Gopi Krishna Tummala

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Visa Status: Green Card

PROFESSIONAL SUMMARY

Technically hands-on Machine Learning Engineering Leader with **12+ years of experience** architecting scalable ML infrastructure for **Generative AI** and **Autonomous Driving** (L3-L5). Proven track record of transitioning complex research into robust production systems while leading, mentoring, and scaling engineering teams. Deep expertise in distributed training infrastructure, high-throughput data pipelines, and MLOps. Passionate about driving technical vision, fostering engineering excellence, and empowering teams to deliver high-impact AI platforms.

CORE COMPETENCIES & TECHNICAL SKILLS

- **Engineering Leadership:** Technical Strategy & Roadmap, Cross-Functional Team Leadership, Mentorship, Agile Project Execution, Research-to-Production Lifecycle.
- **ML Infrastructure:** Distributed Training (FSDP, DeepSpeed), AWS (S3, DynamoDB, EC2), Docker, Kubernetes, Ray, Apache Arrow/Parquet.
- **Machine Learning & GenAI:** PyTorch, JAX, Transformers, Diffusion Models (DiT/VAE), Vision-Language Models (VLMs), vLLM.
- **Languages:** Python (Expert), C++, CUDA, SQL, Bash, TypeScript, Java.

PROFESSIONAL EXPERIENCE

Adobe San Jose, CA
Senior Machine Learning Engineer & Tech Lead Sep 2024 – Present

- **Team Leadership & Architecture:** Lead a team of 3 engineers in architecting a high-performance Data Marketplace (internal Hugging Face equivalent) to centralize and scale data access for the **Adobe Firefly** GenAI organization.
- **Infrastructure Scaling:** Directed the design and deployment of a global training feature store utilizing a distributed **DynamoDB cluster (20B items)**, ensuring ultra-low latency and high availability for distributed training workloads.
- **Performance Optimization:** Spearheaded the development of a high-throughput production dataloader handling $>$**1M calls/month**. Engineered advanced data streaming and caching mechanisms that significantly reduced training bottlenecks.
- **MLOps Excellence:** Established CI/CD automation and runtime profiling suites for inference systems, driving engineering best practices that accelerated deployment velocity and optimized compute resource utilization.

Zoox Foster City, CA
Software Engineer (Prediction) & Tech Lead Apr 2022 – Aug 2024

- **Modeling:** Delivered vehicular and VRU (pedestrian/cyclist) prediction improvements; transitioned legacy CNN/MLP architectures to transformer-based models, outperforming mature baselines.
- **Framework Migration (Led):** Spearheaded the organization-wide migration from TensorFlow to PyTorch Lightning. Architected config-driven module registry and integrated experiment tracking (wandb/CometML), achieving near-parity for mission-critical models.
- **Data & Evaluation Infra (Led):** Directed development of scalable PyTorch dataloaders (TF Records $\rightarrow$ NPZ) and large-scale evaluation framework (**40,000 scenarios per batch**).
- **Cross-Functional Tooling:** Championed the development of a prediction visualization plugin for the Argus viewer (TypeScript/React, Python, C++), enabling cross-stack debugging of probabilistic trajectories.

Qualcomm Research San Diego, CA

Systems Engineer Jan 2019 – Feb 2022

- **Mentorship & Execution:** Managed and mentored 1 L4 engineer. Led the end-to-end development of a rule-based prediction replacement using an XGBoost multi-class classifier, managing the data pipeline, training, and deployment phases.
- **Production Inference:** Architected and hand-wrote a zero-dependency C++ inference engine for the Snapdragon Ride platform, successfully bridging Python-based research with constrained on-device environments.
- **System Integration:** Built automated validation pipelines for ROS bag analysis, extracting key metrics and generating reports that drove the weekly perception/planning integration cycle.

Standard Chartered Scope International Chennai, India
Software Analyst Jun 2012 – Jul 2013

- Developed financial software systems and data analysis tools for global banking operations.

EDUCATION

The Ohio State University Columbus, OH
Ph.D. in Computer Science & Engineering 2013 – 2018
M.S. in Computer Science & Engineering 2013 – 2017
IIT Madras Chennai, India
B.Tech in Electrical Engineering (Minor in Mathematics) 2008 – 2012

SELECTED PUBLICATIONS & THOUGHT LEADERSHIP

- **Technical Blog:** Author of gopikrishnatummala.com, publishing in-depth technical deep dives on generative AI and model scaling, advanced MLOps, production-grade infrastructure, and autonomous systems.
- **AutoCalib: Automatic calibration of traffic cameras at scale.**
  ACM Transactions on Sensor Networking (TOSN) 2018 & *ACM BuildSys 2017*. **Awards:** Best Paper & Best Demo.
- **SmartDashCam: Automatic Live Calibration for DashCams.** *ACM IPSN 2019*.
- **Service & Honors:** Associate Editor for *IEEE RA-L*; Reviewer for *ACM TECS*, *IEEE TMC*; All India Rank 274 (Top 0.1%) in IIT-JEE; Best Paper (IEEE INFOCOM 2018 MiSeNet).

PATENTS

10+ patents granted/pending spanning ML infrastructure, AV prediction, and system calibration.

- **US Patent 10,580,164:** Automatic Camera Calibration (Microsoft).
- **US Patent 10,032,370:** Methods for enabling Mobile communication device based Secure Interaction (Honda).
- **US Patent 12,542,054:** Managing vehicle behavior based on predicted behavior of other vehicles (Qualcomm).
- **US Patent App 17/352,886:** Tree based behavior predictor (Qualcomm).