AHMED KHAN SALMAN (CV)

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EDUCATION

UNIVERSITY OF HOUSTON | **Ph.D. in Atmospheric Science** | 2020 - Present
UNIVERSITY OF HOUSTON | **M.S. in Mechanical Engineering | Specialization in Data Analysis Methods** | GPA: 3.867/4
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA (INDIA)| **B.E. in Mechanical Engineering** | GPA: 3.7/4

EXPERIENCE

University of Houston, Department of Earth & Atmospheric Sciences **May 2022 – Present**
Title: Research Assistant Jan 2020 – Dec 2020

- Improved performance of numerical models predicting air quality i.e., PM forecast improved by more than 15%
- Applied machine learning to perform bias correction of the air quality models.
- Structured station data, remote sensing data, and numerical model data to train machine learning models.
- Designed an emulator to substitute the numerical solver for expediting computational processing.
- Developed a machine learning solver for solving unsteady complex PDEs with high accuracy.

University of Houston, Department of Earth & Atmospheric Sciences **Jan 2021 – May 2022**
Title: Teaching Assistant *(Deep Learning for Big Data analytics)*

- Conducted lab sessions on Deep Learning.
- Prepared Python-based lab material for the class.
- Designed the assignments focusing on practical examples of Deep Learning.
- Grading the assignments and addressing the student's queries.
- Assisting students in designing different machine-learning projects

SKILLS

- ***Machine Learning***- Linear and Logistic Regression, PCA, SVM, Naïve Bayes, GBDT, Random Forest, Anomaly Detection, Clustering, Error analysis
- ***Deep Learning***- CNN, Neural Networks, Reinforcement Learning
- ***SQL***- Data Extraction, Filtration, Joins, Grouping
- ***Python***- TensorFlow, Keras, NumPy, Scikit, re, matplot, seaborn, pandas, SQLite,
- ***Statistical Analysis***- MATLAB, SAS, R
- ***Visualization***- Tableau, MS-Excel

ATMOSPHERIC SCIENCE COURSES

- Dynamic Meteorology
- Atmospheric Numerical modeling
- Applied Mathematics
- Air Pollution Meteorology
- Data analysis methods
- Statistics

CERTIFICATES

- Certificate in Machine Learning, *Stanford University*
- Certificate in SQL, *University of California, Davis*
- Certificate in Python, *University of Michigan*
- Certificate in Energy Trading Systems, *University of Houston*

PUBLICATIONS

- AGATNet: An adaptive graph attention network for bias correction of CMAQ-forecasted PM2. 5 concentrations over South Korea. Journal of Geophysical Research: Machine Learning and Computation. *Dimri R, Choi Y, **Salman AK**, Park J, Singh D. Journal of Geophysical Research: Machine Learning and Computation 1, no. 3 **(2024)**: e2024JH000244.*
- A 1D CNN-based emulator of CMAQ: Predicting NO 2 concentration over the most populated urban regions in Texas. *Payami, M., Choi, Y., **Salman, A.K.**, Mousavinezhad, S., Park, J. and Pouyaei, A., Artificial Intelligence for the Earth Systems **(2024)***
- Deep learning based emulator for simulating CMAQ surface NO2 levels over the CONUS. ***Salman, A.K.**, Choi, Y., Park, J., Mousavinezhad, S., Payami, M., Momeni, M. and Ghahremanloo, M. Atmospheric Environment 316 **(2024)**: 120192, doi.org/10.1016/j.atmosenv.2023.120192*
- Deep-BCSI: A deep learning-based framework for bias correction and spatial imputation of PM2. 5 concentrations in South Korea. *Singh, D., Choi, Y., Park, J., **Salman, A.K.**, Sayeed, A. and Song, C.H., Atmospheric Research **(2024)**: 107283.*
- Development of Deep Convolutional Neural Network Ensemble Models for 36-Month ENSO Forecasts. *Y Lops, Y Choi, S Mousavinezhad, **AK Salman**, D Nelson, D Singh. Asia-Pacific Journal of Atmospheric Sciences, 1-9 **(2023)***
- Spatiotemporal estimation of TROPOMI NO2 column with depthwise partial convolutional neural network. *Lops, Y., Ghahremanloo, M., Pouyaei, A., Choi, Y., Jung, J., Mousavinezhad, S., **Salman, A.K.** and Hammond, D. Neural Computing and Applications 35.21 **(2023)**: 15667-15678.*
- Deep Learning Solver for Solving Advection-Diffusion Equation in Comparison to Finite Difference Methods. ***AK Salman**, A Pouyaei, Y Choi, Y Lops, A Sayeed. Communications in Nonlinear Science and Numerical Simulation 115, 106780 **(2022)**, doi.org/10.1016/j.cnsns.2022.106780*
- CNN-based model for the spatial imputation (CMSI version 1.0) of in-situ ozone and PM2. 5 measurements. *A Sayeed, Y Choi, A Pouyaei, Y Lops, J Jung, **AK Salman**. Atmospheric Environment 289, 119348 **(2022)***
- Application of a partial convolutional neural network for estimating geostationary aerosol optical depth data. *Y Lops, A Pouyaei, Y Choi, J Jung, **AK Salman**, A Sayeed. Geophysical Research Letters 48 (15) **(2021)***
- A Deep Convolutional Neural Network Model for Improving WRF Simulations. *A Sayeed, Y Choi, J Jung, Y Lops, E Eslami, **AK Salman**. IEEE Transactions on Neural Networks and Learning Systems **(2021)***
- A novel CMAQ-CNN hybrid model to forecast hourly surface-ozone concentrations 14 days in advance. *A Sayeed, Y Choi, E Eslami, J Jung, Y Lops, **AK Salman**, JB Lee, HJ Park, MH Choi. Scientific reports 11 (1), 1-8 **(2021)***
- Bias correcting and extending the PM forecast by CMAQ up to 7 days using deep convolutional neural networks. *A Sayeed, Y Lops, Y Choi, J Jung, **AK Salman**. Atmospheric Environment 253, 118376 **(2021)***
- Estimating daily high-resolution PM2. 5 concentrations over Texas: Machine Learning approach. *M Ghahremanloo, Y Choi, A Sayeed, **AK Salman**, S Pan, M Amani. Atmospheric Environment 247, 118209 **(2021)***
- Data ensemble approach for real-time air quality forecasting using extremely randomized trees and a deep neural network. *Ebrahim Eslami, **Ahmed Salman**, Yunsoo Choi, Alqamah Sayeed, Yannic Lops. Neural Computing & application Journal **(2020)**, doi:10.1007/s00521-019-04287-6*
- Using wavelet transform and dynamic time warping to identify the limitations of the CNN model as an air quality forecasting system. *E Eslami, Y Choi, Y Lops, A Sayeed, **AK Salman**. Geoscientific Model Development 13 (12), 6237-6251 **(2020)***