Nrupatunga

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Research Interest

- My current interest and focus is on applying machine learning and deep learning for scene understanding which includes scene classification, detection, recognition and segmentation.

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
  * 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 *Executable* *Code*

  * 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. *t-SNE*

  Lead Engineer, AVI Solutions Team — *2014-2016*

  ○ Project: Histogram of Oriented Gradients for Pedestrian Detection *Code* *t-SNE*

  * Development: Languages & Tools used - C++, OpenCV, Python, SVMLight
  * Aim of this project is to:
    · Demonstrate my understanding of Support Vector Machines by applying to a computer vision problem
    · To understand how hard negative mining and adding non maximum suppression module helps in improving the accuracy of object detection

  ○ 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: Touch Focus (Galaxy S5 onwards)
  * Complete JNI framework design & development for communicating between application and engine

Senior Software Engineer, Multimedia Solutions Team *2012-2014*

- 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 module in Photo Editor. Languages used: C
  * Optimization of Photo Editor effects using POSIX threads

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 edge detectors such as Sobel & Canny, blurring filters such as homogeneous, median, Gaussian & bilateral. Languages & Tools used - C++, OpenCV, QT. *Software*
4. Image Watermarking Algorithm based on DWT DCT and SVD. Languages & Tools used - MATLAB

Relevant Coursework

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

Deep Learning (ongoing): Learning from Data (Abu Mostafa), Machine Learning (Andrew Ng), UFLDL (Stanford).

Skills

Programming Languages: C, C++, MATLAB, Python

Framework: QT, Android JNI

Tools: Caffe Deep Learning Framework, Microsoft Visual Studio, Eclipse, Android NDK, Vim

Miscellaneous: Excellent troubleshooting and debugging skills