John Liu

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Skills

Languages Python, C++, Java, SQL, JavaScript, HTML, CSS, MATLAB
Libraries/Tools PyTorch, TensorFlow, Pandas, Node.js, AWS, GCP, Docker, Kubernetes, Git, Unix

Experience

MIT-PITT-RW | **Software Engineer** *Jul 2022 – Present*

- Created a Python application to generate vehicle race lines and velocity profiles for an autonomous racecar enabling self-driving attacking and defending maneuvers at 150mph+ for various autonomous racing competitions
- Designed a streamlined data pipeline for seamless integration of large data, allowing efficient race line and velocity profile generation. Created an interactive graph UI using Plotly for enhanced data visualization and user-friendliness
- Developed collision checking and path cost function scripts in C++ as part of a vehicle path prediction controller, resulting in improved autonomous pathing decisions

Wyheng Technologies Ltd. | **Software Developer** *Sep 2020 – Aug 2021*

- Automated and streamlined performance calculations of various oil and gas piping equipment using Python. Achieved a 30% acceleration in preliminary sizing calculations
- Built an ETL pipeline using Python and Pandas for oil and gas production data, resulting in well-organized databases, facilitating smoother data analysis and utilization, thereby boosting overall work productivity
- Conducted thorough software testing to identify and address bugs while optimizing code for performance. Achieved a 20% increase in software speed

Nytric Ltd. | **Product Engineering** *Jan 2018 – Apr 2018*

- Developed a VBA program to simulate touch screen performance and cost metrics, resulting in a remarkable cost reduction of over 50% by using alternative components
- Developed a script to streamline company design procedures by automating product and CAD model revision change records
- Used SolidWorks macros to automate some 3D CAD modelling allowing for quick revision design changes of touchscreen enclosures

Projects

Protein Structure Prediction (ESMFold, Flask, Docker, PyTorch) *Sep 2023*

- Created a protein structure prediction app using the ESMFold API, a protein language model, to predict protein structures from a string sequence input
- Deployed the web-based app using Flask, featuring a user-friendly UI for custom protein sequence input
- An interactive 3D render of the protein is created for visualization and the pdb file (protein structure) can be downloaded for use

MLOps End-to-End: Mini GPT (PyTorch, Streamlit, Docker, Kubernetes (GKE), Google Cloud Build) *Apr 2023*

- Designed and built a text GPT model from scratch using a transformer language model and PyTorch, generating contextually relevant text responses based on user input
- Created and deployed a chatbot web app from the GPT model using Streamlit, resembling the functionality of ChatGPT
- Implemented CI/CD pipelines through containerized deployments to GCP Kubernetes Engine and automated build updates using Cloud Build triggers

Sentiment Analysis on Movie Reviews (Pytorch, Scikit-learn, Pandas, NumPy) *Jun 2022*

- Developed and trained an NLP model to predict and differentiate positive and negative movie reviews with an 87% accuracy
- Preprocessed data using Bag of Words and Word2Vec approaches. Trained a custom neural network using Pytorch
- Performed image classification on various data sets using custom CNNs. Conducted data analytics using Scikit-learn, including performing PCA, K-means clustering, DBScan, and T-SNE

Education

University of Waterloo – Waterloo, ON *2022*
Master of Engineering – MEng, Electrical and Computer Engineering
Specialization in Artificial Intelligence and Machine Learning

University of Waterloo – Waterloo, ON *2020*
Bachelor of Applied Science – BASc, Honours Mechanical Engineering (With Distinction)