Ali Boussi

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Education

University of Michigan Ann Arbor, MI

Bachelor of Science in Engineering, Computer Science & Mathematics of Finance and Risk Management *May 2027*

- Relevant Coursework: Data Structures & Algorithms, Database Management Systems, Computer Science Pragmatics, Linear Algebra, Introduction to Probability, Practical Data Science, Data-Driven Applications
- Student Leadership & Involvement: Lebanese Student Association Director of Administration, Arab Student Association Director of Finance, Blackwood Mentorship Mentee Chair, Michigan Data Science Team

Work Experience

DTE Energy Detroit, MI

Data Science & Engineering Co-Op, Business Unit Planning & Development *January 2025 – Present*

- **Redesigned an ETL pipeline** by implementing **SQL** and **Pandas** automation, utilizing **batch files** to schedule and run data processing tasks automatically, resulting in a more efficient **data extraction** and **transformation** process for annual **business intelligence reports** in **Excel**
- Optimized **SQL queries**, achieving an **18% performance improvement** over previous code, **reducing data processing time** for business reporting
- Presented the new **ETL pipeline** to the team, delivering a clear walkthrough of its functionality
- Constructed an **algorithm** to accurately estimate **hourly energy market prices** by analyzing **historical data** and key market inputs, enhancing precision of **forecasting models**

Projects

Ross Datathon: Employment Immigration Analysis | *Python, SQL, Time-Series Analysis* *February 2025*

- Analyzed **10 years of PERM immigration data**, identifying key factors influencing **green card approvals**
- Built and trained a **Random Forest model** to predict case outcomes, enhancing interpretability with **feature importance analysis**
- Performed **time-series analysis** to uncover trends in **green card approvals across different U.S. presidencies**, highlighting policy-driven fluctuations
- Created **confusion matrix visualizations** and evaluated model performance using **ROC-AUC, precision, recall, and F1-score**

Mini-AlphaGo | *Python, PyTorch, Reinforcement Learning, Monte Carlo Tree Search (MCTS)* *January 2025*

- Developed a bot by integrating **reinforcement learning** with **Monte Carlo Tree Search** for game simulation
- Designed and implemented a custom **neural network** architecture leveraging **PyTorch** featuring multiple **convolutional layers** with **residual connections** to extract features from raw board state inputs
- Employed **ReLU activations** and **batch normalization** within convolutional blocks, and implemented dual output heads: a **policy head** for move probability distribution and a **value head** for board evaluation
- Integrated neural network with **MCTS**, enabling dynamic move selection and continuous improvement via self-play, while collaborating with the **Michigan Data Science Team** to fine-tune model parameters

MongoDB Social Media Database | *MongoDB, NoSQL, Aggregation Pipelines* *October 2024*

- Designed and optimized **NoSQL data models** in **MongoDB**, improving query performance and retrieval efficiency for large-scale datasets
- Created **aggregation pipelines** to convert and filter user-tagged photo data, efficiently retrieving **800 targeted users** based on specified criteria while minimizing query execution time

Driving Style Analyzer | *Python, Machine Learning, TensorFlow, Scikit-learn* *July 2024*

- Developed a **Python script** to **automatically label** key **OBD metrics**—including **acceleration**, **speed**, **engine RPM**, and **engine power**—by classifying driving behavior into **normal**, **aggressive**, and **slow** categories
- Preprocessed data with **Z-score normalization** to standardize features, ensuring reliable model training
- Utilized **supervised learning** to devise and compare two predictive models—a **logistic regression** and a **custom neural network** using Python (**scikit-learn**, **TensorFlow**)

Technical Skills

Programming Languages: Python, SQL, C/C++, Java, R, HTML/CSS, JavaScript
Technical Tools & Libraries: Git, Pandas, NumPy, Scikit-learn, TensorFlow, PyTorch, Matplotlib, Seaborn, Pyodbc
Databases: SQL, Oracle, MongoDB, Microsoft SQL Server
Visualization & BI Tools: PowerBI, Tableau