Videsh **Suman**

(+1) (413)409-1993 | vsuman@cs.umass.edu | sumanvid97 | sumanvid97.github.io | sumanvid97

Interests: Computer Vision, Deep Learning, NLP, Graphical Models, Reinforcement Learning

Education

University of Massachusetts (UMass) Amherst *Sep '19 - May '21*
M.S. in Computer Science (GPA: $4/4$)

Relevant Courses: Graphical Models, Computer Vision, Optimization, Advanced NLP, Data Science Algorithms, 3D Vision

Indian Institute of Technology (IIT) Bombay *Aug '15 - May '19*
B. Tech. in Engineering

Relevant Courses: Machine Learning I & II, Deep Learning, Reinforcement Learning, Medical Image Computing, Algorithm Design

Work Experience

Neural View Synthesis | Fyusion Inc. *July '21 - Present*
Research Internship under Dr. Rodrigo Ortiz-Cayon

- [Confidential] Experimenting with NeRF-like methods to propose a deep learning pipeline for realistic neural rendering

Risk-Aware Traffic Interaction Modeling for Autonomous Driving | University of Maryland *June '20 - May '21*
Part-Time Research with Prof. Aniket Bera, GAMMA Lab

- Proposed a traffic interaction based driving framework for frame-level action recognition to understand human driving behavior
- Leveraged graph convolutions for spatio-temporal message-passing to learn intentions and interactions amongst road users
- Achieved **overall mAP** scores **within 3% of state-of-the-art** on goal-oriented action and cause benchmarks of Honda Dataset
- Improved the prior risk assessment benchmark for pedestrians by **6%** through vulnerability modeling of all road users

Data Informed Network Simulation | Microsoft Research India *May '19 - Jul '19*
Research Internship under Dr. Sundararajan S., Dr. Nagarajan N. & Dr. Venkat Padmanabhan

- Hypothesized a novel data-driven network simulator to learn the behaviour of network traces from ns-2 and real Skype calls
- Created probabilistic and LSTM-based state space forecasting models to estimate network sequences from the target distribution
- Achieved **high distribution similarity** for propagation delays & packet loss rates on inference with test sequences

Deep Super-Resolution of Rainfall Projections for Indian Landmass *Sep '18 - Apr '19*
Undergraduate Thesis under Prof. Amit Sethi & Prof. Subimal Ghosh

- Leveraged deep super-resolution to predict regional rainfall projections in $10\times$ spatial resolution, from 9 climate parameters
- Designed an encoder-decoder CNN with dense blocks for learning parameters shared across seven zones of Indian landmass
- Improved state-of-the-art by achieving overall MSE of **5 mm/day** rainfall by training on daily climate data of past **38 years**

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
- Integrated the data with entities, and deployed them for fulfilled responses on tasks like voice search and Helpdesk assistance

Key Projects

3D Vision and Neural Rendering *Mar '20 - Present*
Intelligent Visual Computing under Prof. Evangelos Kalogerakis

- Implemented PointNet for point cloud alignment (**76%** accuracy), and DeepSDF for 3D surface reconstruction from point clouds
- Performed efficient gradient-based camera pose optimization for 3D scenes from their trained NeRF representations

Discriminative Adversarial Search for Text Summarization [report] *Oct '20 - Dec '20*
Advanced NLP under Prof. Mohit Iyyer

- Demonstrated the effectiveness of discriminative adversarial beam reranking for text summarization on CNN DailyMail dataset
- Implemented discriminator-driven beam reranking with UniLM for generating **human-like** (i.e. longer & more novel) summaries

Semi-Supervised Learning for Vision and Language Reasoning [report] [code] *Oct '19 - Dec '19*
Computer Vision under Prof. Subhransu Maji

- Investigated the direction of SSL via self-training, mixup regularization and MixMatch algorithms for NLVR2 dataset using LXMERT
- Concluded the **limitation** (**63%** accuracy) of this learning paradigm of leveraging unlabeled training data for a multimodal task

Super-resolution using Deep Adversarial Learning [report] [code] *Oct '18 - Nov '18*
Deep Learning under Prof. P. Balamurugan

- Implemented GAN to achieve **photo-realistic 4**$\times$ super-resolution using a perceptual loss based minimax objective

Deep RL for Flappy Bird [blog] [code] *Mar '18 - Apr '18*
Machine Learning under Prof. Amit Sethi

- Trained RL agents on the environment using vanilla Q-learning and Deep Q-Network, both acquiring superhuman performance

Miscellaneous

- **Programming Tools:** Python, C++, MATLAB, R, Bash, SQL, Git, LaTeX, Java
- **Machine Learning Tools:** PyTorch, Tensorflow, Keras, OpenCV, Open3D, scikit-learn, pandas
- **Scholastic Achievements:** KVPY Fellowship (2015) from IISc Bangalore; national rank of 1490/140k in JEE Advanced (2015)
- **Extra-Curricular:** former volunteer at MLFL-UMass, WnCC-IITB; former coordinator of Mood Indigo; fine arts and music enthusiast