

Eklavya Sharma

Curriculum Vitae

Education

Aug 2014 – **B.E. (Hons) Computer Science**, *Birla Institute of Technology and Science*
June 2018 (*BITS*), Pilani.
GPA – 9.14 / 10

Research Interests

Algorithms, Complexity, Cryptography.

Projects

- Oct 2017 – **Analysis of Primality-testing Algorithms** ☑ .
Nov 2017 ‘Advanced Algorithms and Complexity’ course project.
Topics: abstract algebra, number theory, computational complexity.
○ Studied the AKS primality test and attempted to improve it.
○ Studied and compared compositeness-proving algorithms like Miller-Rabin, Solovay-Strassen, Baillie PSW.
- Sept 2017 – **Mitigating DNS-related DoS attacks using SDN.**
Dec 2017 Topics: computer networks, network security, SDN.
○ Studied DNS-related DoS attacks and Software-Defined Networking (SDN).
○ Devised a new mechanism for mitigating DNS Amplification attacks, which uses a set of geographically-distributed SDN routers.
○ Wrote a research paper on the above mitigation strategy, which I will present at ICACCI ☑ in September 2018.
- Nov 2017 – **CT-means clustering algorithm** ☑ .
Jan 2018 Topics: machine learning, algorithms, math.
○ Invented a clustering algorithm, which I named CT-means. It is an approximation to C-means fuzzy clustering. It uses KD-trees to reduce running time.
○ Mathematically proved its convergence and approximation guarantees.
○ Implemented ☑ the algorithm and benchmarked its performance on different datasets. It was not significantly faster in practice and its applicability was limited.

Work Experience

Aug 2018 – **Platform Engineer**, *media.net*, Gurgaon, India.
Current Topics: machine learning, game theory.
media.net is an advertisement-technology company. One of *media.net*’s operations involves participating in online real-time auctions to purchase ad-spots. I’m doing research on estimating valuation of ad-spots and choosing the optimal bid amount.

- Jan 2018 – **Intern, American Express**, Gurgaon, India.
- June 2018 Topics: neural networks, machine learning, big data.
Trained a neural network from almost-raw data to estimate the probability of a credit-card applicant defaulting. The data was in a unique format, so a custom neural network architecture was devised. The neural network's performance was at par with the model then in production, which was tuned over many years and utilized several complex hand-engineered features.
- May 2017 – **Intern, Directi**, Mumbai, India.
- July 2017 Topics: machine learning.
Made Directi's news article classification algorithm recognize more categories.
- May 2016 – **Google Summer of Code (GSoC) Student** ☞ , *Zulip*.
- Aug 2016 Topics: software development.
Zulip is an open-source group chat application. 3 students were selected from over 100 applicants to work on Zulip as part of the GSoC program.
- Added type annotations to Zulip's python code (around 50,000 lines) so that it could be statically type-checked using a tool called mypy. This improved developer productivity and made Zulip the first major open source project to be 100% statically typed with PEP-484 annotations.
 - Switched from an apt repository to using virtualenvs in production. This simplified dependency management and testing deployment workflow.
 - Migrated Zulip's python code from Python 2 to Python 3. Apart from a lot of ad-hoc bug-fixing, this involved:
 - Writing scripts which used static code analyzers to find Python 3 bugs.
 - Migrating to python3-compliant dependencies. This required some sections of code to be entirely rewritten.
 - Standardizing the way Zulip uses different kinds of strings (text and byte strings).
 - A more detailed description of my work:
<https://gist.github.com/sharmaeklavya2/57c2420865f17fc9b58a78033de61422>.

Achievements

BITS-Pilani Merit Scholarship.

Scored GPA within top 2% in three semesters.

March 2018 **Graduate Aptitude Test in Engineering (GATE).**

Secured all-India rank 86 (out of approximately 100,000 candidates) in the 'Computer Science and IT' test.

ACM-ICPC

ACM-ICPC is an international annual multi-tiered programming contest for college students. Around 3000 teams (of 3 students each) participate in the Indian online qualifying round each year. Top few teams qualify for on-site regional contests in India.

- Dec 2017 Ranked 29 out of 250 teams in Amritapuri regional contest.
- Dec 2016 Ranked 66 out of 450 teams in Amritapuri regional contest.
- Dec 2016 Ranked 30 out of 70 teams in Kharagpur regional contest.
- Dec 2015 Ranked 88 out of 250 teams in Amritapuri regional contest.

Selected Coursework

- Advanced Algorithms and Complexity

- Discrete Structures in Computer Science
- Design and Analysis of Algorithms
- Graphs and Networks
- Data Structures and Algorithms
- Machine Learning
- Cryptography
- Theory of Computation
- Logic in Computer Science
- Artificial Intelligence

Computer Skills

Programming Languages.

C/C++, Python, Java, Bash, JavaScript, Haskell, Prolog

Software Libraries.

NumPy, Pandas, Scikit-Learn, TensorFlow, Django

Other Languages.

SQL, \LaTeX , HTML, CSS

Student Societies

BITS-ACM, BITS Pilani ACM Student Chapter.

- Problem setter for 3 programming contests organized by BITS-ACM.
- Created backends for web applications used in online quizzing events.
- Conducted intra-BITS-ACM workshops on Linux and CLI.