Adithya V Ganesan

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Research Interests

Natural Language Processing, Computational Psychology, Embedding Analysis, Deep Model Compression

Education

Stony Brook University, Stony Brook NY *GPA:3.94*
PhD in Computer Science *Expected Dec 2024*
Master of Science in Computer Science *May 2021*

Anna University, Chennai India *GPA:8.1/10*
Bachelor of Engineering in Computer Science *May 2019*

Employment

Research Software Engineer *Sep. 2022 – Dec 2022*
Uber | Applied AI
- Trained deep networks to predict opportunities in marketplace through learning a probabilistic mixture model
- Better performance than current deployed solution by 8.3% RMSE on average and stark improvements in predicting long tail
- Probabilistic approach informed uncertainty measures laid inroads to enhance UX while displaying predictions on products
- Implemented the probabilistic loss on PyTorch in Uber's deployment environment for wider adoption across teams

Graduate Research Assistant *Dec. 2020 – June 2021*
Non-Proliferation & National Security Dept. | US Dept. Of Energy
- Developed a general purpose python library for modelling illicit intent detection through sequence of queries
- The library was built to perform self-supervised learning for early prediction with options to integrate expert in the loop

Data Scientist Intern June 2018 – Jan. 2019
Motorq | Connected Car Data Platform
- Carried out analysis on a number of vehicle parameters for more than 10,000 vehicles collected over 3 months
- Devised a streaming algorithm to detect refueling events with constant computation and memory, with robustness to noise caused by the after-market devices as well as the mechanical floats in the fuel tanks
- Characterized discrepancies caused by after-market devices in the data for future tagging

Undergraduate Research Assistant *Jan. 2017 – May 2019*
Solarillion Foundation | Research Foundation
- Research focused on building models for non-stationary time-series in volatile systems
- Headed a team to build a day ahead food sales prediction model for India's leading multiplex chain, saving 170 units per day

Research Publications

Systematic Evaluation of GPT-3 for Zero-Shot Personality Estimation `[Under Review]`
- Evaluated GPT-3 to estimate human personality through systematically exploring different task framing, knowledge injections through prompt and its sample efficiency
- Performed error analysis to illuminate the systematic errors of GPT-3 in comparison to SotA lexical models

WWBP-SQT-lite: Multi-level Models and Difference Embeddings for Moments of Change Identification in Mental Health Forums `[CLPsych, North American Association of Computational Linguistics 2022]`
- Investigated theoretically motivated Psych models, transformers-based, and hierarchical transformer-based models in predicting the mood changes of people through their language over time
- Proposed an elegant method of differencing consecutive language embeddings, which was the second best performing system in the shared task

Empirical Evaluation of Pre-trained Transformers for Human-Level NLP: The Role of Sample Size and Dimensionality `[Full Paper, North American Association of Computational Linguistics 2021]`
- Investigated the relation b/w sample size, embedding dimensions and the performance of language models on human-level tasks like mental health prediction
- Proposed a method to improve the performance of transformers with fewer than $\frac{1}{6}$th of the original dimensions

DeepTrace : Generic Deep Framework for Cross-Domain Univariate and Multivariate Time Series Forecast `[International Work-Conference on Artificial Neural Networks 2019]`
- Framework to model a variety of time series data with a novel training method by using future context
- Analyzed different deep network components' ability to capture various properties in time series on several domains of data

Forecasting Food Sales in a Multiplex using Dynamic Artificial Neural Networks
`[Computer Vision Conference 2019]`
- Built a day ahead prediction model to reduce food wastage in a multiplex using *online learning* with deep neural networks
- The proposed model saved 170 food units per day on average, translating to $450,000 over 9 months

Select Current Projects

Early Prediction of Drinking Behavior through Ecological Language

- Using ecological language over time to predict the alcohol use disorder, depression, and anxiety rating scales
- Work answers how long before can drinking scores be predicted within the desired bounds of error

Analysis of Sparsity in Attention Layers of Large Language Models

- Inducing sparsity through pruning and model compression through quantization at inference to study the effect on LLM (OPT) generation and zero/few-shot capabilities
- Work in collaboration with computer architects to implement transformer architecture on FPGAs

Skills

Languages: Python, C/C++, MySQL, Shell, HTML/CSS, Javascript, LaTeX
Libraries/Frameworks: PyTorch, PySpark, Numpy, Matplotlib, Git, Hadoop, Docker
Cloud platforms: GCP, Azure
Hardware: Arduino, Raspberry Pi
Misc: Offering comic relief during nerve wracking moments

About Me

I am a PhD student working in an inter-disciplinary environment of psychologists, computer scientists and linguists. In a journey to better understand humans, my research focuses on analyzing and modelling human attributes through behavioral and linguistic cues, particularly using deep learning techniques. This unique problem space in conjunction to my urge to take on challenges has given me the opportunity to learn several concentrations . This includes natural language processing, hierarchical approaches, longitudinal methods, systematic evaluation methods to list a few.