

Mithilesh Vaidya

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Education

- Georgia Institute of Technology**, Atlanta, USA [2022 - Present]
 - Master's in Computer Science (Specialisation: Machine Learning)
- Indian Institute of Technology Bombay**, Mumbai, India [2017 - 2022]
 - B.Tech+M.Tech in Electrical Engineering (**CPI 9.52/10**) with a Minor in Computer Science and Engineering

Technical Skills

- Programming:** Python, C++, C, Bash, OpenGL, SQLite, VHDL
- Softwares/Libraries:** PyTorch, LangChain, MATLAB, Arduino, \LaTeX , Blender, AutoCad, Solidworks, Android Studio

Professional Experience

- LLM-powered Natural Language Interface** May'23 - Aug'23
Qualcomm, San Diego — Guide: Mr. Vasudev Nayak, Principal Engineer Machine Learning Internship
 - Designed an end-to-end hierarchical modular pipeline for structured parsing using LLMs such as MPT-7B
 - Developed techniques for reducing bias and hallucinations and compared performance across various open-source LLMs
- Verification of FPGA-based High Frequency Trading Platform** Apr'20 - June'20
APT Portfolio Pvt. Ltd. — Guide: Mr. Vivek Pannikar, Senior Verification Engineer Hardware Engineering Internship
 - Implemented **Direct Programming Interface**, a protocol for exchanging data between SystemVerilog and C, for **speeding up verification** of testbenches using Cocotb, Quartus and Riviera by **3x**
 - Used Python **metaclasses** for automatically generating Python, SystemVerilog and C DPI header and implementation files from high-level JSON inputs
- Autonise AI** Sep'18 - May'19
Machine Learning Startup Co-Founder
 - Delivered an **end-to-end solution** consisting of an annotation tool for labelling datasets, a UNet-based model for **segmenting** out spots, patches and wrinkles in facial images and an AWS API for demonstrating the model
 - Implemented **PixelLink** and a GRU for word-level text detection, **invariant** to font size, colour, background, orientation, etc. and presented it to HDFC bank for automatic field extraction from documents like Aadhar Card, Passport, Driving Licence, etc.

Projects and Publications

- Compiler Optimizations for speeding up Capsules** Mar'23 - May'23
Guide: Prof. Vivek Sarkar, GeorgiaTech Course Project
 - Implemented compiler optimization techniques such as unroll and jam, scalar replacement and loop reordering in CUDA for reducing execution time of the core capsule operation
 - Explained the **4x speedup** in CUDA execution time by examining the profiler output
- Prominence Detection and Oral Reading Fluency of Children's Read Speech** June'21 - June'22
Guide: Prof. Preeti Rao, IIT Bombay — [Published at ICASSP 2022] Master's Thesis
 - Replaced a Random Forest Classifier baseline with a **CRNN** framework and Sinc convolution for predicting the degree of prominence for each word in children's read speech
 - Exploited phrase boundary labels in various **multi-task learning** paradigms and POS tags and BERT embeddings for incorporating complementary lexical information
 - Implemented a **Wav2vec2.0**-based end-to-end model for oral reading fluency assessment and outperformed RFC baseline operating on hand-crafted features by **0.06** (absolute Pearson)
 - Probed** the internal representations for presence of knowledge-based features using linear and MLP probes
- Interpretable latent VAE embeddings for Neural Population Responses** Sep'22 - Present
Guide: Prof. Anqi Wu, GeorgiaTech Research project
 - Studied VAE, CEBRA and LDA for learning **disentangled latent representations** of high-dimensional neural activity
 - Exploring recurrent state space models such as rSLDS for learning the underlying dynamics of decision-making

Honors and Awards

- Institute Silver Medal** at IIT Bombay for best academic standing in department (**2/70**) [2022]
- Undergraduate Research Award** (URA03) at IIT Bombay for outstanding thesis contributions [2022]
- Institute Special Mention** for Journalism carried out as part of Insight, IIT Bombay's student media body [2022]
- JN Tata Scholarship** for pursuing higher education abroad [2022]

Key Coursework

- Machine Learning:** Automatic Speech Recognition, Advanced ML, Foundations of Intelligent and Learning Agents
- Computer Science:** Data Structures and Algorithms, Computer Graphics, Network Security, Operating Systems