# Pachabhatla Dhanush

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**Summary** — **Motivated and detail-oriented developer with growing expertise in NLP, Generative AI, Deep Learning, and Agentic AI systems.** Skilled in designing and building intelligent applications using frameworks like TensorFlow, scikit-learn, and Transformers, with hands-on experience in developing solutions for deepfake detection and carbon emission tracking. While deeply focused on AI, also proficient in full-stack development—capable of building scalable front-end and back-end systems using tools like Next.js, Tailwind CSS, Firebase, and Express. Passionate about building AI-powered products and contributing to impactful, cutting-edge research and development.

## Achievements

- Led a team of 5 to win the **Special Mention Award** at the iCube 4.0 Hackathon organized by SVCE Chennai. — [Link]
- Secured **Runner-Up** position at Covasant Hackathon 2025 for developing an AI-Powered Legacy Code Discovery Tool. — [Link]
- Waitlisted (ranked just after top 5 out of 274 teams) at **Smart India Hackathon 2025** — [Link]

## Education

**Indian Institute of Information Technology, Raichur** — **2023-2027**
- Bachelor of Technology in Computer Science and Engineering

**FIITJEE Junior College, Vijayawada** — **2021 – 2023**
- Completed Intermediate Education with a focus on Science and Mathematics

## Experience

**IIIT Raichur - Website Team** [Link] – Full Stack Developer — Oct 2024 – Present
- Maintained and optimized the official IIIT Raichur website with over **2,000+ monthly visitors**
- Currently leading the development of a **modern, scalable college website** with improved UI/UX and backend integration

## Projects

**Conditional Molecule Generation System** — [GitHub] — 2025
- Developed a **GAN-based molecular generation framework** supporting both **conditional and unconditional** molecule synthesis using SMILES
- Designed a **Transformer-based decoder-encoder generator** conditioned on molecular properties including **SAS, QED, logP, mol weight, and TPSA**
- Trained on a large-scale dataset of **500,000+ molecules**, enabling robust learning of chemical structure distributions
- Integrated **reinforcement learning (REINFORCE)** with a custom multi-objective reward combining **discriminator realism, property alignment, and RDKit validity**
- Achieved strong generalization across training and validation sets with **86.14% / 80.14% validity**, **99.50% / 99.95% uniqueness**, and **95.46% / 98.59% novelty**
- Evaluated molecular quality using **RDKit metrics** and diversity scores, demonstrating suitability for **drug discovery and cheminformatics pipelines**

**Agentic Clinical Decision Support System** — [GitHub] — 2026
- Built an end-to-end AI system to convert **unstructured medical reports (PDFs, images, text)** into structured clinical knowledge using OCR, NLP, and vector search
- Designed an **agentic RAG architecture** with intent-aware orchestration, integrating Pinecone, PubMed, PubChem, and trusted web sources for evidence-based retrieval
- Implemented **entity-centric embeddings and retrieval** to enable explainable clinical summaries, differential diagnosis support, and interactive medical Q&A
- Developed a **safety-first reasoning pipeline** with constrained LLM prompts, JSON validation, and longitudinal multi-report analysis

**Agentic Startup Research Assistant** — [GitHub] — 2025
- Built an **autonomous multi-agent research assistant** to analyze startups, markets, competitors, and funding trends
- Designed task-specialized agents for **web search, fetching research papers, news, summarization, and reasoning orchestration**
- Implemented **tool-using LLM agents** with structured planning and memory for iterative research workflows
- Enabled automated generation of **market reports, competitor matrices, and SWOT analyses**
- Implemented a **central agent orchestrator** coordinating multiple autonomous agents, incorporating **planning, tool-use, memory, reflection, inter-agent communication, and RAG**

**AI-Powered Legacy Code Discovery Tool** — Covasant Hackathon 2025 – Runner-Up Project — [Link] — 2025
- Developed an AI-powered enterprise solution to accelerate comprehension of large legacy codebases using **FastAPI, Python, Neo4j, and Gemini API**
- Project formally **adopted by Covasant**; implementation details retained under IP transfer agreement
- Leveraged **GraphRAG-based Knowledge Graphs** to enable semantic code navigation, dependency tracing, and intelligent querying

**DeepFake Video Detection System** — [GitHub] — 2025
- Engineered a robust DeepFake detection system using a **CNN-BiLSTM** architecture to combat online misinformation
- Built a **custom hybrid dataset** from real and manipulated videos with real-time frame-level preprocessing
- Used **ResNet-50** for spatial feature extraction and **Bidirectional LSTM** for temporal modeling
- Achieved **91.26% validation accuracy** on a 22GB video dataset
- Classification F1-scores: Real (0.90), Manipulated (0.92)

## Skills

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| **Languages** Python, JavaScript, TypeScript, C++, C | LangGraph, HuggingFace |
| **Frontend** React, Next.js, TailwindCSS | **AI/ML Frameworks** PyTorch, TensorFlow, Keras, Scikit-learn |
| **Backend** Node.js, FastAPI, Flask, Express.js | **Data Science** NumPy, Pandas, Matplotlib |
| **Databases** MongoDB, SQL | **Computer Vision** OpenCV, Image Segmentation, Object Detection |
| **Dev Tools** Git, GitHub, Docker | **NLP** Text Classification, Named Entity Recognition, Semantic Search |
| **Machine Learning** Supervised Unsupervised Learning, Random Forest, Gradient Boosting | **Graph Tech** Neo4j, Knowledge Graphs, GraphRAG, Vector Databases |
| **Deep Learning** Neural Networks, CNNs, GANs, Transformers | **MLOps** Model Deployment, API Optimization, Cloud Deployment |
| **LLM / Generative AI** LLMs, RAG Pipelines, Prompt Engineering, LangChain, | |