VISHAL SUNDER

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EDUCATION AND EXPERIENCE

Bachelor of Technology in Electrical Engineering *May 2016*
Indian Institute of Technology, Banaras Hindu University (IIT-BHU) *Overall CPI: 8.35/10*

All India Senior School Certificate Examination, CBSE India *May 2011*
Mahatma Hansraj Modern School (Intermediate) *Cumulative Marks: 87.8%*

Researcher, Deep Learning and Artificial Intelligence group *July 2016 - Present*
TCS Research, New Delhi, India

RESEARCH INTERESTS

Deep Learning and its applications in NLP, Reinforcement Learning and its applications in multi agent collaboration.

PUBLICATIONS

G. Gupta, **V. Sunder**, R. Prasad, G. Shroff: *CRESA: A Deep Learning Approach to Competing Risk Recurrent Event Survival Analysis*; To appear in the proceedings of the 23rd Pacific-Asia Conference on Knowledge Discovery and Data Mining (***PAKDD 2019***).

V. Sunder, L. Vig, A. Chatterjee, G. Shroff: *Prosocial or Selfish? Agents with different behaviors for Contract Negotiation using Reinforcement Learning*; Proceedings of the 11th International Workshop on Automated Negotiations held in conjunction with ***IJCAI/ECAI 2018***.

V. Sunder, M. Yadav, L. Vig, G. Shroff: *Information Bottleneck Inspired Method for Chat Text Segmentation*; Proceedings of the 8th International Joint Conference on Natural Language Processing (***IJCNLP 2017***), pages 194-203.

SELECTED RESEARCH PROJECTS

Agents with different behaviors for Contract Negotiation using Reinforcement Learning
Sept 2017 - March 2018
Mentors: Dr. Lovekesh Vig and Dr. Arnab Chatterjee (TCS Research, New Delhi)

- Trained Deep Learning agents capable of negotiating on a set of clauses in a contract agreement using a simple communication protocol using reinforcement learning.
- Modeled selfish and prosocial behavior to varying degrees in these agents and also trained a Meta agent with an ensemble of these behaviors.
- Results demonstrated that the agents are able to hold their own against human players and that the meta agent is able to reasonably emulate human behavior.

An Ensemble of Deep and Shallow Learning to predict the Quality of Product Titles (CIKM-2017 data challenge) July 2017 - Sept 2017
Self-mentored and co-worked with a teammate

- Developed an ensemble framework of Deep and Shallow learning for predicting the *Clarity* and *Conciseness* of the titles of marketed products.
- An *attentive pooling* approach was used to augment the learning of traditional CNNs and LSTMs for the given task along with LightGBM for shallow learning.

· Findings showed that an ensemble of these approaches do a better job than using them alone suggesting that the results of the deep and shallow approach are highly complementary.

Information Bottleneck Inspired Method For Chat Text Segmentation Sept 2016 - March 2017

Mentors: Dr. Lovekesh Vig and Dr. Gautam Shroff (TCS Research, New Delhi)

· Developed a novel technique for segmenting chat conversations using the Information Bottleneck method, augmented with sequential continuity constraints.
· Utilized critical non-textual clues such as time between two consecutive posts and people mentions within the posts for effective segmentation.
· Experiments demonstrated that our proposed method yields an absolute (relative) improvement of as high as 3.23% (11.25%).

UNDERGRAD PROJECT WORK

A package to implement Mason's Gain Formula

Mentor: Dr Gopal Sharma (Dept. of Electrical Engg., IIT-BHU)

· Developed a robust algorithm to implement Mason's Gain Formula for finding the transfer function of a linear signal flow graph.
· Implemented the algorithm in C++ and developed a package for the same.
· This project was funded by the Design and Innovation Hub (DIH), IIT-BHU.

Face Recognition using Principal Component Analysis (PCA) and Neural Network

Mentor: Dr. Sanjay Kumar Singh (Dept. of Computer Science and Engg., IIT-BHU)

· Obtained reduced set of features for a face image by applying PCA on a set of training images from the ORL face dataset.
· Trained a 2 layer neural network using the reduced set of features as input to predict the identity of a face. Used Matlab for implementation.
· Successfully classified 40 subjects achieving an accuracy of 97.5%.

ACHIEVEMENTS

Secured a spot in the semi finals (top 10) among 500 participants in the competition *CIKM AnalytiCup 2017 - Lazada Product Title Quality Challenge* which was a data challenge held under CIKM 2017. Link

Secured a position in top *0.2%* amongst *150,000 (approx)* candidates in UPTU-SEE 2012.

Secured a position in top *0.7%* amongst *1,200,000 (approx)* candidates in AIEEE 2012.

Secured a position in top *0.4%* amongst *600,000 (approx)* candidates in IIT-JEE 2012.

TECHNICAL STRENGTHS

C, C++, MATLAB, Python, Keras, Pytorch, Tensorflow, LaTeX, Linux

RELEVANT COURSES

Computer Science: EE-3105 Algorithms and Data Structures, EE-3203 Computer Systems, AM-1103 Computer Programming and Graphics, AM-1301 Computer Programming Lab, EE-4101 Artificial Intelligence and Expert Systems.
Mathematics: AM-1101 Mathematics I (Calculus), AM-1202 Mathematics II (Linear Algebra), AM-2204A Numerical Methods, EE-2204 Optimization Techniques.