

Divyanshu Saxena

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Education

MS/Ph.D, Computer Sciences | University of Wisconsin, Madison | GPA – 4/4 2020–Present

B.Tech, Computer Science and Engineering | Indian Institute of Technology Delhi | GPA – 8.14/10 2016–2020

Research

Memory Deduplication in Serverless Platforms October 2020 - Present

University of Wisconsin, Madison | Supervisor: Prof. Aditya Akella

- Ongoing work on studying the impact of duplication, in memory states of containers running on Serverless platforms.
- Designed an efficient mechanism for memory deduplication, leading to improved start-up times and reduced memory footprints.

Designing adaptive consistency models for Distributed Edge Storage July 2020 - September 2020

Indian Institute of Science, Bangalore | Supervisor: Prof. Yogesh Simmhan

- Worked on a distributed data store over unreliable Edge devices, using a super peer overlay network of Fog Devices.
- Designed an efficient algorithm to find data items within two hops across the network, making use of Bloom Filters for indexing.
- Implemented various session and causal consistency models on top of the Edge data store, to support multiple clients.

Ghost Indexing in Graph Databases April 2019 - May 2020

Indian Institute of Technology, Delhi | Supervisor: Prof. Srikanta Bedathur

- Investigated the utility of adding in-graph indexes over Graph Databases, for the Janusgraph and Neo4J frameworks.
- Implemented the novel idea of *Ghost Vertices* to implement in-graph BPlus-Tree and B-Tree indexes in Graph Databases.
- Demonstrated 2-100X improvement in runtimes for range search queries in JanusGraph by using the novel *Ghost Indexes*.

Network Design for a Modified Two Echelon Vehicle Routing Problem May 2018 - July 2018

National University of Singapore | Supervisor: Prof. Andrew Lim

- Designed and implemented a Neighborhood Search heuristic to route available vehicles, choosing the optimal location of carparks for the Two Echelon Vehicle Routing Problem, an NP-hard combinatorial optimization problem.
- Used clustering and local search to get the solution. Designed novel operators for defining neighborhood.

Selected Projects

Combating Multi-Camera Interference using Carrier Sensing | Supervisor: Prof. Suman Banerjee Fall 2020

- Investigated the loopholes in the current interference mitigation mechanisms for multiple 3D camera environments.
- Drawing inspiration from the CSMA-CA protocol, designed a novel carrier sensing based mitigation mechanism for cameras.
- Demonstrated a 50% reduction in the power amplification needed to capture a 3D image, compared to the existing interference mitigating techniques.

BatCoin: Custom Cryptocurrency from the scratch | Course Project under Prof. Smruti R Sarangi Spring 2020

- Implemented a fully-functional custom cryptocurrency by simulating processes as nodes of a Blockchain network.
- Implemented Nakamoto consensus on top of the blockchain network and demonstrated byzantine fault tolerance in the system.

Containerization over xv6 Operating System | Course Project under Prof. Smruti R Sarangi Spring 2019

- Implemented a user space implementation of containers over xv6, a UNIX-like educational Operating System.
- Implemented data structures and system calls in the kernel for maintaining resource and file isolation, and fair scheduling.
- Implemented virtual page tables and associated system calls to allow container processes to declare and use variables.

Identifying Shared Accounts in Streaming Services | Course Project under Prof. Srikanta Bedathur Fall 2019

- Implemented Session-based Heterogeneous Embedding (Jiang et al SIGIR'18) to identify different users using the same account.
- Improved the performance of the model by the use of a novel formulation of loss function using KMeans++ Clustering.

Person Counter and Display Device | Supervisor: Prof. Subodh Kumar Summer 2017

- Implemented real-time processing of images to count number of people in a room, using the Beaglebone microprocessor.
- Used multiple Haar cascade classifiers, applied on the same image, to counter the problem of occlusion.
- Conferred the *Design Innovation Summer Award* by the Ministry of Human Resource Development (Government of India).

Scholastic Achievements

- Awarded a **Departmental Scholarship** of USD3000 at the Department of Computer Sciences, UW-Madison.
- Secured **All India Rank 64** in Joint Entrance Exam Advanced - 2016 among 1.5 million applicants.
- Secured **All India Rank 61** in Kishore Vaigyanik Protasahan Yojana (KVPY) - 2015 conducted by IISc Bangalore.
- Secured **All India Rank 1** in FIITJEE Talent Reward Examination (FTRE) - 2014 conducted by FIITJEE Ltd.
- Conferred scholarship on qualifying **National Talent Search Examination** (2012), conducted by NCERT.
- Qualified the **National Standard Examination** in Physics (NSEP) and Chemistry (NSEC) in 2016.

Work Experience

Joint Seat Allocation Authority (JoSAA) Software Intern <i>Developing software for the premier National Engineering Examination</i>	February 2020 - October 2020
Indian Institute of Science, Bangalore Research Intern <i>Designing adaptive consistency models for Distributed Edge Storage</i>	July 2020 - September 2020 <i>Supervisor: Prof. Yogesh Simmhan</i>
Cohesity Member of Technical Staff Intern <i>Adding Zero Copy Buffer Payloads over gRPC</i>	May 2019 - July 2019 <i>Mentor: Mayank Shekhar Narula</i>
National University of Singapore Research Intern <i>Designing heuristics for a Two Echelon Vehicle Routing Problem</i>	May 2018 - July 2018 <i>Supervisor: Prof. Andrew Lim</i>

Teaching Experience

Teaching Assistant Programming III, Department TA Position at UW-Madison	Fall 2020
Teaching Assistant Artificial Intelligence, offered by Prof. Mausam at IIT Delhi.	Fall 2019

Technical Strengths

Languages and Frameworks

Python, C/C++, Java, Go, Bash, SQL, OCaml, Prolog, Javascript, HTML/CSS, VHDL, Verilog

Tools and Platforms

Git, LXC, Jupyter, PyTorch, Janusgraph, Neo4J, Elasticsearch, Docker, Android, Arduino, Django

Positions of Responsibility

Class Convener Elected among 104 students of 2016 Entry Computer Science Batch	April 2019 - Present
Student Mentor IIT Delhi	June 2018 - May 2019
○ Selected as Student Mentor to mentor six Computer Science Freshmen students. Also appointed as Head Mentor .	

Extra Curriculars

DevClub Software Development Club of IIT Delhi	March 2017 - Present
○ Developed Study Portal (a crowd contributed portal to cater to all types of study material requirements of the students) and Review System (a fully anonymous peer review system).	
○ Delivered several lectures on application and software development with the aim to enhance Computer Science culture in campus.	
Indian Road Safety Campaign Secretary, Technical Arm	January 2017 - May 2018
○ Developed a Road Safety Accidents Data Portal, which was launched by the <i>Ministry of Road Transport and Highways</i> , India.	
○ Collaborated with several Corporations and NGOs to organize technical events, including a Road Safety Hackathon.	