Paymanshu Sharma

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Experience

Hike (Rush Gaming Universe)
December 2024 - Present

Machine Learning Engineer *Remote (Bengaluru, India)*

- Responsible for developing the AI outreach manager - a **real-time voice** based **multilingual** conversational chatbot for automating customer engagement. Integrated a queue-based scheduler to efficiently manage asynchronous call requests over SIP trunking, ensuring scalability and reliability
- Optimized the voice bot's STT-LLM-TTS pipeline using filler responses and interim results to **reduce reply latency**, cutting response time by $\sim$700ms (30%)
- Set up a configurable template for deploying customized bot agents with modifiable guardrails and speech guidelines. Tested for robustness with varying configs, enabling **personalized user engagement** and offer targeting

Mphasis NEXT Labs (R&D Labs)
December 2021 - December 2024

Lead Data Scientist (Prev. Data Science Intern) *Bangalore, India*

- Spearheaded development of a structured **information extraction** solution for form documents. Fine-tuned open-source LLMs with QLoRA, and optimized for **higher inference throughput** with vLLM
- Led the creation and deployment of an intelligent document processing system for **mobile devices**, featuring extraction and RAG-based QA. **Optimized models** using ONNX runtime and quantization
- Directed the orchestration of a **scalable SaaS product** on AWS using CloudFormation, deploying microservices via ECS & Fargate, and automating GPU-enabled EC2 instance scaling with a Lambda-triggered SQS queue
- Designed a **multi-agent** conversational system centred on an LLM-powered **recommendation** engine employing a two-tower model, zero-shot retrieval, and encoding long-context user and product insights, with **explainable** results
- **Implemented a novel** variant of DeBERTa's Disentangled Attention, incorporating document positional information for a data extraction model trained from scratch. Engineered a task-specific **custom evaluation metric**
- Built a multi-modal fusion transformer for **Audio-Video-Text retrieval**, leveraging a combinatorial contrastive loss for cross-modal representation learning.
- Developed a chatbot for contact centre agent assistance using **prompt engineering and chaining** with GPT-3.5, Whisper for STT, and open-source TTS, also providing agent performance feedback
- Applied a modified Multi-modal Autoencoder model for **structured data imputation** on an IOT sensor-based behaviour study dataset. Boosted downstream classification task accuracy by $\sim$8%
- Created an end-to-end pipeline with infrastructure setup using AWS Greengrass and deployment for a Flower-based **Federated Learning** framework on the edge for a medical image classification use case
- Deployed 5+ **containerized** NLP, anomaly detection, multi-modal learning projects via Sagemaker, listing them on the AWS Marketplace
- Created a Streamlit dashboard for an anomaly detection system, incorporating LIME and SHAP-based **interpretations**

MetFlux Research (IIT Bombay)
June 2021 - September 2021

Computer Vision and Signal Processing Research Intern *Remote (Mumbai, India)*

- Formulated algorithms to estimate a patient's HR, RR, SpO2 and associated **physiological parameters** directly from face & fingertip videos taken by a smartphone camera for a healthcare app under the direction of Prof. K.V Venkatesh
- Optimized **PPG signal quality** by testing signal processing, smoothing and dynamic peak detection algorithms using OpenCV, dlib, and SciPy's signal functions on manually collected test data, achieving reproducible device-agnostic results
- Implemented an image processing and Signal Quality check approach to bring about a **55% improvement** in MAE

Amicus.ai
February 2021 - June 2021

Founding Team Member and Data Scientist *Remote (Mumbai, India)*

- Accurately implemented BERT Named Entity Recognition (NER) models and rule-based text extraction with Regex on over 70% of **scraped unstructured, varied format, legal text data** - from more than 100,000 case files
- Drew up interactive data visualizations using the obtained data, on a web dashboard based on Dash and Plotly

Open Health Systems Laboratory
Aug 2020 - January 2021

Web and Research Intern *Remote (International)*

- Carried out **preliminary research** and **data collection** for Biomedical research proposals in Ayurveda and Oncology
- **Coordinated** a cross-functional team for the building and management of OHSL affiliated microsites using Drupal

