



Deep Karkhanis

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Indian Institute of Technology, Bombay

July 2016 - Aug 2020

- o B.Tech with Honors in **Computer Science** and Engineering
- o Core GPA : **9.58/10.0** o Honors GPA : **10.0/10.0**
- o Minor Degree in **Statistics** and Informatics

Work Experience

Microsoft Research Fellow

Since Aug '20

Microsoft Research Lab, India

- o Working under Dr. Harsha Vardhan Simhadri and Dr. Ravishankar Krishnaswamy | Received Letters of Recommendation

Email Search for Microsoft Exchange.....

- o Enhancing Microsoft Exchange to make it easier for users to search for emails within their inbox
- o Improved the Microsoft DiskANN system to require only **half** the number of distance calculations compared to state of the art
- o Achieved **>95%** accuracy kNN search on email datasets having high-rates of inserts and deletes

Bing Ads Recommendation.....

- o Working on the Bing Ad recommendation system serving all European Markets in multiple languages
- o Designed a first of its kind **graph-based ANN** algorithm which has support for filter-based search imbued in the build phase

Awards and Scholastic Achievements

- o Conferred the **Institute Academic Excellence Award** by the Dean for securing **Institute Rank 1** at the end of 1st year
- o Secured a Perfect **10/10 GPA** in **3 out of 8 semesters**. Only student (1 of 950) with 10.0 GPA in both Freshman semesters
- o Received the Undergraduate Research Award, IIT Bombay in the 4th year
- o Awarded **3 AP grades** (Advanced Performer) for having the best performance in the institute in those courses

Academic Projects

Compiler for a subset of C

Prof. Uday Khedkar

- o Designed a **compiler and interpreter** from scratch for processing a C style language and supporting all its standard datatypes
- o Supports **multiple variable scopes**; conditional, control-flow & arithmetic statements; **recursion** & user-defined functions

Valid-time attribute for PostgreSQL

Prof. S. Sudarshan

- o Extended **PostgreSQL** codebase to add a new 'valid-time' attribute – stores time frame for which table entry was valid
- o Designed syntax for declaring temporal relations, which are relations having a **valid time** attribute

Research Experience

Internships.....

RWTH Aachen

May '19 - July '19

Prof. Dr. Ir. Joost-Pieter Katoen | Received Letters of Recommendation

- o Incorporated **Counting-SAT** to compute Bounded Reachability Probabilities in MDPs in one shot
- o Designed a succinct CNF representation for Markov Chains using the transition probabilities *BDD* to get a **10x faster** algorithm

IST Austria

May '18 - July '18

Prof. Krishnendu Chatterjee | Received Letters of Recommendation

- o Improved the *POMCP* algorithm to create an online MEMDP algorithm and established its superiority over POMDP algorithms
- o Exploited the sparse transitions in MEMDPs to have faster belief updates [**O(n)** as opposed to **O(n²)**] to get faster processing

Bachelor's Project.....

IIT Bombay

July '19 - July '20

Prof. Shivaram Kalyanakrishnan | Undergraduate Research Award | Received Recommendation

- o Made POMDP policy iteration more efficient by improving the update of Directed Cyclic Graphs to get **20%** higher rewards
- o Designed algorithms to handle multiple DCGs & improve **arbitrary subsets** of DCG-nodes while ensuring Policy Improvement

Leadership and Mentorship Experience

Teaching Assistant

- o Linear Algebra, Differential Equations, Computer Systems
- o Mentored **200+** UG's, conducted weekly tutorials, created assignments

Institute Web Nominee, Academic Council

Web Secretary

- o Managed portals used by **3000+** students, **100+** professors
- o Received **Organizational Color Award** for exceptional work