Harsh Kumar

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Education

M.Tech in Computational and Data Science   **2024 – 2026**
Indian Institute of Science, Bangalore   *CGPA: 8.6/10*

B.Tech in Electronics and communication   **2020 – 2024**
Indian Institute of Information Technology, Tiruchirappalli   *CGPA: 8.25/10*

Relevant Coursework

- Natural Language Processing (A+)
- Machine Learning for DS (A)
- Numerical Optimization (B+)
- AI for Medical Imaging (B+)
- Intro to Scalable Systems (A)
- Numerical Linear Algebra (B+)

Work Experience (Internship)

Applied AI Engineer, C4Scale   **Oct 2023 – Jun 2024**

- Developed a comprehensive Indian Named Entity Recognition (NER) dataset containing over 1 million records, with an entity count exceeding 30%, covering 20+ entity types, and spanning 100+ unique subjects and 20+ interaction styles.
- Created a parallel dataset generation tool to define and customize regional entities supporting multiple large language model (LLM) providers.
- Trained a high-accuracy NER model tailored to Indian data privacy contexts, achieving an F1 score greater than 0.90 for each entity.
- Designed and implemented a data cleaning pipeline, improving data quality by 40%

Machine Learning Engineer, ConcCoder Services   **jun 2023 – Aug 2023**

- Developed backend APIs for Blog Generation, Content Enhancement, Email Generation, Product Description Generation, and Social Media Post Generator using LangChain
- Utilized Docker and AWS Lambda to deploy the developed APIs, ensuring scalability and efficient execution.

Thesis Project

Federated Learning in Heterogenous data   **Apr 2025 - Ongoing**

- Implemented baseline papers like **FedAvg**, **Fedprox**, **FedProto**, and other for medical imaging on **HAM10000** dataset.

Projects

Hindi-to-English Neural Machine Translation using Sequence-to-Sequence Models   **Mar 2025 - Mar 2025**

- Hindi-to-English Neural Machine Translation using Sequence-to-Sequence Models.
- Implemented a **Seq2Seq model** using **LSTM**-based encoder-decoder architecture with **attention mechanism** and **Byte-Pair Encoding(BPE) tokenizer** to translate names from English to Hindi.

Test-Time Adaptation for Medical Imaging using TENT and MMD Loss   **Mar 2025 – Apr 2025**

- Developed test-time adaptation pipelines using **Entropy Minimization (TENT)** and **Maximum Mean Discrepancy (MMD)** to improve robustness of **ResNet-18** on OrganMNIST datasets.
- Achieved up to **+18% accuracy** and **+0.20 F1 score** improvement under domain shifts and noisy data; validated statistical significance with p-values < 0.001.
- Benchmarked cross-plane and within-plane adaptation, showing superior generalization under challenging domain transfer and corruption scenarios.

AI-Powered Multi-Class Pose Detection for Driver Behaviour Monitoring   **Mar 2025 – Apr 2025**

- Developed a real-time drowsiness and distraction detection system using **MediaPipe**-based facial landmark extraction and a **Decision Tree model**, achieving **96.82% accuracy**.
- Engineered manual features (EAR, MAR, etc.) for robust classification of driver states across 4 classes including *no to severe drowsiness* and *distraction*.

Technical Skills

Programming Languages and Libraries: Python
Tools: Numpy, Pandas, Matplotlib, Pytorch, Sci-kit Learn.
Technical: Machine Learning, Natural Language Processing, Deep Learning, Computer Vision.