Utkarsh Patel

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Education

May 2023 **Indian Institute of Technology Kharagpur** *Kharagpur, India*
Dual Degree in Electronics and Electrical Communication Engineering | CGPA 9.47/10
Minor in Computer Science and Engineering

May 2017 **Shah Faiz Public School** *Ghazipur, India*
All India Senior School Certificate Examination | Aggregate 94.8%

May 2015 **Shah Faiz Public School** *Ghazipur, India*
All India Secondary School Examination | CGPA 10/10

Research Projects

Feb 2021 – Ongoing **Hate Speech Detection** | *Guides: Prof. Mainack Mondal and Prof. Animesh Mukherjee*
- Achieved **5.1%** absolute improvement in 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

Aug 2020 – Dec 2020 **Detection of Autism Spectrum Disorder** | *Guide: Prof. Debasis Samanta*
- 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 ML 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**

Achievements

2021 **Department Rank 1** among the Dual Degree (VIPES) students of the Department of E&ECE

2021 Secured **Global Rank 70** among 12,000+ contestants in **Google Kick Start** (Round C)

2021 Qualified for Round 2 of **Facebook Hacker Cup**

2019 Secured **department change** to E&ECE by acquiring **9.69** CGPA at the end of the first year

Key Projects

Spring 2021 **Create-Debate Scraper** | *Web Scraping*
- Developed a web crawler to scrape all the debates from CreateDebate.com using **Beautiful Soup**
- Used **NetworkX** to construct graphs representing the nested 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

Winter 2020 **Targeted Aspect-based Sentiment Analysis** | *Natural Language Processing*
- Transformed the task to 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**

Fall 2020 **Learning Algorithms** | *Machine Learning*
- Implemented **Decision 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

Languages C/C++, Python, MATLAB

Tools Git, Linux, TensorFlow, PyTorch, Pandas, Scikit-learn, NumPy

Relevant Coursework

Algorithms, Programming and Data Structures, Machine Learning, Natural Language Processing, Expert Systems, Image Processing, Probability and Stochastic Processes, Matrix Algebra