Akhilesh Sanjay Somani

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Education

University of Illinois at Urbana-Champaign (UIUC)   May 2021
Master of Science in Mechanical Engineering   **GPA: 3.91/4.0**

Indian Institute of Technology Bombay (IIT Bombay)   Aug 2019
Bachelor of Technology in Mechanical Engineering; Minor in **Computer Science & Engineering**   **GPA: 9.16/10**

Relevant Skills

Python, Data Science and Analytics, Machine Learning, Statistics, SQL, Jupyter, R, Kubernetes, MATLAB

Technical Experience

○ **Data Science Intern**, *Corteva Agriscience*   **May 2020 - Aug 2020**
  – Worked on predicting transgene expressions in genetically engineered crops (corn and soy) using machine learning
  – Implemented & compared performances of various statistical tools **(linear & polynomial regression, regularization methods)** and machine learning models **(neural networks, decision trees, ensemble methods, KNN)**
  – Built an interactive **R-Shiny dashboard** to assist biologists before conducting experiments, to save time & money
  – Used **Kubernetes** to run deep learning models on the GPU cluster for faster execution
  – Performed **cluster analysis, PCA, & Naive Bayes classification**, for exploration & gaining insights into the data

○ **Data Science Projects**, *University of Illinois at Urbana-Champaign*   **Jan 2020 - May 2020**

  Autonomous Vehicle (AV) Safety Data Analysis:
  – Performed **Hypothesis testings and Kolmogorov-Smirnov tests** to compare AVs' performance results with human drivers, predicting an accident probability of 213 times higher, implying AVs not yet ready for large-scale deployments
  – Coded **Naive Bayes Model** from scratch to predict, with over 80% accuracy, causes of failure under different conditions

  Unsupervised Stool Sample Analysis in Hepatic Encephalopathy:
  – Studied stool sample data for liver cirrhosis patients to analyze & predict the microbes responsible for brain damage
  – Refined and cleaned the raw data by coding and implementing **Bayesian Networks** from scratch
  – Implemented Kolmogorov-Smirnov tests to perform statistical analysis on microbe abundance data
  – Performed dimensionality reduction using **PCA** & clustering using **KMeans, GMM, Hierarchical clustering**, etc. to successfully identify & study taxonomical relations between 20 microbes (from 150) with altered abundance levels

  Data Analytics in High-Performance Computing Security:
  – Parsed the raw data from network packets into analysis-friendly format using Pyshark
  – Identified attacker & legitimate user and DNS servers to study the origins and progression of the multi-stage attacks
  – Implemented **Hidden Markov Models** & **Factor Graphs** to predict the likely state of attacks

  Quant Analysis of Stock Market:
  – Performed feature engineering, PCA, LDA, and clustering for automated sector-identification of S&P 500 Index stocks
  – Attempted to predict future stock prices using Keras LSTMs

○ **Computational Modeler**, *University of Illinois at Urbana-Champaign*   **Jan 2020 - May 2020**
  – Modeled the underlying physics, and simulated & visualized the optimized motion of a slithering snake in Python
  – Coded from scratch & implemented **Genetic Algorithm** and **Co-variance Matrix Adaptation Evolution Strategy** to maximize forward velocity of snake by optimizing activation torque generated by snake's muscles

○ **Summer Intern**, *University of California at Berkeley*   **May 2017 - Jul 2017**

  Data Analysis of Nanoscale Thermal Protrusions on Hard-Disk Drives:
  – Used MATLAB to clean, process, and analyze data (captured from experiments on nanoscale protrusions (~10 nm) of control resistors on hard disk drives) to derive a linear relation between protrusions and power input of resistor

Key Projects

Finite Element Analysis (FEA) of Bimetallic Strip, *UIUC*   Nov 2019 - Dec 2019
– Coded a MATLAB Finite Element Solver and compared results with ABAQUS software, achieving errors less than 3%