Aditi Partap

Computer Science
Stanford University
Citizenship: Indian

aditi741997@gmail.com
aditi712@illinois.edu
+1 2178198126

Academic Details

Year	Degree	Institute	CGPA/Percentage
2021-2026 (Expected)	Ph.D. in Computer Science	Stanford University	
2019-2021	M.S. in Computer Science	University of Illinois at Urbana Champaign	3.85/4.0
2014-2018	B.Tech in Computer Science & Engg.	Indian Institute of Technology, Delhi	9.675/10
2014	Class XII, CBSE	Swami Sant Dass Public School, Jalandhar	95.4%
2012	Class X, CBSE	Swami Sant Dass Public School, Jalandhar	10/10

Scholastic Achievements

- Received **Institute Silver Medal** for securing **Department Rank 1** in Computer Science Dept. at IIT Delhi.   *2018*
- **All India Rank 7** in IIT Joint Entrance Examination (JEE Advanced-2014) & secured 1st rank among all girls.   *2014*
- Consistently received the **Semester Merit Award** for being in Top 7% in Computer Science Dept. at IIT Delhi.   *2014-18*
- Awarded the **NSDI 2020 Diversity grant**.   *2020*
- Among 16 students across all India to be awarded **Aditya Birla Group Scholarship**.   *2014*
- **All India Rank 208** among 1.4 million candidates appearing in JEE Mains organized in India by CBSE.   *2014*
- Among **Top 300** in Indian National Physics Olympiad.   *2014*
- Certificate of Merit awarded for being among **Top 30** in Indian National Mathematical Olympiad (**INMO**).   *2013*
- Awarded Kishore Vaigyanik Protsahan Yojana Fellowship (**KVPY**) by Dept. of Science & Tech., Govt. of India.   *2012-13*
- Selected as National Talent Search Examination (**NTSE**) scholar for being in top 1000 at National level.   *2010*

Interests

Computer Networks & Systems, Algorithms

Research Experience

Leveraging AI to improve agricultural crop production   Ranveer Chandra & Anirudh Badam
Summer Intern, Microsoft Research   *May 2021 - August 2021*

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Efficient Resource Management for Robot & AR/VR Systems   Prof. Radhika Mittal & Prof. Brighten Godfrey
Graduate Research Project, University of Illinois at Urbana Champaign   *August 2019 - May 2021*

- Designed an algorithm to manage CPU resources among different tasks within the robot system, to meet given requirements on low level metrics such as throughput and latency.
- Developed a scheduling framework that implements the algorithm and dynamically adapts to variations in system requirements as well as available resources.
- Integrated the framework with ROS and improved performance for a face tracking robot application by 4-7x. <u>Here</u> is the link to an early version submitted to Hotnets'20.
- Submitted to SOSP'21, with evaluation for robot navigation & extending the framework to Virtual reality applications.

Enhancing Reliability & Scalability of the Emerald IoT System using AWS   Prof. Dina Katabi
Summer Project, Massachusetts Institute of Technology   *July 2018 - October 2018*

- Designed & developed a scalable and secure **real time communication system** to manage the configuration and monitor the status of **globally distributed IoT devices**.
- Implemented an MQTT based publish subscribe protocol using AWS IoT to modify device configuration based on asynchronous updates from server.

- Employed multithreading at the devices to regularly publish current health & maintain state reliably and used TLS mutual authentication with restricted certificate permissions to ensure security.

Answering Complex Tourism Questions Using Deep Learning Prof. Mausam & Prof. Parag Singla
B. Tech. Thesis, IIT Delhi *July 2017 - April 2018*

- Worked towards building an AI system that can answer multi faceted tourism questions from a huge set of answers.
- Applied a pipeline of NLP tools to extract correct entities from free text answers collected with online travel forum posts to curate a large **48k sized dataset**.
- Designed & implemented a neural network employing LSTMs and attention mechanism & implemented a few OpenQA based research papers for baseline comparison.
- Currently under submission at the WebConf 2021. *Here* is the link to the arXiv paper.

Local Search Heuristic for k-median problem with m outliers Prof. Naveen Garg
Summer Research Project, IIT Delhi *May 2016 - September 2016*

- The problem involves choosing k centers out of a given set of n points such that the sum of distances of all but m points to their nearest centers is minimized.
- Analysed a matrix based local search algorithm using Dynamic Programming principles for a point set with clusters at infinite distances and attempted to extend it to the general setting.
- Formulated a local search procedure involving guessing the costliest edge in the optimal solution and proved its infeasibility with a counter example.

WORK EXPERIENCE

- **Email Notification System for Power BI Service** December 2018 - August 2019
  Microsoft Corporation, Vancouver, BC

  Designed and implemented an email notification system which involved adding infrastructure support, efficiently querying the back-end database to identify users with expiring subscriptions, and extensive system testing. Developed various front-end features to improve customer engagement for the Power BI service.

- **Deploying Tabular Data Models on Azure** May 2017 - July 2017
  Microsoft Corporation, Redmond

  Designed and developed a web application that allows users to deploy and visualize tabular models over their data on Azure Analysis Services. Used AngularJS framework to incorporate data binding and developed APIs in C# to connect to and fetch metadata from the user's database. Leveraged CRM solutions to integrate the app with Dynamics 365.

- **Cricket Utility and Gaming Application** May 2015 - July 2015
  Microsoft IDC, Hyderabad

  Built a robust Windows 10 app implementing the Model - View - ViewModel application design pattern. A rich and fluid user interface was developed by embedding various user-friendly features using Data and command binding. Contributed in the client side as well as telemetry and 'Quality essentials' of the application.

