Abhinav Khare

abhinavk@buffalo.edu
https://www.linkedin.com/in/abhinavkhare1/, https://github.com/akrm3008 +1-313-818-7754

Education

University at Buffalo (UB) Buffalo, NY, USA
Ph.D. Candidate in Operations Research; GPA: (3.93) *Sept 2015 – Sept 2020 (Expected)*

Delhi College of Engineering Delhi, India
Bachelor of Technology in Industrial Engineering; GPA: (3.7) *Aug 2009 – June 2013*

Expertise

• Machine Learning • Natural Language Processing • Statistics • Mixed Integer Programming • Optimization

Programming Skills

Languages: Python, R, SQL **Tools**: TensorFlow, Keras, Spark, scikit-learn, CPLEX, Gurobi

Experience

Applied Operations Research Lab, University at Buffalo Buffalo, NY
Research Assistant *Jan 2016 - Present*

- **Sharing the inventory of PPEs across hospitals during the Covid-19 pandemic [Python, TensorFlow]**
  - Built a BERT based neural network to identify tweets that sense future PPE shortage and hospitalisations
  - Developing a reinforcement leaning problem to the dynamic sharing and re-distribution of PPEs across in order to minimise shortage at all locations
- **Predicting gasoline shortage using social media during Hurricane Evacuations [R, Python, Keras]**
  - Built SVM, topic models and neural networks to classify tweets about gasoline shortage achieving a F-score= 0.876.
  - Built a Loss Function combining ARIMA & Regression to forecast shortage via tweets and accurately forecasted gasoline shortage in 8 major cities of Florida achieving MAPE = 0.31
- **Assisting Evacuations before Hurricane using social media data [Python, CPLEX]**
  - Developed a Bayesian Network that infered the probability of shortage at gas stations using tweets with 92% accuracy
  - Modeled a novel problem of finding the optimal search route on a network with finite probabilities of finding an entity on each node and developed an efficient solution method reducing evacuation times during Hurricane Irma by 17%
- **Vehicle Routes on Tree Graphs for Humanitarian Relief Supply [Python, CPLEX]**
  - Modeled the NP-hard humanitarian relief supply problem of Nepal earthquake and developed an extremely efficient solution method achieving 1000 fold reduction in computational time over CPLEX
  - Decomposed the problem into Multiple Bounded Knapsack & Vehicle Routing on Tress with Split Delivery (apporx*)
  - Developed polynomial time algo. to solve vehicle routing on trees with split delivery & Multiple Bounded Knapsack

NBCUniversal Media LLC Orlando, FL
Data Scientist Intern *June 2019 - Sept 2019*

- **Dynamic Pricing of Tee Times at Golf Courses. [Python, Keras]**
  - Developed the dynamic pricing algorithm to sell golf course tee times on GolfNow increasing revenue by 20 percent.
  - Modeled demand curve for different golf course using deep learning & xgboost achieving RMSE = 1.67
  - Optimised the price for different golf courses, seasons, weather conditions, etc using a dual annealing algorithm

SAP Labs Bengaluru, India
Research Assistant *July 2014 - April 2015*

- **Building computational tools to process genomics data for cancer research [R]**
  - Built a feature extractor for genomics' features that can classify driver and passenger mutations
  - Extracted 50 most important features achieving a F-score = 0.81 using a Random Forest Classifier
  - Published a journal article with a list of important features to identify driver mutations of multiple cancers.

Honda Cars India Ltd Greater Noida, India

Graduate Engineer Trainee *June 2013 - May 2014*

- **Engine sub-assembly management**
  - Managed Engine sub-assembly for multiple models of Honda cars achieving 10 % reduction in assembly related errors

Additional Projects

- **MIT Solve 2017:** Developed a Internet-of-things & machine learning based solution for reducing chronic disease load in lower income settings and won the finals of the MIT Solve 2017 held at the United Nations.
- **Social Network Behavior Analysis:** Predicted information sharing behavior on social media by developing a model that calculates re-posting probabilities of a post on VK.com using different features achieving 87 % accuracy
- **Crisis image classification:** Developed convolutional neural networks to identify images on social media about people in need for rescue during floods and achived an F-score = 0.83
- **B.E Final Year Project:** Designed the instrument to capture welding fume particles and using ANOVA & regression analysis showed correlation between welding current and Parkinson's causing Mn found by X-ray diffraction
- **Formula Student, Silverstone 2012:** Worked on conceptualisation, design and fabrication of a fully functional medium sized formula race car prototype for participation in Formula Student at Silverstone Race Circuit, UK

Positions of Responsibility and Awards

- President, Graduate Student Association, Department of Industrial Systems Engineering, UB for 2017-2018
- Secretary, INOFRMS Student Chapter at University at Buffalo from 2017-2019
- Head of Chassis Divison in Delhi College Engineering's Formula Student team for the year 2011-12
- Summa Cum Laude Honors as secretary of student chapter of INFORMS at University at Buffalo for 2017-18
- Magna Cum Laude Honors as secretary of student chapter of INFORMS at University at Buffalo for 2018-19
- Winner of MIT Solve held at United Nation's Socio-Economic Council for the year 2017
- Represented Delhi College of Engineering, India as finalist at the Formula Student, Silverstone, UK, July 2012
- Winner of the prestigious Junior Science Talent Search Examination of Indian for the year 2007

Publications

- A. Khare, Q. He, R. Batta, Predicting gasoline shortage during disasters using social media ***OR Spectrum***
- A. Khare, R. Batta, J. Kang On the analysis of last-mile relief over a tree network: Application to 2015 Nepal earthquake ***Journal of Operational Research Society***
- A. Khare, R. Batta, Q. He Social Sensing for Sharing Essential Commodities across Locations During Disasters. *submitted to* ***Management Science***
- A. Gupta, A. Khare, L. Su, C. Qiao Estimation of Transverse Road Geometry Features Using Crowd-Sourced Data from Smartphones. *submitted to* ***SIGSPATIAL 2020***
- A. Khare, Q. He, R. Batta Incorporating social media information in Search and Rescue Operations during disasters. *under review*

Conferences

- A. Khare, S. Dong, D. Gammoh, S. Amruth, Dynamic Pricing by combining Xgboost and Dual Annealing (Poster) **INFORMS 2019**
- A. Khare, R. Batta, Q. He, Incorporating Social Media Information in Search Planning: Application On Gasoline Search During Hurricane Irma **INFORMS 2019**
- A. Khare, R. Batta, Q. He, Search and Rescue Operations in Disaster Management using Social Media **IISE 2019**
- A. Khare, R. Batta, J. Kang, The Analysis of Last-Mile Relief Delivery on a Tree Network **POMS 2019**
- A. Khare, Q. He, R. Batta, M.Sabbaghtorkan Predicting Gasoline Shortage in Florida During Irma using Tweets **INFORMS 2018**
- A. Khare, R. Batta, J. Kang A Multi-modal Vehicle Routing Model For Post-disaster Relief Supply In Inaccessible Mountainous Regions **INFORMS 2016**