

# Vikram Voleti



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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>Indian Institute of Technology (IIT), Kharagpur, India</b> Dual Degree (B.Tech. (H) + M.Tech.) in Electrical Engineering with Master's specialization in Instrumentation and Signal Processing	2009 - 2014  <b>CGPA: 8.44 / 10</b>
RESEARCH PAPERS	<b>Journal:</b> [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) <b>Conference:</b> [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) [pdf] [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 (under review) [pdf] [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 [pdf, IEEE]	
CURRENT WORK	<b>Research Intern — Applied Research Lab</b> INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY (IIIT) - HYDERABAD, INDIA <i>Under Prof. C. V. Jawahar, Centre for Visual Information Technology, IIIT-Hyderabad</i>	May 2017 - present <ul style="list-style-type: none"><li>• Towards weakly supervised lipreading using deep neural networks</li><li>• Analyzing the effect of visual attributes such as head pose, facial landmarks on visual speech recognition datasets such as GRIDcorpus, Lipreading-in-the-wild (LRW)</li><li>• Experimenting with convolutional and recurrent neural networks for self-training on unlabelled data</li></ul>
WORK EXPERIENCE	<b>Image Processing Engineer — Embedded Systems Team</b> GREYORANGE ROBOTICS, INDIA — <i>a multinational firm that designs, manufactures and deploys advanced robotics systems for automation at warehouses, distribution and fulfillment centres</i>	February 2016 - May 2017 <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 [3] based on work is under review at ICIDE 2017, for publication by ACM</li></ul> <b>Associate Engineer — Avionics Software &amp; Systems Testing Group</b> 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> IIT KHARAGPUR — <i>Prof. Rajiv Sahay, Department of Electrical Engineering</i>	2013 - 2014 <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 [4] based on work is published in the proceedings of ICAPR 2015 in <a href="#">IEEE Xplore</a></li><li>• Co-authored journal paper [1] 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>, codes, and related files</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](#), codes, and related files

RESEARCH KU LEUVEN, BELGIUM — *Prof. Ingrid Verbaauwhede, Computer Security & Industrial Applications* Summer 2013

- 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](#), and related files

**“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
- Designed and implemented an automated workflow for signal processing, and visualization of results
- Links — [GitHub repository](#) containing [presentation](#), and related files

TECHNICAL SKILLS **Languages :** C, C++, HTML/CSS, Javascript, Python, MATLAB, Shell, Verilog  
**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
  - 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

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