Awarathon
July 2019 - December 2019

AI Intern *Mumbai, India*

- Devised algorithms to compute quantitative scores for parameters for a **video assessment model for interviewees**
- Researched and developed features like gaze estimation, hand gesture recognition and multilingual transcription
- Tested on **200+ clips from clients** for performance optimization and finally incorporated in the primary codebase

Projects and Research Work

COVID Mythbuster Bot | *Python, TensorFlow/Keras, Flask, nltk, Twilio*

Built a bot using Flask to detect fake news related to COVID-19, evaluated with F1 score on a manually collated dataset. Deployed the bot on 3 platforms - WhatsApp, Telegram and as a live Web App

Paragon: Crime Detection Center | *Python, TensorFlow/Keras, PyTorch, Streamlit, Pandas, NumPy*

Developed a crime detection center prototype with Streamlit - implementing Face Verification using Haar Cascades and Siamese Networks, Action Recognition from surveillance videos with CNN-LSTM, and statistical region-based crime prediction

iKitchen Aid | *Python, Flutter, TensorFlow/Keras, TensorFlow Lite*

Developed a Flutter app for object detection with YOLOv4 to identify kitchen items for aiding interaction of the visually impaired. Scraped, cleaned and tagged Google Images to create a training dataset of condiment images

AudioAnalytics Package: Emotion Detection | *Python, OpenCV, TensorFlow, Librosa, PyPi*

Published a PyPi python package to extract audio sample features and predict emotion backed by a 1D CNN model

Gaze Estimation and Saliency Prediction Pipeline to Study Visual Attention for E-Commerce Websites *(Undergraduate Thesis)*

Achievments

LLM Prompt Recovery Challenge: Bronze Medal   **[Kaggle Competition]**

Placed in the top 9% of 2200 participants as a solo participant of the LLM Prompt Recovery Challenge, dealing with prompt jailbreaking and evaluation.

Bajaj Finserv Hackathon: National-level Runner-Ups   **[Search and Recommendation Engine]**

Placed 2nd Overall and 1st in category out of 3000+ teams from 200+ colleges nationwide. Developed a Recommendation Engine using BERT embeddings with data mining from the Finserv website to improve their search engine

ACM Mumbai Hackathon: Region-level Winners   **[Ideation, prototyping and app development]**

Developed Entrenet – a Flutter app to provide a network for Entrepreneurs, Investors and Job Seekers to connect

SIH Internal Hackathon: College-level Winners   **[ML app prototyping and pitching]**

Presented prototypes of an ML-enabled app for aiding farmers through crop detection; Placed 1st at College Level

Technical Skills

Languages: Python, C++, R, HTML, CSS, SQL, Dart (Flutter)
Techniques: Deep Learning, Image & Signal Processing, NLP, Web Scraping, Multimodal Learning, ETL, Transformers
Technologies/Platforms: Git, Docker, REST APIs, AWS, GCP, Azure, Linux, Tableau, Excel, Figma

Education

MPSTME, Narsee Monjee Institute of Management Studies, Mumbai   **2018 – 2022**
Bachelor of Technology in Data Science – CGPA: 3.82/4.0   *Mumbai, India*

Delhi Public School, Gurgaon   **2018**
President, NODE (Computer Club)   *Gurgaon (NCR), India*

Relevant Coursework

- Statistics
- Predictive Modelling
- DBMS (SQL, MongoDB)
- Artificial Intelligence
- Applied Mathematics
- NLP
- Data Structures & Algorithms
- Computer Vision

Activities

Rotaract Club of Bombay Airport   **July 2019 – July 2021**

Initiated and led community development projects including the Open School program - reaching 150+ underprivileged students, receiving national media recognition. Involved in mentoring for the Technology for Change program

Enactus   **July 2019 – July 2020**

Engaged in on-field research, business venture conceptualization and training programs for community upliftment through social entrepreneurship