Akash Mittal

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EDUCATION

Indian Institute of Technology, Delhi   India | 2015-2019
BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING, GPA: **9.2/10.0**
THESIS: GCOMB: Learning Budget-constrained Combinatorial Algorithms over Billion-sized Graphs. *paper*

- 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)

WORK EXPERIENCE

SAMSUNG RESEARCH HQ | RESEARCH ENGINEER   Seoul, Korea
DEPLOY TEAM   Jan 2021 – Present

- Built an on-device deep learning based infrastructure-free indoor positioning system using IMU sensors and WiFi.
- Achieved <5 meters of performance and >95% accuracy in identifying sections in real retail store.
- Piloted a location driven AR based application with 200+ users in one of the biggest retail stores in Korea.

DATA INTELLIGENCE TEAM   Sep 2019 – Dec 2020

- **XAI:** Devised a sampling based approach for model interpretability measures and achieved 10X speedup.
- **Healthcare Informatics:** Modeled the user behavior using time series representation learning and built an intent prediction model using Samsung Health Data (400 TB).
- **Recommender Systems:** Placed in top-10 teams in a contest of music recommendation based on a playlist.

INTERNSHIPS

NATIONAL UNIVERSITY OF SINGAPORE | PROF. ANDREW LIM   Singapore | Summer 2019

- 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   Seoul, Korea | Summer 2018

- Developed a continuous learning ML data pipeline using Apache NiFi & Sparkling Water to avoid model drift.
- Built a 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 internship.

PURDUE UNIVERSITY | PROF. HE WANG   West Lafayette, USA | Summer 2017

- 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.

PROJECTS

BRANULAR - AN INTERACTIVE BRAIN STUDY TOOL ↗   Dec 2016 - Jan 2017

- Built a 3D model of brain from segmented MRI scans.
- Developed a windows application in Unity 3D to study the human brain in an interactive way.
- Designed and built a brain surgery simulator to help surgeons simulate the surgery experience.

INDOOR NAVIGATION SYSTEM FOR VISUALLY IMPAIRED PEOPLE ↗   May 2016 - July 2016

- Designed and created an indoor navigation application for visually impaired people using audio based directions.
- Successfully deployed the system in one of the university buildings.
- Awarded **Design Innovation Award** by the Ministry of Human Resource Development (Government of India).

COURSE PROJECTS

Information Retrieval System — Aug 2018 - Oct 2018
- Implemented Boolean and Vector retrieval model to retrieve the ranked list of relevant documents for search query.
- Parsed Boolean queries (& and |) and implemented zone weighted ranking model.

Hand Drawn Sketch Recognition - TU-Berlins Dataset — Mar 2018 - Apr 2018
- Implemented a 7-layer CNN with residual links along with feature engineering of input image.
- Improved the performance using an ensemble of K-Means, SVM, Neural Networks and CNNs.

Medical Diagnosis — Feb 2018 - Mar 2018
- Modeled a Bayesian Network for a given data of health records with missing values.
- Implemented Expectation Maximization for learning the conditional probabilities in the Bayesian network.

Pipelined MIPS Processor — Feb 2017 - Mar 2017
- Developed a muti-threaded pipelined MIPS processor in C that supported 30+ instructions.
- Created an animation engine for visualizing the different stages of instructions being executed by the processor.

AWARDS AND ACHIEVEMENTS

- Won 2nd place in **Samsung Foldable App Hackathon** for designing an innovative note taking application — **2020**
- **IITD Semester Merit Award** for being in top-5 students in the department in 7th Semester. — **2018**
- Among the 10 students selected for Go-Boiler Research Internship Program at Purdue University, USA. — **2017**
- IITD Semester Merit Award for being in top-7% of all students for two consecutive semesters — **2015-2016**
- 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. — **2015**

TEACHING EXPERIENCE

UNDERGRADUATE TEACHING ASSISTANT | Prof. Anshul Kumar — Aug 2018 - May 2019
Digital Logic and System Design, Computer Architecture
- Responsible for handling the lab work i.e. assistance in lab assignments and evaluation of 20+ students.
- Assisted in the execution of lab assignments and the correction of exam and quiz copies of 100 students.

RELEVANT COURSEWORK

- **ML/AI/Data Science:** Introduction to Artificial Intelligence, Introduction to Machine Learning, Machine Learning for Large Scale DB Systems, Information Retrieval, Data Mining, Introduction to Knowledge Graphs
- **Systems:** Digital Logic and System Design, Computer Architecture, Programming Languages, Operating Systems, Parallel Computing, Networks, Design Practices
- **Theory/Algorithms:** Data Structures and Algorithms, Discrete Mathematics, Analysis and Design of Algorithms, Theory of Computation

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.
- Organized several India-wide immersive trips to understand social development models.

Xerox Research and GoodEd Technologies — May 2016 – July 2016
- Created study content including quizzes, notes, and question bank for high school students.
- Recorded video lectures on various topics of Physics and Mathematics.

Captain - Hostel Team of Table Tennis — July 2016 - Apr 2017
- Led a hostel team in IITD Inter-Hostel Table Tennis tournament.
- Organised an Intra-Hostel TT tournament among 15+ participants.