# Nrupatunga

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## Research Interest

- My current interest and focus is on applying machine learning and deep learning techniques to analyze images/videos for the problem of recognition, segmentation and scene understanding. Also, use deep networks to learn and combine features over multiple modalities

## Education

- **Indian Institute of Science** — Bangalore, Karnataka
  *Master of Engineering in Signal Processing* — *2010 - 2012*
  - Master Thesis: Complex Network Approach for Analysis of Biomedical signals
  - CGPA: 5.8/8.0
  - Advisor: Prof. D. Narayana Dutt
- **Sri Jayachamarajendra College of Engineering** — Mysore, Karnataka
  *Bachelor of Engineering in Electronics and Communication* — *2005 - 2009*
  - Percentage: 71.14%

## Work Experience

- **Samsung R&D India** — Bangalore
  *Technical Lead, Media Analytics and Recognition Team* — *2016-Present*

  ○ Project: Semantic Segmentation of Sky and Non-sky regions in an Image using Fully Convolutional Neural Network *Blog*

  * Development: Languages & Tools used - Python, Caffe Deep Learning Framework
  * Aim of this project is to:
    · Understand how Fully Convolutional network enables end to end dense learning
    · Fine tune the weights of the pretrained model, appreciate how transfer learning enables to address different computer vision problems with reasonable amount of data
    · Investigate the features learnt in each layer of the network
    · Experimentation on using sky segmentation map as prior for horizon detection

  ○ Project: Nearest Neighbor Image retrieval using GIST descriptor *Command tool*

  * Development: Languages & Tools used - C++, OpenCV, MATLAB
  * Aim of this project is to:
    · Evaluate GIST descriptor for task of Image retrieval
    · Demonstrate how GIST descriptor can be used for detection of duplicate images

  ○ Project: Histogram of Oriented Gradients for Pedestrian Detection

  * Development: Languages & Tools used - C++, OpenCV, SVMLight
  * Aim of this project is to:
    · Demonstrate my understanding in Support Vector Machines by applying to a computer vision problem

  ○ Project: Combining Sketch and Tone for Pencil Drawing Production. *Software* *Code*

  * Development: Languages & Tools used - C++, OpenCV, QT
    · A system to produce pencil drawings from natural images.
    · This system mimicks human style of pencil drawing
    · Designed a GUI using QT

- Project: Auto Image Enhancement (Galaxy S6 onwards)
  - Design and development: Languages used - C, Matlab
    - Algorithm for detection of low-light/backlight images
    - Algorithm for detection of poorly lit faces in an image
    - Colorfulness measurement in natural images
  - Complete architecture design of Auto Image Enhancement Engine
  - Complete JNI framework design & development for communicating between application and engine
- Project: Photo Editor, Best Photo.
  - Design and development: Red eye correction algorithm. GUI developed using Matlab GUIDE for quick demo
  - Design and development: Measurement of blur in an image. Algorithms implemented from two IEEE papers. Languages used:C++
  - Implementation of bilinear resizer module for less memory architecture - Insert emoticon effect in Photo Editor. Languages used: C
  - Optimization of Photo Editor effects using POSIX threads
- Project: Touch Focus (Galaxy S5 onwards)
  - Complete JNI framework design & development for communicating between application and engine

## Pet Projects

1. Implementation of Canny Edge Detector. Languages & Tools used - C++, OpenCV. *Code*
2. Implementation of Bilateral filter. Languages & Tools used - C++, OpenCV. *Code*
3. QT based GUI Application for experimenting Sobel & Canny Edge Detectors. Languages & Tools used - C++, OpenCV, QT. *Software*

## Relevant Coursework - IISc, Bangalore

**Signal Processing Courses:** Digital Image Processing, DSP System Design, Biomedical Signal Processing, Speech Information Processing

**Mathematical Courses:** Linear Algebra, Probability & Random Process, Detection & Estimation Theory, Mathematics for Electrical Engineers

## Skills

**Languages:** C/C++, MATLAB, Python, QT, Android JNI

**Tools:** Microsoft Visual Studio, Eclipse, Android NDK, Vim

**Miscellaneous:** Excellent troubleshooting and debugging skills