

Avijit Ghosh

Indian Institute of Technology Kharagpur

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Complex Networks Computational Sociology Algorithmic Auditing Machine Learning (ML) Natural Language Processing (NLP)

Education

2019 **Indian Institute of Technology, Kharagpur**
B.Tech. in Chemical Engineering
M.Tech. in Financial Engineering
Minor in Computer Science
Major GPA: 8.78/10
Minor GPA: 9.0/10

2014 **Modern English Academy**
ISC Class XII
Percentage: 94.5%
2012 **St. Claret School**
ICSE Class X
Percentage: 97.8%

Publications

1. "SAVITR: A System for Real-time Location Extraction from Microblogs during Emergencies" 2018

Ritam Dutt, Kaustubh Hiware, Avijit Ghosh, Rameshwar Bhaskaran

at the WWW 2018 workshop on Exploitation of Social Media for Emergency Relief and Preparedness (SMERP) – 2018 Lyon, France.

Twitter Geolocation Dash Python MongoDB NLP ML Feature extraction

2. "Molecule2Vec: Vector Space Representation of Organic Molecules for prediction of properties using Deep Neural networks" 2018

Avijit Ghosh, Debasis Sarkar

at the European Congress of Chemical Sciences (EUCHEMS) 2018, Liverpool, UK.

Doc2Vec Deep Learning Regression Chemistry

3. "WebSelect: A Research Prototype for Optimizing Ad Exposures based on Network Structure" 2016

Avijit Ghosh, Agam Gupta, Divya Sharma, Uttam Sarkar

at the Workshop on Information Technology and Systems (WITS) 2016, Dublin, Ireland.

Complex Networks Web Crawling Advertisements Genetic Algorithms Flask Python

Internship Experience

May – July
2018

Visiting Researcher
Northeastern University, Boston

Study of advertiser behavior and targeting patterns on Facebook by using the ad reach information obtained from Facebook's ad transparency feature and the personal targeting dataset from Propublica's Facebook ad dataset, aided with controlled ad placement experiments.

Supervisor: Prof. Alan Mislove

Facebook Propublica Advertisements Behavior Patterns Transparency Controlled experiments

Dec 2017
– Jan 2018

Data Science Intern
Ernst and Young, Gurgaon

Automatic PDF report generation system by reading data from company database. Fraud likelihood prediction by running simple statistical models and ML on credit history of consumers provided by client companies.

Supervisor: Gaurav Jain

Web server Automation Database Classification Fraud Detection

May – July
2017

Summer Intern
Xerox Research, Bangalore

- > Implemented XTrack, a Smart Vehicle Tracking and Battery usage minimizing Algorithm.
- > Uber Surge Price Prediction using Spatio-Temporal techniques like the Neural Hawkes and Recurrent Marked Temporal Point Process. Was awarded the **Best Internship Project** award for this project.

Supervisors: Narendra Annamaneni, Poorvi Agrawal

Android Bluetooth Handshake Algorithm Uber Transportation Point Process Tensorflow

Apr – Aug
2016

GSoC Student

Google Summer of Code - OpenMRS

Replaced the HTML XForms system used in the Android app with native generated forms using the Forms REST Api and added offline form saving. Configured Travis CI to automatically build and push the apk to play store.

Supervisors: [Rafal Korytkowski](#) and [Robert O'Connor](#)

[Android](#) [Travis.CI](#) [Play Store](#) [Rest API](#) [Database](#) [Open Source](#)

Research Experience

Thesis Work

Bachelors Thesis
2017-18

"Vector Space Representation of Organic Molecules for prediction of solubility of hydrocarbons in water"

- > Converted 3D Molecules to a Vector Space Model using Doc2Vec.
- > Using information from IUPAC and other literature, created an exhaustive database of aqueous solubility data.
- > Using the trained molecule vectors and the solubility data, train ML and Deep Learning Algorithms to predict solubility within an error of 0.3 g/litre.

Supervisor: [Professor Debasis Sarkar](#), Chemical Engineering, IIT Kharagpur

[Doc2Vec](#) [Deep Learning](#) [Regression](#) [Chemistry](#)

Masters Thesis
2018-19

"Modeling Connectedness of Firms in Financial Markets with Heterogeneous Agents"

- > Goal: To discover connectedness and study heterogeneous agents in an experimental framework of ASM (Artificial Stock Market)
- > Decomposition of volatility spillover or variance through networks.
- > To create models of interconnectedness using network theory.

Supervisor: [Professor Abhijeet Chandra](#), VGSOM, IIT Kharagpur. Co supervised by [FNA.fi team](#), UK

[Complex Networks](#) [Finance](#) [Failure Prediction](#) [Artificial Stock Market](#)

Faculty supervised projects

Mar – May
2016

"Maximizing the reach of advertisements based on Network Structure"

- > Built a Graph of websites by scraping traffic information from Alexa.
- > Designed a tool (named Webselect) to select the best subset of websites to maximise the reach of advertisements, within budget and demographic limits.
- > Used Genetic Algorithm to optimize the selection problem as the original problem is NP-Hard.

