Ramneet Singh

Junior Undergraduate · Computer Science and Engineering

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Education

Indian Institute of Technology, Delhi *New Delhi, India*

Integrated B.Tech and M.Tech, Computer Science and Engineering *2019 - Exp. 2024*

- Grade Point Average: **9.455/10.0**

Modern Vidya Niketan, Sec. 17 *Faridabad, India*

CBSE Board - XII Grade *2018 - 2019*

- Score: **96.2%**

Honors & Awards

2020	**Third Place, HCL Hack IITK**, among 12,500 teams - students, professionals and startups from 12 countries.	*India*
2020	**IIT Delhi Semester Merit Award**, for exceptional academic performance in a semester.	*IIT Delhi*
2020	**Univ.AI**, full scholarship to take the ML/AI Basics course, taught by Pavlos Protopapas from Harvard.	*Online*
2019	**All India Rank 146**, Joint Entrance Exam Advanced among 170,000 candidates.	*India*
2019	**All India Rank 113**, Joint Entrance Exam Mains among 1.1 Million candidates.	*India*
2018	**State Rank 1**, Haryana State topper in the National Level Science Talent Search Examination.	*India*

Work Experience

Data Driven Marketing Spend Optimisation, DataChannel Technologies *Gurugram, India*

Data Analyst Intern *June 2021 - August 2021*

- Developed a system to give optimal spend recommendations across media channels & adsets using historical marketing data, allowing marketing teams to focus on creativity and design.
- Implemented a revenue forecasting model to predict the revenue-budget relationship for each channel and adset, taking into account adstock transformation as well as the diminishing nature of returns. Dealt effectively with sparsity of data at the adset level.
- Implemented a cross-channel optimiser which used revenue forecasting models at both hierarchical levels to provide optimal spend allocations. Incorporated constraints like minimum/maximum channel spend keeping in mind practical marketing strategies.

Projects

Value Equivalence based Optimal Stateless Model Checking *IIT Delhi*

Research Project, Prof. Subodh Sharma *C++ | Formal Verification*

- Implemented a novel algorithm to verify the correctness of concurrent programs operating in the Sequential Consistency Memory Model.
- Added custom tool as part of a large open-source software (Nidhugg) used for finding bugs in concurrent programs.
- Created a custom class to execute the program and build execution sequences dynamically as well as analyse them.

ML based P2P Botnet Detection through Network Flow Analysis *HCL | IIT Kanpur*

Third Place Winner, HCL Hack IITK [GitHub] [Presentation] *LightGBM | Python | Scapy*

- Built a command line tool to identify P2P Botnet traffic over a network & also detect the hosts involved.
- Consulted multiple research papers to identify useful features for classification, hand engineered certain statistical features & selected the best through RFE & Select-K-Best methods.
- Used the LightGBM Model based on Gradient Boosted Decision Trees, which is efficient and capable of handling large-scale data. Obtained increased accuracy compared to Random Forest, as well as faster training time.

Parser & Evaluator for a Functional Language *IIT Delhi*

Course Project, Programming Languages, Prof. S. Arun-Kumar [GitHub] *Standard ML | mllex | mlyacc*

- Parser and evaluator for a custom defined, strongly typed functional language of integer & boolean expressions.
- Supported static lexical scope rules (through `let in` statements) and named as well as lambda function declarations. Treated functions as first-class objects and supported higher order functions & recursion.
- Built a type-checker to operate on the abstract syntax trees and ensure type-safety of programs of the language.
- Evaluated well-typed input programs and displayed the value along with its type to the user.

Multi-Core Processor & DRAM Memory Simulator
IIT Delhi

COURSE PROJECT, COMPUTER ARCHITECTURE, PROF. P. R. PANDA [GITHUB]
C++ | MIPS Assembly

- Built a simulator for both Processor & DRAM & integrated them to form the complete system.
- Modelled some timing and resource constraints of DRAM, printed summary statistics & cycle-wise analysis if specified.
- Supported the execution of multiple CPU Cores, operating on a shared DRAM Memory. Created a Memory Request Manager as the interface between memory and cores.
- Implemented the FR-FCFS memory scheduling algorithm & sw-lw forwarding to maximize throughput.

Traffic Density Estimation using OpenCV
IIT Delhi

COURSE PROJECT, DESIGN PRACTICES, PROF. RIJUREKHA SEN [GITHUB] [REPORT]
C++ | OpenCV

- Used OpenCV functions to estimate the traffic density at a junction from recorded videos.
- Calculated the queue and dynamic density for each frame using background subtraction and optical flow methods.
- Analyzed the utility-runtime tradeoff in software design by experimenting with different methods and measuring performance. For example, dropping some frames lead to faster processing but lower accuracy.
- Efficiently parallelized the above computations, taking advantage of the independent nature of computations for respective frames. Analyzed the CPU Usage and runtime variation with number of threads, taking into account the underlying machine. Complete analysis present in the report.

Skills

Programming	C++, Standard ML, Python, Java, Prolog
Web	Javascript, ReactJS, Redux, NodeJS, Flask, MongoDB
Libraries	Numpy, Pandas, Scikit-learn, Pytorch, OpenCV
Tools	lex, yacc, Nidhugg

Relevant Coursework

- **Computer Science:** Computational Neuroscience[†], Artificial Intelligence[†], Machine Learning[†], Algorithm Design[†], Computer Networks[†], **Programming Languages***, Computer Architecture, **Design Practices***, Discrete Mathematics, **Data Structures & Algorithms***

- **Mathematics and Electrical: Linear Algebra****, Signals & Systems, Prob. & Stochastic Processes, **Calculus***.

[†] - Upcoming Semester   *** - A Grade**   **** - Scored 100/100**

Extracurricular Activity

Co-WIN Vaccine Alerts Telegram Bot
Faridabad, Haryana

PERSONAL PROJECT [TELEGRAM]
Python

- Created a Telegram bot to provide users with a flexible and user-friendly way to be notified about available vaccination slots.
- Enables users to join channels for their districts and subscribe to updates about slot availability periodically, or to search for slots one-time.
- Created channels for **400+** districts till now, & helped many people find available slots.

AI/ML Club IIT Delhi
IIT Delhi

CO-FOUNDER [WEBSITE]

- Hosted Padma Shri Dr. Sankar Kumar Pal for a keynote lecture at our first live event. Dr. Pal has over 37000 citations on Google Scholar.
- Interacted with alumni pushing the boundaries of Machine Learning through our podcast The ML Muse.
- Organized a Summer of ML guest lecture series, culminating in a hackathon.