

SKILLS SUMMARY

- **Languages:** Python, C, C++, Matlab
- **Deep Learning Frameworks:** Caffe, MXNet, PyTorch, PyTorch-Lightning, TensorFlow, TFLite
- **Tools:** Vim, Git, Tmux, Microsoft Visual Studio, QT, Eclipse, Android JNI/NDK

EXPERIENCE

- **BYJU'S/Osmo** Bangalore, India
Staff Research Engineer *September 2019 - Present*
 - **Fractions mathbox:**
 - Localization of the game tangibles using YOLOv5 based detector trained with synthetic and real dataset
 - Continuous orientation estimation of game tangibles using multi-classifier with mean-shift smoothing
 - Mobile friendly oriented bounding box detection using corners/ box boundary aware vectors and orientation estimation using edge classification
 - **Snapbook:**
 - Hand and fingertip detection for content retrieval using phygital interaction
 - Built SSD/CenterNet based single-shot detectors with SqueezeNet/Mobilenet/SqueezeNext backbones
 - Adoption of asymmetrical focal loss to improve detections
 - **Kids' handwriting recognition:**
 - Implemented preprocessing algorithm to eliminate data variability in kids' handwriting and enhance input quality
 - Reliable real-time feedback by building model to classify kids' interactions
 - Improve OCR performance and user experience by adding frame to frame optimization
 - Enhance the game feedback to the user by building a calibrated character recognition model using focal loss and knowledge distillation
 - [Web app](#) for creating ambiguous data using Joint-VAE for model calibration and to compare different models performance
 - **Visual element detection for auto-grading worksheets:**
 - Developed keypoint based object detection to identify page elements and orientation
- **Whodat™ (AR startup acquired by BYJU'S)** Bangalore, India
Deep Learning Research Engineer *April 2017 - August 2019*
 - **Live face verification with selfie and KYC document:**
 - Built ResNet based models to improve the vector representations for faces using inter and intra marginal loss functions.
 - **Ground/Wall plane and centroid estimation:**
 - Built VGG based models to predict segmentation maps, depth, and normal to estimate planes, orientation, and centroid to assist the placement of virtual objects in real-world
- **Samsung R&D Institute** Bangalore, India
Technical Lead *July 2012 - March 2017*
 - **Deep Convolutional Network for Food Recognition:** Data Collection, labeling to support Indian food categories and built smaller model for mobile inference
 - **Fully Convolutional Network for Segmentation of Sky and Non-sky regions:** sky segmentation map used as prior for horizon detection in an image
 - **Detection of Duplicate images in Gallery:** Nearest Neighbor Image Retrieval using GIST descriptor ([Code](#))
 - **One-Touch Auto Image Enhancement (commercialized in flagships after Galaxy S6):**
 - Implemented algorithm for detection of low-light, poorly lit face images
 - Architecture design of auto image enhancement engine
 - **Photo Editor/Best Photo (commercialized in all android Phones):**
 - Bilinear resizer module for less memory architecture in Photo Editor
 - Red-eye correction, Blur Detection, and Ranking Algorithm
 - **Touch Focus (commercialized in flagships after Galaxy S5):** Complete JNI framework design & development for communicating between application and engine

EDUCATION

- **Indian Institute of Science** Bangalore, India
Masters in Signal Processing *2010 - 2012*
- **Sri Jayachamarajendra College of Engineering** Mysore, India
Bachelor of Engineering in Electronics and Communication *2005 - 2009*

WORKSHOP PAPERS

- **Nrupatunga**, Aashish Kumar, Anoop Rajagopal. *Phygital Math Learning with Handwriting for Kids*. NeurIPS 2021 Workshop on Math AI for Education ([Paper](#))

OPEN SOURCE PROJECTS

- **Single object tracking** ([Code-1](#))/([Code-2](#)): Implementation to facilitate easy training and experimentation
- **Fast Image Filters with CNN** ([Code](#)): Implementation of few Image filters using CNN
- **Color Pencil Sketch Effect** ([Code](#)): Combining sketch and tone for human-style pencil drawing
- **Pedestrian detection using Histogram of Oriented Gradients** ([Code](#)): SVM model to detect pedestrians in the image
- **Image Processing Toolbox** ([App](#)): QT based GUI application to test basic blur and edge detection algorithms

OTHERS

- Recognition for the effort in the success of Touch Focus USP commercialized in Galaxy S5