Divyanshu Singh

Curriculum Vitae

Education

2022–Present **B.E. Computer Science**, *Birla Institute of Technology and Science Pilani*, Goa

Publications

[IEEE Xplore] **The Last Mile: A Novel, HotSpot Based Distributed Path-Sharing Network for Food Deliveries**, *IEEE Transactions on Intelligent Transport Systems*, DOI: 10.1109/TITS.2024.3465217

- **Authors:** Ashman Mehra, **Divyanshu Singh**, Vaskar Raychoudhury, Archana Mathur, Snehanshu Saha.

Experience

Jan 2024 – Present **Undergraduate Researcher**, *APP Center for AI Research (APPCAIR)*, Goa, India
Supervisors: Dr. Snehanshu Saha, Dr. Santonu Sarkar, Dr. Surjya Ghosh

- Developed DeliverAI, a Reinforcement Learning-based model optimizing food delivery routes.
- Researching a novel dynamic ride-sharing system using a multi-agent actor-critic approach with novel enhancements to minimize detours and optimize rider pickups.
- Working on a novel driver behavior modeling problem to quantify behavioral realism in traffic scenarios, with plans to adapt the model for complex traffic conditions in countries like India.

May 2024 – July 2024 **Research Intern**, *Digital India Bhashini Division*, New Delhi, India
Contributed to the National Language Mission to develop language technologies for all Indian languages.

- Collaborated with the post-processing team, focusing on Inverse Text Normalization.
- Developed a WFST model for handling Inverse Text Normalization across multiple Indic languages, Git
- Implemented a BERT-based indic-punct model to introduce punctuation handling in Inverse Text Normalization.
- Researched state-of-the-art translation and transliteration tools.

Research / Projects

November 2024 – Present **Zero-shot Classification with RoBERTa**, *Associated with BITS Pilani, Goa*, Git
Natural Language Processing, Deep Learning, Generative AI

- Implemented a pre-trained RoBERTa model for zero-shot classification using Hugging Face transformers on the AG News dataset.
- Enhanced classification accuracy by iteratively optimizing label prompts using generative language models (LLMs) such as Gemma2-9B, Qwen2.5-32B, and Nemotron-70B by incorporating a feedback loop between data analysis results and the LLMs.
- Improved performance metrics, achieving a significant increase in accuracy from 48.5% to 82.13% which was achieved by Nemotron-70B.
- Evaluated results using metrics like precision, recall, F1-score, and confusion matrices, focusing on common error patterns and label effectiveness.

November 2023 **TheCourseAssignment**, *Associated with BITS Pilani, Goa*, Git
Heuristic Algorithm, Graph Theory, Dynamic Programming

- Designed a heuristic graph-optimization algorithm for assigning faculty to courses based on preferences and load constraints.
- Applied advanced heuristic strategies, including constraint propagation and search space pruning, to improve the efficiency of the backtracking algorithm for large-scale assignments.

Relevant Coursework

CS Data Structures and Algorithms, Database Management Systems, Logic in CS#, Discrete Structures for CS#, Theory of Computing#, Operating Systems#, Reinforcement Learning, Generative AI*[Git], Natural Language Processing#, Foundations of Data Science

Ongoing courses, * Audited courses

Technical Proficiency

Languages Python, C++, C, Java

Software/Tools PyTorch, TensorFlow, HuggingFace, Gymnasium, PettingZoo, Anaconda, GitHub, Docker

Interests Reinforcement Learning, Deep Learning, Natural Language Processing, Optimization

Extra Courses

YouTube/edX DeepMind x UCL | Deep Learning Lectures, DeepMind x UCL | Reinforcement Learning Lectures, CS229 Stanford's ML, CS50's Introduction to Artificial Intelligence with Python[Certificate]

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