BUVANI PAI

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EDUCATION

Northwestern University, Evanston, Illinois   Sep 2023 – Dec 2024
Master of Science in Computer Science (Focus: Artificial Intelligence & Machine Learning)   CGPA: 3.71/4.0

Rajiv Gandhi Institute of Technology, Mumbai University, India   Aug 2019 – Jun 2023
Bachelor of Engineering in Computer Engineering   CGPA: 3.64/4.0

SKILLS

- **AI/ML Frameworks**: PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy, NtworkX, spaCy, NLTK
- **Development & Cloud**: Django, Node.js, Express.js, React.js, Git, Docker, AWS, Streamlit, Gradio
- **Programming Languages**: Python, JavaScript, SQL, Java, R, C

WORK EXPERIENCE

AI/ML Engineer (Volunteer) | Happy World Foundation, Inc.   Aug 2025 – Present
- Designing Python matching algorithm to automate volunteer-teacher pairing based on language, timezone, and availability for classroom exchanges across **40+** countries.
- Building request pipeline consolidating web, Instagram, and email inquiries, reducing manual coordination by **70%** and enabling same-week responses.
- Redesigning website infrastructure, refactoring navigation and core pages to improve usability for a nonprofit platform connecting educators with volunteers worldwide.

AI Engineer | Argonne National Laboratory   Jan 2025 – Jun 2025
- Fine-tuned a pre-trained conditional diffusion U-Net combining image and spectral data, collaborating with supervisors to ensure alignment across modalities.
- Constructed preprocessing pipelines (normalization, truncation, and filtering) for 300k+ galaxy images and spectra, enhancing spatial-spectral alignment by **12%**.
- Accelerated model training from **one week to 20 hours** by optimizing distributed 8-GPU workflows with adaptive learning strategies, ensuring reliable model performance through systematic troubleshooting.

ACADEMIC PROJECTS

Agentic CRM Entity Resolution Pipeline   Nov 2025 – Dec 2025
- Engineered a graph-based deduplication system using LLM reasoning and NetworkX clustering to resolve ambiguous customer identities, achieving **96%** F1 score and **92%** recall with zero false merges.
- Designed hybrid blocking and batch inference pipeline under rate limits, reducing database redundancy by **28%** through BFS-connected component analysis while maintaining full provenance tracking.
- Implemented few-shot prompt engineering with hard negative examples to prioritize precision over recall, maintaining **95%** average confidence across predictions through conflict detection logic before semantic matching.

Multi-Agent Text-to-SQL System   Apr 2025 – May 2025
- Conceptualized & built a three-agent pipeline (decomposer, refiner, selector) to translate natural-language queries into SQL across 11 SQLite schemas, documenting decisions for clarity.
- Iterated on few-shot prompts and sampling parameters, testing diverse NL queries to boost SQL validity by **30%** and the Valid Efficiency Score to **61%** from 55%.
- Added schema-aware repair loops with metadata-driven validation, improving table & column match rate by **12%** and execution accuracy to **58%** from 53%.

Mars Landmark Detection   Jun 2024 – Aug 2024
- Collaborated with two teammates to address severe class imbalance in an 8 K-image Mars landmark dataset via targeted data augmentation, tripling underrepresented class counts.
- Developed a two-stage CNN pipeline (detecting landmark presence then classifying type) with class-weighted training, coordinating design choices with peers.
- Achieved **75.5%** accuracy and **0.74** F1-score, outperforming ResNet50 at 67% and DenseNet121 at 52%, validating the augmentation and class-weighting strategies.

PROFESSIONAL DEVELOPMENT & CERTIFICATIONS

- Google Cloud + Endava Hackathon - Agentic AI Product Launch, **2nd Place** (Sept 2025)
- McKinsey & Company - Forward Learners Program (Dec 2025)
- Amazon Campus Prep Series - Amazon University Event (2025)
- Building RAG Agents with LLMs - NVIDIA (In Progress, 2025)