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TARUSHREE GANDHI

COMPUTER SCIENCE GRADUATE
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Research Interests

Computer Vision | Deep Learning | Machine Learning

Education

- Vellore Institute of Technology, Chennai, India (VIT University*)* ***9.13 CGPA***
  Bachelor of Technology (B.Tech) at the Dept. of Computer Science Engineering *(2012 - 2016)*
- Delhi Public School, Vasant Kunj, New Delhi ***93 %***
  Class XII / Senior Secondary *(2012)*
- Delhi Public School, Gurgaon ***9.6 CGPA***
  Class X / Matriculation *(2010)*

Key Skills

- Language proficiency - Python, R, C, C++, Java
- Tools - Android Studio, Git, MongoDB | OS - Linux, ROS
- DL and ML libraries - OpenCV, Scikit-Learn, Dlib, Darknet, Torch7, Pytorch, Caffe, Keras, TensorFlow.
- CNNs and ML algorithms implemented and experimented : HOG, SVM, DenseNet, SqueezeNet, ENet, PspNet, Mask R-CNN, Faster R-CNN

Achievements

- **National Honour - Innovative Project Fund** (Awarded with INR 1 lakh) *(Dec 2015)*
  Project Airport Assistance System (AAS) was selected by IEDC (Innovation and Entrepreneurship Development Centre), Department of Science and Technology, Government of India for project development funding. IoT based, developed by a team of four students, AAS is an autonomous robot with three major modules: robot navigation, camera based face detection and query processing using speech-to-text conversion.
- **Meritorious Student Award - VIT University (Rank - 7 / 120)** *(July 2016)*
  Was awarded to top 10 rank holders of B.Tech Computer Science (Batch 2012 – 2016), based on CGPA.

Work Experience

Research Engineer | The Hi-tech Robotic Systemz Ltd. *Gurgaon, India*
Fields: Computer vision | Deep Learning | Machine Learning *(June 2017 - Present)*

Image Classification

- ***Real-time Traffic Light Classification*** - Road scene image classification into red light/ green light/ no light using convolutional neural networks. Modified DenseNet to achieve 2% higher accuracy and a smaller model. Model accuracy - 98.4% on test data, speed - 8 fps on Nvidia TX1.

- ***Dual Classifier*** **-** Implemented modified SqueezeNet (Caffe) to achieve two objectives simultaneously i.e.
  (i) Classifying images into 2 classes (day and night) to segregate day time and night time images.
  (ii) Classifying images as interesting/uninteresting - images containing traffic lights, tunnels, bridges, flyovers, rain, fog, glare or animals are considered unusual (interesting).
  Model accuracy - 92.3% on test dataset.

- ***Single Shot Detector (SSD) features classifier*** - Designed a convolutional neural network to classify SSD features into good or bad. The network is trained using SSD features of images whose detection results by SSD are pre-determined. The model successfully predicts the images on which SSD object detection will fail.

Image Segmentation

- ***Semantic Segmentation*** **-** Implemented ENet (using Torch) for semantic segmentation of images into road, four-wheelers, two-wheelers and person. Trained extensively on Indian road data along with online datasets like Cityscapes, BDD, Mapillary Vistas, GTA etc. Incorporated ResNet features into ENet to achieve 65% accuracy on test data running at a speed of 7 fps on Nvidia TX1.

- ***Instance-level Segmentation*** **-** Multiple-branch Encoder-Decoder network (Torch) used for simultaneous class-wise and instance-wise image segmentation. Experimented with layers and loss function. Achieved 45% instance accuracy on Cityscapes test dataset.

Object Detection

- ***Blind-spot Warning*** **-** Working on vehicle and person detection in the blind-spot of trucks. Warning is generated if an object is detected in the vehicle's blind spot while turning. Object detection is implemented using HOG and SVM (Dlib). Current overall accuracy - 68.5%

Data Management and Data Annotation

- ***Active Learning*** **-** Developed a smart image selection framework for image annotation using deep learning. Basic idea is to predict different/ difficult images that should be annotated for increasing object detection accuracy. Networks used - Mask R-CNN, SSD.
- ***MongoDB inference framework*** **-** Implemented an automated framework for data querying and test inference reports generation, presenting accuracy numbers and related graphs.

Software Engineer | Cleartrip Pvt. Ltd *Bangalore, India*

Field: Android Development *(July 2016 - June 2017)*

- Worked as a mobile developer (Android) for Cleartrip mobile applications - Individually handled 'Trains' segment of the app. Other major contributions included adding new features to the app like Wish list, Google smart lock for passwords, and Cleartrip wallet and convenience fee for payment segment of the app.

UG thesis project | Research Intern | Zenatix Solutions Pvt. Ltd *Gurgaon, India*

Field: Machine Learning *(Dec 2015 - June 2016)*

- Designed a framework for predictive thermal modelling for HVAC optimization in commercial buildings. Proposed a thermal model that aims at optimizing air-conditioner usage in order to conserve energy and reduce energy cost while maintaining the same comfort level. Used machine learning algorithms and concepts (Python) like regression, SVM, clustering, normalization, cross-validation etc. Carried out data analysis using statistics and data visualization.