

Promila Ghosh

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🔗 <https://promila.info/> | 📍 Khulna, BD

EXPERIENCE

United We Care

Data Scientist

July. 2022 – March, 2025

Gurgaon, Haryana, India

- Built a transformer ASR system **United-MedASR** for medical transcription, reducing **Word Error Rate (WER)** to **5.96%** and improving transcription speed by **7-10x** with an optimized interfacing mechanism.
- Generated around **5,486 hours** of synthetic clinical audio using a **Diffusion Model** and **GPT**, featuring male and female voices. Open-sourced as **United-Syn-Med** on **Hugging Face** for research.
- Developed a **multi-modal agent system** for **production** using **LangGraph** for analysing and classifying complex medical documents in various formats (*PDFs, scanned images, and handwritten notes*) using a **Large Multi-Modal Model (LMM)**, achieving **70% accuracy** on multi-page and handwritten inputs.
- Built systems for **face detection**, **gesture recognition**, and **facial analysis**, achieving around **60% accuracy** and **faster detection** with **sliding windows** and **Redis** for **real-time processing**
- Created a robust data pipeline to seamlessly stream real-time user data into **BigQuery** for a high-traffic app (**10K+ downloads**), enhancing analytics efficiency and optimising data management.

The Data Dilemma

Founder & AI Research Scientist

May 2025 – Present

Remote

- Created and open-sourced **MediBeng**, around 4,000-sample synthetic clinical Bengali-English code-switched speech transcription and translation dataset, with **1,000+ total downloads**.
- Fine-tuned a lightweight model, **MediBeng Whisper Tiny** for clinical speech translation, achieved 0.98 BLEU score vs 0.3 for baseline Whisper Tiny, demonstrating **227% improvement** in Bengali medical transcription accuracy.
- Developed the **Medibeng-Orpheus-3b-0.1-ft** model for healthcare, handling code-switching and respecting privacy in speech-to-text and translation tasks.
- Built a full-stack **WebSocket-based chat system** with **FastAPI**, **LangChain**, and **Groq API**, enabling real-time LLM responses and seamless user experience.
- Engineered a **healthcare knowledge retrieval system** using **Retrieval-Augmented Generation (RAG)** with LangChain and ChromaDB vector database and hierarchical context trees.

SKILLS

Deep Learning : Neural Networks, Transformers, Large Language Modelling, Reasoning Models

LLM & ASR Technologies : LLaMA, Gemini, GPT, Whisper, Gemma, Retrieval-Augmented Generation (RAG), AI Agents

AI/ML Programming Tools & Frameworks Python, Scikit-Learn, PyTorch, Langchain, LangGraph, FastAPI, Groq, Kafka

Cloud Computing : AWS (EC2, S3), GCP (Compute Engine, Vertex AI, Google Cloud Storage)

PROJECTS

- **Medical Document Processing & ASR United We Care | The AI-Powered Co-Pilot Revolutionising Workflows - Ask Sam** Developed an intelligent system for ASR and medical document analysis using transformers.
- **MediBeng Whisper Tiny: Code-Switched Bengali-English Speech Translation for Clinical Settings** Built a dataset and fine-tuned the Whisper Tiny model for transcription and translation of code-switched speech in healthcare.

EDUCATION

M.Sc. Engg., Computer Science and Engineering

Khulna University - CGPA: 3.88/4.00 (**Distinction**)

February 2022 – August 2023

Khulna, BD

Publications

- **Recognition of Sunflower Diseases Using Hybrid Deep Learning and Its Explainability with AI**
- **Risk prediction of ischemic heart disease using artificial neural network**
- **Multi-labelled Bengali Public Comments Sentiment Analysis with Bidirectional Recurrent Neural Networks**