Videsh **Suman**

MS Student in CS @ UMass Amherst

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Education

University of Massachusetts (UMass) Amherst — *Amherst, MA*
M. S. in Computer Science (**Research Track**) — *September '19 - Present*

- Research — Detection and segmentation of bird migration from weather radar data
- Relevant Courses — Computer Vision, Applied Numerical Optimization

Indian Institute of Technology (IIT) Bombay — *Mumbai, India*
B. Tech. in Civil Engineering — *August '15 - May '19*

- Thesis — Super-resolution of rainfall projections using Deep Learning techniques
- Relevant Courses — Machine Learning, Deep Learning, Reinforcement Learning, Advanced Machine Learning, Medical Imaging

Research & Work Experience

Data Informed Network Simulation | Microsoft Research India — *Bengaluru, India*
Research Internship under Dr. Sundararajan Sellamanickam — *May '19 - July '19*

- Formulated a data-driven network simulator to learn the behaviour of network traces from ns-2 and real Skype calls
- Devised probabilistic and neural approaches for state space modeling to estimate a sequence of network states
- Evaluated state-transition models as well as the deepAR forecasting model for test data on metrics capturing network realism
- Derived a log-likelihood applicability score for a given test input trace, based on the ensemble of training data

Segmenting Bird Roosts from Weather Radar Data — *CICS, UMass Amherst*
Independent Study under Prof. Daniel Sheldon & Prof. Subhransu Maji — *September '19 - Present*

- Fine-tuning MistNet, a deep CNN for discriminating biology from precipitation in radar scans, to correctly segment the bird roosts
- The future goal is to segment the detected roosts in radar scans using state-of-the-art segmentation models like Mask R-CNN

Deep Statistical Downscaling of Rainfall Projections for Indian Landmass [report] [poster] — *EE, IIT Bombay*
Undergraduate Thesis under Prof. Amit Sethi & Prof. Subimal Ghosh — *September '18 - April '18*

- Leveraged super-resolution to predict rainfall projections (∼25 km^2 resolution), from 9 simulation variables (∼250 km^2 resolution)
- Owing to the $10\times$ scaling factor and varying rainfall patterns across India, only the central zone was subjected to experimentation
- Designed custom CNN architectures with dense blocks, dilated and transpose convolutions, and cyclic learning rate schedulers to achieve MSE of 5 mm/day (better than the baseline kernel regression approach) throughout test data.

Intelligent Conversational Platform | The Walt Disney Company — *Mumbai, India*
Internship in Consumer Technologies under Mr. Aftab Sheikh — *May '18 - July '18*

- Designed conversations, and trained the agents for conversational assistance with effective intent & context recognition
- Integrated the data with entities, and deployed them for fulfilled responses, for tasks like voice search and Helpdesk assistance

Research Implementations

Unsupervised Learning for Archetypal Style Analysis [report] [code] — *CSE, IIT Bombay*
Advanced Machine Learning under Prof. Sunita Sarawagi — *March '19 - April '19*

- Derived 32 archetypal styles from 2046 artworks, implemented style transfer and experimented with the quality of stylization

Progressive Neural Networks for Multitask Learning [report] [code] — *CSE, IIT Bombay*
Reinforcement Learning under Prof. Shivaram Kalyanakrishnan — *October '18 - November '18*

- Investigated knowledge transfer via multitask learning between 2 tasks by adding lateral connections to the A3C framework

Single Image Super-resolution using Adversarial Learning [report] [code] — *IEOR, IIT Bombay*
Deep Learning under Prof. P. Balamurugan — *October '18 - November '18*

- Implemented a perceptual loss based GAN for super-resolution on Pascal VOC2012, using SRResNet as the generator network.

Flappy Bird AI [blog] [code] — *EE, IIT Bombay*
Machine Learning under Prof. Amit Sethi — *March '18 - April '18*

- Trained an environment agnostic bot using Q-learning and Deep Q-Network with ε-greedy and experience replay strategies

Deep Learning for Medical Image Analysis [slides] — *EE, IIT Bombay*
Literature Review under Prof. Amit Sethi — *February '18 - April '18*

- Presented in-depth studies on CNN-based WSI classification to detect clinical heart failure, and on CRF-based pancreas segmentation from the fused results of CNNs for tissue & boundary detections

Skills & Achievements

- **Programming:** Python, MATLAB, R, C++, Java, Git, LaTeX, HTML/CSS
- **Tools/Frameworks:** PyTorch, Tensorflow, Keras, OpenCV, scikit-learn, OpenAI Gym, Jekyll, Dialogflow, Node.js
- **Scholastic Achievements:** KVPY Fellowship (2014) from IISc Bangalore; national rank of 1490/140k in JEE Advanced (2015)
- **Extra-curricular Activities:** Former convener of the web and coding club (WnCC-IITB) organizing hackathons, research talks, Seasons of Code, etc; former coordinator in marketing and technical teams of Mood Indigo; sketching and music enthusiast