

Danishjeet Singh

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Education

Indiana University, Bloomington

Ph.D. in Computer Science

M.S. in Computer Science

B.S. in Computer Science

Bloomington, IN

May 2030

May 2026

May 2025

Skills

Languages: Python, R, JavaScript, TypeScript, Java, PHP, C#, Bash, JSON, SQL

Databases and Tools: AWS, GCP, MySQL, PostgreSQL, MongoDB, Supabase, Snowflake, Tableau, Power BI, Git, Docker, Apache Spark, Excel

Data Analysis/Exploration: Pandas, Statistical Models, Matplotlib, Seaborn, Plotly, Regression, Time Series Analysis

Machine Learning: PyTorch, TensorFlow, NumPy, Scikit-learn, OpenCV, Generative AI, Hugging Face, XGBoost

NLP: Word Embeddings, NLTK, BERT, GPT, Gemini, LLaMA, LangChain

Development: HTML5, CSS3, React, Next.js, REST API, GraphQL, LAMP Stack, FastAPI, Flask, Django, Node.js, Express.js

Software Engineering: Design Patterns, System Design, Microservices, CI/CD, Distributed Systems

Experience

Observatory on Social Media

Bloomington, IN

Machine Learning Engineer

January 2023 - Present

- Designed and optimized scalable ETL pipelines on AWS, leveraging S3 for data storage, AWS Lambda for event-driven processing, and AWS Batch with EC2 Spot Instances for parallelized multiprocessing. Utilized Apache Spark on EMR for distributed computing, reducing image similarity analysis for 860 million comparisons from 14 days to 3 minutes
- Developed deep learning models with PyTorch and TensorFlow, leveraging CLIP and open-source Vision-Language Models (VLMs) such as Qwen 2.5 and Llama 3.2 for deepfake detection and reasoning, achieving over 87% accuracy
- Led a team of 6 graduate students to implement advanced computer vision architectures (ResNet, Xception Net, Ensemble Learning) for GAN-generated face detection, optimizing model efficiency and improving detection accuracy to 92%

IU Computer Vision Lab, Indiana University

Bloomington, IN

Machine Learning Engineer

May 2022 - January 2023

- Executed large-scale GPU benchmarking experiments on Lambda servers to evaluate optimal hardware configurations for training diffusion models, improving training efficiency for Stable Diffusion, LoRA fine-tuning, ControlNet, and IPA adapters.
- Built a generative AI pipeline leveraging Image Diffusion Models, GANs, and advanced image conditioning techniques to generate 500+ high-fidelity, diverse synthetic human images, ensuring consistency in style and attributes across samples.
- Applied dimensionality reduction (t-SNE, PCA) and clustering (K-Means, DBSCAN) to analyze generative model latent spaces, optimizing hyperparameters for improved representation learning and classifier robustness.

Rite Clinic Private Limited

Remote, India

Software Engineer

March 2021 - April 2022

- Developed a scalable and secure EMR system using React, Node.js, PostgreSQL, and AWS, focusing on frontend usability, backend efficiency, and cloud deployment to ensure seamless performance and compliance with healthcare regulations.
- Implemented key backend functionalities in Node.js and PostgreSQL, designing efficient API endpoints and optimizing database queries to reduce patient record retrieval time by 40%. Integrated JWT authentication and AWS-based storage for handling patient documents securely.

Projects

Deepfake detection on Twitter(<https://arxiv.org/pdf/2401.02627.pdf>)

- Estimated that 10,000–15,000 daily active Twitter (X) users have AI-generated profile pictures by leveraging a CNN-based eye-position classifier, achieving 99% precision and 95% recall.
- Designed an image ranking pipeline to systematically assess the likelihood of AI-generated profile images, analyzing 10 million Twitter profiles to uncover deepfake usage patterns at scale.

AI-Image detection with Vision-Language Models(<https://arxiv.org/pdf/2506.11031>)

- Developed a response prefix (“Let’s examine the style and the synthesis artifacts”) that steers vision-language models to focus on subtle clues and improves zero-shot detection of AI-generated images by 8–29% compared with standard prompts.
- Validated the method across multiple vision-language models and diverse datasets of faces, objects, and animals, showing it generalizes well and scales without extra training.

Denoising Diffusion models(singhdan.me/diffusion)

- Built an unconditional diffusion model from scratch, capable of generating high-quality and diverse landscape images, showcasing strong generative capabilities. Additionally, designed and optimized four label-based conditional diffusion models, incorporating Exponential Moving Average (EMA) and Classifier-Free Guidance techniques, leading to a 15% improvement in image quality compared to standard diffusion models.