Soumali Roychowdhury
PhD. Computer Science(Pursuing)
IMT School of Advanced Studies

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Objective: Seeking internship in an organization so as to hone my technical skills and to be a part of the projects which will provide me enough challenges and opportunities to learn and grow while meeting organizational needs.

Academic Qualifications

Year	Degree	Institute	GPA/Grade
2014-present	PhD.Computer Science	IMT School of Advanced Studies	-
2011-2013	MSc.Cybernetics	University of Reading,UK	Distinction
2005-2009	B.Tech Computer Science	Maulana Abul Kalam Azad University	9.6(10 scale)

Technical Skills

- **Numerical Analysis and Computer Science:** Machine Learning, Advanced Neural Networks, Logic Systems, Computer Vision, Pattern Recognition, Data Structures and Algorithms, Data Mining, Optimization, Advanced Operations Research, Artificial Intelligence, Linear Algebra, Signal Processing, Database Management and Operating Systems
- **Programming** C++, C, CUDA, Python, Java, Lua, R, HTML
- **Libraries** Caffe, OpenCV, Torch
- **Platforms** Matlab, Blender, Maya, Linux, Eclipse, Visual C++, VB. Net, Git
- **Documentation** Microsoft Office, LateX,

Research Projects and Work Experience

- **Injection of Logic Constraints in Deep Convolutional Neural Networks** Siena, Italy
  PhD Student at IMT School of Advanced Studies *May, 2016 - Present*
  - Integrating first order logic clauses with labelled data examples creating a semi supervised learning framework used for image classification problem.
  - Inductive (machine learning using only supervised examples) and deductive (learning with logic clauses) form of learning when integrated gives higher accuracy and is more generic form of learning.
  - The framework is developed (under the supervision of Prof. Michelangelo Diligenti) in C++ and Caffe.
  - Image classification experiments using Imagenet-2012 is performed on GPUs using CUDA.
  - This is my current research work and it will be extended to solve many real world image classification problems.
- **Protein Classification using Logic Constraints in Deep Net** Siena, Italy
  PhD student at IMT School of Advanced Studies *August, 2015 - April, 2016*
  - Developed a framework that integrated logic constraints with shallow networks like kernel machines and multi-layered neural networks.
  - Comparison of classification accuracy of protein classification between logic integrated shallow networks and deep networks.
  - This project was developed in C++ (under the supervision of Prof. Marco Gori and Prof. Michelangelo Diligenti) and the journal article on this will. be submitted soon.

- **Multiclass Image Classification** Lucca, Italy
  PhD Student at IMT School of Advanced Studies *November, 2014 - July, 2015*
  - Coursework project developed to compare the classification accuracy of different deep frameworks like deep auto-encoders, deep convolutional neural networks, deep restricted boltzmanns' machines on CIFAR-10 image classification problem.
  - This project was developed in Matlab under the supervision of Prof. Sotirios Tsaftaris.

- **Terahertz Spectrocopic Measurements** Marburg, Germany
  Research Intern in University of Marburg *May, 2014 - October, 2014*
  - This project dealt with taking terahertz spectroscopic measurements from plant leaves. These images were analysed to study the water content in leaves of plants in different climatic conditions.
  - This application was developed in Python under the supervision of Prof. Martin Koch.

- **Feasibility study for Detection of Contaminants** Didcot, UK
  Research Assistant in Lime Tree Innovation *January, 2014 - April, 2014*
  - Feasibility study and literature survey on hyper spectral and multispectral imaging in the detection and identification of contaminants and adulterants in food, beverage and pharmaceutical products.

- **Automatic Vehicle Detection and Tracking** Kolkata, India
  Researcher in Videonetics Technology Pvt. Ltd. *May, 2013 - January, 2014*
  - Video management software was developed to recognize characters from the license plates of moving vehicles for automatic and robust tracking of the traffic.
  - The application was developed in C++.

- **3D Reconstruction Techniques** Saarbruecken, Germany
  Research Intern in Max Planck Centre for Computer Sciences *Summer 2013*
  - Implemented algorithms for 3D scene reconstruction from multiple 2D images of the same object from different angles
  - Worked as an intern on one part of this project implementing it in C++ under the supervision of Prof. Christian Theobalt.

- **Logo Detection from Document Images** Kolkata, India
  Research Intern at Indian Statistical Institute *January, 2013 - April, 2013*
  - Developed an algorithm to perform document image retrieval by detecting the logos in the large Tobacco800 database.
  - This application was developed in Java under the supervision of Prof. Bidyut Baran Chaudhuri.

- **Revealing The Wall Paintings At Çatalhőyűk** Reading, UK
  Masters' Student at the University of Reading *Summer 2012*
  - Developing signal and image processing methodologies for spectral analysis of the reflected Terahertz radiations to differentiate the obscured pigments hidden behind the walls of plaster in the archaeological site at Çatalhőyűk.
  - This project was developed as my masters' thesis in Matlab under the supervision of Prof. John Bowen.

