Mukul Kumar
ML Researcher, Wadhwani AI

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EDUCATION

IIIT Delhi
Computer Science with Economics and Sociology

Graduate Jul' 21
CGPA: 8.2 / 10

WORK EXPERIENCE

WadhwaniAI
Associate ML Scientist II

August 2021 - Present

Wadhwani AI is a non-profit, applied AI institute building solutions for underserved communities in healthcare, agriculture and education.
- *Leading ML for multiple projects in healthcare, with the Ministry of Health, Govt of India and LV Prasad Eye Institute.*

Clinical Decision Support System(CDSS) for e-Sanjeevani (Govt of India's telemedicine platform)
- I led the ML team to build CDSS system for Indian govt's telemedicine platform with daily usage in millions.
- Solution was selected as **Semi-Finalist for MIT Solve Challenge 2023**
- Did thorough data analysis of the existing system and provided recommendations to build better data collection tools to facilitate AI development.
- Collaborated with Design and Medical Experts to create a Smart Interactive Form to capture comprehensive patient medical details
- Created ML model to predict Differential Diagnosis from patient symptoms. Achieved a **Top-3 accuracy of 90%**
- Have supported more than **30 millions** consultations till now.

Personal Assistant for Frontline Healthcare Workers
- Building an LLM-based chatbot for more than 1 million Frontline Healthcare Workers in India to help them in their daily tasks and responsibilities.
- Using Retrieval Augmented Generation to generate responses from the training modules.
- Have used extensive prompting and manual rules to restrict hallucinations and better results.
- In early stages, have achieved an **acceptance rate of 83%** for the chatbot responses in an internal evaluation by domain experts.
- Using LLMs, Prompt Engineering, vector stores, ASR and TTS services.

Automating the interpretation of Line Probe Assay(LPA) tests in Tuberculosis
(Technical Paper accepted at AAAI'2024, Vancouver)
- Worked on creating object detection model to detect bands on an LPA strip to identify Drug-Resistant TB. Used Detection Transformer (DETR). Achieved a **band-accuracy of 96%** on First-Line and Second-Line Drug tests.
- Set up annotation requirements for the task with a vendor for object detection and final interpretation
- Designed experiments and facilitated a Ground Truth Study with expert Microbiologists across India to curate a Gold Standard Dataset of Line Probe Assay strips to evaluate the AI model against human performance and quantify inter-rater disagreement for the task.

Other Contributions:
- Building an AI suite for Keratoplasty to help patients undergoing cornea surgery achieve better vision outcomes.
- Working on creating three AI solutions, Predicting BCVA outcomes, Predicting future Loss to Followup and Predicting survival of the corneal graft of the surgery.
- Curated content for AI training for medical professionals, bureaucrats and conducted AI readiness workshops at top medical institutes in India.

May 2020 - July 2020

Wadhwani AI
Research Intern ***(Received Full-time Pre-Placement Offer based on performance)***
Predicting Non-adherence in TB patients:
- Used tabular models like Logistic Regression, Decision Trees, XGBoost on covariates of TB patients and 99DOTS calling history to identify patients who were likely to drop-off their medical regimen. This was to help authorities make interventions and save them from developing Drug-Resistant Tuberculosis

PUBLICATIONS

AAAI 2024 - Vancouver, Canada
Co-author of Automatic Interpretation of Line Probe Assay Tests in Tuberculosis **(AI for Social Impact Track)**

SKILLS and EXPERTISE

Programming languages and libraries: Python, R, Pytorch, Pandas, NumPy, Matplotlib, Gradio, Streamlit, Git