

Somshubra Majumdar

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Education

University of Illinois at Chicago

Masters in Computer Science (GPA 3.77 / 4.0) (OPT)

Chicago, Illinois

2017 - 2018

University of Mumbai

Bachelor of Engineering in Computer Science (CGPA 8.0 / 10.0)

Mumbai, Maharashtra

2012 - 2016

Technical Skills

Programming: Proficient : Python, Java, Android, **Intermediate:** C#, C, C++

Deep Learning Frameworks: Tensorflow, PyTorch, Keras, Theano

Relevant Experience

Research Assistant at Prominent Group (UIC)

Chicago, Illinois

Professor Houshang Darabi - Time Series Classification with Deep Learning

May, 2017 - Present

- I. Published two papers on hybrid LSTM Fully Convolutional Neural Networks which obtain state of the art scores on UCR univariate and multivariate time series classification datasets.

Research Assistant (UIC)

Chicago, Illinois

Professor Bing Liu - Lifelong Deep Learning

August, 2017 - December, 2017

- I. Performed research on how to avoid the catastrophic forgetting issue when training neural networks on new tasks or when finetuning models on vastly different domains.

Muktangan (NGO)

Mumbai, Maharashtra

Application Developer

January - July 2015

- I. Designed and implemented an automatic timetable generation software in C# and Visual Studio to manage and create non-conflicting timetables for 7 schools of Muktangan in Mumbai.
- II. Implementation of a student grade assessment tool in C# and Visual Studio to grade students proficiencies and determine how to aid their academics by analysing the skill level in that subject, and can recommend if the student should take supplementary classes.

Horizon Solutions

Mumbai, Maharashtra

Co-founder, CTO / Software Engineer

January 2015 - July 2016

- I. Founded to provide software solutions to local business and clients. Developed multiple applications in Java / Android / C#.
- II. Tasked with managing the codebase, incorporate machine learning and manage database and backend infrastructure of the projects.

Relevant Projects

- I. Implemented **Neural Style Transfer** from the paper "A Neural Algorithm of Artistic Style" in Keras. Includes several improvements from various other papers such as **Color transfer, Multi style transfer and Masked style transfer. (1200+*)** <https://github.com/titu1994/Neural-Style-Transfer>
- II. Implemented **Image Super Resolution** neural network models such as SRCNN, Denoise SRCNN, SRResNet and ESPCNN **which can upscale an image** with reduced loss of details. **(350+*)** <https://github.com/titu1994/ImageSuperResolution>

- III. Implemented **Neural Image Assessment**, trained on the AVA dataset to evaluate how visually impressive an image is. (200+*) <https://github.com/titu1994/neural-image-assessment>
- IV. Implemented **deep convolutional neural network classifiers** in Keras, such as Wide Residual Networks, DenseNets, Inception Res-Net v2, ResNeXt, MobileNets, Squeeze-and-Excitation Networks, NASNet. (200+*) <https://github.com/titu1994/Keras-Classification-Models>
- V. Created a hybrid **Long Short Term Memory RNN - Fully Convolutional Network (LSTM-FCN)** which outperforms all other state of the art models on 85 UCR univariate time series datasets. (100+*) <https://github.com/titu1994/LSTM-FCN>
- VI. Improved **LSTM-FCN model to be used with Multivariate Time Series datasets**, called Multivariate LSTM-FCNs which obtain state of the art performance on 28 out of 35 multivariate datasets. (50+*) <https://github.com/titu1994/MLSTM-FCN>
- VII. Implemented **Neural Architecture Search used by Google for their AutoML project**, which uses a Controller RNN to train and optimize the structure of children models to obtain high performance architectures automatically. (100+*) <https://github.com/titu1994/neural-architecture-search>. A recent update to this was **Progressive NAS**, which uses Sequential Model-Based Optimization to quickly obtain the best model for a search space using fewer number of models trained. (35+*) <https://github.com/titu1994/progressive-neural-architecture-search>.
- VIII. Wrote a **python library, PySHAC**, which applies **Sequential Halving and Classification** to reduce the search space, which can be used to perform architecture search or hyperparameter optimization in an efficient manner. <https://github.com/titu1994/pyshac>
- IX. Implemented the **Fully Connected DenseNet for Semantic Segmentation** which improves upon SegNet and U-Net on various public benchmarks such as Pascal VOC and CamVid. (70+*) <https://github.com/titu1994/Fully-Connected-DenseNets-Semantic-Segmentation>

Research Papers

- I. Author of the paper “*LSTM Fully Convolutional Network for Time Series Classification*”, which is a hybrid model of LSTM and FCN. Accepted at IEEE Access and published in IEEE Transactions : <http://ieeexplore.ieee.org/document/8141873/>
- II. Co-author of the paper “*Multivariate LSTM-FCNs for Time Series Classification*”, which extends the above model to multivariate time series datasets. Can be viewed at: <https://arxiv.org/abs/1801.04503>
- III. Co-author of “*Microaneurysm Detection using Fully Convolutional Neural Networks*”, which obtains state of the art results on semantic segmentation of microaneurysms in fundus photography. Accepted in the *Journal of Computer Methods and Programs in Biomedicine* : <https://www.sciencedirect.com/science/article/pii/S0169260717308544>
- IV. Author of “*Parallel Quick Sort using Thread Pool Pattern*”, a paper on the utilization of thread pools to improve the time and space complexity of Quicksort. It can be viewed at : <http://www.ijcsit.com/docs/Volume%207/vol7issue2/ijcsit2016070209.pdf>
- V. Author of “*AdaSort: Adaptive Sorting using Machine Learning*”, a paper which described utilization of machine learning to create a meta sorting algorithm to select the best sorting algorithm for a given arrayset. <http://www.ijcaonline.org/archives/volume145/number12/majumdar-2016-ijca-910726.pdf>

Extracurricular Activities

- Won First prize at Emirates Carnegie Mellon CMU Machine Learning & AI Hackathon
- Completed Deep Learning courses 1-5 by Andrew Ng on Coursera