SRIVATHSAN BADRINARAYANAN

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EDUCATION

Carnegie Mellon University *(GPA - 4.0)* Pittsburgh, PA
Master of Science in Artificial Intelligence Engineering - Chemical Engineering December 2024
Coursework: Generative AI, Large Language Models, Intermediate Deep Learning, Scientific Software Engineering, Mathematical Modeling of Chemical Engineering Processes, Analysis and Modeling of Transport Phenomena

Indian Institute of Technology Madras Chennai, India
Bachelor of Technology in Chemical Engineering (Minor in Bioprocess Engineering) July 2023
Coursework: Data-driven Modeling and Optimization of Bioprocesses, Bioreactor Design and Analysis, Downstream Processing, Pattern Recognition and Machine Learning, Modern Control Theory

EXPERIENCE

Graduate Research Assistant May 2024 - August 2024
Mechanical and AI Lab (MAIL), Carnegie Mellon University Pittsburgh, PA
Project: Multimodal Language and Graph Learning of Adsorption Configuration in Catalysis

- Innovated a generative-predictive pipeline for accurate adsorption energy predictions in adsorbate-catalyst systems.
- Enhanced accuracy by combining generative LLM with graph-assisted multimodal pretraining, leading to publication.

Project: Generative AI Podcasts (hosted at dreampodcasts.com and on Spotify @dreampods) and automated lectures

- Led the development of an innovative prompt-to-audioform generative AI pipeline by integrating Large Language Models with Text-to-Speech models, enhancing public knowledge accessibility through automated podcast creation.
- Leading the development and pilot of a pdf-to-lecture video automated ML pipeline, assisting universities and professors in creating educational content with 50% reduced preparation time.

MITACS Globalink Research Intern May 2022 - August 2022
University of Alberta Edmonton, Canada
Project: Data-Driven Optimization of Refinery Process Operations

- Developed 97% accurate multivariate deep learning models to predict process outputs for a hydro-processing plant.
- Optimized business decisions by implementing time-series prediction models on real-time refinery data, resulting in improved operational efficiency and higher profits through key parameter adjustments.
- Communicated findings effectively by delivering a concise 3-minute thesis to an audience of 50+ scholars.

Machine Learning Intern June 2021 - July 2021
Tirios AI Chennai, India (Remote)

- Engineered a robust machine learning pipeline for object recognition, deployed using AWS Sagemaker, for accurately identifying home appliances needing repair from photos, reducing service wait time by 50%.

PROJECTS

Multi-Peptide: Multimodality Leveraged Language-Graph Learning of Peptide Properties January 2024 - May 2024

- Achieved state-of-the-art results in protein property prediction by developing a multimodal deep learning model.
- Improved prediction accuracy by implementing a contrastive framework (CLIP) between protein sequence data (transformer encoder) and AlphaFold generated structures (GNN model), culminating in a publication.

SKILLS

Packages and frameworks: PyTorch, TensorFlow, Keras, scikit-learn, SparkML, PySpark, OpenCV, Git, HuggingFace, RDKit, ASE, Pymol, AlphaFold, AWS, GCP, Docker, Matplotlib, Seaborn, Scipy, CUDA, GPT, Llama, PostgreSQL, Docker, Pandas, Pillow, BeautifulSoup, Apache Kafka, DynamoDB, COMSOL Multiphysics, Aspen Plus, Simulink, Fusion360
Programming languages: Advanced - Python, C++, MATLAB; Basic - R, Julia, SQL

PUBLICATIONS

Multi-Peptide: Multimodality Leveraged Language-Graph Learning of Peptide Properties, S. Badrinarayanan et al.
(arXiv preprint: https://doi.org/10.48550/arXiv.2407.03380, under review in ACS JCIM)
Multimodal Language and Graph Learning of Adsorption Configuration in Catalysis, J. Ock et al.
(arXiv preprint: https://doi.org/10.48550/arXiv.2401.07408, accepted in Nature Machine Intelligence)