

SHRUTHI NARASIMHE GOWDA

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EDUCATION

MS – Electrical and Computer Engineering [Sep 2010-Sep 2012]	UPC (Universitat Politècnica de Catalunya), Spain UCL (Université Catholique de Louvain), Belgium	GPA - 8.14/10 (<i>'cum laude'</i> , a Latin term for <i>'with honour'</i>)
BE - Electronics and Communication Engineering [Jun 2006-Jun 2010]	B.M.S College of Engg, VTU, India	Grade - 86% (<i>First Class with Distinction</i>)

WORK

- NI VISION, National Instruments (NI) R&D, India - **Algorithm Engineer** [Jan 2013 till present]
- Image and Signal Processing group(ISP), UCL, Belgium - **Research Assistant** [Jan 2012-Sep 2012]
- DRDO (Defense Research and Development Organization), India – **Intern** [Jan 2010-Jun 2010]
- M.P. Birla Institute of Fundamental Research, India - **Research Associate** [Sep 2007-Sep 2008]

AREAS AND SKILLS

Digital Image Processing, Computer Vision, Pattern Matching, 3D Vision, Calibration
Machine Learning, Deep Learning

Libraries: Keras, TensorFlow, Intel DAAL, CNTK
Software Optimizations: SSE, Intel CILK, Intel IPP, TBB (Multicore)
Programming Languages: C & C++, Python
Simulations: LabVIEW, MATLAB, Simulink
Open Source: OpenCV, OpenGL, PCL
Hardware Languages: VHDL, VERILOG

PROJECTS

- NI VISION, National Instruments (NI) R&D, India

Defect Inspection using Deep Learning [Oct 2017 – present] – Generalized Defect Inspection to cater to diverse Industrial Inspection cases. Experiments conducted with various known networks to building new models. Prototypes include algorithms using Keras (and Theano); Intel DAAL (for inference on CPU);

Defect Inspection using Pattern Matching and Geometric Matching [Aug 2016 – June 2017] – The defective part is found from the image using Pattern Matching (feature: pixel intensity) or Geometric matching (feature: edges, curves). The template is now compared with the matched defect image using different metrics to obtain a Defect Map. Product released on August 2017

Pattern Matching 16-bit support [Jan 2016 – Mar 2016] – Extended PM from 8 bit images to 16 bit images.

Pattern Matching [Aug 2015 - Jan 2016] – Implemented a robust Pyramidal-based Pattern Matching algorithm: Grayscale and Gradient matching. Product released on August 2016.

Feature Detection and Matching [Aug 2014 – June 2015] – Implemented an improved Harris Corner Detector, Feature Descriptors and a robust Feature Matching algorithm for achieving Feature Correspondence between images. The Match algorithm also provides Homography and the estimated Pose between the views. Product released on August 2015

Barcode Localization, Decoding and Grading [Sep 2013 – Aug 2014] - Researched, prototyped and productized 1D Barcode feature that detects multiple barcodes in an image using segmentation and decodes it using standard Barcode decoding logic. Product released on August 2014.

Object Tracking [Jan 2013 - Aug 2013] - Researched, prototyped and productized tracking feature that uses Continuously Adaptive Mean Shift algorithm to track multiple objects across frames and is invariant to scale, shape and rotational changes of the object. Product released on August 2013.

- UCL, Belgium

MASTER THESIS: Virtual Viewpoint Reconstruction in a Multi-Camera Network [Jan 2012-Sep 2012]
The thesis proposes a method towards reconstruction of dynamic regions in a scene in any virtual viewpoint in a multi-view environment using Epipolar Geometry and Color Camera Calibration and View Interpolation.

Automated Electrocardiogram Prediction using Neural Networks [Sep 2011-Nov 2011]

Implemented several regression models, namely Linear Regression, kNN and Radial Basis Function Network models, to predict one beat of an ECG signal from a given one wave of the signal.

- Center for Language and Speech Technologies and Applications (TALP), UPC, Spain

Novel Feature Extraction Methods for Speech Recognition [Feb 2011-Apr 2011]

- Defense Research and Development Organization, India

THESIS: Fixed point IF Filter implementation on FPGA for Radar Signal Processing [Jan 2010- Jun 2010]

MENTORED PROJECTS

- **Different ways to Calibrate Stereo Vision System** [Jan 2017 – Mar 2017] - **Mentored** an intern on improving efficiency while calibrating a Stereo Camera: Single Calibration Grid, Multiple Grids, no grids
- **3D Vision research** [Jan 2016 – Jun 2016] – **Mentored** an intern on depth map calculation using Stereo Camera Calibration Setup. Analyzed depth map and point cloud data to provide 3D Analysis features such as 3D Plane segmentations and Registration algorithms.
- **Feature Extraction and Classification** [Jan-2014 – June 2014] - **Mentored** an intern on a research project on feature extraction. Experimented with HOG & LBP feature descriptors and SVM classifiers for Object Detection applications.

PUBLICATIONS [INTERNAL]

- *"Defect Detection using different Computer Vision Algorithms and Finding a Generalized Defect Inspection System using Deep Learning"*, NITech Conference 2016, NI R&D, Austin
- *"Analysis of Superpixels on existing Vision Algorithms"*, NITech Conference 2014, NI R&D, Austin
- *"Steganography in images using DWT and Skin Detection Biometrics"*, NITech 2013, NI R&D, Austin

DEMOS & PET PROJECTS

- **Deep Learning Experiments:** Attended 3D Vision Conference 2016 at Stanford University and got inspired to try out Deep Learning architecture to solve problems at work. Tried CNN (Convolutional Neural Network) for classification; U-Net for image segmentation; F-CRN (Fully Convolutional Residual Networks) for depth prediction
- **Augmented Reality using PTAM:** PTAM (Parallel Tracking & Mapping) used to do 3D mapping of the surroundings and OpenGL used to for small AR applications.
- **3D Tracking:** Object Tracking combined with Stereo Vision to build a live 3D tracking demo.

AWARDS AND HONOURS

- **ENGINEERING EXCELLENCE AWARD** (2016) – In Recognition of excellent work and dedication in bringing out innovative ideas and products in NI R&D - by National Instruments, Austin, Texas
- **ROOKIE OF THE YEAR AWARD** (2013) – In Recognition for the outstanding achievement and contribution of an employee to the company - by National Instruments, Austin, Texas
- **ERASMUS MUNDUS SCHOLARSHIP** (2010-2012) – The most prestigious fellowship offered by European Union to 10 International Students every year; to study in Consortia of universities across Europe
- **PRATIBHA PURASKAR** (2006) – honor by the Indian Govt. for the top 0.1% of top scorers in academia
- **CET** (2006) - Common Entrance Test for Engineering Entrance Exam –Rank 305 –among ~150,000 students