NIKHIL AGGARWAL

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EDUCATION

Year	Degree	Institution	Performance
2014**	B.Tech, Computer Science and Engineering	IIT Kanpur	**8.5/10.0***
2010	Class 12 : CBSE Board	Apeejay School, Sheikh Sarai, New Delhi	92.2%
2008	Class 10 : ICSE Board	Christu Jyoti Convent School,Baghpat	93.3%

*after completion of 6 semesters   **expected year

SCHOLASTIC ACHIEVEMENTS

AWARDS	• **Selected among 17 students** from across the globe for **ECE internship program** at Carnegie Mellon University • **IIT Kanpur Academic Excellence Award** for academic year 2010-11, awarded to top few students in the department • Certificate of merit for being placed in top 1% in **National Physics Olympiad and Chemistry Olympiad** 2010 • **Best Project and Second Best Project Awards** in manufacturing and mechanical course projects respectively
SCHOLARSHIPS	• **Kishore Vaigyanik Protsahan Yojana (KVPY)** scholarship for the year 2009-10 (*top 90 students* across India) • **CBSE Merit Scholarship** under AIEEE 2010 awarded to 332 students from a pool of 11Lac students • Certificate of excellence in **IGSC Scholarship Examination** held at National level
RANKS	• Achieved an **All India Rank (AIR) 229** in **IIT-JEE'10** in which nearly 5Lac students appeared. **Percentile-99.95%** • Secured **AIR 262** in AIEEE'10 in which nearly 1,100,000 students appeared. **Percentile- 99.98%** • Secured **AIR 6** in Uttar Pradesh Technical University Examination 2010. **Percentile- 99.99%**

INTERNSHIPS

Content Monitoring for Wal-Mart Affiliates (WM Global Technology Services India Pvt. Ltd, Bengaluru)   *(May-July 2013)*

Technology used: coding in JAVA, eclipse IDE, SBT project, Machine Learning

- Made a **binary classifier for webpages**: Given a URL, classify it as *Bad* if it does not adhere to Wal-Mart policies otherwise *Good* and display Wal-Mart ads on good webpages
- **Generated probabilistic distribution data** of words in *Bad* URLs and *Good* URLs and concept matrix for huge dataset
- **Used logistic regression** to classify webpages leading to tremendous **increase in precision and recall** of the system
- Also **Implemented classification based on URL** and not the content of the Webpage by looking at the structure of the URL

Parallel Computing for Autonomous Vehicle Simulation (Carnegie Mellon University, USA)   *(May-July 2012)*

Guide: Prof. Raghunathan Raj RajKumar, Department of Electrical and Computer Engineering, CMU

Technology used: coding in CUDA, GeForce GT530 NVidia Graphic Card

- **Implemented AutoSim for GPU Architecture** (Parallel execution) so that traffic model for a city could be simulated easily
- AutoSim is modular software **that simulates autonomous cars** in hybrid environment consisting of real and autonomous cars
- **Analyzed execution time** for different models of AutoSim on single core CPU and GPU for different number of cars simulated
- **Performance of AutoSim increased** by a factor more than 50 as compared to CPU(sequential execution) implementation

KEY ACADEMIC PROJECTS

Build Hindi and Bangla OCR System for Crowd Sourcing: BTech Project   *(Aug 2013 - ongoing)*

- Implement a **crowd sourcing system** that would take an image and perform OCR on it. User could also edit the output text
- Analyze the existing **OCR systems for Hindi and Bangla Language** for their efficiency and robustness
- Implement a new OCR system with new algorithm and do **performance analysis** based on correctness of word and character

Activity Manager: Software Engineering   *(Aug 2013 - ongoing)*

- The project aim to build a desktop application that runs in background and **log all user activities on the laptop/PC**
- User could view logs and could analyze his activities on computer based on parameters like time spent and efficiency
- logs will be **synced with Google calendar** so that activities on his Google calendar could also be analyzed for efficiency
- User could edit log for his personal use and could also pause the application if some other user is using his laptop

Database Systems: Bill-Monk   *(Mar-April 2013)*

- Built a website where user could keep track of things he has borrowed from others and lend to others
- Designed E-R model for money and items sharing database and implemented in MySQL. Model was normalized to 3NF
- User could **add shared bills, payments of debts, shuffle** the debt between friends and manage his library of items

Chess Playing Robot: Artificial Intelligence   *(Mar-April 2013)*

- **Designed and built a robotic arm** using Lego Mindstorm Robotics Kit that could play one on one chess with human
- Continuous image feed from an overhead camera is used to detect user move and help robotic arm make its move
- **GNU Chess Algorithm** is used to decide robots move. We could also set the difficulty level from 1-8 for the robot

P2P File Sharing System: Computer Networks   *(Aug-Nov 2012)*

- Implemented P2P file sharing system(in socket programming) with **central server** to keep log of all the files shared by all users
- A user (client) queries central server for file which in turn returns name of all users who have shared that file. Client could now connect with any listed user (server) and receive that file. Every user could be both Client and Server

Dynamic Graph Connectivity in poly-logarithmic worst case time: Graph Algorithms *(Mar-April 2013)*
- Implemented the **Monte Carlo algorithm** for dynamic graph connectivity in poly-logarithmic worst case
- **Analyzed the error** in the answer and run time for different number of vertices and edges and compared with trivial algorithm

