REZA IRANZAD

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EXPERIENCES

Data Scientist Intern at Ozark Consulting and Marketing (OCM)

- Worked on Walmart retailing data
- Create a **report system** and a **dashboard** for vendors' lost sales
- Sales forecasting
- **Clustering** stores and distribution centers (DCs) causing the shortage
- Designed several plots which summarise the information for thousands of stores in the U.S. and over time.

Graduate Research Assistant

Proposed the first gradient Boosting Trees for Spatial Data (Boost-S) with covariate information.

Integrating spatial random fields into the classical framework of XGBoost, Boost-S has provided a powerful alternative to how spatial data can be modeled (especially when the spatial responses and features present a non-linear and complex relationship). Boost-S is demonstrated by the 3D FDG-PET imaging data from cancer chemoradiotherapy.

Teaching Assistant at University of Arkansas

Probabilities and Statistics.

EDUCATION

Ph.D. in Industrial Engineering

University of Arkansas, Fayetteville, AR

M.Sc. and B.Sc in Industrial Engineering

Sharif University of Technology, the top-ranked university in Iran.

Thesis: Proposed an Exact Algorithm for Operating Room Scheduling Using Open Planning and Elective Patient Strategy.

RESEARCH PROJECTS

Tree-Based Ensemble Machine Learning for Medical Imaging Data

- Modeling and voxel-wise chemotherapy effectiveness prediction for spatially-correlated cancer imaging data
- Image processing and smart detection of blood clots over time within pulmonary microcirculation following E-cigarette exposure in mice

SKILLS

Data Science: Machine Learning (Logistic Regression, SVM, Naive Bayes, K-mean Clustering, Unsupervised Learning), Deep Learning (NNs, CNNs, RNNs), Data Mining
Spatial Statistics: Gaussian Processes, Kriging, Convolutional Basis Functions
Ensemble Learning: Bootstrap Aggregating (Bagging), Boosting Trees, Random Forests
Time Series Analysis: ARIMA, Fourier Seasonal Model

Programming: R (> 10k loc), Python (> 10k loc), Minitab, SQL, and C#/C++ (familiar)

Application Packages: dplyr, tidyverse, ggplot2, plotly, neuralnet, caret, glmnet, GAMs, geoR, nlme, mgcv, spBayes, dlm, astsa, imager, raster,

HONORS AND AWARDS

• Winner of the INFORMS 2021 Student Chapter Annual Award as a Cum laude chapter	2021
• Academic Scholarship from University of Arkansas	2020 & 2021
• Research Assistant Position from University of Arkansas	2018
• Ranked 2^{nd} in the National Industrial Engineering-Systems Optimization Exam	
(10,000 contestants)	Iran 2015
• Ranked 3^{rd} in the National Industrial Engineering-Finance Exam (10,000 contestants)	Iran 2015

Summer 2021

2018 - Present

Five Semesters

2018 - Exp 2022

2010 - 2017

RELEVANT PROJECTS

Statistical Learning for Spatial Data:

A Spatio-Temporal model for COVID-19 Clusters and Spreads by State. A Bayesian Approach Using an *Autoregressive Process* with a *Spatially Autocorrelated* Prediction Matrix.

Time Series:

Analysing Air Ozone Pollutants Data from Jan 1998 to June 2005 Using Various Models. The *Local Linear Trend Plus Seasonal Factors* Model Performed Well.

Machine Learning:

Identifying Digits from Handwritten Images. Using a *Logistic Regression*, *Multiple Neural Networks* and *Convolutional Neural Networks* to Categorize Images in the MNIST Dataset.

COURSEWORK

University of Arkansas

Spatial Statistics (A), Time Series Analysis (A), Multivariate Analysis (A), Machine Learning (A), Engineering Statistics (A), Advance Stochastic Processes (A), Statistical Learning and Applications (A)

Sharif University of Technology

Regression Analysis (A), Design of Experiment (A), Stochastic Processes (A), Simulation (A)

DataCamp

Data Visualization with ggplot2 Data Manipulation with dplyr in R Nonlinear Modeling in R with GAMs

Coursera

Introduction to Data Science in Python **NVIDIA Deep Learning Institute** Fundamentals Of Deep Learning

PUBLICATIONS AND PRESENTATIONS

Accepted Journal Articles

- P. Forouzannezhad, D. Maes, D. Hippe, P. Thammasorn, **R. Iranzad**, ... & S. Bowen. (2022), "Multitask Learning Radiomics on Longitudinal Imaging to Predict Survival Outcomes following Risk-Adaptive Chemoradiation for Non-Small Cell Lung Cancer", Cancers, 14(5), 1228.
- R. Iranzad, X. Liu, W. Chaovalitwongse, S. Bowen, (2021), "Gradient Boosted Trees for Spatial Data and Its Application to Medical Imaging Data", IISE Transactions on Healthcare Systems Engineering, 1-15.
- V. Kayvanfar, MR. Akbari Jokar, M. Rafiee, S. Sheikh, **R. Iranzad**, (2021), "A New Model for Operating Room Scheduling with Elective Patient Strategy", Information Systems and Operational Research, 59(2), 309-332.
- S. Bowen, D. Hippe, W. Chaovalitwongse, P. Thammasorn, X. Liu, **R. Iranzad**, ... & J. Zeng. (2020), "Voxel Forecast Classifier to Predict Spatially Variant Binary Tumor Voxel Response On Longitudinal FDG-PET/CT Imaging of FLARE-RT Protocol Patients", Medical Physics, 47(6), E672-E672.

Submitted Papers

• **R. Iranzad**, X. Liu, M. Bennewitz, "Structured Adaptive Boosting Trees and Detection of Platelet-Neutrophil Aggregations due to E-Cigarette Exposure".

Research Talks

- R. Iranzad, X. Liu, H. Snoderly, M. Bennewitz, "Detection of Blood Clots Within Pulmonary Microcirculation Following E-Cigarette Exposure in Mice", INFORMS annual conference, Anaheim, CA, 2021.
- R. Iranzad, X. Liu, W. Chaovalitwongse, S. Bowen, "Boost-S: Boosting Trees for Spatial Data and Its Applications to Cancer Therapy Response Data.", INFORMS annual conference, Virtual, 2020.
- R. Iranzad, X. Liu, W. Chaovalitwongse, S. Bowen, "Additive-Tree-Based Methods for Spatial Molecular Image Voxel Modeling.", IISE annual conference, Virtual, 2020.
- R. Iranzad, X. Liu, W. Chaovalitwongse, S. Bowen, "Combine Random Forests and Gaussian Process for Spatial Molecular Image Voxel Modeling of Cancer Response to Chemotherapy.", INFORMS annual conference, Seattle, WA, 2019.

SERVICE

Vice President of the INFORMS Student Chapter at the University of Arkansas	2021 - Present
Reviewer for IISE Transactions on Healthcare Systems Engineering	2021
Treasurer of the INFORMS Student Chapter at the University of Arkansas	2020 - 2021
Member of Alpha Phi Mu Honor Society, INFORMS, and IISE.	