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[Homepage ⌐](#) [Github ⌐](#)

Interests

Computer Vision, Deep Learning, Robotics

Research Experience

- **Person Re-Identification: Multi-Task Deep CNN with Triplet Loss**   [Code ⌐](#)
  Supervisor: Prof. Vinay Namboodiri
  - *Objective:* To solve the problem of Person Re-Identification i.e. Identifying a person in a **Low-resolution** Dataset given a query image of that person from a Same or a Different Camera
  - *Method:* Multi-Task Deep Convolutional Neural Network with shared parameters in lower layers to Jointly Learn Attributes and Features for Pedestrain Images with Multi-Task Loss
  - Implemented the Deep CNN with Multi-Task Loss using *Caffe- Deep Learning Framework* by *BVLC*

- **Zero-Shot Image Tagging**   [Report ⌐](#) [Presentation ⌐](#) [Code ⌐](#)
  Supervisor: Prof. Piyush Rai   *Course Project : Machine Learning Techniques*
  - *Objective:* Automatic Annotation of Images with Previously Unseen Tags
  - Studied and Implemented Research Papers: *"Fast Zero-Shot Image Tagging"* by Yang Zhang, Boqing Gong et.al and *"Fast Image Tagging"* by Chen, Zheng et.al
  - Proposed a Deep Neural Net with Multi-Task Loss for FastTag instead of Linear Mappings
  - Experimented with Tag Embedding generated on the basis of Co-occurence instead of Word2Vec
  - Suggested a Method based on Kernelized Ridge Regression to learn the Principal Direction for an Image

Selected Projects

- **Semantic Segmentation**   [Survey-Report ⌐](#) [Survey-Presentation ⌐](#)
  Supervisor: Prof. Gaurav Pandey
  - *Objective:* To solve the problem of Pixel-level Semantic Segmentation i.e. Segmenting a scene into several semantically meaningful segments and classfying each segment into one of the pre-defined categories
  - Conducted a Survey and studied research papers covering all the major algorithms for semantic segmentation(Image/Video/3D) based on various techniques such as Conditional Random Fields, Fully Convolutional Networks, HyperColumns, Dilated Convolutions, Sensor Fusion
  - To come up with a method for the problem of Semantic Segmentation in 3D using LIDAR data and image data to solve the problem of obstacle detection and route planning for autonomous vehicles

- **Texture Synthesis**   [Code(nps) ⌐](#) [Code(quilting) ⌐](#)
  Supervisor: Prof. Vinay Namboodiri   *Course Project : Introduction to Computer Vision*
  - *Objective:* To synthesize large Texture image from small samples,capturing important Texture Properties
  - Studied and Implemented Research Papers: *"Image Quilting for Texture Synthesis and Transfer"* by Alexei A.Efros, William T.Freeman and *"Texture Synthesis by Non-parametric Sampling"* by Alexei A.Efros, Thomas K. Leung

- **Varun : Autonomous Underwater Vehicle**   [Webpage ⌐](#) [Github ⌐](#)
  Faculty Advisers : Prof. K.S. Venkatesh, Prof. Sachin Y. Shinde
  - Implemented Image Enhancement Algorithms for Underwater Environment
  - Designed and implemented Object Detection Algorithms using OpenCV to detect various obstacles Underwater to help the vehicle maneuver autonomously around these obstacles
  - Developed the software architecture of the Vehicle using ROS(Robot Operating System)
  - The Vehicle uses the Live Video Feed from On-Board cameras to complete mission tasks
  - The vehicle completed several tasks underwater and secured 2nd position in the National Student Competition of Save, organized by *National Institute of Ocean Technology, India*

Other Projects

- **Software Testing Tool**   Code ⬈
  Supervisors : Prof. Amey Karkare, Prof. Subhajit Roy
  - Learned and Implemented algorithms used in Software Testing for High Coverage
  - Implemented an algorithm used for Generating Automatic Test Cases for High MCDC coverage
  - Developed a tool for Automatically Generating Test Cases for High MCDC coverage
  - Build the solution over open-source tools implemented in multiple languages like Ocaml,C and Python

- **Speech Recognition - Hidden Markov Models**   Report ⬈
  Supervisor: Prof. Rajat Mittal   *Course Project: Discrete Mathematics*
  - Learned about the concepts related to Markov Chains and Hidden Markov Models
  - Automatic Speech Recognition using Hidden Markov Models considering the Markov assumption
  - Studied Article: "An Introduction to Hidden Markov Models" by *L.R.Rabiner , B.H. Juang*

- **ShareCab**   Code ⬈
  Supervisors: Prof. Satyadev Nandakumar, Prof. Piyush Karur   *Course Project: Computing Laboratory II*
  - Ride-Sharing Web Application, based on Django, for Campus Community
  - Automated Search for Suitable Ride Matching based on Timings, Train/Flight Details, Destination
  - Comment Forum for each Ride and Driver Review Submission

- **NachOS: Operating Systems**
  Supervisor: Prof. Mainak Chaudhury   *Course Project: Operating Systems*
  - Implemented System Calls such as Fork, Exec, Sleep, Yield over the basic implementation of NachOS
  - Experimented, Implemented and Analysed various different Scheduling Algorithms
  - Implemented Shared Memory Interface, Demand Paging and various Page Replacement Algorithms

- **Windows Phone Applications**   Code ⬈
  Microsoft Code.fun.do
  - *2014*: Encrypts and Decrypts confidential messages, also sends them as SMS
  - *2015*: Combines and Produces the best results from various Online Shopping Stores

Technical Skills

- **Languages:** C/C++, Python, R, C# , Matlab, HTML, CSS
- **Libraries and Tools:** OpenCV, ROS, Caffe, Theano, Keras, MatConvNet, Django, LaTeX, Vim, Git
- **Operating Systems:** Linux(Ubuntu, CentOS), Windows , BSD(FreeBSD)
- **Platforms:** ARM Odroid X2, ARM Odroid U3, Arduino, Raspberry Pi

Academic Achievements

- Secured All India Rank 118 in JEE-2014 among 1,400,000 candidates (99.99 percentile)
- Kishore Vaigyanik Protsahan Yojana (KVPY) Scholar 2013-14 with an All India Rank 240
- Qualified for the **National Level Science Exhibition-2012** for the project- *Microbial Degradation of Insecticides and Pesticides.*
- Qualified for **INOI-2012** conducted by *IARCS* (Indian Association for Research in Computing Science)
- Secured 2nd position in the **National Student Competition of Save**, organized by *National Institute of Ocean Technology, India, 2016*

Relevant Courses

- Introduction to Programming (A*)
- Introduction to Logic
- Abstract Algebra
- Discrete Mathematics
- Data Structures and Algorithms
- Computer Organization
- Computing Laboratory
- Probability and Statistics

- Introduction to Computer Vision
- Machine Learning Techniques
- Operating Systems
- Theory of Computation
- Design and Analysis of Algorithms
- Compiler Design
- Topics in Computer Vision
- Multi Agent Systems: Games, Algorithms, Evolution

A* grade for exceptional performance