Utkarsh Agarwal

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Educational Qualifications

Year	Degree	Institution	CPI/Percentage
2017(Expected)	Bachelor of Technology	Indian Institute of Technology, Kanpur	9.3/10
2013	AISSCE(CBSE 12th)	DAV Public School, Kota	92.4
2011	AISSE(CBSE 10th)	Mayoor School, Ajmer	10/10

Scholastic Achievements

- Secured All India Rank (AIR) **132** (top 0.09%) in **IIT Joint Entrance Examination 2013** amongst **0.15 million** candidates
- Awarded **Academic Excellence Award** (given to **top 5%** students) for exceptional performance in the academic year 2014-15
- Secured **99.87** percentile in **JEE Main 2013** amongst **1.4 million** students from all over India
- Selected to appear in **INJSO, 2010; INAO (Jr.), 2010** and **INChO, 2013** for being amongst the **top 300 in India**
- Selected for **NTSE Scholarship, 2009**: a prestigious scholarship funded by NCERT, Delhi

Professional Experience

Summer Internship at Samsung Electronics HQ, South Korea *(May'16 - Jul'16)*

◦ **Project Spark**: To expedite the data processing and query execution workflows of a commercial big data analytics tool

- Worked actively with development teams spread across countries in a commercial project about to be pushed into production
- Brought about overall **2X capacity** improvement, **3X performance** improvement in the big data tool with increased stability
- Changes recommended to the application architecture and the code base were pushed to the final implementation of the tool

Data Processing

- Studied the complete architecture of the data analytics tool, analysed and baselined the performance of various components
- Analysed the performance tuning parameters of Apache Spark and other components of the application stack
- Achieved increased stability and more than **2X improvement** in the worst case performance of workflow, **doubling the raw data processing capacity** of the commercial tool
- Automated some aspects of performance tuning to enable the tool to optimise itself in various performance scenarios

Query Execution

- Analysed the query performance at a microscopic level to identify the bottlenecks in the query execution
- Identified best practices in industry for SparkSQL query optimisation and adapted them for the application
- Studied the already existing code base in detail and recommended changes to the application architecture and code base
- Achieved **maximum 4X improvement** (75 percent reduction) and minimum 2X improvement (50 percent reduction) in query time across all queries with an average improvement of 2.89X

Summer Internship at Altisource Business Solutions Pvt. Ltd., Bengaluru *(May'15 - Jul'15)*

◦ **Project Chef**: To automate configuration management of the organisation

- Attained automation of **custom installation** of various applications along with reporting any error or a major update
- Automated inventory management with reporting of key parameters like IP address, CPU count, memory, storage, etc.
- Accelerated the building, upgrading and repairing of infrastructure as well as achieved the upkeep of a **hundred node cluster**

◦ **Project Graphite**: To report server parameters through graphs using Graphite

- Tested plotting of **large dynamic data** over internal network and achieved real time monitoring of a scalable infrastructure
- **Transformed** and **expedited** the **auditing process** in the organisation by monitoring crucial parameters through graphs

Work Experience

Most Violated Constraint for Concentrated ROC (CROC) *(Jan'16 - Ongoing)*

Mentor: Prof. Purushottam Kar, Department of Computer Science and Engineering, IIT Kanpur

- Extensively studied state of the art SVMs and cutting plane techniques for multi-label classification
- Explored various performance measures like Precision@k, Area Under Curve (AUC), partial AUC (pAUC) and their existing algorithms to gain insight into the existing optimisation techniques for such performance measures
- **Proposed a novel algorithm** for optimising Concentrated ROC (CROC) and partial CROC (pCROC), performance measures originating from the field of Bioinformatics for optimising early retrieval
- Presently running experiments on offline and online learning using the proposed algorithm and **aiming for a publication**

Convex Surrogates for Optimising AUC related performance measures *(Jul'16 - Ongoing)*

Mentor: Prof. Purushottam Kar, Department of Computer Science and Engineering, IIT Kanpur

- Extended the work on CROC and used bipartite and full ranking techniques to solve a bunch of more complex performance measures viz. Rate Weighted AUC, Robust Initial Enhancement which are modifications of AUC and focus on early retrieval

Object Detection and Classification in Traffic Surveillance Video *Course Project (Jan'16 - Apr'16)*

Mentor: Prof. Harish Karnick, Department of Computer Science and Engineering, IIT Kanpur

- Extracted regions of interest from the video using image processing algorithms and refined them using NMS (Non-maximum suppression) algorithm on a pyramid of gaussians built from the subframes of the initial regions
- Experimented with different feature representations of images like HoG and SIFT for training the classifiers
- Achieved accuracy of **85 percent** and precision of **82 percent** using Linear SVM as classifier and HoG feature representation

Nachos *Course Project (Jul'15 - Nov'15)*

Mentor: Prof. Mainak Chaudhari, Department of Computer Science and Engineering, IIT Kanpur

- Implemented system calls pertaining to Fork, Exec, Join, Yield, Sleep and Exit for Nachos (a rudimentary OS)
- Programmed paging, signal handling and different process scheduling algorithms for multithreaded processes and evaluated the relative performance of different scheduling algorithms

Scala to MIPS Compiler *Course Project (Jan'16 - Apr'16)*

Mentor: Prof. Subhajit Roy, Department of Computer Science and Engineering, IIT Kanpur

- Programmed a Scala to MIPS cross compiler from scratch with support for basic data types, conditional statements, looping statements, arrays, nested functions and recursion

Movie Database *Course Project (Jan'16 - Apr'16)*

Mentor: Prof. Sumit Ganguly, Department of Computer Science and Engineering, IIT Kanpur

- Developed a web based application over a Database Backend to find and discuss movies, TV series and actors

Scotland Yard Computer Game under Programming Club, IITK *(May'14 - Jun'14)*

- Designed GUI of the game using Pygame library in Python
- Implemented the AI using Minimax Algorithm and used socket programming to extend it to a Multiplayer Version over LAN

Relevant Courses

Machine Learning Techniques	Data Structures and Algorithms	Principles of Databases
Operating Systems	Compiler Design	Computer Networks
Probability and Statistics	Online Learning and Optimisation#	Theory of Computation
Software Engineering	Regression Analysis#	Abstract Algebra

#: *Ongoing*

Technical Skills

- Programming/ Scripting Languages: Assembly, C, C++, Bash, Python, Java, SQL, HTML, CSS
- Platforms/ Tools/ Frameworks: Apache Spark, Hadoop, YARN, Chef, Graphite, Windows, Linux, Latex, Octave, Django

Extra-Curricular Achievements

Programming	• Active participation in contests on Codeforces, Codechef and Spoj with more than **300** problems solved • Rated expert on Codeforces with a peak rating of **1716**
Debating / Oration	• Stood first in Parliamentary Debate in Galaxy'14, an Intra IITK cultural festival • Adjudged **Best Debater** in School and participated in various Inter School Debate Competitions
Alumni Contact Program (ACP), IITK	• Mentored a team of six for contacting Alumni to foster a healthy relationship with them • Adjudged an Executive caller for **exhibiting commendable soft skills** in English

Positions of Responsibility

Senior Executive, Public Relations, Antaragni *(Mar'14 - Nov'14)*	• Invited eminent personalities in the field of economics for Antaragni, an Inter College Cultural fest • Convinced NGOs to organise Antaragni Leadership Initiative (ALI) in major cities viz. Delhi and Lucknow • Helped in managing India Inspired, a panel discussion and ALI, a nationwide hunt for leaders
Academic Mentor *(Jul'14 - Mar'15)*	• Took hall level classes and did peer to peer mentoring for academically deficient students