Amit Roy

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Research Interests

Combinatorics, Complexity Theory, Cryptography, Design and Analysis of Algorithms

Education

Program	Institution	%/CGPA	Year
MS (Computer Science and Engg.)	IIT Madras	**8.0**	2021
B.Tech(Computer Science and Engg.)	IEM Kolkata	**8.61**	2018
XII	Delhi Public School Ranchi	**91.2**	2014
X	St. Xavier's High School Deoghar	**10**	2012

MS Thesis

New Bounds and Variants of VC Dimension of Boolean Function Classes **July 2018 - May 2021**
Advisor- Prof. Jayalal Sarma *IIT Madras*

- **Proved** VC-dimension bounds of family of non-monotone Boolean functions parameterized by alternation.
- **Studied** VC-dimension of families of Boolean functions and its relation with other complexity measures.
- These bounds are used to tell number of **examples** needed to **learn a hypothesis** by a learning algorithm.
- Established VC-dimension bound of AND,OR,Parity,Threshold, Majority, Monotone, k-slice Boolean functions.
- **Proved** NP-hardness and Co-NP hardness of computing VC-dimension.
- **Published** the work in EuroComb-2021 Barcelona

Publications

- **Amit Roy** and Jayalal Sarma, **On Alternation, VC-dimension and k-fold Union of Sets**, *EuroComb*21 at Barcelona. **DOI**: 10.1007/978-3-030-83823-2_108
- J. Siddiquee, **A. Roy**, A. Datta, P Sarkar; S. Saha, S S Biswas, **Smart Asthma Attack Prediction System using Internet of Things**, IEEE IEMCON 2016. **DOI**: 10.1109/IEMCON.2016.7746252
- **A Roy**, A Datta, J Siddiquee, B Poddar, B Biswas, S Saha, P. Sarkar, **Energy Efficient Data Centers & Smart Temperature Control System with IoT Sensing**, IEEE IEMCON 2016. **DOI**: 10.1109/IEMCON.2016.7746251
- **A Roy**, J Siddiquee, A Datta, P Poddar, G Ganguly, A Bhattacharjee, **Smart Traffic & Parking Management using IoT**, IEEE IEMCON 2016. **DOI**: 10.1109/IEMCON.2016.7746331

Work Experience

Cisco Systems India - Software Engineer in the Webex Collaboration team **Aug-2021 -** present
- Worked on Webex Collaboration team to build a strong calling platform.
- Implemented and tested codes for features such as Call Recording, Automatic Callback, Call Forwarding etc.

Indian Institute of Technology Madras- Teaching Assistant
- Introduction to Programming **Jul 18 - May 19**
  - **Mentored** and guided **15 non-Computer Science** students in learning **Programming in C**.
- Advanced Data Structures & Algorithms **Jul - Nov 2019**
  - **Assisted** 14 first year MTech students in understanding the subject matter.
  - Responsible for making and evaluating assignments, quizzes and invigilation.
- Pseudorandomness **Jan - May 2020**
  - **Helped** students to read their first **technical research paper**.
  - Responsible for evaluating assignments,quizzes, invigilation and attendance.

Course Projects

1. Mystery of Negations (CS6840) *IIT Madras, Jan-May 2019*

- Presented the paper Mystery of Negations and demonstrated the proofs and ideas in the class.

2. Elementary construction of Expanders (CS6845) *IIT Madras, Jan-May 2019*
- Demonstrated the ideas involved in the proofs in the paper for construction of constant degree expanders.

3. Stop and Wait Protocol (Computer Networks) *IEM Kolkata, Jan-May 2017*
- Implemented Stop and Wait Protocol for file transmission using Java Socket Programming.

4. Multi Client-Server File Transfer Protocol *IEM Kolkata, May 2017- April 2018*
- Designed a platform independent File Transfer Protocol which could handle multiple client requests.

Course Works and Certifications

Algorithmic
- Advanced Data Structures & Algorithms
- Sublinear Algorithms
- Approximation Algorithms(Audited)

Mathematical Toolkit
- Computability and Complexity
- Pseudorandomness
- Modern Complexity Theory

Systems
- Computer Networks
- Operating Systems

Data Analytics
- Data Analysis with Python: Zero to Pandas

Participation in Seminars and Conferences

- European Conference on Combinatorics, Graph Theory and Applications held at Barcelona (Online)
- Indo-US workshop on Pseudorandomness held at IISc Bangalore .
- Foundations of Software Technology and Theoretical Computer Science-2019 held at IIT Bombay.
- Graphs, Structures and Algorithms(Nov-2019) held at IMSc Chennai.
- Sensitivity, Query and Communication Complexity and Analysis of Boolean Functions held at ISI Kolkata.

Scholastic Achievements

- Obtained **99.11 percentile** in GATE CS 2018.
- Secured All India Rank 28 in Indian Engineering Olympiad 2017.

Skills and Tools

- **Languages**: *Proficient*- C, C++, Java; *Prior Experience*- Python, HTML, SQL
- **Advanced Java**: Maven, Spring, Spring Boot, JUnit, Mockito, PowerMock
- **Softwares**: LaTeX, GitHub, SVN
- **Libraries**: Numpy, Pandas, Matplotlib, Seaborn

Positions of Responsibility

Class Committee Representative
- **Resolved** Research Scholars' course related **grievances** such as evaluation policy and delivering **feedbacks**.
- **Helped** course instructors in tuning courses to benefit Research Scholars as well as other non-CS participants.

Extra Curricular Activities

- Runner up in CS-Trophy 2020 cricket tournament.
- Participated in Samanvay Marathon 2019 organised by DoMS IIT Madras.
- Participated in CS-Trophy 2020 Volleyball tournament and Mahanadhi Hostel Team for Schroeters 2020.