

# VIKRAM VOLETI

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| ONLINE             | Website: <a href="https://voletiv.github.io">voletiv.github.io</a>  | GitHub: <a href="https://github.com/voletiv">github.com/voletiv</a> | LinkedIn: <a href="#">Vikram Voleti</a> |
| RESEARCH INTERESTS | To work at the intersection of computer vision and machine learning towards artificial intelligence; to understand and apply learning techniques such as deep neural networks to vision-related research  |   |   |
| EDUCATION          | <b>Dual Degree (B.Tech. (H) + M.Tech.) in Electrical Engineering</b> <span style="float: right;">2009 - 2014</span><br>with Master's specialization in Instrumentation and Signal Processing<br>INDIAN INSTITUTE OF TECHNOLOGY (IIT), KHARAGPUR <span style="float: right;"><b>CGPA: 8.44 / 10</b></span>   |   |   |
| RESEARCH PAPERS    | <b>Journal:</b><br>[1] S. Jonna, S. Satapathy, <u>V. S. Voleti</u> , R. R. Sahay, "Unveiling the scene: A Multimodal Framework for Simultaneous Image Disocclusion and Depth Map Completion using Computational Cameras," <i>International Journal of Computer Vision</i> , 2017 (under review)<br><b>Conference:</b><br>[2] <u>V. Voleti</u> , "Carry-Free Implementations of Arithmetic Operations in FPGA" in <i>Proc. 24<sup>th</sup> National Conference on Communications</i> , 2018 (under review) [ <a href="#">pdf</a> ]<br>[3] <u>V. Voleti</u> , P. Mohan, S. Gupta, J. Iqbal, "Simple Real-Time Pattern Recognition for Industrial Automation," in <i>Proc. International Conference on Industrial Design Engineering</i> , 2017 (accepted) [ <a href="#">pdf</a> ]<br>[4] S. Jonna, <u>V. S. Voleti</u> , R. R. Sahay, and M. S. Kankanhalli, "A Multimodal Approach for Image De-fencing and Depth Inpainting," in <i>Proc. Int. Conf. Advances in Pattern Recognition</i> , 2015, pp. 1—6 [ <a href="#">pdf</a> , <a href="#">IEEE</a> ]   |   |   |
| CURRENT WORK       | <b>Mentor</b> — <i>Foundations of Artificial Intelligence and Machine Learning</i> <span style="float: right;">January 2018 - present</span><br>IIIT HYDERABAD, INDIA — <i>six months certificate program for software professionals</i> <ul style="list-style-type: none"><li>• Mentor industry professionals in lab sessions by teaching machine learning concepts</li></ul> <b>Research Intern</b> — <i>Applied Research Lab</i> <span style="float: right;">May 2017 - present</span><br>INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY (IIIT) - HYDERABAD, INDIA<br><i>Prof. C. V. Jawahar, Centre for Visual Information Technology, IIIT-Hyderabad</i> <ul style="list-style-type: none"><li>• Towards weakly supervised lipreading using deep neural networks</li><li>• Experimenting with convolutional and recurrent neural networks for self-training on unlabelled data, zero-shot learning on out-of-vocabulary words, and information retrieval</li></ul>  |   |   |
| WORK EXPERIENCE    | <b>Image Processing Engineer</b> — <i>Embedded Systems Team</i> <span style="float: right;">February 2016 - May 2017</span><br>GREYORANGE ROBOTICS, INDIA — <i>a multinational firm that designs, manufactures and deploys advanced robotics systems for automation at warehouses, distribution and fulfillment centres</i> <ul style="list-style-type: none"><li>• Developed computer vision module to perform video processing in real time for warehouse automation</li><li>• Optimized and implemented vision and learning algorithms for faster pattern recognition</li><li>• Experimented with CNNs on GPU for classification of objects on warehouse conveyor belts</li><li>• Developed embedded vision modules in automated guided robots for warehouses</li><li>• Research paper [<a href="#">3</a>] based on work has been accepted at ICIDE 2017, for publication in ACM</li></ul> <b>Associate Engineer</b> — <i>Avionics Software &amp; Systems Testing Group</i> <span style="float: right;">July 2014 - February 2016</span><br>AIRBUS, INDIA — <i>a commercial aircraft manufacturer, the largest aeronautics &amp; space company in Europe</i> <ul style="list-style-type: none"><li>• Involved in development and integration of avionics systems for the long-range aircrafts family</li><li>• Simulated signal-level modifications to the Flight Warning Computer, adopting standard avionics coding guidelines (DO-178B)</li></ul> |   |   |
| RESEARCH PROJECTS  | <b>"De-fencing of Images using RGB-D Data" — M.Tech. Thesis</b> <span style="float: right;">2013 - 2014</span><br>IIT KHARAGPUR — <i>Prof. Rajiv Sahay, Department of Electrical Engineering</i> <ul style="list-style-type: none"><li>• Elimination of fence-like occlusions, inpainting of images using RGB-D data</li><li>• Nominated for Best M.Tech. Project Award among three departments (Electrical, Electronics, CS)</li><li>• Research paper [<a href="#">4</a>] based on work is published in the proceedings of ICAPR 2015 in <a href="#">IEEE Xplore</a></li><li>• Co-authored journal paper [<a href="#">1</a>] is under review at the International Journal of Computer Vision (IJCV)</li><li>• Links — <a href="#">GitHub repository</a> containing <a href="#">thesis</a>, <a href="#">presentation</a>, code files, and results</li></ul>   |   |   |

