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Summary

I am a Machine Learning professional with 9 years of industry experience, including 3 years in leadership roles, building on 6 years of academic research. I specialize in addressing complex challenges across diverse sectors such as Financial Technology, Autonomous Checkout, Autonomous Vehicles, and Digital Health. My expertise includes advanced techniques in Large Language Models(LLM), Computer Vision (CV), Machine Learning (ML), Deep Neural Networks (DNN), and Edge AI. I am passionate about developing scalable, impactful ML products. Key achievements include:

- Spearheaded the design, development and deployment of Reinforcement Learning(RL) based multi-turn agents to facilitate autonomous decision-making, advancing agent-driven commerce and payments at PayPal.
- Scaled Autonomous checkout systems at Standard Cognition from 2 to 40+ stores while cutting costs by$4M YoY with end to end ML Model lifecycle development. Delivered next-generation Edge AI hardware platform creating a path for cost-effective scaling to the next 100 stores, projecting margins improvement of $1M/store/year.
- Independently led the end-to-end design and selection of Edge compute for a fully autonomous(L4) platform at NIO which was foundational to Adam supercomputer powering over 100k vehicles/year.

Experience

Staff Machine Learning Engineer, PayPal, San Jose, CA **Jul '23 - Present**

- Spearheaded the design, development and deployment of a multi-turn RL agent to enable long-horizon decision-making in commerce workflows — laying the technical foundation for autonomous, agent-led payment experiences at PayPal; led infrastructure, modeling, and evaluation efforts end to end.
- Demonstrated a 30% increase in developer productivity and projected an annual savings of $1M through successful Proof of Concepts (PoCs) in SWE and ML development lifecycle, influencing strategic decisions on build versus buy solutions.
- Established end-to-end lifecycle for Open Source Coding LLMs, including dataset management, finetuning, RAG, and evaluation harness for improving developer productivity for SWEs and Data Scientists

Engineering Manager, Machine Learning, Standard AI, San Francisco, CA **Nov '19 - May '23**

- Scaled and productionized Autonmous checkout solution from 2 to 40+ stores with 5x more environment complexity and foot traffic with 3 different hardware platforms leveraging various ML models including Human Pose estimation
- Led the end to end design for the next generation hardware platform, delivering Perception on Edge within a 6 month roadmap, projecting improved margins of $1M/store/year on average
- Established various product verticals in the field of Human trajectory based Retail Analytics platform and Visual feature based Re-Identification that scaled the profit margins and user retention respectively.
- Designed and implemented an automatic labeling system for identifying tail distribution for Perception models, leading to a 10x increase in software deployments and cutting development costs by 85% ($1M YoY in savings)
- Architected, and designed systems for automated training, deployment, and management of machine learning models, resulting in over 90% operational cost reduction ($1M YoY in savings) and 25% improvement in model accuracy
- Spearheaded the design of Vertex AI based based ML inference serving platform from scratch, serving 5 internal ML teams for deploying all ML and DNN algorithms
- Effectively managed, mentored, and led a globally dispersed team of 7 ML engineers, researchers and interns, driving multiple projects with tight deadlines and managing them cross-functionally with engineering, product, and QA teams
- Demonstrated proactive leadership in managing team culture, including the hiring process, onboarding engineers and interns, and ensuring the career growth of direct reports
- Defined the team's short-term and long-term strategy, built the team's roadmap, success metrics, and priorities, and translated them into engineering goals for the team

Perception Engineer, NIO, San Jose, CA **March '18 - Nov '19**

- Independently led the end to end design and selection of Edge compute for fully autonomous(L4) platform at NIO which was foundational to Adam supercomputer powering over 100k vehicles/year.
- Optimized DNN-based algorithms to accelerate ML models upto 5x for edge target platforms deployment for fully autonomous (L4) vehicle program within 1% accuracy loss.
- Designed and optimized DNN for lidar-based scene understanding algorithms for autonomous driving, including a two-stage object detection algorithm with multimodal input representations of BEV image and 3D voxels, resulting in compressed and accelerated algorithms.
- Designed and led the creation of a low-level library for Inference on Edge with custom operation support for running deep learning models on various hardware accelerators

