Yogesh Balaji

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EDUCATION

Indian Institute of Technology, Madras, Chennai, India

B.Tech., Electrical Engineering (2016)
Minor: Operations Research
CGPA: 9.53/10

Dayanand Anglo-Vedic Senior Secondary School, Chennai, India

Class XII (All India Senior School Certificate Examination, 2012)
Aggregate: 95.8 %

Smt. Durgadevi Choudhary Vivekananda Vidyalaya, Chennai, India

Class X (All India Secondary School Examination)
CGPA: 10/10

SCHOLASTIC ACHIEVEMENTS

- Branch Rank 4 in a class of 130 students
- All India Rank - 1600 (99.7 %ile) in IIT-Joint Entrance Examination, 2012
- Nominated to receive INSPIRE scholarship for top 0.1 percentile in AISSCE[1]

RELEVANT COURSE WORK

Key Courses
- Computer Vision
- Artificial Neural Networks
- Data Structures and Algorithms
- Statistical Estimation Theory
- Advanced Operations Research
- Introduction to Machine Learning
- Computational Photography
- Natural Language Processing
- Analog and Digital Signal Processing
- Introduction to Game Theory

Mathematics Courses
- Calculus
- Probability, Statistics and Stochastic Processes
- Linear Algebra
- Mathematical Logic

RESEARCH PROJECTS

Human Pose Estimation using Deep Neural Networks
IIT Madras | Guide - Prof. Anurag Mittal   **December 2014 - Present**
- Implemented a Part Detector and a MRF-Based Spatial Model jointly using Convolution Neural Network
- Working on incorporating Mixture of Parts model in the Neural Network framework to handle complex poses

Motion Segmentation And Depth Map Recovery from a single image using blur as a cue
Undergraduate Thesis | Guide - Prof. A.N.Rajagopalan   **August 2015 - Present**
- Classified the blur kernel at each pixel using Deep Convolutional Neural Networks and decoupled the motion and defocus blur
- Performed Segmentation on motion kernels after accounting for the camera motion
- Recovered the relative Depth Map using defocus blur information

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[1]AISSCE - All India Senior School Certificate Examination

Qualcomm Research, San Diego, U.S.A
Intern, WiFi System Team, R&D   **May 2015 - July 2015**
Guide - Dr. Aleksandar Damnjanovic
- Only intern selected from India based on strong technical skills
- Worked on developing MAC layer algorithms for fair coexistence of WiFi and LTE-U in unlicensed spectrum
- Carried out intense system simulations and theoretical study to quantify the performance of developed algorithms

PUBLICATIONS   Abhijith Punnappurath, Yogesh Balaji, Mahesh Mohan M R and A.N.Rajagopalan, *Deep Decoupling of Defocus and Motion Blur for Dynamic Segmentation,*
Submitted to CVPR[2] 2016 (under review)

PROJECTS AND   **Air Hockey Playing Robot**
INTERNSHIPS   *Team of 3*   **May 2013 - July 2013**
- Developed a robotic arm that plays Air Hockey using the feedback received from an overhead camera
- Built the entire system - both hardware and software at a cost less than $100
- Implemented algorithms for stable and efficient tracking of the puck in real time.

Federation Of International RoboSoccer Association (FIRA)
Team of 11 |Computer Vision Module   **May 2013 - July 2013**
- Built a module for automatic Dynamic Colour Calibration in the presence of variations in lighting conditions
- Designed path planning strategies for different agents (Attacker and Defender) in the game

Augmented Reality
Team of 3   **January 2013 - April 2013**
- Developed an application that detects a known patten in a video feed and superimposes a video on the detected pattern
- Implemented fast and stable perspective invariant pattern detection and tracking

Dhavani Research
Intern |Guide - Mrs. Padma Purushotaman   **December 2013 - January 2014**
- Estimated the dimensions of cracks in solid objects using fluorescent images
- Mapped the crack onto 3D CAD model using Ray Tracing and projected the crack dimensions in real world coordinates

Center of Excellence in Wireless Technology
Intern |Guide - Mr. Sendil   **May 2014 - July 2014**
- Implemented 3GPP SCM 3D Channel Model for Wireless channel and estimated the large scale and small scale parameters between each Base Station-User link.
- Compared the potential gains of the 3D channel model with the 2D model that was in use

Virtual Lab
EEA[5] hackathon |Guide - Prof. Nitin Chandrachoodan   **February 2014 - April 2014**
- Built an online Graphical User Interface for constructing, solving and analysing circuits on a virtual Breadboard
- Circuits with Linear Analog components and simple Integrated Circuits were implemented and tested

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[2]CVPR - IEEE Conference on Computer Vision and Pattern Recognition

COURSE PROJECTS **Salient Object Detection**
Course: Computer Vision|Guide - Prof. Sukendhu Das   **February 2015 - May 2015**
- Implemented Saliency Map Prediction using Supervised Discriminative Regional Feature Integration Approach
- Extracted foreground segments by feeding the predicted saliency map as input to the Grab Cut algorithm

Spell Check System
Course: Natural Language processing   **August 2015 - October 2015**
Guide - Prof. Sutanu Chakraborti
- Developed an application that detects and corrects mistakes in a given piece of text
- Incorporated Context Sensitive and Context Free error detection and correction

Statistical Machine Translation
Course: Natural Language processing   **September 2015 - November 2015**
Guide - Prof. Sutanu Chakraborti
- Implemented IBM Model 1 and Model 2 for translating French sentences to English
- Improved the models by choosing better alignment functions
- Proposed a fast and efficient algorithm for generating English sentence using the learnt translation and alignment probabilities

COMPUTER SKILLS **Operating Syatems:** Linux (Ubuntu), Windows
Languages: C/C++, Java, Python, Lua
Software and Tools: MATLAB, OpenCV, TORCH, CAFFE

POSITIONS OF
RESPONSIBILITY
Head of Electrical Engineering Association   **August 2014 - August 2015**
- Led a team of 10 students to conduct various department activities with faculty support
- Responsible for conducting EEA Annual Hackathon, Lecture Series, Electrical Engineering Department Night and Department sport activities

Coordinator of Puzzle Champ, Shaastra[3] 2014   **September 2013 - January 2014**
- Part of a team of 4 responsible for organizing Online and Offline Puzzle Champ, one of the largest events in Shaastra
- Event spanned over 3 days with more than 500 participants each day

Volunteer of National Service Scheme, IIT Madras   **August 2012 - March 2013**
- Worked on a 6 month National Service Scheme project on Video Content Generation for government schools that lack laboratory facilities
- Recorded Science experiments for high school students and provided explanations in regional languages

OTHER
ACHIEVEMENTS
- Placed 1st in Online Math Modelling, Shaastra[3] 2014
- Winner of Mimamsa[4] 2014, Chennai region
- Winner of Annual EEA[5] Hackathon, 2014

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[3]Shaastra - IIT Madras Technical Fest
[4]Mimamsa - National level inter-college Science Quiz conducted by IISER, Pune
[5]EEA - Electrical Engineering Association, IIT Madras