PINTOS: Operating Systems *(Aug-Nov 2012)*
- The project aimed at providing various **functionalities to PINTOS**, instructional software that runs as secondary OS on Linux
- Implemented **POSIX message queue, indexed file-system** with direct, indirect and doubly indirect blocks, **buffer cache, virtual memory management** via pure demand paging, **POSIX threads and scheduling algorithms** like FCFS, RR

Compiler for C#: Compiler Design *(Mar-April 2013)*
- Designed a C# compiler which can generate code for SPIM architecture with the following features support: **Data types, Operators, Statements, Functions** (with return type and recursion), **Object Oriented** (with Access Modifiers, Inheritance)
- Input programs passes through five analysis stages (**lexical analysis, syntax analysis, semantic analysis, intermediate code generation and final code generation**) to give assembly code for SPIM. Intermediate code generated was **three address code**

Digital Clock: Computer Organisation *(Aug-Nov 2011)*
- Designed a digital clock in BSV with four modes *HH:MM, MM:SS, stopwatch, alarm modes*
- Code ran on FPGA architecture. User could set time, alarm and use clock as stop watch

OTHER PROJECTS

Rover Bot: Robotic Club, IIT Kanpur *(May-July 2011)*
- Designed and built **regional exploration rover** demonstrating locomotion capabilities, payload accommodation, and control
- Efficient locomotion system capable of moving on rough terrains, steps, cylindrical objects, and slope up to 50 degree
- An article was **published** in a reputed newspaper (Times of India) describing about the design and various abilities of robot

Economic Analysis of Indoor Air Pollution and Respiratory Health *(Mar-April 2012)*
- Analyzed **impact of Indoor Air Pollution** on health of families using solid fuel and various awareness programs and policies
- Economic analysis of programs and policies undertaken by Indian Government and various NGOs and causes of their failure
- **Proposed new policies** that government could undertake and **technical solution** to decrease the impact on health

Cricbot: Robotics Club, IIT Kanpur *(Nov-Dec 2011)*
- Designed and built a robot that could collect a ball rolled down from a ramp and deposit it into the collection pit
- Images processed from overhead camera were used to detect position and orientation of robot and ball

TECHNICAL SKILLS

Programming Languages	C, C++, Java, Python, HTML, PHP, Java Script, Oz, Smalltalk, Assembly Language ,Bluespec
Platforms	Windows, Linux
Tools	LaTeX, Beamer, Yacc, Make, Shell, awk, GNU Octave, SQL, GDB, MATLAB, Autocad, Eclipse

RELEVANT COURSES

Computer Science: Data Structures & Algorithms I, Algorithms II, Randomized Algorithms*, Artificial Intelligence Programming, Principles of Database Management, Operating Systems, Compiler Design, Computer Networks, Theory of Computation, Principles of Programming Languages, Introduction to Software Engineering*, Introduction to Computer Organization
Mathematics: Probability and Statistics, Discrete Mathematics, Complex Analysis & Linear Algebra, Fourier Analysis & Differential Equations, Multivariable Calculus, Introduction to Mathematical Logic
Economics: Introduction to economics, Economic Analysis of Laws, Applied Game Theory*
*to be completed in July-Nov 2013

POSITIONS OF RESPONSIBILITY

- **Takneek Pool Coordinator** *(2012-13)*
  - **Led a pool** consisting of students from 3 hostels in organizing Takneek'12 and ensured healthy participation in all events
  - Scored 1100 points and stood **1st in more than 75% of the events** leading to remarkable success and **1st position in Takneek'12**
- **Secretary, Robotics Club**, IIT Kanpur *(2011-12)*
  - **Guided students and organized competitions** in robotics events in Techkriti and Takneek
  - Responsible for scheduling and smooth conduction of robotics **lectures and workshops**
- **Student Guide, Counseling Service, IIT Kanpur** *(2011-12)*
  - Mentored 6 freshmen students and assisted them in getting familiar to the college environment
  - Assisted in the successful organization of the orientation program for the benefit of around 815 students in IIT Kanpur
- **Academic Mentor, Counseling Service, IIT Kanpur**: Taught ESC101 (C language) and PHY103 (Electrodynamics) *(2011-12)*

EXTRA-CURRICULAR ACTIVITIES

- **Robotics:**
  - Built an All-Terrain Vehicle with exceptional Locomotion capabilities. Published in reputed newspaper(TOI)
  - Made an autonomous line following robot in Takneek'10
  - Participated in Techkriti'11 and 12, Kshitij'11 IIT Kharagpur, Techfest'12 IIT Bombay, Wild Soccer in Takneek'11 and 12
- **Business: Won first prize** in **Business simulation game** on a virtual market for cycles held at IIT Kanpur by IIM, Bangalore
- **Programming:** Stood **second in Xceed Kanpur '13** as part of Kurukshetra'13 organized by Anna University
- **Social Services:** Awarded **Certificate of Special Effort** in Mass Awareness Campaign against AIDS and Cancer organized by Caring Souls Foundation to alleviate the sufferings of the Needy Cancer Patients