

# Videsh Suman

MS STUDENT IN CS @ UMASS AMHERST

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## Education

### University of Massachusetts (UMass) Amherst

M. S. IN COMPUTER SCIENCE (RESEARCH TRACK)

GPA: 3.83/4

September '19 - Present

- Research — Detection and segmentation of bird migration from weather radar data
- Relevant Courses — Probabilistic Graphical Models, Simulation Techniques, Computer Vision, Applied Optimization

### Indian Institute of Technology (IIT) Bombay

B. TECH. IN CIVIL ENGINEERING

Mumbai, India

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

### Segmenting Bird Roosts from Weather Radar Data [report]

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**

### Data Informed Network Simulation | Microsoft Research India

Bengaluru, India

RESEARCH INTERNSHIP UNDER DR. NAGARAJAN NATARAJAN

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

### 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 '19

- Leveraged **super-resolution** to predict **rainfall projections** (~25 km<sup>2</sup> resolution), from 9 simulation variables (~250 km<sup>2</sup> resolution)
- Owing to the 10× 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 '19

- 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

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

CICS, UMass Amherst

COMPUTER VISION UNDER PROF. SUBHRANSU MAJI

October '19 - December '19

- 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]

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  **$\epsilon$ -greedy** and **experience replay** strategies

## Skills & Achievements

- **Programming:** Python, MATLAB, R, C++, Java, Git,  $\text{\LaTeX}$ , 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