# Tushar Gwal

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## EDUCATION

**Illinois Institute of Technology, Chicago, IL** – Master of Science in Computer Science          Aug 2023 – May 2025
**AKTU, Lucknow, India** – Bachelor of Technology in Computer Science and Engineering          Aug 2014 – May 2018

## SKILLS

**Languages**: Python, Java, SQL
**Frameworks**: FastAPI, Spring Boot, LangChain, LangGraph
**AI/ML**: LLMs, RAG, PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, OpenCV
**Databases**: PostgreSQL, MySQL, Pinecone(vector DB)
**Cloud/DevOps**: AWS, Azure, Docker, CI/CD, Git
**Domains**: AI, Machine Learning, Deep Learning, MLOps, Computer Vision, Healthcare, NLP

## AWARDS & LEADERSHIP

**2nd Place** StarPlan Multi-Agent Systems Hackathon (SF): *AI Consultation Listener* (multi-agent voice app)
**3rd Place Overall** - Product Manager Accelerator: Awarded for GenAI Coach execution + product viability.
**Publication** - IJSRCSEIT (2018): *Signature Verification (CNN + IR)*; reported 93% validation accuracy to reduce offline signature fraud.

## EXPERIENCE

**AI Engineer Intern**          Sep 2025 – Present
*Product Manager Accelerator, Tallahassee, FL*
- Founding AI engineer building an AI Coach application powered by Generative AI (LLMs, LangChain, Pinecone, FastAPI) to guide users through career planning, skill recommendations, and personalized coaching.
- Built an entire backend recommendation engine by integrating multiple labor market APIs and optimizing the RAG pipeline with hybrid search and reranking, while fine-tuning matching logic using user questionnaire & chat history to achieve a 50% latency reduction for real-time career suggestions.
- Led full-stack development, integrating LLM APIs (OpenAI GPT-4o) into the FastAPI backend and connecting PostgreSQL & Pinecone vector DB with a React/Vercel frontend to deliver seamless, scalable user experiences.

**AI Researcher - Model Validation Expert (MOVE) Fellow**          Aug 2025 – Present
*Handshake AI, San Francisco, CA*
- Created 20+ complex prompts using Tree-of-Thought (ToT) and multimodal (MIIT) techniques to stress-test LLMs, successfully exposing 3 major failures in logical reasoning and visual interpretation.
- Promoted to an ML-focused project to analyze agentic AI plans and code, validating outputs against strict security guardrails and ensuring generated code matched intended design and scientific reasoning steps.

**Research Assistant - Deep Learning & XR Analytics**          Aug 2024 – May 2025
*Illinois Institute of Technology, Chicago, IL*
- Worked across 2 research labs, **Social Spatial Interaction (SSIL) Lab** and **Magnetic Resonance Technology Discovery (MRTD) Lab**, on applied AI projects involving extended reality (XR) motion analytics & MRI-based neural implant stability analysis.
- At SSIL Lab - Standardized 137 GB of XR motion datasets into BIDS format, reducing data preprocessing time for future researchers by 90% and enhancing accessibility for research in spatial computing to study human behavior and interactions in Extended Reality (XR).
- At MRTD Lab - Engineered a 3D Computer Vision workflow to assess neural implant stability across longitudinal MRI datasets, performing segmentation of 35 implants via ITK-SNAP and utilizing PCA and quaternion-based spatial analysis to detect sub-millimeter 3D angular shifts, providing high-precision quantitative metrics for clinical validation.

**System Engineer**          Jan 2020 – Sep 2023
*Tata Consultancy Services, New Delhi, IND*
- Upgraded legacy Java applications for a leading Healthcare organization **CVS Health** to Java 17 & Spring Boot 3 and migrated apps to Azure Cloud with GitHub & Azure DevOps CI/CD, improving performance, release reliability, and future-proofing the tech stack.
- Designed ETL pipelines (SSIS) and automated report generation (SSRS) for **Humana** to deliver clean, client-ready datasets for monthly stakeholder reporting, reducing manual reporting effort by 70%.
- Collaborated directly with clients & cross-functional teams in an Agile environment to deliver high-quality releases, resolve critical defects, write unit/integration tests, participate in code reviews, and mentor new hires.

## PROJECTS

**Machine Learning A-Z Hands On Projects in Python for Data Science (2025)**          *Feb 2025 – Apr 2025*
- Hands on implementation of core and advanced machine learning concepts including regression, classification, clustering, association rules, reinforcement learning (UCB, Thompson Sampling, Q-learning), NLP pipelines, ANN/CNN architectures, PCA/LDA for dimensionality reduction, and advanced boosting techniques (XGBoost, CatBoost). Includes complete Python code, handwritten notes, and real-world dataset experiments following the full machine learning lifecycle.

**CS512 – Computer Vision**          *Aug 2024 - Nov 2024*
- Practical implementation of core Computer Vision concepts including matrix operations, geometric transformations, filtering, edge detection, robust estimation, and deep learning models (CNNs, VGG/ResNet, U-Net, YOLOv3, ViT). Fine-tuned and trained models on real datasets like CIFAR-10 and Oxford-IIIT Pet using Python, OpenCV, and TensorFlow.