Sourin Dey

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Projects

08/2021 – 12/2021 **Benchmarking Graph Neural Network(GNN) architectures for material property prediction.**

- Investigated the impact of node level featurization in rotationally equivariant and atomistic line graph neural networks for material property prediction.
- Conducted a benchmark study to analyze the impact of different message passing blocks to solve over-smoothing problems in graph neural networks.

01/2023 – 05/2023 **Benchmarking Deep Neural and Spiking Neural Network Performances in Edge devices and Neuromorphic devices**

- Becnhmarked DNN latency , throughput in Intel Movidius Neural Computing Stick edge device. This helps to identify and deploy efficient neural network models for real time applications.
- Converted object detection based CNN models to Spiking Neural Networks (SNN).

08/2022 – 12/2022 **Solar Cell based Chemical Synthesis Information Extraction by Fine-tuning Transformer Model Trained on Chemical Data**

- I have designed a NLP pipeline using language model Bio-BERT and Spacy that summarizes solar cell chemical synthesis information from a given paragraph.

08/2022 – present **Calibrating design choices for halide perovskite solar cells using interpretable machine learning**

- Integrated a novel algorithm into Generalized Additive Model that predicts continuous target within a desired range.
- Identified important patterns of experimental parameters that influence Power Conversion Efficiency of perovskite solar cells using interpretable machine learning model.

Education

08/2021 – present **Ph.D. in Computer Science**
University of South Carolina
Selected Coursework: Computer Processing of Natural Language, Neuromorphic Computing, Data Mining.

08/2019 – 12/2021 **MS in Computer Science**
University of Wyoming
Selected Coursework: Intro to AI, Randomness in Computation, Deep Reinforcement Learning.

05/2014 – 05/2018 **B.Sc. in Electrical and Electronic Engineering**
Khulna, Bangladesh *Khulna University of Engineering & Technology*

Skills

- **Python** (PyTorch, Pytorch-Geometric,Tensorflow, Deep Graph Library, GenSim, SpaCy), Openvino, Shell scripting, C++
- SQL, Jupyter Notebook, VS Code, Github, High-Performance Computing.
- Algorithm & Data Structure coding in Leetcode

Research Experience

08/2021 – present **Graduate Research Assistant**
Sutton Lab & MLEG Lab, University of South Carolina

- I developed an Atomistic Line Graph Neural Network based model to learn electronic structure of crystals for predicting eigenvalue, a critically important opto-electric property. This model significantly outpaces the conventional DFT method, which is known for its high computational costs
- I am currently working to develop a graph neural network based contrastive-learning model that will help to find similar crystal structures from all available structures in material projects. I used Crystal Graph Convolution for message passing generates the embedding for contrastive model. This project will greatly narrow down search space for material/drug discovery on specific application.

08/2019 – 12/2021 **Graduate Research Assistant**
Artificially Intelligent Manufacturing Center, University of Wyoming

- I automated the AI powered Laser-Induced Graphene Process(LIG) manufacturing using Bayesian Optimization. The automated system is generalized and can be deployed to manufacture other materials.

Publications

My Google Scholar profile

Extracurriculars

Instructor, Dept. of Chemistry & Biochemistry, University of South Carolina
Worked as an instructor for Python Programming Summer Camp Workshop