Supervisors: [Professor Uttam Sarkar](#), MIS, IIM Calcutta and [Professor Agam Gupta](#), IIM Rohtak

[Complex Networks](#) [Web Crawling](#) [Advertisements](#) [Genetic Algorithms](#) [Flask](#) [Python](#)

Nov 2015
– Jan 2016

"Classification and Summarization of Tweets during a Disaster Event"

- > Developed an improved SVM Classifier to separate disaster related tweets into Situational and Non Situational Classes, using sentiment detection, dependency graphs and linear patterns for feature engineering.
- > Built a **Software Demo: DISSUM** using Flask to showcase the working of the above. This was selected and showcased at **IBM Day Conference 2016**, IIT Kharagpur.

Supervisor: [Professor Niloy Ganguly](#), CSE IIT Kharagpur

[NLP](#) [Twitter](#) [Classification](#) [Feature Engineering](#) [Disaster](#)

Jul 2017
– Jan 2018

"System for Real-time Location Extraction from Microblogs during Emergencies"

- > Developed a system that leverages the information posted on the Twitter microblogging site to monitor and analyse emergency situations.
- > Employed natural language processing techniques to infer the locations mentioned in the microblog text, in an unsupervised fashion and display it on a map-based interface.
- > The system is designed for efficient performance, achieving an F-score of 0.79, and is approximately two orders of magnitude faster than other available tools for location extraction.

Supervisor: [Professor Saptarshi Ghosh](#), CSE IIT Kharagpur

[Twitter](#) [Geolocation](#) [Dash](#) [Python](#) [MongoDB](#) [NLP](#) [ML](#) [Feature extraction](#)

Miscellaneous Projects

- > **"Selective Commenting for Online News Media"** – manuscript targeting ECIR 2019.
NLP Deep Learning Web Design
- > **"Using Global Vectors in Social Interaction Network for Song Recommendation."** – Independent work, extended abstract submitted to CompNet 2018.
Complex Network Facebook Social recommender Music
- > **"How News and Word of Mouth Affects Stock Price."** – System to find relevant news articles causing price fluctuations. Silver at Inter IIT Tech Meet 2017.
Finance Market prediction ML
- > **"Detecting catch phrases in Legal Documents."** – Natural Language Processing Term Project, Autumn 2018.
NLP Legal Document
- > **"Creating embeddings from very large networks."** – Scalable Data Mining Term Project, Autumn 2018.
Spark Scala Hadoop Complex Networks
- > **Android Apps** – Free and Paid apps made as a freelance developer on the Google Play Store and for Startups like Truckerrs.
Android Development UX Design
[Play Store Profile: https://goo.gl/Cbgt9C](https://goo.gl/Cbgt9C)

Awards and Grants

Academic

- 2018 **SGSIS Challenge Grant**
Awarded the SGSIS Challenge Grant worth INR 1 Million for Masters Thesis. Only 9 projects from the Institute qualified.
- 2012 **Mamraj Agarwal Rashtriya Puraskar**
Conferred by the Governor of West Bengal for ranking 5th in India in the ICSE Exams.
- 2010 **NTSE Scholar**
Qualified for the National Talent Search Examination Scholarship conducted by NCERT.

Technical

- 2017 **Inter IIT Tech Meet – Kanpur**
Silver Medal in the Stock Market Analysis Event.
- 2016 **Inter IIT Tech Meet – Mandi**
Gold Medal in the Software Development Event.
- 2015 **YU App Challenge**
(3rd Prize) – at National Level App Making Competition organised by YU Televentures (Micromax).
- 2014 **Flipkart Hackathon**
Podium finish in the Flipkart Hackathon organised at IIT Kharagpur.

Extracurricular

- 2017 **5th Position – Inter Hall General Quiz**
- 2015 **Bronze Medal – Open IIT Bengali Elocution**
- 2011 **Runners Up Team – The Frank Anthony Memorial All India Inter School Debate – Regional Level**
- 2010 **8th Rank – Albert Barrow Memorial All India Inter-school Creative Writing Competition**

Skills

- > **Languages:** C, Java, BASIC, Python and R
- > **Data Science:** Hadoop, Spark, ML
- > **Android Development:** Play Store, freelance
- > **Web:** HTML, CSS, Flask, Mysql, Javascript
- > **Version Control Systems and CI :** Git, Travis, AppVeyor, Codacy
- > **Design:** Photoshop, Illustrator, Justinmind, \LaTeX
- > **Relevant Subjects:** Algorithms, Artificial Intelligence, Machine Learning, Social Computing, Information Retrieval, Computer Architecture and Operating Systems, Regression and Time Series, Financial Analytics, Natural Language Processing, Scalable Data Mining.

Positions of Responsibility

- 2014 – 18 **Advisor, Kharagpur Open Source Society**
Advises a team of 30+ coders who organize events to network and spread awareness about Free and Open Source culture.
- 2016 – 17 **General Secretary Technology, Vidyasagar Hall of Residence**
Handled a tech budget of INR 130K over the academic year.
- 2014–15 **Associate Manager, Entrepreneurship Cell**
Organized Entrepreneurship Drive in Bhubaneswar. 2000 students attended.
- 2017 **Mentor, Google Summer of Code**
Advised a student to finish set goals and monitored pull requests.

References

- > **Dr. Alan Mislove**
Northeastern University
- > **Dr. Abhijeet Chandra**
IIT Kharagpur
- > **Dr. Saptarshi Ghosh**
IIT Kharagpur
- > **Dr. Niloy Ganguly**
IIT Kharagpur
- > **Dr. Debasis Sarkar**
IIT Kharagpur