Somshubra Majumdar

titu1994@gmail.com

Address: 809 S. Damen Avenue, SSR 1513A, Chicago IL, 60612 **Phone:** +1 (312)-623-6795
Github: http://github.com/titu1994/ **LinkedIn**: linkedin.com/in/somshubramajumdar
Website: http://titu1994.github.io/

Education

University of Illinois at Chicago Chicago, Illinois
Masters in Computer Science (GPA 3.77 / 4.0) (OPT) 2017 - 2018

Dwarkadas J. Sanghvi College Of Engineering Mumbai, Maharashtra
Bachelor of Engineering in Computer Science 2012 - 2016

Technical Skills

Programming: **Proficient** : Python, Java, Android, **Intermediate:** C#, C, C++
Deep Learning Frameworks: Tensorflow, Theano, Keras

Relevant Experience

Collaboration with Prominent Group (UIC) Chicago, Illinois
Professor Houshang Darabi - *Time Series Classification with Deep Learning* May, 2017 - May, 2018

Research Assistant (UIC) Chicago, Illinois
Professor Bing Liu *- Lifelong Deep Learning* August, 2017 - December, 2017

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 student proficiencies and determine how to aid the student's academics by analysing the student's 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 algorithm 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 reconstruction loss of details. **(350+*)** https://github.com/titu1994/ImageSuperResolution
III. Implemented Neural Image Assessment, trained on the AVA dataset to evaluate images on how visually impressive they are, using several models. **(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 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

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Research Papers

I. Author of the paper "***LSTM Fully Convolutional Network for Time Series Classification***", which is a hybrid model of LSTM and FCN, which obtains state of the art in 65 out of the 85 UCR univariate time series datasets, beating all previous state of the art models on many tasks. Accepted at IEEE Access. 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. Utilizing *"Squeeze-and-Excitation"* mechanism, we were able to get state of the art results on 28 datasets out of 35. Submitted for review at IEEE Transactions on Neural Networks and Learning Systems. 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. Currently under review 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, which is shown to be over 2.5 times as fast as the inbuilt Java method of Arrays.sort() and is 20% faster than the inbuilt method Arrays.parallelSort() without requiring the additional O(n) working memory. 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. It also discusses the optimizations to the AdaSort algorithm, which allow for such adaptive behavior, while minimizing the overhead required for the decision process. View at : http://www.ijcaonline.org/archives/volume145/number12/majumdar-2016-ijca-910726.pdf

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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