Sandeep N Menon

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Research Interests

Deep Learning, Computer Vision, Autonomous Vehicles, Adversarial Networks

Education

National Institute of Technology Karnataka, Surathkal, India **2014 – 2018**
Bachelor of Technology in Computer Science Karnataka, India
CGPA 8.83/10

Kendriya Vidyalaya Rubber Board, Kottayam **2012 - 2014**
Higher Secondary Kerala, India
97%, 2nd in class. Centum in Mathematics.

Industry Experience

Deepen AI **September 2020 – Present**
Deep Learning Research Engineer Hyderabad, India

- Developed a 3D PointNet model that performs temporal smoothing of segmentation predictions over point cloud sequences, improving mean Intersection over Union (mIoU) by 20%.
- Built a Sparse Point-Voxel CNN model for semantic segmentation of 3D point cloud sequences. Pre-labeled sequences improved data annotation speed by 30% and achieved mean Intersection over Union (mIoU) score of 76%.
- Implemented object-aware anchor-free tracking for 2D visual object tracking and VPGNet model for lane segmentation and classification.
- Created an on-demand GPU Virtual Machine allocation system using Azure. Enabled automatic allocation and de-allocation of expensive GPU machines, thereby saving up to 1000 USD per month.
- Worked with Potree, an open-source WebGL based point cloud renderer for large point clouds, thereby developing a system that could render point clouds with more than 150 million points in a web browser.

Microsoft **June 2018 – September 2020**
Software Development Engineer II Hyderabad, India

- Introduced a new Machine Learning method to identify similar won deals in CRM context for Relationship Analytics in Dynamics 365, filed a patent on the same (awaiting approval).
- Designed and implemented Machine Learning infrastructure to run, store and display AI model predictions for Sales Insights features in Dynamics 365.
- Developed a GDPR query handling service for the email insights infrastructure that handles up to 1 million daily service requests.
- Shipped Dynamics 365 sales insights connector in Microsoft Flows that manages more than 9 million monthly service requests.

Publications and Projects

Removing noise from Optical Coherence Tomography (OCT) Images **August 2017 - May 2018**

- Sandeep N Menon, VB Vineeth Reddy, A Yeshwanth, BN Anoop, and Jeny Rajan. A novel deep learning approach for the removal of speckle noise from optical coherence tomography images using gated convolution–deconvolution structure. In *Proceedings of 3rd International Conference on Computer Vision and Image Processing*, pages 115–126. Springer, Singapore, 2020

- Created a deep encoder-decoder neural network with gated skip connections that identifies and removes noise from medical images. Applied this method on OCT images to eliminate the inherent speckle noise.
- Achieved Structural Similarity Index (SSIM) value of 96.7% for low noise images and 91.2% for high noise images, surpassing the state-of-the-art results at the time of publishing.

Point Cloud Oversegmentation using Superpoint Graphs | *PyTorch, Boost* **May - June 2021**

- Adapted Superpoint Graph implementation to Argoverse point cloud dataset to achieve oversegmentation results of overall accuracy of 96% and Boundary Recall of 92%.

Point Cloud Segmentation using projected 2D segmentation | *MMSegmentation* **April - May 2021**

- Created point cloud semantic segmentation pipeline by projecting image segmentation of camera output using HRNet, DeepLabV3 and PointRend models.
- Implemented projection of 3D space onto the 2D segmentation results of images from every camera mount to obtain the estimated class value of all 3D points; inspired from PointPainting paper.

Asymmetric 3D Convolutions in Torchsparse | *PyTorch* **February 2021**

- Contributed Asymmetric 3D Convolutions implementation for the open source repository TorchSparse, a high-performance neural network library for building deep neural networks that process point clouds.

Virtual Gym Trainer | *PyTorch, Azure, OpenCV, Pose Estimation* **May - June 2019**

- Devised a platform where trainers upload their exercise specifics and then users are guided through them using audio and visual cues.
- Provided real-time human pose estimation using PoseNet network and geometric estimations to measure correctness of the posture.
- Awarded 1^{st} position in Microsoft Intelligent Edge Hackathon 2019.

Technical Skills

Strengths: Deep Learning, Computer Vision, Computational Geometry, Cloud Computing
Languages/Libraries: PyTorch, TensorFlow, Keras, OpenCV, SciPy, C++, C#, Python, React.js, Three.js
Databases: MongoDB, RocksDB, MySQL, Azure CosmosDB
Cloud: Azure, Google Cloud Platform, Docker Cloud

Certifications

Computer Vision Nanodegree, Udacity **June 2020 – August 2020**
Image Captioning using CNN-RNN, Landmark Detection and Tracking using 2D Graph SLAM

Deeplearning Specialization, deeplearning.ai **December 2020 - March 2020**
Neural Networks and Deep learning, Structuring Machine Learning Projects, Convolutional Neural Networks, Sequence Models

Statistical Learning, StanfordOnline: STATSX0001 **March 2020 – April 2020**
Boosting trees, Discriminant Analysis, Splines, Support vector machines

Leadership / Extracurricular

- Served as the President of Web Enthusiasts Club NITK during 2017-18. Organized events such as mock technical interviews, CTFs, Linux installation drives.
- Selected as a Core executive member at IEEE NITK Student Chapter during 2017-18. Conducted hackathons and competitive programming contests.
- Writing research paper commentary at *https://oneortworesearchdigest.blogspot.com* focusing on new neural network architectures and applications since 2020.