

# DHRUV JYOTI DAS

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## SUMMARY

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An innovative and results-driven undergraduate student pursuing dual degrees at IIT Madras (BS in Data Science and Programming) and SRM University (BTech in Computer Science and Engineering, CGPA: 9.0). Recognized for strong leadership skills, a unique problem-solving approach, and the ability to motivate teams to achieve challenging goals.

A natural innovator, I excel at finding creative solutions to complex problems and thrive in environments that demand critical thinking and adaptability.

### TECHNICAL SKILLS:

**Languages & Programming:** Java, C, Python, JavaScript

**Web Development:** Node.js, Express.js, React Native, HTML5, CSS3, WebSocket, REST API

**Databases:** MySQL, PostgreSQL, MongoDB, Firebase

**Machine Learning & Data Science:** Pandas, NumPy, Scikit-learn, Vision Transformers (ViT), Matplotlib, Seaborn, Gabor Filtering

**Tools & Platforms:** Firebase Hosting, Render, Serveo, ngrok, Git, GitHub, Postman, Tableau

**AI & LLMs:** Transformer-based Summarization (DeepSeek), Ollama (Local LLMs), WebRTC Signaling

## PROFESSIONAL EXPERIENCE

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### LLM-BASED CONVERSATIONAL QUERY ENRICHMENT SYSTEM

**Role:** Research Intern / Developer

**Organization:** Samsung R&D

**Duration:** [Mar 2025 – Oct 2025]

**Mentors:** Pankaj Awasthi (Principal Architect), Reeve Maity (Senior Chief Engineer)

#### Project Summary:

Developed a memory-augmented, conversational AI system leveraging Large Language Models (LLMs) to refine vague user queries through dynamic, multi-turn dialogue. The system enhances query understanding by generating clarifying questions, retaining user preferences using vector databases **ChromaDB**, and transforming under-specified inputs into structured, actionable queries.

#### Key Responsibilities:

- Designed and implemented a query refinement pipeline involving interactive question generation, long-term memory storage, and structured output generation.
- Integrated and evaluated multiple open-source **LLMs** (Llama3, DeepSeek, Qwen 2.5) for performance on conversational query enrichment tasks.
- Engineered a Memory Module using **vector embeddings** to retain and retrieve user context across sessions.
- Built a Question Generation Module that dynamically identifies missing query parameters and asks clarifying questions in real-time.
- Converted final refined queries into structured formats (Text/JSON/SQL) via a **Structured Output Module**.
- Used evaluation metrics such as Query Completeness, Dialogue Efficiency, and User Satisfaction Score to assess system performance.

#### Tech Stack:

Python, LangChain, OpenAI/GPT-4 API, ChromaDB, FAISS, HuggingFace Transformers, JSON, SQL

#### Key Outcomes:

- Achieved high user satisfaction through personalized query handling and contextual recall.
- Demonstrated reduced query clarification cycles by ~40% through efficient dialogue structuring.
- Contributed to Samsung's internal research on GenAI-based smart assistants

### DAILY MOOD TRACKING MOBILE APP

- Designed and developed a cross-platform mood tracking app using **React Native (Expo)**, enabling users to log daily moods with emojis and short journal entries.
- Integrated **Firebase Authentication** for secure login and **Cloud Firestore** for real-time storage and retrieval of

personalized mood logs.

- Implemented **React Navigation** and **react-native-calendars** to allow users to visualize mood trends over time via a calendar-based interface.
- Utilized **dynamic state-based theming** and custom UI components to reflect mood-based color changes, enhancing user engagement.

## **CHAT X – REAL-TIME CHAT APP WITH AI & VIDEO CALLING**

**Tech Stack:** Node.js, Express, WebSocket, MongoDB, WebRTC, HTML/CSS/JS, DeepSeek, Python, TURN/STUN

- Built and deployed a secure real-time chat application with login-based user authentication, individual and group chats, and persistent **MongoDB**-stored history.
- Engineered peer-to-peer WebRTC video calling with **TURN/STUN relay** (hosted locally & tunneled via **Serveo**), including popups for call requests, accept/decline, mute, and camera toggle.
- Previously used **Jitsi Meet** via iframe for SFU-based calls, later replaced with fully custom **WebRTC** setup for greater control and learning depth.
- Developed AI-powered “Smart Conversation Summarizer” integrated via local **DeepSeek API** (Python, exposed using **ngrok on Mac**), toggle-enabled per message, maintaining original content untouched.
- Added a sentiment-based emoji indicator on chat header using **NLP tone analysis** to reflect the emotional tone of ongoing messages.
- Designed a polished UI with emoji reactions, typing animations, responsive design, and fixed input/chat scroll behavior; user-search with status and dynamic chat header.
- Handled multi-device orchestration: Windows PC hosts chat server, while MacBook runs LLM-based backend for AI summarization via local API.
- Integrated system logs, **REST + WebSocket** dual communication, and fallback error handlers for robustness.

## **TUMOR DETECTION USING NON-CNN IMAGE ANALYSIS**

- Built a CT scan classification model using **Vision Transformer (ViT)** and **Swin Transformer**, avoiding CNNs to support variable input sizes.
- Replaced dense layers with adaptive pooling + attention blocks to eliminate fixed-size constraints.
- Used **PyTorch**, **Albumentations**, and Gabor filters for preprocessing and data augmentation.
- Trained on publicly available tumor datasets; supported mixed input sizes (224×224 to 512×512) without padding or resizing.
- Achieved **accuracy: 92.4%**, **AUC-ROC: 0.94**, outperforming ResNet and DenseNet baselines.
- Integrated custom training loop with mixed precision and early stopping for stability..

## **EDUCATION & OTHER**

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**IIT MADRAS | BS IN DATA SCIENCE AND PROGRAMMING | EXPECTED GRADUATION: 2027**  
**SRM UNIVERSITY, KTR | B TECH IN CSE CORE) | CGPA: 9.0 | EXPECTED GRADUATION: 2027**

### **LANGUAGES:**

- English: Fluent
- Hindi: Fluent
- Bengali: Fluent
- Odia: Fluent
- Japanese: Basic (N5 Level)

### **OTHER EDUCATION:**

- Global Certified ORACLE JAVA SE 11 Developer
- Foundational Level Cleared in Data Science and Programming from IITM
- NPTEL Certification: Programming in JAVA Introduction to DBMS

**INTERESTS:** Financial topics and stock markets, Learning Japanese