Vikram Voleti

Online — *Website*: voletiv.github.io *GitHub:* github.com/voletiv *LinkedIn*: Vikram Voleti

Education

Dual Degree (B.Tech. (H) + M.Tech.) in Electrical Engineering *2009 - 2014*
with Master's specialization in Instrumentation and Signal Processing
Indian Institute of Technology (IIT), Kharagpur, India **CGPA:** 8.44 / 10

Current Work

Mentor — *Foundations of Artificial Intelligence and Machine Learning* *January 2018 - present*
IIIT Hyderabad, India — *six months certificate program for software professionals*

- Mentoring industry professionals in lab sessions by teaching machine learning concepts

Research Assistant — *Applied Research Lab* *May 2017 - present*
International Institute of Information Technology (IIIT) - Hyderabad, India
Prof. C. V. Jawahar, Centre for Visual Information Technology, IIIT-Hyderabad

PROJECT: **Video Translation**

- To generate videos of movies and educational tutorials in Indian languages by morphing lip movement
- Experimenting with GANs (Pix2Pix) to generate videos using original faces, new key facial landmarks, and dubbed audio

PROJECT: **Assessor for Lipreader**

- Build a visual speech recognizer (lipreader) to classify spoken words in videos, and an assessor by combining convolutional and recurrent neural networks to check if the lipreader's output is correct
- Use the lipreader and assessor for self-training on unlabelled data, zero-shot learning on out-of-vocabulary words, and information retrieval

Research Projects

"De-fencing of Images using RGB-D Data" — M.Tech. Thesis *2013 - 2014*
IIT Kharagpur — *Prof. Rajiv Sahay, Department of Electrical Engineering*

- Elimination of fence-like occlusions, inpainting of images using RGB-D data
- Nominated for Best M.Tech. Project Award among three departments (Electrical, Electronics, CS)
- Research paper [3] based on work is published in the proceedings of ICAPR 2015 in IEEE Xplore
- Co-authored journal paper [1] is under review at the International Journal of Computer Vision (IJCV)
- Links — GitHub repository containing thesis, presentation, code files, and results

"Identification of Bilabial Consonants in Audio and Lip Closures in Video" — B.Tech. Thesis
IIT Kharagpur — *Prof. Rajiv Sahay, Department of Electrical Engineering* *2012 - 2013*

- Measurement of synchronization between audio and video using bilabial cues in both modes
  - Trained a Gaussian Mixture Model (GMM) in MATLAB with MFCCs extracted from audio
  - Devised a C++ program to identify lip closures in video using OpenCV modules
- Links — GitHub repository containing thesis, presentation, code files, and results

Research Papers

Journal:

[1] S. Jonna, S. Satapathy, V. S. Voleti, R. R. Sahay, "Unveiling the scene: A Multimodal Framework for Simultaneous Image Disocclusion and Depth Map Completion using Computational Cameras," *International Journal of Computer Vision*, 2017 (under review)

Conference:

[2] V. Voleti, P. Mohan, S. Gupta, J. Iqbal, "Simple Real-Time Pattern Recognition for Industrial Automation," in *Proc. International Conference on Industrial Design Engineering*, 2017 [pdf]

[3] S. Jonna, V. S. Voleti, R. R. Sahay, and M. S. Kankanhalli, "A Multimodal Approach for Image De-fencing and Depth Inpainting," in *Proc. Int. Conf. Advances in Pattern Recognition*, 2015, pp. 1—6 [pdf, IEEE]

Work Experience

Image Processing Engineer — *Embedded Systems Team* *February 2016 - May 2017*
GreyOrange Robotics, India — *a multinational firm that designs, manufactures and deploys advanced robotics systems for automation at warehouses, distribution and fulfillment centres*

- Developed computer vision module to perform video processing in real time for warehouse automation
- Experimented with CNNs on GPU for classification of objects on warehouse conveyor belts
- Developed embedded vision modules in automated guided robots for warehouses
- Research paper [2] based on work has been accepted at ICIDE 2017, for publication in ACM

Associate Engineer — *Avionics Software & Systems Testing Group* *July 2014 - February 2016*
Airbus, India — *a commercial aircraft manufacturer, the largest aeronautics & space company in Europe*

- Involved in development and integration of avionics systems for the long-range aircrafts family
- Simulated signal-level modifications to the Flight Warning Computer, adopting standard avionics coding guidelines (DO-178B)

Research Internships

"Implementation of Carry-Free Arithmetic Operations in FPGA" *Summer 2013*
KU Leuven, Belgium — *Prof. Ingrid Verbauwhede, Computer Security & Industrial Applications*

- Designed and implemented addition, subtraction, multiplication using Carry-Free Logic
- Developed, tested and verified the modules in Verilog, and simulated circuits in Xilinx
- Links — GitHub repository containing report, presentation, and related files

"Fingertip Gesture Recognizer using HMMs" *Summer 2012*
IIT Kharagpur, India — *Prof. Aurobinda Routray, Department of Electrical Engineering*

- Implemented Hidden Markov Models (HMMs) in MATLAB, used to recognize shapes drawn by fingertip
- Links — GitHub repository containing report, presentation, code files, and results

"Measurement of Intra-die Power Variation in Sub-nm FPGA's" *Summer 2011*
Imperial College, London — *Prof. Peter Cheung, Head, Electrical and Electronics Engineering*

- Measured the relative power consumption among the LookUp Tables (LUTs) of an FPGA
- Links — GitHub repository containing presentation, certificate, and recommendation letter

Technical Skills

Languages : C, C++, HTML/CSS, Javascript, Python, MATLAB, Shell, Verilog
Operating Systems: OS X, Ubuntu, Windows
Libraries: CUDA, IDS (cameras), Keras, LaTeX, OpenCV, PyTorch, Tensorflow

Scholastic Achievements

- Talk: "Image de-fencing using RGB-D data" [presentation] — at Max Planck Insitute for Informatics, Saarbrücken, Germany
- Talk: "Mathematics of back-propagation in multi-layer perceptrons" [link] — at GreyOrange Robotics, India, and at IIIT-Hyderabad
- Talk: "Intuition behind LSTMs" [presentation] — at IIIT Hyderabad, India
- Won the SMS Classification challenge, participated in the Video Action Recognition challenge in the 2017 Hack2Innovate hackathon in Bangalore, India
- Attended summer schools on Computer Vision and Machine Learning at IIIT-Hyderabad in 2017
  - Stood 3rd in Computer Vision Summer School out of 120+ participants, rewarded full fee waiver
  - Stood 4th in Machine Learning Summer School out of 120+ participants, rewarded full fee waiver
- Awarded the Order of Merit by IIT Kharagpur upon graduation in 2014
- Completed *additional* courses in Computer Science & Engineering at IIT Kharagpur
  - Algorithms-I, Artificial Intelligence, Computational Number Theory
- Participated in Amazon Data Science competition in MVSP 2012, Kaggle competitions, Coursera courses on machine learning, computer vision, neural networks, natural language processing
- Qualified JEE 2009 by IIT at 99.7 percentile, with All India Rank of 1330 (out of 384,977)