Utsav Singhal

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Technical Skills

- **Languages & Frameworks**: Python, C/C++, Java, HTML/CSS/JavaScript, Flask, Django, ReactJS
- **Machine Learning / Deep Learning**: TensorFlow, PyTorch, Keras, Scikit-learn, XGBoost, OpenAI API, Azure OpenAI
- **NLP & Computer Vision**: NLTK, SpaCy, BERT, T5, YOLO, OpenCV, Hugging Face Transformers
- **AI & Agent Technologies**: LangChain, LangGraph, AI Agents, ReAct, Agent-to-Agent (A2A)
- **Data Science & Analytics**: Pandas, NumPy, Matplotlib, Seaborn, SQL, MongoDB
- **Vector Databases**: Pinecone, Weaviate, FAISS, Milvus
- **Tools & Platforms**: MLflow, Docker, Kubernetes, Git/GitHub, Streamlit, Gradio, AWS Textract, VS Code
- **Quantum Computing**: Qiskit, Quantum Cryptography, IBM Quantum Experience

Experience

M3AI (MCube AI) **2026 – Present**

AI/ML Research Engineer *Full-time*

- Developing end-to-end AI services for Rent Roll and Cash Flow documents in commercial real estate: extraction, normalization, reconciliation, and financial data validation.
- Engineering intelligent document processing workflows with AWS Textract and LLM-based information extraction for heterogeneous Excel and PDF financial documents.
- Building reconciliation and validation mechanisms, and integrating deterministic business rules with LLM-based reasoning, to improve the consistency and reliability of extracted data.
- Modeling CRE financials, including lease structures, rental escalations, recoveries, market rent, and tenant classification, to produce structured, validated financial models.

Culinda Inc. **Aug 2025 – Sep 2025**

Machine Learning Intern *Remote*

- Enhanced AI-driven cybersecurity solutions for healthcare, reducing threat detection time by 30% and improving system performance by 25%.
- Optimized the existing chatbot, increasing efficiency and response accuracy by 40%, leading to a 20% improvement in user satisfaction.
- Collaborated with cross-functional teams to develop machine learning models, improving real-time anomaly detection by 35% and predictive analytics accuracy by 25%.

EGREEN QUANTA **May 2025 – July 2025**

Quantum Computing Research Intern – Software Engineer *Hybrid*

- Applied quantum computing fundamentals to analyze and design novel post-quantum cryptography (PQC) protocols.
- Authored an innovative proposal for a quantum-resistant cryptography protocol, which was selected for incubation by a National Center of Excellence.
- Collaborated with quantum engineers to design advanced cryptographic algorithms, enhancing quantum-resistant security protocols.

Data Culture Technologies **Jun 2024 – Aug 2024**

Data Science Intern *Remote*

- Optimized ETL pipelines using Python and SQL, reducing data processing latency by 40% and improving scalability.
- Built predictive models (regression, time-series) that improved decision accuracy by 10% in sales and retention.
- Developed interpretable ML models (e.g., XGBoost with SHAP) to extract insights from complex business datasets.

Projects

PyVerse – Python Universe of Projects and Tools | *Open Source Contributor* **2024 – Present**

- Contributing to a large-scale open-source repository recognized by GSSoC'24 Extd., Hacktoberfest 2024, SSOC 2025, and GSSoC 2025.
- Authored code and reviewed PRs across domains including Machine Learning, Automation, and Cybersecurity, collaborating with 180+ developers.
- Improved and maintained codebases, enhanced documentation, and mentored onboarding contributors.

DungeonLM – AI-Powered Dungeon Master Game | *Python, Streamlit, OpenAI GPT-4o* **2025**

- Developed a full-stack AI Dungeon Master using OpenAI GPT models to simulate dynamic D&D-style adventures.
- Implemented a turn-based combat engine, a dynamic world generator, and a save/load system for persistent campaigns.
- Built and deployed a Streamlit-based UI for real-time interaction, improving accessibility for non-technical users.

Text-to-Image Synthesis Using Stable Diffusion | *Stable Diffusion, CLIP, Hugging Face, Gradio* **2025**

- Generated domain-specific images using Stable Diffusion and advanced prompt engineering.
- Enhanced visual quality using CLIP guidance and latent-space refinements.
- Deployed via a public Gradio interface hosted on Hugging Face Spaces for real-time testing.

Retrieval-Augmented Generation with LLMs | *LangChain, GPT-4, FAISS* **2025**

- Developed a scalable RAG system using LangChain, GPT-4, and FAISS for enterprise-level QA tasks.
- Reduced hallucinations by 40% by grounding LLM responses in contextually retrieved embeddings.
- Optimized performance through prompt engineering and dynamic document ranking.

Medical Image Processing for Diagnostic Support | *TensorFlow, Flask, Docker* **2024**

- Increased tumor detection accuracy using CNN architectures (U-Net, ResNet) on MRI/CT datasets.
- Enhanced model robustness through data augmentation and preprocessing techniques.
- Deployed scalable APIs using Flask and Docker, reducing inference latency.

AI-Driven Disease Progression Forecasting | *LSTM, ARIMA, Prophet, EHR Analytics* **2024**

- Achieved 85%+ accuracy in disease progression prediction using time-series models trained on EHR data.
- Identified high-risk cases by incorporating clinical KPIs into forecasting pipelines.
- Delivered actionable insights to clinicians through real-time dashboards and visual analytics.

