

Deepak Kumar Singh

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EDUCATION

- **International Institute of Information Technology** Hyderabad, India
MS by Research in CSE; GPA : 7.33/10.0 *Aug. 2018 – pursuing*
- **Rajarajeswari College of Engineering** Bengaluru, India
Bachelor of Engineering in CSE; Percentage : 73% *Aug. 2010 – June. 2014*

WORK EXPERIENCE

- **Celstream Systems Pvt. Ltd.** Bangalore
Software Engineer - Full time *Sept 2014 - Sept 2016*
 - 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.
 - Restructured the modules to work in JavaScript environment.
 - Developed REST APIs in Java.

PUBLICATION

There is a surge of interest in the recent years for self-driving cars and autonomous vehicles which perceive their environment through various sensors and cameras. This work is focused on evaluating various state of the art models for semantic segmentation, instance segmentation, and object detection on various road scenes datasets like Cityscapes, Berkeley Deep Drive, India Driving Dataset. We are benchmarking performances of various models on various datasets by utilizing only images to understand the complexity and response. This work has been submitted to **ACPR-21** and is currently under the review period.

RESEARCH WORK

- **Incremental Object Detection** IIIT Hyderabad, India
Aug 2020 - Present

Most object detection models are modeled on a fixed-set of classes which makes them inherently susceptible to misdetections. The goal of this project is to model object detection model to learn new classes in an incremental fashion without losing the knowledge of previous classes. This project is being pursued at the Centre for Visual Information Technology(CVIT), IIIT Hyderabad, advised by Prof. C V Jawahar.

PROGRAMMING SKILLS

- **Languages:** Python, Java, JavaScript, C, C++
- **Technologies and Frameworks:** PyTorch, TensorFlow, fast.ai, scikit-learn, pandas

COURSE WORK

- **MS by Research** IIIT Hyderabad, India
Aug 2018 - Dec 2019
 - Digital Image Processing
 - Statistical Methods in AI
 - Computer Vision
 - Topics in Applied Optimization
 - Optimization Methods
 - Mobile Robotics

MOOCs

- **Coursera**

Aug 2016 - Present

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|-------------------------------------|-----------------------------|---|
| ◦ Neural Networks and Deep-Learning | ◦ CNNs | ◦ Probabilistic Graphical Modeling(Ongoing) |
| ◦ Improving Deep Neural Networks | ◦ Structuring ML Projects | |
| | ◦ Linear Algebra 18.06, MIT | ◦ Bayesian Statistics(Ongoing) |

PROJECTS

- **Self-Training:** A semi-supervised technique on MNIST digits dataset as a proof-of-concept whether a classification model can be improved using Self-Training approach.
- **Principal Component Analysis and Naive Bayes Classifier on face images:** PCA was used to get reduced dimension images for faster and efficient classification. PCA was followed by two methods to perform classification namely, gradient descent method using the cross entropy loss, a Naive Bayes classifier using the Bayes's theorem to determine the probability of classification.
- **Classification on CIFAR-10:** Developed a classifier on various data representations like PCA, LDA, Raw data. Various classifiers were used including Softmargin Linear SVM, MLP, Kernel SVM with RBF-Kernel and Logistic Regression.
- **Contrast Based Filtering for Salient Region Detection [Link]:** Image decomposed into basic, structurally representative elements that abstract away unnecessary detail, and at the same time allow for a very clear and intuitive definition of contrast-based saliency.
- **Oriented Edge Forests for Boundary Detection [Link]:** Efficient model for learning boundary detection based on a random forest classifier. Boundary detector consists of a decision forest that analyzes local patches and outputs probability distributions over the space of oriented edges passing through the patch. This space is indexed by orientation and signed distance to the edge ($d; \theta$). These local predictions are calibrated and fused over an image pyramid to yield a final oriented boundary map

OTHER ROLES

- **HPC Cluster Moderator:** Responsible for maintaining a smooth operation of 92 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.

EXTRACURRICULARS

- **Winner** - 5k Marathon 2018
- **Winner** - Intramural PG Volleyball 2018