NIKHIL CHATURVEDI

Computer Science and Engineering

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ACADEMIC DETAILS

Year	Degree	Institute	CGPA/Percentage
2013-2018	B.Tech + M.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	UG: 9.17/10 PG: 9.83/10
2013	Class XII, CBSE	St. Columba's School, New Delhi	98.8%
2011	Class X, CBSE	St. Columba's School, New Delhi	10/10

SCHOLASTIC ACHIEVEMENTS AND AWARDS

- **All India Rank of 4** in the IIT Joint Entrance Examination (JEE) Mains 2013; **State Rank of 1** across Delhi.
- **All India Rank 2** in Class 12 Senior Secondary Examinations by the Central Board of Secondary Education (2013).
- **Department Rank of 5** in the batch of Computer Science on basis of academic performance (across 8 semesters).
- **Cargill Global Scholarship:** 1 of 10 students in India to be awarded; underwent 2 years of leadership grooming.
- **IIT Delhi Semester Merit Award** for having a CGPA in the top 7% of students for semesters 1 & 2 (2013-14).
- **Teaching Assistant** for undergraduates in 3 consecutive semesters (Computer Architecture & Computer Networks).

PUBLICATIONS

- Chaturvedi, N., Garg, R. & Prathosh, A.P. (2018). On Decidability of Sanskrit Morphophonological Processes.
- Chaturvedi, N. & Garg, R. (2018). A Tool for Transliteration of Bilingual Texts involving Sanskrit. In WSC.
- Bhardwaj, S., Gantayat, N., Chaturvedi, N., Garg, R., & Agarwal, S. (2018). SandhiKosh: A Benchmark Corpus for Evaluating Sanskrit Sandhi Tools. In LREC.

INTERNSHIPS AND MAJOR PROJECTS

Semantic Generalisation of Query Patterns   Microsoft IDC, Hyderabad, India

Summer Internship   *May - July, 2017*

- Performed Linear Dirichlet Allocation on web-table dumps for topic segregation; near 100% accuracy on Wikia.
- Extracted, cleaned and parsed queries for a given class using Satori's knowledge graph for entities & source urls.
- Generalised queries & discovered candidate attributes for fact answers using Entity-Concept database - ProBase.
- Filtered candidates by formulating a linear optimisation problem with web frequency, semantic similarity scores.
- Discovered 24k relevant queries for country class and 38k queries for sports athletes; Was presented with a PPO.

Co-process Lifecycle Framework   Indeed.com, Austin, Texas, USA

Summer Internship   *May - July, 2016*

- Developed a framework in Go to spawn, log and manage side processes during internal application deployments.
- Used Caddy web-server and the framework to create a proxy layer atop each deployable for increased security.
- Built a TLS-supporting open source LDAP plugin for Caddy to authenticate and authorize on specified paths.
- Currently used in 10 production data-centres, for hundreds of daemons and handles millions of requests daily.

Multi-Node Network Simulator   EPFL, Lausanne, Switzerland

Summer Internship   *May - July, 2015*

- Integrated network simulator NS3 with QEMU to model network latency and topology for large data-centers.
- Used it to evaluate glue-less fabric network protocol, soNUMA, in a rack architecture free of external routers.

Other Projects

Thesis: Sanskrit Computational Linguistics   Prof. Rahul Garg, 2017-18

Deduced the undecidability of general morphophonological processes by mapping a Turing Machine to an arbitrary well-defined language. Compiled a machine readable rule-set and constructed a C++ tool to perform Sanskrit Sandhi. Trained a syllable based Naive Bayes model for word level classification amongst romanised Devanagiri and English.

OCR Based Word Predictor   Prof. Parag Singla, November 2016

Used Markov Graphical Models to recognise words from images using neighbouring dependencies. Formulated the problem as an undirected graphical network and converted the same to a junction tree. Performed exact inference over the tree using two-way message passing algorithm as well as loopy belief propagation algorithm.

Facial Similarity Prediction   Prof. Parag Singla, April 2016

Predicted similarity between high-dimensional facial data. Used forward selection and PCA for dimension reduction. Compared performance of SVMs, DTrees, NNs and Naive Bayes on test sets with varying mean & variance.

Online Administrative Portal and Backend   Rendezvous, IITD Cultural Festival, 2017

Built the backend and administrative portal for North India's largest cultural festival with a traffic of over 10k users daily. Used React, Node.js, DynamoDB & Webpack for bundling. Hosted on AWS and handled mails through SES.

Optimal Strategy for Blackjack   Prof. Mausam, October 2015

Modelled a single player blackjack game in Python as a Markov Decision Process with state space as cards in hand. Decided the optimal action amongst hit, stand, double and split by evaluating expected returns for a given bet.

File Storage and Sharing Service   Prof. Huzur Saran, February 2015

Built server & client side of a TCP/IP based cloud service using C++ and Qt with persistent storage, share & sync. Implemented data de-duplication to minimize server disk usage. OpenSSL was used to ensure encrypted file transfer.

Relevant Courses

- **Computer Science:**
  Data Structures & Algorithms, Programming Languages, Computer Architecture, Computer Networks, Artificial Intelligence, Analysis & Design of Algorithms, Parallel Programming, Operating Systems, Algorithmic Game Theory, Machine Learning, Probabilistic Graphical Models, Deep Learning, Data Mining, Cryptography & Network Security

- **Mathematics and Electrical Engineering:**
  Calculus, Linear Algebra, Intro to Electrical Engineering, Probability & Stochastic Processes, Signals & Systems

- **Programming Languages:** Java, Python, C++, C#, C, Go, Matlab, Lex, Yacc, SQL

- **Web Development:** AWS, ReactJS, AngularJS, NodeJS, JQuery, HTML, PHP, CSS3

Extra Curricular Activities

Executive Team Member, Rendezvous   April, 2016 - April, 2017

- Selected to lead a fourtier team of 30 student coordinators and 500 volunteers for 100+ Rendezvous events.
- Conceptualized the infrastructure, security, publicity and hospitality plans; contacted artists and celebrities.

Debating Secretary, BRCA   April, 2015 - April, 2016

- Elected to lead a team of 13 hostel representatives to run a debating society with over 150 members.
- Planned and executed over 10 inter-hostel and inter-college debating tournaments through the year.