene context resulting in **12%** decrease in prediction error.
- Write SQL queries to process large scale traffic flow sensor data.
- Developed forecasting models based on **ARIMA** and **LSTM** to predict traffic flow up to 10 mins
- Provided insights to transportation researchers by deploying these models using **R-Shiny** and **AWS**

Jan'20 - July'20 **Research Intern, Automotive Products Lab, Hitachi America, Detroit, MI**
- Develop proof of concept for deploying eco-friendly routing technology on connected vehicles
- Set up SQL database to store geo-spatial information and write queries to retrieve optimal routes
- Created R-Shiny dashboard to visualize vehicle routes and vehicle fuel consumption.
- Carried out field tests at M-city to collect V-2-V interaction data using **DSRC** technology.
- Processed vehicle sensor data and developed features from surrounding vehicle information.
- Forecast vehicle speed up to 10 secs with with recurrent auto encoders using **tensorflow**
- Deliver production ready code by optimizing DNN using **TensorRT**, reducing inference time by **16%**.

Jun'19 - Aug'19 **Applied Scientist Intern, Amazon.com, Seattle, WA**
- Designed elasticity experiments to test customer response by giving **10-40 pound** gift cards
- Preprocessed raw data and built around **400 features** for training machine learning models
- Implemented SMOTE oversampling technique to handle highly imbalanced data sets.
- Built random forest classifier using scikit learn to extract important features.
- Studied **30k** customer profiles based on RFM score, spending history etc to built prediction model
- Built and tuned logistic regression model to predict probability score of customer acquisition
- Through hierarchical clustering, performed customer segmentation for incentive targeting
- Shared business insights and recommended marketing strategies to product managers

Apr'16 - Sep'17 **Controls Systems Specialist, Amazon.com, Avenel, NJ**
- Collaborated with data engineering teams to build realtime database pipelines using **AWS stack**
- Devised predictive maintenance plans by analyzing sensor data and forecasting equipment failure.
- Deployed real-time anomaly detection system saving **10 hr** of downtime and **33%** production loss.

Jan'15 - Dec'15 **Research Assistant, New York Institute of Technology, NY**
- Received research funding of **USD 160,000** from **UTRC** for traffic density estimation modeling
- Developed data collection methodology through in-vehicle sensors and cellular infrastructure
- Forecast vehicle density using nonlinear regression analysis in MATLAB curve fitting toolbox

## Publications

Jun'20 **15th International Symposium on Visual Computing (ISVC), San Diego, USA**
*CNN,Segmentation or Semantic Embeddings: Evaluating Scene Context for Trajectory Prediction*

Jun'19 **30th IEEE Intelligent Vehicle (IV) Symposium, Paris, France**
*SSeg-LSTM: Semantic Scene Segmentation for Trajectory Prediction*

Nov'16 **19th IEEE Intelligent Transportation Systems Conference (ITSC), Rio, Brazil**
*Prediction of Traffic Density From Wireless Cellular Data*

## Conferences/Talks

Nov' 15 ITS Travel Information System and Mobile Application for Enhanced Transportation Workshop

Dec' 15 4th Connected and Autonomous Vehicles Symposium at SUNY Polytechnic, Albany NY

Dec' 14 Symposium of University Research and Creative Expression (SOURCE) NYIT, NY

## Skills

**Machine Learning:** SVM, logistic regression, RNN, Random Forest, ARIMA, Hierarchical Clustering, PCA
**Deep Learning:** RNN/LSTM, GAN, VAE, Graph NN, Transformers
**Computer Vision:** Semantic Segmentation (SegNet, FCN, ICNet, E-Net, PSP-Net), Mask/Fast RCNN
**Programming:** Python(Tensorflow/Keras, Pytorch, scikit-Learn), Matlab, SQL, ROS, CARLA
**Open source AV datasets:** CamVid, Cityscapes, NuScenes, Lyft, ApolloScapes, Agroverse
**Amazon Web Services:** Redshift, S3, Kinesis, Lambda, Rekognition