Deepak Kumar Singh

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Research Interests

Computer Vision, Deep Learning, Machine Learning, Life-long/Continual/Incremental Learning, Open World Learning

Education

2018-Present **International Institute of Information Technology (IIIT), Hyderabad**
M.S. by Research, Computer Science and Engineering, CGPA : 7.33/10
Advisors : Dr. C V Jawahar and Dr. Vineeth N Balasubramanian

2010-2014 **Visvesvaraya Technological University**
BE, Computer Science and Engineering, CGPA : 7.33/10 (First Class with Distinction)

Publications

- **ORDER: Open World Object Detection on Road Scenes**
  Deepak Singh*, Shyam Nandan Rai*, Joseph K. J., Rohit Saluja, Vineeth N Balasubramanian, Chetan Arora, Anbumani Subramanian, C. V. Jawahar
  Machine Learning for Autonomous Driving(ML4AD) **Workshop**, **NeurIPS, 2021**

- **Evaluation of Detection and Segmentation Tasks on Driving Datasets**
  Deepak Singh, Ameet Rahane, Ajoy Mondal, Anbumani Subramanian, C. V. Jawahar
  International Conference on Computer Vision and Image Processing **(CVIP), 2021 (Oral)**

Experience

September 2016
September 2014

Software Engineer, Celstream Systems Pvt. Ltd., Bangalore, India

- Built the product's main UI Console on JavaScript environment for better accessibility.
- Developed modules using IgniteUI Library to create dynamic data-visualization modules.
- Developed data-adapters for live data-visualization modules.
- Implemented libraries for multiple custom window management.
- Migrated the in-house application from Adobe Flash environment to JavaScript environment.
- Developed REST APIs in Java.

Java | HTML5 | JavaScript | IgniteUI | Adobe Flex | REST APIs

Projects

Formulating Open World Object Detection (Life-long Learning) — Research Group
Vision for Mobility and Safety, CVIT, IIIT Hyderabad — August 2020 - October 2021

– First work that formulates open-world object detection on road scene datasets.
– Identify and address two inherent issues in road scene datasets: intra-class scale variation and high distribution of small objects.
– Introduce an approach which improves the feature representation on unknowns.

PyTorch | Detectron2

Benchmarking Computer Vision tasks on Road Scene Datasets — Dr. C. V. Jawahar, Dr. Anbumani
CVIT, IIIT Hyderabad — Jan 2019 - August 2021

– We evaluated various computer vision tasks such as object detection, semantic segmentation, and instance segmentation.
– We evaluated these tasks on Cityscapes, India Driving Dataset(IDD), Berkeley Deep Drive(BDD) datasets.
– We also proposed future approaches to be taken by deeplearning models on road scene datasets for improved generalization and adaptation.

PyTorch | Detectron2 | mmdetection

Oriented Edge Forests for Boundary Detection Computer Vision Project

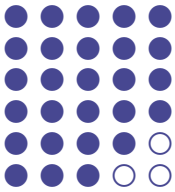
CVIT, IIIT Hyderabad

– Learns boundary detection based on a random forest classifier.
– Analyse local patches and outputs probability distributions over the space of oriented edges.
– The local predictions are calibrated and fused over an image pyramid to yield an oriented boundary map.

Python

Skills

Python
PyTorch, fast.ai
OpenCV, scikit-learn, SciPy
NumPy, pandas
C, Java
Scripting, HTML, JS



Course work

- Computer Vision
- Digital Image Processing
- Statistical Methods in AI
- Optimization Methods
- Topics in Applied Optimization
- Mobile Robotics

Co-Curricular Activities

HPC Student Administrator	Responsible for maintaining a smooth operation of 252 GPUs cluster using SLURM with various requirements of resource allocation policies, reservation policies, data storage, task management and day-to-day management of optimal usage of the cluster.
CVIT Paper Reading Group	Monthly paper discussions on popular papers, and also discussions on common Computer Vision and Machine Learning concepts, organized during 2019-2020.
Moderator	Moderated various keynote-speaker sessions during 5th Summer School on AI, 2021 at CVIT, IIIT-H.
Marathon	Winner in 5K winter marathon 2018.
Volleyball	Our team won the intramural PG volleyball 2018.
Presenter	Our work called ”A Software Application to Navigate Using GPS and Google Maps” was one among the 425 selected projects across the entire state of Karnataka, and was sponsored by **Karnataka State Council for Science and Technology(KSCST),IISc**, Bangalore. It was presented at KLE Tech, Hubli, Karnataka in 2014.
Student Magazine Editor	Initiated monthly magazine for Computer Science department during 2012-2014.