Publications & Patents

Digital Device for Vedic Knowledge Analysis | *Indian Design Patent No. 447520-001* **Issued: Jun 2025**

- Co-invented and filed a design patent for an AI/NLP platform that digitizes and interprets ancient Vedic literature.
- Designed system architecture for automated text processing, translation, and knowledge extraction from historical manuscripts.
- Enabled accessibility of Vedic knowledge to researchers and students through a modern, interactive user interface.

Exploring Human Brain Activity Classification | *Springer LNNS Series* **Published: Jul 2025**

- Analyzed EEG signals to enhance classification and early detection of neurological disorders like epilepsy and Alzheimer's using machine learning.
- Implemented and compared Gradient Boosting, HMM, and AdaBoost classifiers, improving diagnostic accuracy for rural healthcare applications.
- Achieved a 15% increase in sensitivity over baseline methods, demonstrating potential for low-cost clinical tools.

Unlocking Drug Discovery Potential with BELKA | *AIP Conference Proceedings* **Published: Sep 2025**

- Utilized the BELKA dataset and predictive models like DiffDock to estimate molecular binding affinities.
- Aimed to accelerate the drug discovery process by converging DNA-Encoded Library (DEL) technology and machine learning.
- Highlighted potential therapeutic candidates by screening millions of compounds in silico within hours.

Transforming Renewable Energy with Piezoelectric Substance | *Springer Energy* **Published: May 2025**

- Researched piezoelectric materials' ability to convert mechanical energy into electrical energy for sustainable energy harvesting.
- Studied the evolution from traditional materials to eco-friendly options to minimize environmental impact.
- Proposed application of hybrid materials for powering IoT sensors in remote or off-grid environments.

Achievements & Awards

Cyber Security Grand Challenge 2.0 Idea Stage Winner **2025**

Government of India (MyGov)

- Achieved Idea Stage Winner status out of 1,000+ national participants in the Government of India's Cyber Security Grand Challenge 2.0.
- Designed and proposed a novel quantum-resistant cybersecurity framework to mitigate emerging threats against critical national digital infrastructure.
- Presented solution to a panel of industry experts and government officials, showcasing both technical innovation and a strategic implementation roadmap.

Bronze Medalist, Predict New Medicines with BELKA **2024**

NeurIPS 2024 (Kaggle)

- Secured a bronze medal (top 6%) out of 1,946 global teams in the NeurIPS 2024 BELKA competition by Leash Biosciences.
- Engineered ML models to predict binding affinities for 133M molecules, applying advanced feature engineering and deep learning for drug discovery.

Certifications

Feb 2025 **AI Agents Fundamentals** — Hugging Face (Credential ID: UTSAVS26)

Aug 2024 **Foundational Generative AI** — iNeuron.ai

Aug 2024 **CFI's Summer School (AI, ML/DL)** — Programming Club, CFI, IIT Madras

Jul 2024 **Hackathon Participation (HTMX Edition)** — deco.cx (Credential ID: 3aff8fc5-baa5-4338-8cfb-b9f4fb8b572c)

Jun 2024 **Career Essentials in Generative AI** — Microsoft & LinkedIn

Jun 2024 **OpenCV Bootcamp** — OpenCV University (Credential ID: acacaf725a814afda5d936b1896101d7)

Jan 2024 **Introduction to AI with Python** — EdX (Credential ID: 0a732372-bb7f-4f7d-904f-ca11dfc046a6)

Dec 2023 **Introduction to Responsible AI** — United Latino Students Association (Credential ID: 6777622)

Oct 2023 **Machine Learning with Python** — freeCodeCamp

Sep 2023 **Data Science using Python** — IBM

Leadership & Extracurricular Activities

President **Feb 2025 – Dec 2025**

CLUSTER - The Data Science & AI Community, VIPS

- Led the university's AI/ML community, driving initiatives in machine learning and generative AI.
- Organized the first AI Symposium (150+ attendees) and led a campus-wide generative AI campaign.

Core Member **Jan 2025 – Dec 2025**

Career Development Center (CDC), VIPS

- Led resume review and interview preparation sessions for 50+ students, coordinating networking events with 15+ tech companies.
- Provided direct mentorship on project development, guiding 20+ students to secure technical internships.

Education

Vivekananda Institute of Professional Studies - TC **New Delhi, India**

B.Tech. in Artificial Intelligence and Machine Learning *CGPA - 9.1/10*

Relevant Coursework

- Machine Learning
- Deep Learning
- Natural Language Processing
- Computer Vision
- Reinforcement Learning
- Artificial Intelligence
- Data Structures & Algorithms
- Database Management Systems
- Software Engineering
- Cybersecurity Principles
- Quantum Computing
- Statistical Methods for AI

Additional Information

- **Languages**: English (Fluent), Hindi (Native), Sanskrit (Academic Proficiency)
- **Interests**: Mathematics and Theoretical Foundations, Quantum Computing, Generative AI & Large Language Models, AI Agents & Autonomous Systems, Open Source Development
- **Certifications**: Currently pursuing AWS Certified Cloud Practitioner, IBM Quantum Developer Certification, TensorFlow Developer Certificate