Kaustubh Uday Kulkarni

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EDUCATION

Arizona State University **Graduating May 2025**
Master of Science, Computer Science, GPA: 3.8/4.0 Tempe, Arizona
PES Institute of Technology **August 2021**
Bachelor of Engineering, Computer Science, GPA: 3.2/4.0 Bengaluru, India

SKILLS

Programming Languages: Java, Python, JavaScript, TypeScript , Go, C++, SQL, C, HTML, CSS
Frameworks and Libraries: Django, Flask, React, Next.js, Remix.js, Supabase, Flask, HuggingFace, LangChain, PyTorch
Tools and Technologies: Docker, Kubernetes, AWS (Lambda, API Gateway, DynamoDB, SQS, EC2), GitHub Actions, Generative AI, RAG, MySQL, PostgreSQL, scikit-learn, Machine Learning, Pandas, Numpy
Soft Skills: Cross-Functional Collaboration, Communication, Decision Making, Leadership

PROFESSIONAL EXPERIENCE

Founding Software Development Engineer **August 2021 - May 2023**
Prevale **Bengaluru**

- Led development of a high-performance React application, implementing server-side rendering (SSR) and client-side rendering (CSR) optimizations to enhance performance and SEO
- Refactored and modularized the React component architecture with TypeScript, React Hooks, and Zustand, optimizing state management and cutting re-render overhead by 30% to improve performance and maintainability
- Established a unified styling system by integrating TailwindCSS, leading to a maintainable and scalable UI framework
- Designed and owned a PostgreSQL-based data architecture, leveraging Next.js API routes for efficient data fetching and implementing row-level security for enhanced protection
- Integrated CI/CD with Docker and GitHub Actions, achieving 30% improvement in deployment frequency and eliminating downtime during releases

Software Developer Intern **December 2020 - April 2021**
Global Discovery Academy **Bengaluru**

- Developed and implemented a scalable REST API system using Django REST Framework, improving API response times by 40% through efficient database query optimization and connection pooling
- Spearheaded and architected a robust data migration pipeline processing educational data for 7+ schools, implementing automated validation checks and error handling that improved processing speed by 60%
- Engineered a robust student data processing system using Python and OpenPyXL, handling complex Excel data transformations while maintaining data integrity across multiple school databases
- Developed secure JWT based user authentication and authorization with multi role access reducing login issues by 80%

PUBLICATIONS AND PROJECTS

Enhancing Video Diffusion Models for Storytelling **January 2024 - April 2024**
Generative AI **Tempe**

- Designed and developed a hybrid text-to-video generation pipeline combining Stable Diffusion and I2VGenXL, integrating CLIP embeddings and a custom 3D U-Net to improve spatial consistency
- Engineered a multi-stage prompt refinement framework using Chain of Thought reasoning with LLMs, extracting detailed narrative elements (characters, settings, and actions) to enhance semantic alignment in video generation
- Implemented a dual-conditioning mechanism combining first-frame image inputs with text prompts in the I2VGenXL pipeline, improving scene structure retention and motion stability across frames
- Integrated AnimateDiff with MotionLoRA for fine-grained motion synthesis, enriching static visuals with dynamic motion patterns while preserving content clarity and narrative coherence
- Benchmarked model output using CLIPScore, FVD-UMT, and Inception Score, achieving a 25% improvement in visual quality and reducing content drift in long-form video sequences

Elastic Cloud Application **January 2024 - March 2024**
Web Applications **Tempe**

- Deployed a low-latency, distributed face recognition pipeline on AWS using EC2 and SQS, integrating built-in fault tolerance for seamless recovery
- Engineered an auto-scaling infrastructure using EC2, SQS queues, CloudWatch, efficiently processing 10,000 video frames while maintaining consistent performance
- Optimized SQS messaging with tuned visibility timeouts and idempotent frame handling to ensure reliable fault recovery
- Designed and deployed containerized face recognition services on EC2 instances that efficiently processed 100 concurrent video requests within a 300-second timeframe, ensuring reliable performance