

Videsh Suman

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Interests: Autonomous Driving, Computer Vision, Deep Learning, Graphical Models, Reinforcement Learning

Education

University of Massachusetts (UMass) Amherst

Sep '19 - Present

M.S. IN COMPUTER SCIENCE (GPA: 3.94/4.00)

- Relevant Courses: Graphical Models, Computer Vision, Optimization, Advanced NLP (ongoing), Data Science Algorithms (ongoing)

Indian Institute of Technology (IIT) Bombay

Aug '15 - May '19

BACHELOR OF TECHNOLOGY

- Relevant Courses: Machine Learning, Deep Learning, Reinforcement Learning, Advanced Machine Learning, Medical Imaging

Research & Work Experience

Traffic Interaction Modeling for Ego-centric Autonomous Driving | University of Maryland

May '20 - Present

RESEARCH INTERNSHIP UNDER PROF. ANIKET BERA, GAMMA LAB

- Experimenting with **HDD** and **TITAN** datasets to investigate interaction modeling by learning the action prior of traffic agents
- Proposing the idea of background scene prior for traffic interaction graphs, towards the goal of **risk assessment**

Data Informed Network Simulation | Microsoft Research India

May '19 - Jul '19

RESEARCH INTERNSHIP UNDER DR. NAGARAJAN NATARAJAN

- 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 [report]

Sep '19 - Dec '19

INDEPENDENT STUDY UNDER PROF. DANIEL SHELDON & PROF. SUBHRANSU MAJI

- 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]

Sep '18 - Apr '18

UNDERGRADUATE THESIS UNDER PROF. AMIT SETHI & PROF. SUBIMAL GHOSH

- Leveraged the idea of deep **super-resolution** to predict spatial **rainfall projections** in 10× resolution, from 9 climate parameters
- Designed robust **CNN** architecture with **dense blocks**, and **cyclic LR schedulers** to achieve MSE of 5 mm/day (improving **SOTA**)

Intelligent Virtual Conversational Platform | Disney India

May '18 - Jul '18

INTERNSHIP IN CONSUMER TECHNOLOGIES UNDER MR. AFTAB SHEIKH

- Designed conversations, and trained the agents for conversational assistance with effective intent & context recognition

Research Implementations

Semi-Supervised Learning for Vision-and-Language Tasks [report] [code]

Oct '19 - Dec '19

COMPUTER VISION UNDER PROF. SUBHRANSU MAJI

- Implemented a recent semi-supervised learning approach **MixMatch** on the **LXMERT** framework, by strategically **mixing-up** the labeled and unlabeled multi-modal examples of a visual-language reasoning dataset, **NLVR2**.

Unsupervised Learning for Archetypal Style Analysis [report] [code]

Mar '19 - Apr '19

ADVANCED MACHINE LEARNING UNDER PROF. SUNITA SARAWAGI

- **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]

Oct '18 - Nov '18

REINFORCEMENT LEARNING UNDER PROF. SHIVARAM KALYANAKRISHNAN

- 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]

Oct '18 - Nov '18

DEEP LEARNING UNDER PROF. P. BALAMURUGAN

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

Flappy Bird AI [blog] [code]

Mar '18 - Apr '18

MACHINE LEARNING UNDER PROF. AMIT SETHI

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

Skills & Achievements

- **Programming:** Python, MATLAB, R, C++, Java, Git, ~~TeX~~TeX, HTML/CSS
- **Tools/Frameworks:** PyTorch, Tensorflow, Keras, OpenCV, scikit-learn, OpenAI Gym, Jekyll, Dialogflow, Node.js
- **Scholastic Achievements:** **KVPY** Fellowship (2015) 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