- **Conway's Game of Life(extended with new rules)** Reading, UK
  Masters' Student at the University of Reading *March, 2012 - May, 2012*
  - An applet was designed demonstrating various rules of Game of life and variations of its patterns. Some innovative patterns were developed following the rules of evolution.
  - The project was developed in Java under the supervision of Prof. Slawomir Nasuto.

- **Channel Logo Recognition for Home Infotainment Platform** Kolkata, India
  Researcher in Innovation Laboratory, Tata Consultancy Services *December, 2009-December, 2010*
  - Application developed to automatically detect the logo region (of TV channels) from streaming video sequences.
  - Developed in Visual C++ and ported into DSP Boards using X-DIAS programming.

- **Profiler for cricketing performance- Natural Language Processing** Kolkata, India
  Graduate Student at West Bengal University of Technology *December, 2008- January, 2009*
  - Developed an application to rank cricketers based on a specified cricketing style using a Naive Bayes classifier and collecting data from a corpora obtained from Cricinfo.
  - The application was developed in C++.

- **Text-based image Extraction From Streaming Video Sequences** Kolkata, India
  Research Intern in Tata Consultancy Services *September, 2008 - June, 2009*
  - Using machine learning algorithms for the recognition of text-based images in video frames for video indexing and video summarization.
  - Application was developed in C++ under the supervision of Dr. Tanushyam Chattopadhyay.
- **MEMS data interpretation for gesture based interaction in set-top box** Kolkata, India
  Reserach Intern in Innovation Laboratory, Tata Consultancy Services *Summer 2008*
  - An algorithm for interpreting MEMS data that allowed users to use the sensor as a mouse pointer(like channel/volume up/down)or as an alternative to keyboard (by writing an English alphabet in capital letter) to give gesture input to an interactive Set Top Box for performing the desired actions described by gestures.
  - The application was developed using Visual C++.
- **Library Management Project** Kolkata, India
  Reserach Intern in CMC Ltd. *Summer 2007*
  - Developed a data management software in Visual .NET
  - The software helped in keeping track of books, users and transactions made in the Kolkata Central library.

Publications and Patents

- **Patent: Logo Recognition, WO2012093407 A2**, 2012
- **Injection of Logic Constraints in Deep Convolutional Networks**, writing in progress
- **Protein Classification using Logic Constraints in Neural Networks**, To be submitted
- **Multiclass Image Classification in a Deep learning Framework**, writing in progress
- **Signal processing Techniques to Extract Information in noisy Terahertz Parametric Images from real world environments**, submitted in The Transactions of Image Processing, 2016
- **Image Retrieval Techniques for THz Applications in Cultural Heritage**, Invited paper, in the proceedings of International Conference on Infrared, Millimeter and Terahertz Waves, 2013.
- **Sub-surface Terahertz Imaging through Uneven Surfaces: Visualizing Neolithic Wall Paintings in Çatalhőyűk** in Optics Express,Vol. 21, Issue 7, pp. 8126-8134 (2013)
- **Experiences in the CAVE: An Immersive Virtual Reality Environment** submitted to the University of Reading students workshop, 2012
- **Offered an invited talk** in IEEE National Conference on Computing and Communication Networks (ICCN), India, 2012
- **Recognition of channel logos from streamed videos for value added services in connected TV**, in the proceedings of International Conference on Consumer Electronics (ICCE), 2011
- **Participated in student workshop on Embedded Systems in the Vector Institute, Hyderabad in 2010**
- **An Approach for Interpretation of MEMS Data for Gesture Based Man Machine Interaction in Advanced Set-top Box** in the proceedings of Computational Intelligence, Communication Systems and Networks (CICSYN), 2009
- **Masters' Thesis: Seeing Through the Walls: Revealing The Wall Paintings At Çatalhőyűk** under the supervision of Prof. John Bowen (University of Reading)
- **Bachelors' Thesis: Image Extraction from Video Sequences for Video Indexing and Video Summarization** under the supervision of Dr. Tanushyam Chattopadhyay(senior scientist, TCS)

Awards and Recognitions

- **Won the prestigious Felix Scholarship in 2011**(being the only masters' student selected from India to study in UK), £ 35,000 a year
- **IMT scholarship recipient in 2014** being amongst the top-5 from 5000 students competing internationally
- Won the Best All-rounder of the college award(Gold medal) in 2006, 2007, 2008 and 2009
- Secured a rank in the top 1% of all Engineering students at WBUT: Maulana Abul Kalam Azad University of Technology in 2009
- Among the top 1% in Indian National Mathematics Olympiad 2004
- All India Rank 265, Rank in Mathematics 92, in National Science Talent Search Examination 1999
- Won the Youth Leadership award in the community
- Won several gold medals in Inter-school and state-level Athletics in India