

Akhilesh Sanjay Somani

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Education

University of Illinois at Urbana-Champaign (UIUC)

Master of Science in Mechanical Engineering

May 2021

GPA: 3.91/4.0

Indian Institute of Technology Bombay (IIT Bombay)

Bachelor of Technology in Mechanical Engineering; Minor in **Computer Science & Engineering**

Aug 2019

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
- **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%