UTKARSH MUNJAL

SENIOR UNDERGRADUATE   utkarshmunjal35@gmail.com
COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY, DELHI

ACADEMIC DETAILS

Year	Degree/Board	Institute	CGPA/Marks(%)
2018–*Present*	B.Tech. in Computer Science and Engineering	Indian Institute Of Technology Delhi	9.248/10
2018	CBSE	LRS DAV Sr. Sec. School, Abohar	93.4%
2016	ICSE	Assumption Convent School, Abohar	92.0%

SCHOLASTIC ACHIEVEMENTS

- **IIT Delhi Merit Award**: Received scholarship & merit certificate for being in **top 7%** among 900+ students in semesters I & II.
- **All India Rank 87** in Joint Entrance Examination (Advanced),2018 among **0.23 million** candidates
- **All India Rank 432** in Joint Entrance Examination (Main),2018 among **1.3 million** candidates
- Selected as **KVPY Scholar** after securing **All India Rank 86** in KVPY examination, conducted by **IISc, Bangalore**
- Among **top 1% students of the State** in National Science Exam In Chemistry(NSEC–2017)

INTERNSHIPS

- **Support for System Tables with Arrow Flight**   Dremio Software, Hyderabad
  Software Development Engineer Intern   *May-July 2021*
  - Created new **gRPCs** to expose service endpoints; Replaced the older fabric protocols for better support.
  - Designed methods to create **Apache Arrow** batches of received data and to stream using **Apache Arrow Flight**.
  - Developed a mechanism to push the filter in a query to scanning phase; Enhanced the efficiency of query processing.
  - Added unit and integration tests to verify the working of the new functionality and code coverage.

RESEARCH PROJECTS

- **Unified Framework For Coarsened Graph Learning**   Prof. Sandeep Kumar, IIT Delhi
  Graph Learning   *August 2021 - Present*
  - Proposed a novel algorithm to learn a lower dimension graph representation of data; Can also be used as a clustering algorithm.

- **Prophet Secretary**   Prof. Ashish Chiplunkar, IIT Delhi
  Online Algorithms   *May-August 2020*
  - Formulated the problem as an **optimization problem** using the optimal dynamic programming-based algorithm.
  - Performed numerical optimization to obtain results for the upper bound on competitive ratio of the problem.
  - Successfully **improved** the upper bound; Constructed an instance of random variables which achieves this bound.

COURSE PROJECTS

- **Machine Learning Models**   Prof. Parag Singla, IIT Delhi
  Machine Learning   *October 2020- January 2021*
  - Implemented linear & logistic regression, Naive Bayes classifier with stemming, SVM classifier with gaussian kernel, decision trees with post pruning, and neural networks from scratch; Analysed their performance on multiple datasets.

- **Convolutional Neural Networks**: Trained and tuned the parameters of **RESNEXT50** model for emotion detection using **PyTorch** library; Enhanced the existing baseline on macro-F1 score from 40% to 58% for the detection task.

- **AI Agent for Pacman** Prof. Rohan Paul, IIT Delhi
  Artificial Intelligence November 2020
  - Implemented **A* search** with a consistent heuristic to find the optimal path for pacman game in absence of ghosts.
  - Implemented adversarial search using **minimax algorithm with alpha-beta pruning** to play against adversary.
  - Developed an **expectiminimax** algorithm to play against random ghosts; Experimented with heuristics to improve the agent.

- **MyThreads Library** Prof. Kolin Paul
  Operating Systems March 2021
  - Developed a **pthreads-like** library to support thread operations of create, join, yield, and exit.
  - Used Jmp_Buf structure to save & load the states of threads; Analysed library's performance on matrix multiplication task.

- **Plagiarism Checker** Prof. Kolin Paul, IIT Delhi
  Design Practices August 2020
  - Built a plagiarism checker in C to find similarity between the input file and files in a corpus folder.
  - Constructed **bi-grams & tri-grams** of documents; Used Jaccard Index on these to find percentage similarity.

- **LogPro Interpreter** Prof. Sanjiva Prasad, IIT Delhi
  Programming Languages April-May 2020
  - Developed an interpreter for a **toy logic programming language**; Used OCamlLex for lexing & OCamlYacc for parsing.
  - Implemented a **unification algorithm** to find the most general unifier of two terms; Used this algorithm with backtracking approach to solve the queries by unifying queries with facts and rules present in the knowledge base.

- **Parallel Matrix Decomposition** Prof. Soham Chakraborty
  Parallel & Distributed Programming April 2021
  - Used **OpenMP** and **MPI** to speed up LU decomposition of large matrices; Analysed their relative performance and efficiency.

RELEVANT COURSES

Computer Science	Analysis & Design of Algorithms, Machine Learning, Artificial Intelligence, Numerical Algorithms, Stochastic Control & Reinforcement Learning, Operating Systems, Data Structures & Algorithms, Discrete Mathematics, Programming Languages, Design Practices, Theory of Computation, Distributed & Parallel Computing , Computer Networks
Mathematics & others	Probability Theory & Stochastic Processes, Stochastic of Finance, Graph Theory, Linear Algebra, Calculus, Number Theory, Signals & Systems, Macro-Economics

TECHNICAL SKILLS

Programming Languages	C, C++, Java, Python, MATLAB, SML, Ocaml, Prolog, VHDL
Softwares & Tools	LaTeX, Xilinx ISE, Vivado, Autodesk Inventor

EXTRA CURRICULAR ACTIVITIES

- Mentored five freshmen, guided and helped them adapt to our college environment.

- Volunteered for Intellify to coach school students for Programme for International Student Assessment(PISA-2021).

- Designed various science projects under the Science Seeds Scheme of NSS, IIT Delhi, to impart practical knowledge to underprivileged children through demonstrations.