Akella Ravi Tej

B.Tech. – Electronics and Communication Engineering – Indian Institute of Technology, Roorkee
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Interests

Computer Vision, Deep Learning, Natural Language Processing, Robotics and Reinforcement Learning

Education

Bachelor of Technology (B.Tech) **Indian Institute of Technology, Roorkee, India**
Major in Electronics and Communication Engineering
Minor Specialization in Computer Science and Engineering *2014-2018*

Publication

A Randomized Kernel-Based Secret Image Sharing Scheme **Workshop Publication**
Authors: Akella Ravi Tej, Rekula RaviTeja, Dr. Vinod Pankajakshan

- The paper proposes a (k, n)-threshold secret image sharing scheme that offers flexibility in terms of meeting contrasting demands such as information security and storage efficiency.
- Accepted for presentation at IEEE International Workshop on Information Forensics and Security (WIFS), 2018.

Experience

Undergraduate Thesis Project

Single Image Super Resolution Using Perceptual Loss
Supervisor: Dr. Vinod Pankajakshan, Assistant Professor, IIT Roorkee *Dec 2017-May 2018*

- Replacing point estimates with perceptual loss as objective function for training SR networks to output more photo-realistic images.
- Literature survey on deep learning techniques used to solve Super Resolution (SR) problem.

Research Projects and Internships

Efficient Exploration in State-Action space
Supervisors(remote): Prof. Anima Anandkumar, Bren Professor, California Institute of Technology
Kamyar Azizzadenesheli, Ph.D. Candidate, University of California, Irvine *Aug 2018-Present*

- Joint project by researcher at Caltech and DeepMind on unifying Bayesian Actor-Critic methods with Trust Region Policy Optimization (TRPO) techniques to achieve efficient exploration in continuous state-action spaces while guaranteeing monotonic improvements to policy.
- The critic network outputs a random variable whose mean is used to evaluate the policy gradient and covariance metrics to estimate the trust region.

Statistical Modelling of Speech Signals
Supervisors: Dr. Ajit K Chaturvedi, Professor & Director, IIT Roorkee
Dr. R Balasubramanian, Associate Professor, IIT Roorkee *Jan 2018-May 2018*

- Compare convolutional auto-regressive networks (dilated causal convolutions for broad but finite receptive field) with stacked LSTM networks (theoretically infinite receptive field) for high fidelity speech synthesis and speech-to-text synthesis.
- Designed a speaker recognition model using a 3 layer stacked LSTM architecture with 100 hidden units. The network is trained over Voice Conversion (VCC) 2016 dataset.

Paper Implementations

Handwriting Synthesis

- Demonstrates how LSTM networks can be used to generate complex sequences with long range structure. Based on work in *Alex Graves et al.*, 2013. This work was done as a part of *lyrebird.ai* challenge.

Disentangled Learning in β-Variational Auto-Encoders

- Balancing the trade-off between disentanglement and reconstruction fidelity by adjusting the hyperparameter β to extract disentangled factors from *dsprites* dataset.
- Disentanglement helps with zero-shot inference and faster knowledge transfer to new tasks. Based on work in β-VAE paper of DeepMind.

Language Identification

- Train a character-level LSTM model for language identification over DSLCC-v2.0 dataset.
- Inspired from work done in *Stanford Language Identification Engine (SLIDE)*.

Self-supervised Projects

Face Recognition with One-Shot Learning

- Used one-shot learning to build a face recognition system.
- Uses siamese network with triplet loss function.

Art Generation with Neural Style Transfer

- Implementation of *Gatys et al.* paper on neural style transfer.
- Blends low level features of style image with high level features of context image.

Trigger Word Detection

- Detects trigger words from continuous audio stream using LSTM.
- Uses CTC cost for speech recognition.

Debiasing Word Embeddings

- Word embeddings can often represent gender, ethnicity, age and other biases of the text used to train the model. Debiasing is performed on word embeddings to remove observed biases. Based on work in *Bolukbasi et al.*, 2016.

Academic Achievements

- Ranked in top 1% students of the country in IIT-JEE Advance 2014
- Secured 99.99%tile in IIT-JEE Mains 2014
- KVPY Scholar (SX Stream-2014)

Computer skills

Programming Languages: Python, Java, C++

Frameworks: Tensorflow, Pytorch, Keras

Relevant courses

MAN 001: Mathematics-I

MAN 002: Mathematical Methods

MAN 006: Probability and Statistics

CSN 106: Machine Learning

Online Courses

Coursera: Deep Learning Specialization by *Andrew NG, deeplearning.ai*

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Convolutional Neural Networks
- Sequence Models

Coursera: Neural Networks for Machine Learning by *Geoffrey Hinton, University of Toronto*

Coursera: Machine Learning by *Andrew NG, Stanford University*

References

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