- Mentored Sr Perception Engineers and interns to develop software for deploying multiple DNN models concurrently on the embedded target platforms

Machine Learning Engineer, Otsuka Digital Health, Princeton, NJ **July '17 - March '18**

- Improved short-term cost prediction for medical claims data by 90% using Deep Learning(LSTM) as a proxy for ordering patients for better medical care.
- Designed and implemented various Deep Learning and advanced ML algorithms including new predictive models, and new ways to describe and visualize medical claims data

Graduate Research Assistant, Rutgers University, New Brunswick, NJ **July '16- June '17**

- Developed a novel algorithm for face clustering based on multiple facial attributes
- Developed and published a novel face recognition algorithm for aggregating visual features based on clustering in a multi-shot video-to-gallery template retrieval problem in an unconstrained environment
- Investigated the role of face data and attribute bias in automated photo-sketch generation

Visiting Researcher, Indian Institute of Technology, Delhi, India **Dec '11 - July '15**

- Developed and published a robust speaker verification algorithm invariant to noise and multi-channel input using GFCC, MFCC and i-vectors.
- Developed and published novel decision tree based method for error analysis for eye movement tracking for biometrics.
- Independently led data collection, curation, labeling and management of human irises datasets from 50+ users in a period of one month.

Publications

Atul Dhingra, G Sood, " Instate: Predicting the State of Residence From Last Name ", Machine Learning with Applications, Elsevier (Under Review), arXiv:2303.06823

Atul Dhingra, G Sood, " Scaling ML Products At Startups: A Practitioner's Guide", arXiv:2304.10660

Atul Dhingra, G Sood, " Instate Corpus", Harvard Dataverse, doi.org/10.7910/DVN/ZXMVTJ

Atul Dhingra, G Sood, "Indian Electoral Roll Corpus", Harvard Dataverse, doi.org/10.7910/DVN/OG47IV

Atul Dhingra, M. Jeevan, M. Hanmandlu, B.K Panigrahi , "Robust Speaker Verification using GFCC based i-vectors", in Proceedings of the IEEE International Conference on Signal, Networks, Computing, and Systems 2016 (Springer)

Atul Dhingra, K Vishal, "Wielding Audio-Books for Visually Impaired Using Gesture Recognition", International Journal Of Advanced Research Trends In Engineering And Technology; 2(5), pp. 64-68, 2015

Atul Dhingra, A Kumar, M. Hanmandlu, B.K Panigrahi , "Biometric Based Personal Authentication Using Eye Movement Tracking", SEMCCO 2013, Part II, LNCS(Springer) 8298, pp. 248-256, 2013

Patents

Atul Dhingra, et al, "One or more cameras for use in an autonomous checkout in a cashier-less shopping store and otherwise"", US Application No. 18/539,228, December 13, 2023

Atul Dhingra, et al, "Subject-tracking in a cashier-less shopping store for autonomous checkout for improving item and shelf placement and for performing spatial analytics using spatial data and the subject-tracking", U.S. Application No. 18/522,104, November 28, 2023

Atul Dhingra, et al, "Systems and methods for performing spatial analytics using spatial data related to a cashier-less shopping store for autonomous checkout", U.S. Application No.: 63/428,373, November 28, 2022

Atul Dhingra, et al, "Machine learning-based re-identification of shoppers in a cashier-less store for autonomous checkout ",U.S. Application No. 17/988,650, November 16, 2022

Skills

Programming Languages: Python

Tools/ APIs: Langchain, Hugging Face, Milvus, Pytorch, Tensorflow, TensorRT, Vertex AI, MLOps, NLP, Edge Computing, Numpy, Git, Keras, OpenCV, Dlib, Pandas, Selenium, VLFeat, Unity3D, Data Analysis, Linux

Edge Hardware: Nvidia Drive AGX, Nvidia Jetson, Intel Accelerators, Others (Under NDA)

Softwares: Scrum, Kanban, Jira, Smartsheets, github, dvc, GCP, databricks, looker, Pager Duty

Education

M.S in Computer Science, Rutgers University, NJ, USA 2015-2017

Visiting Researcher in Biometrics, Indian Institute of Technology, Delhi, India 2011-2015

B.E in Instrumentation & Control Engineering, University of Delhi, India 2010-2014