Sambaran Bandyopadhyay

Contact Address

Dept. of Computer Science & Automation,
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Education

- Master of Engineering in Computer Science and Engineering
  Dept. of Computer Science and Automation (CSA)
  Indian Institute of Science (IISc), Bangalore, India
  Cumulative GPA (Current): **6.9 out of 8.0** August 2011-July 2013

- Bachelor of Technology in Computer Science and Engineering
  Dept. of Computer Science and Engineering (CSE)
  Institute of Engineering and Management (IEM), Kolkata, India
  under **West Bengal University of Technology**, Kolkata, India
  Degree GPA: **8.98 out of 10.0** August 2007-July 2011
  GATE 2011 All India Rank: 22 (Percentile Score: 99.98)

- School
  Hooghly Branch Govt. School, Hooghly, West Bengal, India
  Higher Secondary Examination: 83.57% (Board: WBCHSE) 2007
  Secondary Examination: 88.50% (Board: WBBSE) 2005

Research Experience

- Research Project Work
  Dept. of Computer Science and Engineering (CSE)
  Indian Institute of Technology (IIT), Kharagpur, India August 2010-July 2011

- Summer Internship
  Dept. of Computer Science and Engineering (CSE)
  Indian Institute of Technology (IIT), Kharagpur, India June 2010-July 2010

Subjects of Interest

- Current Research Interests: **Machine Learning, Data Mining, Game Theory, Algorithms**
- Previous Research Experience: **Reversible Digital Watermarking, Cellular Automata**

Technical Qualifications

- Computer Languages : C, C++, Java, HTML, SQL
- Assembly Language : Intel 8085 Micro-Processor
- Software Tools : MATLAB, LaTeX, gem5 Simulator
- Operating Systems : Windows, Linux

Courses taken at the Graduate Level

- Topics in Pattern Recognition; Data Mining; Machine Learning; Game Theory; Information Theory, Inference & Learning Algorithms; Probability and Statistics; Design and Analysis of Algorithms; Automata Theory and Computability; Computer Architecture; Network Distribution & Security Services; Number Theory (Audit); Linear Algebra & Applications (Audit); Computational Methods of Optimization (Audit)

Graduate Project Work

- **Topic : A Framework for Incremental Clustering (2012, Ongoing project)**
  - **Advisor : Prof. M N Murty**, Department of CSA, **IISc, Bangalore**.

    An Axiomatic Framework for Incremental Clustering has been designed and a new one data set scan clustering algorithm to satisfy all the properties (constrained appropriately) of this framework, is proposed. **This work has been submitted to IJCAI, 2013.**

- **Topic : Topic Modeling and Problems of High Dimensionality (2012, Ongoing project)**
  - **Advisor : Prof. M N Murty**, Department of CSA, **IISc, Bangalore**.

    We study Topic Modeling and application of LDA and its extension to assign topics to a *soft-paragraph* level. We are also trying to give a theoretical explanation for the peculiar nature of distance metrics and intelligent algorithms in high dimensional spaces.

- **Topic : Prediction Market (2012)**
  - **Advisor : Prof. Y Narahari**, Chairman, Department of CSA, **IISc, Bangalore**.

    We investigate about prediction markets and derive theoretical results on the implemental issues of the **Spherical Scoring rule**. We also develop an **IISc-wide web application** using open source **Zocalo Framework** to implement a prediction market based on **IPL 2012**.

- **Topic : Cache Prefetching using Semi-Markovian Model with Smoothing Technique (2011)**
  - **Advisor : Prof. R Govindarajan**, Chairman, Department of Super Computer Education & Research Center, **IISc, Bangalore**.

    We propose and implement (using gem5 Simulator) a **Semi-Markovian technique** that uses previous Cache Miss Information to predict the future misses in advance. We also use some kind of **smoothing technique** to avoid over fitting of this model.

Undergraduate Project Work

- **Topic : Reversible Image Watermarking with High Embedding Capacity (2010 – 2011)**
  - **Advisor : Dr. R S Chakraborty**, Department of CSE, **IIT, Kharagpur**.

