Shubhangi Ghosh | Curriculum Vitae

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Education

- **Bachelor of Technology** **July 2015–Present**
  Electrical Engineering

  CGPA: 9.1/10
  Research Interests: Machine Learning, Deep Learning, Natural language Processing
  Relevant Courses: Machine Learning, Deep Learning, Natural language Processing, Convex Optimisation, Probability, Statistics, and Stochastic Processes, Linear Algebra, Data Structures and Alorithms

Research Experience

Bachelor's Thesis Project

Graph Convolutional Networks for solving math word problems **Jul 2018–Present**

- *Indian Institute of Technology Madras*
  Guide: Prof. Mitesh Khapra
  - This project proposes the use of Graph Convolutional Networks (GCNs) for modelling the hierarchical structure of math word problems. The GCN embeddings are used to obtain the output equation template using an attention-based seq2seq model.
  - Pointer-generator framework is used to fill in the number slots in the template.

Research Projects

Mathematical Interpretation of Convolutional Networks for Image Deblurring **Jul 2018–Present**

- *Indian Institute of Technology Madras*
  Guide: Prof. Avhishek Chatterjee
  - This project attempts to interpret state-of-the-art techniques for blind non-uniform image deblurring using Convolutional Neural Networks (CNNs) in the form of a Maximum-A-Posteriori formulation.

Time Series Forecasting **May 2018–Jul 2018**

- *Nanyang Technological University, Singapore*
  Guide: Prof. Suresh Sundaram
  - This project involved working on time series forecasting algorithms which were further tested on synthetic dynamical system identification problems and chaotic time series problems.
  - The novelty of this project is to have introduced recurrence in fuzzy inference systems, while using a faster one-shot projection based learning algorithm for time series forecasting.
  - This enabled our algorithm to be around ten times faster than previous algorithms, while also achieving similar or better accuracy. This work has been accepted by the **IEEE SSCI conference 2018**. [CONFERENCE PAPER]

Automatic Speech Recognition for Indian Languages **Nov 2017–Aug 2018**

- *Indian Institute of Technology Madras*
  Guide: Prof. S.Umesh
  - The project involved exploring, implementing and experimenting with methods ranging from the classical Automatic Speech Recognition (ASR) models to the current state-of-the-art End-to-End Encoder-Decoder framework for speech recognition.
  - Furthermore, it involved collecting, processing and standardizing native language text to create a over 15 million word corpus to train a RNNLM (Recurrent Neural Network Language Model) for the languages Tamil, Telugu and Gujarati. [REPORT]

Extraction of Defnitional Sentences **Jan 2018–Apr 2018**

- *Indian Institute of Technology Madras*
  Guide: Prof. Sutanu Chakraborti
  - The Word Class Lattice approach to extract definitional sentences within texts was implemented and analyzed, where lexicosyntactic patterns of definitional sentences were organised as a directed graph to improve generalisation.
  - Based on our analysis of the WCL model, modificaitons were proposed and implemented. The modifications were primarily aimed at embedding syntactic knowledge into the existing WCL model and hence achieved better performance measures than before. [REPORT]

Number theory study **May 2016–Jul 2016**

- *Indian Statistical Institute Bangalore*
  Guide: Prof. B. Sury
  - This project involved the study of proofs of congruence theorems such as Fermat's theorem, Euler's theorem and Chinese Remainder Theorem and solving numerical problems based on the aforementioned concepts. [REPORT]

Industrial Experience

Defence Research and development Organization **May 2017–Jul 2017**

- *Manager: Regu Kumar*
  Mentor: Alka Soni *Bangalore, India*
  The project was aimed at building a Real Time Executive for a Avionics system. It involved developing optimized code for task scheduling, interrupt handling and context switching for PowerPC P1024RM processor, e500v2 core. [REPORT]

DrumUP Bangalore **May 2017–Jul 2017**

- *Manager: Vishal Dutta*
  Mentor: Raghavendra Kumar *Bangalore, India*
  The internship involved developing Javascript applications to edit images and add captions online and download analytics reports as CSV files from the DrumUp web frontend.

Awards and Fellowships

- **INSPIRE Fellowship**: The INSPIRE Fellowship is offered by the Govt. Of India to students who feature in the national top 1 percent of students among those taking the CBSE board Class XII Exam.
- **Certifcate of Merit** received from the HRD Ministry, Govt. of INDIA for CBSE class X Exam, 2012.

Skills and Tools

- **Programming languages**: C, Python, C++, Bash, TEX
- **Libraries**: TensorFlow, Scikit-learn
- **Applications and Tools**: Embedded C, Scientifc Python, MATLAB, Octave, LTSpice
- **Operating Systems**: Linux, Windows

College Activities

- **The Fifth Estate Correspondent**: The Fifth Estate is the student media body of IIT Madras. Apr 2017–Present
- **Shaastra Web-Operations Coordinator** Shaastra is the annual technical festival of IIT Madras. May 2016–Jan 2017

Extra-Curricular Activities

- **Sports**: Jul 2015 - May 2016
  Was a part of the National Sports Organisation trained swim team in my first year of college..
- **Music**
  Certified to have completed Grade 3 Keyboard Examination by Trinity College, London.
  Active participant of several events organised by Music Club, IIT Madras.