SWATI

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EXPERIENCE & EDUCATION

Researcher, TCS Innovation Labs, New Delhi *July 2016 - Present*
Research Interest: Deep Learning and its applications in Computer Vision

Master of Technology in Communications and Signal Processing *July 2014 - June 2016*
Department of Electrical Engineering Overall GPA: 9.03/10
Indian Institute of Technology (IIT), Hyderabad

Bachelors of Engineering in Electronics and Communications *July 2010 - June 2014*
Department of Electrical Engineering Overall GPA: 8.67/10
University Institute of Engineering and Technology, Panjab University, Chandigarh

PUBLICATIONS AND PATENTS

- ***Swati***, G. Gupta, M. Yadav, M. Sharma, Lovekesh Vig, *"Siamese Networks For Chromosome Classification"*, Bioimage Computing (BIC) workshop, **ICCV** 2017.
- G. Gupta, ***Swati***, M. Sharma, Lovekesh Vig, *"Information Extraction from Hand-marked Industrial Inspection Sheets"*, CBDAR workshop, **ICDAR** 2017.

RESEARCH PROJECTS

Automatic Karyotyping of Human Chromosomes in Cell Images August 2016 - Present
Advisors: Dr. Lovekesh Vig and Dr. Gautam Shroff, TCS Innovation Labs

- The aim of this work is to assist doctors by automating the karyotyping process which is usually carried out manually for the diagnosis of various birth defects or other bio-medical disorders.
- Karyotyping consists of two stages, namely, segmentation of chromosomes from Q-banded prometaphase images and classification of the segmented chromosomes into one of the 23 classes of chromosome pairs.
- Our focus is on developing an end-to-end pipeline system that will perform segmentation as well as classification with a very limited amount of labeled data.

Information extraction from Document Images April 2017 - Present
Advisors: Dr. Lovekesh Vig and Dr. Gautam Shroff, TCS Innovation Labs

- While supervising large equipments (such as gas turbines), engineers take notes of potential cracks/defects on inspection sheets which are later utilized to register in system log.
- We have built an automated multi-stage system consisting of text region localization using image processing, character/digit classification using deep neural networks and filling log via text classification.
- Our work has enabled an effective automated method of extracting information from the inspection documents and also ease the process of populating information or observations in the log files.

Acoustic Segment Modeling(ASM) using Spectral Clustering techniques Jan 2015 - June 2016
M.Tech Thesis Project, Advisor: Dr. K. Sri Rama Murty, IIT Hyderabad

- Motivated by the fact that transcribing speech is laborious, we attempted to build unsupervised methods for acoustic segment modeling (ASM), i.e. finding underlying phoneme-like speech units.
- ASM involved three stages: a) initial segmentation of speech waveform using a thresholded distance, b) labeling of segments using clustering and c) an iteratively purification of segment boundaries.
- We utilize the posterior distribution over the clustering components as a feature representation, for the task of language identification. We found that such a feature representation is effective when utilized in conjunction with supervised models, hence reducing the requirement of labeled data.

ACADEMIC PROEJCTS

Kaggle Challenges
Course: Deep Learning, TCS Innovation Labs

- **Expedia Hotel Recommendation**: Deep auto-encoder neural networks were explored for the task of recommending hotels given a user profile and previous history.
- **Facial Keypoint Detection**: Deep convolutional neural network were trained to estimate the key-points on the face images of various subjects.
- **Forcecast Eurovision Voting**: We have trained an LSTM based recurrent neural network to predict the short-term movements in stock prices based on text available from news data.
- **Quora Question Pair Classification**: An LSTM based Siamese of recurrent neural network was trained to perform classification of whether or not a pair of questions have the same intent.

Shadow Removal and automatic segmentation in OCT images of Optic nerve head
Course: Image and Video Processing, IIT Hyderabad

- Our aim was to improve the quality of OCT images by removing shadow and automatically segmenting the retinal layer of interest in spectral domain of OCT using graph theory and dynamic programming.

Object detection using Support Vector Machines(SVM)
Course: Computer Vision, IIT Hyderabad

- A binary SVM classifier was trained using HOG features extracted from foreground and background images, along with non-maximum suppression method to get the boundary box for detected objects.

TECHNICAL SKILLS AND COURSES

Languages and Tools	Python, Theano, Keras, C, C++, Shell scripting, Matlab.
Courses	Deep learning, Machine learning, Computer vision, Image processing.

ACHIEVEMENTS

- Secured **All India Rank 432** - Top 0.2% (amongst 2,16,000) in GATE-2014.
- Secured **All India Rank 8507** - Top 1.2% (amongst 4,70,000) in IIT JEE-2010.

TEACHING EXPERIENCE

- Probability and Random Process, *Teaching Assistant*, Aug-Dec 2015.
- Adaptive Signal Processing, *Teaching Assistant*, Jan-April 2016.