Satyam Singh

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TECHNICAL SKILLS

Languages: Python, Java, JavaScript, C, C++, SQL
Backend & Cloud: Spring Boot, Node.js, Express.js, REST APIs, PostgreSQL, MongoDB, Redis, Kafka, Docker, AWS
Web: React.js, Next.js, Tailwind CSS, Flask
ML/AI: TensorFlow, PyTorch, Scikit-learn, Keras, CNNs, RNNs, LSTMs, NLP, NumPy, Pandas
DevOps & Tools: Docker, Kubernetes, Git, Flyway, CUDA

EXPERIENCE

Research Intern   May 2025 – Aug 2025
Indian Institute of Technology (IIT) Mandi   *Mandi, HP*
- Spearheaded research on computer vision for small object detection in remote sensing using FFCA-YOLO model.
- Deployed GPU-accelerated solutions with PyTorch and CUDA for real-time inference on aerial images.
- **Tech Stack:** PyTorch, CUDA, Python, YOLO, OpenCV

PROJECTS

Brain Tumor Classification Using Convolutional Neural Networks   *Feb 2025*
- Designed an end-to-end **medical image classification pipeline** for automated brain tumor detection from MRI scans, addressing challenges such as limited labeled data, inter-patient variability, and subtle visual differences between tumor classes.
- Implemented and fine-tuned deep CNN architectures using **transfer learning** (VGG16, ResNet), adapting pretrained feature extractors to the medical imaging domain through selective layer freezing and retraining.
- Applied advanced **data augmentation, normalization, and regularization techniques** to improve generalization and reduce overfitting in small-sample regimes.
- Achieved **92% validation accuracy** on held-out MRI data and performed class-wise performance analysis to evaluate sensitivity to tumor size, contrast variation, and imaging artifacts.
- Conducted error and failure-mode analysis to identify systematic misclassifications, gaining insights into model limitations in low-contrast and ambiguous clinical cases.

Sign Language Recognition Using Deep Learning   *Sep 2024*
- Developed a **computer vision based sign language recognition system** for American Sign Language (ASL) gestures, focusing on reliable recognition under real-world variations.
- Designed and trained a **CNN based visual recognition model** capable of processing live webcam input, enabling near real-time inference for human–computer interaction scenarios.
- Curated, cleaned, and preprocessed gesture datasets, handling challenges such as background clutter, lighting variability, and inter-user differences.
- Optimized the inference pipeline to reduce latency while maintaining accuracy, achieving **95% classification accuracy** on test datasets.
- Evaluated system robustness across different users and environmental conditions, highlighting deployment considerations for assistive technology applications.

Fake News Detection Using NLP and LSTM Models   *June 2024*
- Designed a **natural language processing pipeline** for automated fake news detection, addressing semantic ambiguity, noisy labels, and domain shift across heterogeneous news sources.
- Implemented a **Long Short-Term Memory (LSTM) based sequence model** with pretrained **GloVe word embeddings** to capture contextual and temporal dependencies in news articles.
- Performed extensive text preprocessing including tokenization, padding, stop-word handling, and class balancing to stabilize model training.
- Achieved an **F1-score of 89%** on a benchmark dataset and conducted qualitative error analysis to study linguistic patterns contributing to misinformation detection failures.
- Compared model behavior across varying article lengths and writing styles, identifying limitations of sequence models in detecting subtle or opinion-based misinformation.

Awards & Achievements

Top 30/2400 Teams - IIT Guwahati Techniche Tech-Expo 2025 — Finalist in Techniche 2025

Rank 76 - IIT Kharagpur Data Science Hackathon 2025 — Kshitij 2025

1st Prize - College Research Paper Competition — Paper: "Fault-Tolerant Task Scheduling for Cloud Computing"

Research Paper (Under Review) — "IoT for Sustainable Resource Management"

Education

NIST University   Berhampur, Odisha
B.Tech. in Computer Science & Engineering — CGPA: 8.98/10   *Aug 2023 – Present*