Utkarsh Patel

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EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR Kharagpur, India | May 2023

Bachelor and Master of Technology (Dual Degree) | GPA 9.47/10

Major: Electronics and Electrical Communication Engineering; **Minor:** Computer Science and Engineering

RESEARCH EXPERIENCE

COMPLEX NETWORKS RESEARCH GROUP | Undergrad Researcher IIT Kharagpur | Feb 2021 - Present

- Achieved **5.1%** absolute improvement in macro-F1 score by fine-tuning BERT on **CMV** dataset against baselines
- Projected attention weights to the original texts as heat maps to identify the keywords triggering hate
- Created a corpus of 10,000+ politics-related posts containing 114,000+ comments using **Beautiful Soup**
- Used **NetworkX** to build support and dispute networks of 7,000+ users to identify key users and communities

BRAIN-COMPUTER INTERFACE LAB | Undergrad Researcher IIT Kharagpur | Aug 2020 - Dec 2020

- Worked on the **ABIDE** dataset to extract and process resting-state functional MRI data using **nilearn**
- Used correlation-based approach to determine functional connectivity between regions of interest
- Implemented various classification algorithms to classify subjects as autistic or not from the connectivity matrices
- Achieved test accuracy of **0.68** and **0.65** using **Support Vector Machines** and **K-Nearest Neighbors** respectively

PROJECTS

CREATEDEBATE SCRAPER Python, Beautiful Soup, NetworkX

- Developed a web crawler to scrape all the debates from CreateDebate.com using **Beautiful Soup**
- Used **NetworkX** to construct graphs representing the nested hierarchical structure of the comments in the threads
- Incorporated features like sort-by, type, topic, time and state of the debate to narrow down the search space

TARGETED ASPECT-BASED SENTIMENT ANALYSIS Python, Transformer NNs, NLP

- Transformed the task into Sentence-pair classification by constructing auxiliary sentences from target-aspect pairs
- Used Question Answering and Natural Language Inference methodologies for constructing auxiliary sentences
- Fine-tuned **BERT** on **SentiHood** dataset, achieved aspect F1-score **0.90** and sentiment AUC **0.98**

MACHINE LEARNING COURSE PROJECT Python, Scikit-learn, NumPy, Pandas

- Implemented **Regression Trees** to predict the increase in Covid-19 cases, used **RE-pruning** to prevent over-fitting
- Implemented **Naive Bayes** classifier to predict patient length-of-stay in ICUs, used **PCA** for dimension reduction
- Used **SVM** and **MLP** classifier to predict the biodegradability of chemical from its molecular description

SKILLS

C++ | Python | Git | Beautiful Soup | NetworkX | PyTorch | TensorFlow | Keras | Scikit-learn | NumPy | Pandas | LaTeX

COURSEWORK

Algorithms | Programming and Data Structures | Machine Learning | Natural Language Processing* | Expert Systems* | Image Processing* | Probability and Stochastic Processes

ACHIEVEMENTS

- **Department Rank 1** among the Dual Degree students of Electronics and Electrical Communication Engg. Dept.
- **Global Rank 70** among 12,000+ contestants in **Google Kick Start 2021** (Round C)
- Secured **department change** to E&ECE by acquiring **9.69** CGPA at the end of the first year