Param Khakhar

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Computer Science & Engineering
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Param Khakhar
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Academic Details

Year	Degree	Institute	CGPA/Percentage
2018-Present (Current)	B.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	9.068/10
2018	Class XII, CBSE	Aklank Public School, Kota	92.6%
2016	Class X, CBSE	Shree Vallabhacharya International School, Rajkot	10/10

Scholastic Achievements

- Secured a perfect **10 SGPA** in second semester 2018-19
- Awarded **Certificate of Merit** for being in **Institute Top 7%** amongst 900 students in semester II
- **All India Rank 83** in Joint Entrance Exam-Advanced - 2018 among 231,000 candidates
- **All India Rank 132** in Joint Entrance Exam-Mains - 2018 among 1.15 million candidates
- Qualified **National Standard Examination in Chemistry(NSEC) 2018** being among the top 1% of the country.

Internships

Estee Advisors, Strategy Intern May - July 2021
Future Returns Prediction using CNN

- Trained a **CNN** on time series data for predicting future returns for the stocks of public sector banks.
- Used diferent trade and orderbook features for diferent securities, and introduced new micro-price features.
- Checked robustness of the predictions in terms of reproducibility and proftability over time.
- Evaluated the predictions using diferent metrics such as net - gross profts, buy - sell accuracy, and event-rates.

JBM Group, Machine Learning Intern July - August 2020
Anomaly Detection for Automobile Parts

- Trained a **CNN-Autoencoder** on augmented non-defective images of automobile parts
- Experimented with diferent image enhancement techniques, losses, regularization, and thresholds
- Classifed defective automobile parts from non-defective parts on the basis of reconstruction loss
- Achieved a **recall** of **70%** and a **precision** of **67%** for the defective parts

Projects

User-Level Thread Package in C Feb'21 - Mar'21
Operating Systems *Prof. Kolin Paul*

- The implemented package provided all the essential functionality of the standard *pthreads* package of C
- Implemented *locks*, *conditional variables*, and *semaphores* using the assembly version of test and set
- Implemented context switching using *setjmp* and *longjmp* functionality of C and tested for robustness.

AI Agent for Pacman Oct'20 - Nov'20
Principles of Artificial Intelligence *Prof. Rohan Paul*

- Implemented A* search and designed a consistent admissible heuristic for the same.
- Implemented the *Minimax* algorithm and used *Alpha-Beta Pruning* to make it more efficient.
- Devised different features and corresponding weights for the game-states for the Reflex Agent.

BitTorrent Simulator in Python Nov'20 - Dec'20
Computer Networks *Prof. Aaditeshwar Seth*

- Used Python's *Socket* library for establishing TCP connection and downloading chunks of a file.
- Implemented a parser for parsing the incoming requests and to track download progress for the file.
- Used threads to make the download process more efficient and made it resilient to disconnections.

Predicting Future Item Sales May'20 - Jun'20
Kaggle Competition (Completed) *Personal Project*

- Performed Exploratory Data Analysis on the time series data followed by processing outliers.
- Devised new features based on the time window frame, item-categories, and locations of shops.
- Trained an *XGBoost* classifer for making predictions along with tuning hyper-parameters

Lambda Spreadsheet Feb'20 - Mar'20
Programming Languages *Prof. Sanjiva Prasad*

- Specified the tokens and implemented *Lexical Analyser* using *Ocamllex* for tokenizing the input.
- Designed the grammar for the *Parser* and implemented it using *Ocamlyacc* for the tokenized input.
- Implemented the backed in *Ocaml* for carrying out various row-column operations on the spreadsheet.

Mini - Processor for MIPS Architecture Mar'20 - Apr'20
Computer Architecture *Prof. Preeti Ranjan Panda*

- Implemented and compared the *Multicycle* and *Pipelined* version of the processor for MIPS architecture in C++.
- Detected branch and control hazards, and resolved Hazards using techniques such as *Forwarding* and *Stalling*.
- Modeled the variable delays in the data memory by *Probabilistic Execution* of the read operation from the memory.

Multithreaded Inventory Management Sept'19 - Oct'19
Data Structures *Prof. Subodh Kumar*

- Implemented *queues*, *priority-queues*, and other auxiliary data structures in Java for the application.
- - Implemented the buyer and seller interfaces in an object oriented paradigm, using the implemented datatypes.
- Used Java's threading library to simulate a real time run of the application and resolved deadlocks.

Relevant Courses

- **Computer Science:**
  Principles of Artificial Intelligence, Machine Learning, Analysis and Design of Algorithms, Computer Networks, Data Structures and Algorithms, Discrete Mathematical Structures, Digital Logic and System Design, Computer Architecture, Programming Languages, Design Practices, Operating Systems, Parallel and Distributed Programming, Theory of Computation, Introduction to Computer Science
- **Mathematics and Economics:**
  Stochastic of Finance*, Statistical Methods, Probability and Stochastic Processes, Linear Algebra and its Applications*, Calculus, Microeconomics, Intro to Economics
- **Online Courses:**
  Financial Markets, How to Win a Data Science Competition, Introduction to Deep Learning

* denotes courses ongoing courses

Technical Skills

- **Languages:** Python, C++, C, Java, Ocaml, Prolog, VHDL, SQL, Lex-Yacc
- **Libraries:** Pandas, Numpy, Scikit-Learn, Matplotlib, Keras, Pytorch, Tensorflow, OpenMP
- **Others:** Git/Github, HTML/CSS, Latex

Extra Curricular Activities

- **Vice Chair** at ACES ACM IIT Delhi, the dept. society of Computer Science and Engineering for the year 2021-22
- Involved in collection drive and Know Your Rights initiative as a Student Volunteer for NSS, IIT Delhi
- Part of the Hostel Badminton Team for the Inter Hostel Sports Tournament