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, PyTorch
- **Softwares:** Matlab, Arduino, LaTeX, Blender, VHDL, AutoCad, Solidworks, Android Studio

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]

Research Experience and Publications

- **Prominence Detection in Children's Read Speech [Published at ICASSP 2022]** June'21 - Oct'21
  Guide: Prof. Preeti Rao, IIT Bombay Thesis I
  - Replaced a Random Forest Classifier baseline with a **CRNN** framework for predicting the degree of prominence for each word in children's read speech
  - Demonstrated an improvement in the acoustic features extracted from word segments using Sinc convolution
  - Exploited phrase boundary labels in various **multi-task learning** paradigms
  - Used part-of-speech tags and **NLP** embeddings such as **BERT** for incorporating complementary lexical information
- **Deep Learning for Assessment of Oral Reading Fluency [Submitted to NCC 2023]** Oct'21 - June'22
  Guide: Prof. Preeti Rao, IIT Bombay Thesis II
  - Implemented a **Wav2vec2.0**-based end-to-end model for oral reading fluency assessment
  - 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
  - Proposed a **self-supervised learning framework** for utilising an unlabelled dataset
- **Interpretable latent VAE embeddings for Neural Population Responses** Sep'22 - Present
  Guide: Prof. Anqi Wu, GeorgiaTech Research project
  - Using identifiable VAE for learning **disentangled latent representations** of high-dimensional neural activity
  - Exploring the possibility of extending the iVAE framework using structured priors such as manifold learning
- **Character Animation from Video for Blender** July'21 - Dec'21
  Guide: Prof. Parag Chaudhuri, IIT Bombay Research Project
  - Developed a Blender plugin consisting of an **integrated pipeline** for extracting **3D human pose** from a video using various deep learning backends such as VIBE and MediaPipe and **retargeting** it to a rigged character in Blender
  - Explored a **self-supervised** graph neural network for dynamic mapping of animations from source to dissimilar target skeletons

Professional Experience

- **Verification of FPGA-based High Frequency Trading Platform** Apr'20 - June'20
  APT Portfolio Pvt. Ltd. — Guide: Mr. Vivek Pannikar, Senior Verification Engineer Internship
  - Implemented **Direct Progamming 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.

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