    We develop two novel reversible digital watermarking methods with high embedding capacity using Integer Wavelet Transform. **We have two international publications based on the work done in this project.**

- **Topic : Cryptography-Diffie-Hellman Key Exchange Through Elliptic Curve Method (2010 – 2011)**
  - **Advisor : Prof. M Samanta**, Department of CSE, **IEM, Kolkata**.

    We study and implement various aspects of Diffie-Hellman two party key agreement protocol and its Elliptic Curve variant.

- **Topic : Study of Non-Linear Cellular Automata (Summer Internship, 2010)**
  - **Advisor : Dr. D Mukhopadhyay**, Department of CSE, **IIT, Kharagpur**.

    We consider a cellular space and experiment with different functions on this space and try to give rigorous mathematical explanation to some observed properties. **This work has been presented in a seminar at IISc, Bangalore in the month of December, 2011**.

Major Academic Achievements and Honors

- Secured **All India Rank 22** (among a **total of 136,027 candidates**) in **GATE 2011**.
- Presently receiving **Scholarship** from ***Ministry of Human Resource and Development*** (**MHRD**), Government of India (2011-2013) for higher studies at Indian Institute of Science, Bangalore.
- Was **invited to review a paper** in **IEEE Transactions on Information Forensics & Security**.
- **Ranked 73** in National Merit Scholarship Scheme of Government of India on the result of Madhyamik Pariksha (Secondary Examination) in 2005.
- Have experience in **presenting** and **publishing** research work in International Conferences.
- Received **Certificates of Merit** for outstanding performance in both Madhyamik examination (2005) and Higher Secondary examination (2007) from the **Teachers Association of WBUAFS** and **Hooghly- Chinsurah Municipality**.
- Was a **Question Setter** in GATE FORUM for the subjects like Algorithms, Compilers, Automata Theory and Computability designed for GATE aspirants.

Publications

- ***Sambaran Bandyopadhyay***, *M Narasimha Murty: Submitted a paper in* ***23rd. International Joint Conference on Artificial Intelligence (IJCAI)*** *2013, Beijing, China (Under Review).*
- ***Sambaran Bandyopadhyay***, *Ruchira Naskar and Rajat Subhra Chakraborty,* ***Reversible Watermarking Using Priority Embedding through Repeated Application of Integer Wavelet Transform****, International Conference on Security Aspects in Information Technology, High-performance Computing and Networking (InfoSecHiComNet) 2011, Haldia, West Bengal, India. Published in Lecture Notes in Computer Science, vol. 7011, pp. 45-56, 2011.*
- ***Sambaran Bandyopadhyay***, *Ruchira Naskar and Rajat Subhra Chakraborty,* ***Reversible Digital Watermarking using Integer Wavelet Transform****, International Conference on Scientific Paradigm Shift in Information Technology and Management (SPSITM), 2011, Kolkata, India.*

Extra Curricular Activities And Hobbies

- Participation in Online Programming Contests like SPOJ.
- Social Work, Film Making (Participated in **HYUNDAI FILM CARE contest**).
- Painting, playing computer games, playing Chess, Soccer, Cricket.

Personal Details

- **Date of Birth** : August 08, 1989
- **Nationality** : Indian
- **Sex** : Male
- **Mother's Name** : Mrs. S. Banerjee (*Teacher*)
- **Father's Name** : Dr. A. K. Bandyopadhyay (*Professor, Ex-Vice-Chancellor, WBUAFS, Kolkata*)
- **Languages Known** : English (*with Full Professional Proficiency*), Bengali and Hindi
- **Permanent Address** : 29/10, Goaltuli, Durgatala, Hooghly, WB, India, Pin Code: 712103

References

- **Dr. M. Narasimha Murty** , Professor, CSA, IISc, Bangalore
  Email: `mnm@csa.iisc.ernet.in`
- **Dr. Y. Narahari** , Professor & Chairman, CSA, IISc, Bangalore
  Email: `hari@csa.iisc.ernet.in`
- **Dr. Rajat Subhra Chakraborty**, Assistant Professor, CSE, IIT, Kharagpur
  Email: `rschakraborty@cse.iitkgp.ernet.in`
- **Dr. Indrajit Bhattacharya**, Research Scientist, IBM Research
  Email: `indrajitb@gmail.com`