Akash Mittal

akashm3@illinois.edu | +1-447-902-1250 | **in** | ○ | 𝄞 | ⌂

SUMMARY

- I am interested in Machine Learning & Systems, Data Engineering, Computer Vision, NLP, and Performance Engineering.
- I have built several zero-to-one large-scale software/ML systems serving thousands of users over the past 4 years.
- **Programming Languages/Frameworks:** Python (OpenCV, PyTorch, Keras), CUDA, C/C++, Go, Kotlin, Django, REST, GraphQL
- **Others:** CI/CD, AWS, git, docker, SQL, Spark, Pandas, Android/Web Development (backend), Flutter, Streamlit

EDUCATION

University of Illinois, Urbana-Champaign   Aug 2022 - May 2024

MASTER OF SCIENCE IN COMPUTER SCIENCE, GPA: 4.0/4.0 | Specializing in Machine Learning and Systems

KEY COURSES: Distributed Systems (A+), Computer Vision (A+), Advanced Data Management*, Advanced Parallel Algorithms (CUDA Programming), Autonomous Vehicles (A), Law for Startups (A)

TEACHING: ML + Data Systems, Real-World Algorithms for IoT and Data Science

Indian Institute of Technology, Delhi   Aug 2015 - May 2019

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING, GPA: 9.2/10.0

3 times on Dean's list for academic excellence.

KEY COURSES: Artificial Intelligence, Deep Learning, Machine Learning for Large Scale DB Systems, Information Retrieval, Data Mining, Knowledge Graphs, Operating Systems, Discrete Mathematics, Advanced Algorithms

TEACHING: Digital Logic and System Design, Computer Architecture

PUBLICATIONS AND PATENTS

- A. MITTAL et al. AIDB: a Sparsely Materialized Database for Queries using Machine Learning.   **VLDB, 2024
- S. Manchanda, **A. MITTAL** et al. GCOMB: Learning Combinatorial Algorithms over large graphs.   NeuRIPS, 2020
- A. MITTAL et al. Camera-assisted robotic monitor arm for better posture.   2023
- A. MITTAL et al. Automatic camera calibration using invariant features for monocular depth estimation.   2023
- A. MITTAL et al. Identification and localization of mobile devices using camera and IMU sensor.   2023
- A. MITTAL, et al. Device and algorithms for mapping an indoor space efficiently.   2022

WORK EXPERIENCE

SAMSUNG RESEARCH HQ | ML ENGINEER   Seoul, South Korea

DEPLOY TEAM | LOCATION BASED INTELLIGENT SERVICES   Jan 2021 – June 2022
Tech Stack: PyTorch, torchscript, Android, Flask, AWS, Postgres

- Built and commercialized an on-device deep learning-based indoor localization system using IMU sensors and WiFi.
- Architected and developed the Android application from scratch, backend integration, and CI/CD.
- Prototyped several ideas working with designers & product managers to find new business opportunities.
- Deployed the location-driven AR service in one of the biggest retail stores in Korea.

DATA INTELLIGENCE TEAM   Sep 2019 – Dec 2020
Tech Stack: AWS EMR, Spark, Django, GraphQL, Python, React, Data preprocessing and visualization, Pandas, SQL

- **AutoML Platform:** Devised an algorithm for ML model interpretability measures and achieved 10X speedup.
- **Healthcare Informatics:** Derived insights from hundreds of terabytes of Samsung Health log data.
- **Recommender Systems:** Placed in top-10 teams in a contest of music recommendation for a playlist.

INTERNSHIPS

SAMSUNG RESEARCH AMERICA | THINK TANK TEAM   California | Summer 2023

- Developed a deep learning-based monocular depth estimation algorithm. Filed **2 US patents** as a lead inventor.
- Developed end-to-end Android application for reusing old smartphones. Project Link
- Prototyped an on-device search engine to search through your past activity on phone.

NATIONAL UNIVERSITY OF SINGAPORE | Prof. Andrew Lim   Singapore | Summer 2019
Optimization of OD Engine 🗗
- Built an end to end service for the computation of OD matrix for any locations over complete Singapore map.
- Achieved 20X speedup over geo-informatics service by ArcGIS, using novel heuristics and deployed it in production.

SAMSUNG RESEARCH HQ | Data Intelligence Team   South Korea | Summer 2018
Continuous Machine Learning Flow
- Developed a continuous learning ML data pipeline using Apache NiFi & Sparkling Water to avoid model drift.
- Built an ML service data pipeline that is capable of making predictions on incoming data in real-time.
- Got a full-time offer because of exemplary performance during the internship.

PURDUE UNIVERSITY | Prof. He Wang   USA | Summer 2017
Automatic Gym Exercise Counting System 🗗
- Independently led the project and developed a POC for gym exercise counting system using surveillance cameras.
- Collected training data and built a deep learning model for gym exercise differentiation i.e. squats, pushup, etc.
- Extended the system from single person to multiple people present in gym and optimized it for speed.

SELECTED RESEARCH & SOFTWARE PROJECTS

AIDB: A SPARSELY MATERIALIZED DATABASE FOR QUERIES USING ML   Feb 2023 - Present
- Proposed a novel approach to analyze unstructured data by mapping ML models to structured tables.
- Integrated vector stores and new keywords in SQL to support fast approximate queries with statistical guarantees.
- Achieved **2-350×** SQL query speedups on sparsely materialized tables. The system will be open-sourced soon.

LENSTALK-PERSONAL AI ASSISTANTS FOR PHYSICAL WORLD 🗗   Sep 2022 - Mar 2023
- Proposed and developed a novel deep learning-based algorithm to locate and identify users using cameras and IMU.
- The proposed algorithm works in a privacy-preserving way without doing any face recognition. Filed a **US Patent**.
- Pitched the idea at Cozad (UIUC's venture capital competition).

GCOMB: LEARNING COMBINATORIAL ALGORITHMS OVER LARGE GRAPHS
- Proposed a novel deep reinforcement learning based algorithm to solve combinatorial problems over large graphs
- GCOMB is 100 times faster and marginally better in quality than SOTA learning based combinatorial algorithms.
- Work was published in **Neural Information Processing Systems 2020** (A* conference in Machine Learning)

DECISION SUPPORT SYSTEM FOR GOVERNMENT OFFICIALS 🗗
Software suite for government officials in India. **Tech Stack:** Postgres, Django, GraphQL, React
- Developed features inluding JWT token based authentication, Calendar/Events, Meeting notes, and City statistics.
- Led a team of engineers to develop the whole service from conception to deployment.

AWARDS AND ACHIEVEMENTS
- **Samsung S/W Development Award** for fostering code review culture in the team.   2022
- Won 2nd place in **Samsung Foldable App Hackathon** for designing an innovative note taking application   2020
- Among the 10 students selected for **Go-Boiler Research Scholarship (5500USD)** at Purdue University, USA.   2017
- Awarded **Design Innovation Award** for building an indoor navigation system for blind.   2016
- Secured **All India Rank – 81** in JEE-ADVANCED among 1.3 million students.   2015
- Secured **All India Rank – 36** in National Level Science Talent Search Examination   2014
- National Top 1% in Physics and Chemistry Olympiad   2014

EXTRACURRICULAR ACTIVITIES
Overall Coordinator - AINA IIT Delhi (An Initiative for National Advancement)   July 2017 - May 2018
- Led a team of 20+ student volunteers to conduct weekly activities of social and national importance.
- Conducted weekly teaching program for 70+ underprivileged kids to inculcate ethical education and academics.

Captain - Aravali Hostel (IITD) Team of Table Tennis   July 2016 - Apr 2017