**“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 **“Implementation of Carry-Free Arithmetic Operations in FPGA”** *Summer 2013*  
INTERNSHIPS 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
- Single-author research paper [2] is under review at the 24<sup>th</sup> Indian National Conference on Communications (NCC) 2018, for publication in IEEE Xplore
- 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, verified with standard implementations
- Created a program that recognizes shapes drawn by fingertip using HMM
- 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
- Implemented an automated workflow for power measurement, and visualization of results in MATLAB
- Links — [GitHub repository](#) containing [presentation](#), certificate, and recommendation letter

TECHNICAL **Languages :** C, C++, HTML/CSS, Javascript, Python, MATLAB, Shell, Verilog  
SKILLS **Operating Systems:** OS X, Unix/Linux, Windows  
**Libraries:** CUDA, IDS (cameras), Keras, L<sup>A</sup>T<sub>E</sub>X, OpenCV, PyTorch, Tensorflow

- SCHOLASTIC **ACHIEVEMENTS**
- Attended summer schools on [Computer Vision](#) and [Machine Learning](#) at IIIT-Hyderabad in 2017
    - Stood 3<sup>rd</sup> in Computer Vision Summer School out of 120+ participants, rewarded full fee waiver
    - Stood 4<sup>th</sup> in Machine Learning Summer School out of 120+ participants, rewarded full fee waiver
  - Talk: “Mathematics of back-propagation in multi-layer perceptrons” [\[link\]](#)
    - Lecture given at GreyOrange Robotics, India, and at IIIT-Hyderabad
  - Won the SMS Classification challenge in the 2017 [Hack2Innovate](#) hackathon in Bangalore, India
  - 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
  - Achieved highest grade in Digital Voice & Picture Communication, Programming & Data Structures, Real Time Signal Processing lab., Digital Electronic Circuits, Control & Electronic System Design, Power Systems lab., Total Quality Management, Transform Calculus, Game Theory & Applications
  - 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)

RELEVANT **COURSES**

**Computer Science & Engineering:** Algorithms-I, Artificial Intelligence, Computational Number Theory, Computer Architecture & Operating Systems

**Computer Vision and Multimedia:** Digital Image Processing & Applications, Digital Voice & Picture Communication, Vision & Visualization

**Signal Processing, Embedded Systems:** Analog Communication, Analog Signal Processing, Data Communication Networks, Digital Electronic Circuits, Digital Signal Processing, Programmable & Embedded Systems, Real Time Signal Processing, Signals & Networks, Statistical Signal Processing

**Mathematics & OR:** Probability & Stochastic Processes, Transform Calculus, Game Theory & Applications, Total Quality Management