Yuhan Zhang

EDUCATION

UNIVERSITY OF MICHIGAN, Ann Arbor, MI Expected May 2024

Major: Honor Mathematics, Computer Science

Course Highlights: Computer Vision, Natural Language Processing, Machine Learning, Operating System, Computer Organization, Algorithms, Data Structure, Real Analysis, Applied Functional Analysis, Honor Analysis, Probability Theory, Introduction to Numerical Methods

EXPERIENCE

UNIVERSITY OF MICHIGAN, Ann Arbor, MI Feb 2023 - Present

Advisor: Hui Deng

- Developed a pipeline that employed a filter matrix simulated by Discrete Dipole Approximation to transform from k-space near-field images to images seen by detectors, and later used U-Net for effective reconstruction of the near-field images. Compare linear least squares method and U-Net method for reconstruction
- Utilized deep learning methodologies to engineer Valley Photonic Crystal patterns through both inverse design and forward prediction, drawing on FDTD simulation data. The objective was to achieve a resonant frequency, ensure a direct bandgap with a large bandgap, and optimize the coupling strength.
- Enhanced Photoluminescence Spectroscopy data analysis through a multi-output neural network that automatically identified Lorentzian and Gaussian peaks and extracted peak features

UNIVERSITY OF MICHIGAN, Ann Arbor, MI Nov 2022 - Present

Advisor: Oliver He, Justin Johnson

- Utilized Reverse Vaccinology and designed an MLP method for identifying protective bacteria antigens BPAgs, with biological and physiochemical features annotated using bioinformatics software
- Enhanced model applicability against new emerging pathogens by implementing a leave-one-pathogen-out strategy and benchmarked on a curated independent dataset. The model achieved an AUC-ROC score of 0.95 and an accuracy of 0.95
- Develop a web-based deep learning tool for predictive analysis of vaccine candidates, streamlining the process for potential future research.

PROJECTS

Predicting Music Popularity Based on Extracted Instrumental Features

Generated a Mel-Spectrogram dataset of over 50,000 songs obtained from raw MP3 files. Leveraged models including ResNet model, and Transformers for Mel spectrogram analysis.

Object Detection Systems

Implemented a One-Stage Detector based on FCOS. Trained and evaluated the detector on the PASCAL VOC 2007 object detection dataset. Implemented a Two-Stage Detector similar to Faster R-CNN that combined a fully-convolutional Region Proposal Network (RPN) and a second-stage recognition network.

Memory Manager (Operating System)

Architected a robust pager system to manage the kernel's virtual address spaces of application processes, effectively optimizing system call functions for space allocation, creation, and management.

Thread Library (Operating System)

Engineered a comprehensive thread library to bolster support for multi-threaded applications. Effectively enabling thread creation, interruption, synchronization, and context switching.

SKILLS

Python, C++, C, Java, MATLAB, Linux, SQL, Docker, Git