ACADEMIC PROJECTS

Artificial Intelligence player for the game Tak Prof. Mausam, September 2016 - November 2016
Designed and developed AI based player for the game Tak (similar in complexity to chess) in a team of two. Used Negamax algorithm with iterative deepening and alpha beta pruning. Implemented heuristics such as PV search & Transposition Table to greatly reduce the search time and developed a time management scheme & evaluation function to enhance it's performance. Won the **course level tournament** in Tak Board size 6*6. Click *here* for more details.

Discrete event simulator of Blockchain cryptocurrency Prof. Vinay Rebeiro, January 2018 - March 2018
Designed and developed a simulator to analyze a peer to peer cryptocurrency network based on bitcoin, in a team of 3. Used locks & semaphores to enable individual peer threads to send & receive messages to other peers in real time.

Visual Question Answering Prof. Parag Singla, September 2017 - November 2017
In a team of 2, Built a neural network for answering questions given an image. Implemented a CNN - LSTM based and attention based model in PyTorch. Secured 1st rank in the class with an accuracy of 52.5% on the MS-COCO VQA dataset hosted in the EvalAI server.

Linux like Operating System Functionalities Prof. Saurav Bansal, February 2017 - May 2017

Designed and developed a basic linux based terminal in C++. Implemented tasks as coroutines & fibres and performed round robin scheduling in both preemptive & non preemptive fashion. Divided the processing & rendering among cores and implemented Leslie Lamports single-producer single-consumer buffer algorithm for communication.

Optical Character Recognition using Graphical Models   Prof. Parag Singla, September 2016 - November 2016
Modeled the OCR problem using both Markov and Bayesian networks. Performed parameter learning and implemented MAP and MPE inference using Loopy Belief Propagation, Clique Tree Algorithm and Gibbs Sampling on both models. Achieved average accuracy of 79%.

Network Based Ping Pong Game   Prof. Vinay Rebeiro, March 2016 - May 2016
Designed and developed a p2p network based Ping Pong game in a team of three. Used Java Swing library for Graphics and UDP Sockets as network component. Used separate threads to render the game and exchange game state among all pairs of peers. Included features such as a level-based computer player algorithm and multiple balls.

ARM Processor Implementation in VHDL   Prof. Anshul Kumar, March 2016 - May 2016
Designed and implemented ARM processor with RAM, Register File, ALU and Control in VHDL. Involved 5 stage Pipelining and Data forwarding between different stages as well as Static Branch Prediction. Additionally implemented a 32-bit floating point Co-Processor that supports arithmetic operations using tight coupling with the main Processor.

Compiler for a simple Programming Language   Prof. S. Arun Kumar, January 2016 - May 2016
Implemented a compiler comprising of a Scanner and a Recursive Descent Parser. Performed type checking & modified the Abstract Syntax Tree to generate low level machine code. Developed a stack machine to run the generated code.

RELEVANT COURSES

- **Computer Science:**
  - Systems : High speed & Programmable Networks, Advanced Operating Systems, Database Management Systems, Intro. to Blockchain & Cryptocurrencies, Cloud Computing Technology, Intro. to Parallel & Distributed Programming, Operating Systems, Computer Networks, Programming Languages, Computer Architecture, Digital Logic & Design.
  - AI : Deep Learning, Machine Learning, Artificial Intelligence, Probabilistic Graphical Models.
  - Theory : Analysis & Design of Algorithms, Theory of Computation, Data Structures & Algorithms, Discrete Mathematics.
  - Others : Computer Graphics, Design Practices, Intro. to Bioinformatics.

- **Mathematics and Electrical Engineering:**
  Random Processes, Intro. to Game theory, Micro Economics, Macro Economics, Signals & Systems, Probability & Stochastic Processes, Calculus, Linear Algebra, Intro to Electrical Engineering.

TECHNICAL SKILLS

- **Programming Languages:** C, C++, Java, C#, Python, SML, JavaScript, OCamL, NodeJS, CUDA, AngularJS, LaTeX

- **Programming Environments:** Android Studio, Visual Studio, Xilinx ISE Design Suite

EXTRA CURRICULAR ACTIVITIES

- Among **Top 100** students selected from universities across Europe, Asia & the Americas to attend the Cornell, Maryland, Max Planck Pre-doctoral Research School (**CMMRS**), 2018.
- Co-chaired the Programmable networks session at HotNets'20.
- Undergraduate **Teaching Assistant** for Programming Languages course during Spring, 2018 and Data Structures & Algorithms course during Fall, 2017.
- Selected as a **mentor** for five Computer Science & Engineering freshmen, to guide them in academics.
- Built a **web chat-room** that allows sharing of all file types, using NodeJS & MongoDB in Nutanix HackX 2015 at IITD.
- Served as IIT Delhi Literary Club hostel representative for the session 2015-16. Involved in organising literary events and workshops on word games for first year students.
- Ranked 288 in Google **APAC** Round C.

REFERENCES

Prof. Brighten Godfrey
Thesis Advisor
UIUC

Prof. Radhika Mittal
Thesis Advisor
UIUC

Prof. Sarita Adve
Thesis Collaborator
UIUC

Prof. Dina Katabi
Research Project Advisor
MIT

Prof. Parag Singla
B.Tech. Thesis Advisor
IIT Delhi

Prof. Mausam
B.Tech. Thesis Advisor
IIT Delhi