Abhinav Dadhich

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Interested in applied *Deep Learning* in computer vision across several domains. Have worked with popular frameworks such Pytorch, Mxnet, Keras etc. to develop

- models for image classification such as Inception, Resnet etc. and object detection models such as SSD.
- Unsupervised modeling with VAE and GANs.
- Video based action classification.

Worked in an international and multi-cultural team to develop projects from ideas to deployments. Other notable projects are Visual SLAM, 3D Mapping etc.

Education

- 2013–2015 **M. Eng. Information Science**, *Nara Institute of Science and Technology*, Nara, Japan.
- 2009–2013 **B. Tech. Electrical Engineering**, *Indian Institute of Technology*, Jodhpur, India.

Previous Employment

Aug'16-Curr **Deep Learning Researcher**, *Abeja Inc.*, Tokyo, Japan.

- Within an international team, I am responsible for conceptualizing and designing deep learning projects. I provide mentoring to understand deep learning and computer vision for practical applications. With an understanding of recent research and state-of-art models, I have experimented with hyper-parameter tuning and reproduced results on standard benchmarks.

Oct'15-May'16 **Robot Navigation Intern**, *Rapyuta Robotics*, Tokyo, Japan.

- I developed and extended state-of-art algorithms for Cloud based RGBD SLAM. In order to achieve real time performance, fine tuned parameters and performed extensive testing on real world environment and datasets. In a team of 4, conducted weekly live demos for potential clients on aerial vehicle obstacle avoidance.

May'12-Jun'12 **Research Intern**, *Panasonic R&D Center India*, Gurgaon, India.

- In a team of 3, developed System of Portable Clinic. Conceptualized and Implemented special functioning of Smartphones' NFC to Healthcare System resulting to increased efficiency.Awarded as Excellent Work in Official Company Feedback.

Technical Skills

- **Programming Languages:** Proficient in: Python, C++, Arduino, LaTeX
- **Deep Learning Software Skills:** PyTorch(Advanced), Mxnet(Intermediate), Keras(Intermediate), Tensorflow(Intermediate), Nvidia-Docker, CUDA, CUDNN
- **Robotics and Computer Vision Software Skills:** OpenCV(Advanced), ROS(Advanced), Docker(Advanced), Jupyter(advanced), Turtlebot, Quadcopters
- **Datasets Skills:** Worked with MSCOCO, VOC, TUM-RGBD etc.

Publications

2018 **Practical Computer Vision**, *Book, Packt Publishing*.

- This book is designed for developers or undergraduate students who would like to have a practical approach in learning and implementing recent computer vision algorithms. It consists of chapters ranging from simple image processing to deep learning based object detection and follows OpenCV, Keras and Tensorflow as development environment.

2015 **Modeling occupancy grids using EDHMM for dynamic environments**, *AIR, 2015*.

- Map generation of mobile robots over long periods of working suffers from inconsistencies because of gradually changes in the environment. This paper presents a novel method to infer such gradual changes and incorporate them in map generation.

Notable Projects

- **Auto Encoding Generative Adversarial Networks:** Personal Project

  Autoencoders are used to learn representation of a high dimensional data in an unsupervised setting, while Generative Adversarial Networks learns the distribution of data implicitly. Combining both results in a representation of data as well as a generative model that uses that representation. Using published research, implemented this in Pytorch and tested on varied datasets such as CelebA, Cifar10 etc.

- **Masters Thesis:** *'Map Inference Adaptive to Low-Dynamic Objects for Mobile Robot Navigation'*

  While robot navigation is challenging in static world, in dynamic world the limitations and challenges increases many folds for the standard techniques. Under the supervision of Dr. Kazushi Ikeda and Dr.Tomohiro Shibata, presented a novel solution to this problem by utilizing repetitive map generation by a navigating robot to update state of the environment around it. A part of it is published as conference proceeding.

- **Real Time 3D Mapping Using Depth Camera:** Intern Project

  Developed dense 3D Mapping algorithm using Visual SLAM technique for robots. Using ROS platform, tested and tuned for real time performance on an embedded device. The overall improvement achieved was near real time performance.

- **Embedded System based Video Object Tracking:** Undergraduate Project

  Developed a Video Tracking system for a general object. Implemented Lucas-Kanade tracking method of sparse optical flow for general object tracking. Feature points used were from SIFT algorithm. Python was used as working environment with OpenCV and controller for the system was Beagleboard with ubuntu 11.10.

- **Quadcoptor Modeling and Simulation:** Undergraduate Project

  Developed Scilab Simulation and Implemented it on Indigenous made Quadcopter with successful flights. Further , in a team of 2, developed mechanical structure of Quadcopter. We tested the stability in vertical take-off on the developed structure. We used PID based control system for stability while take-off. The parameter values of PID were approximated first using the simulation and further manually tuning on the developed structure

Presentations

- **Machine Learning Kitchen Tokyo, Mar 2017, Tokyo** Delivered a talk on "Object Detection Pipeline" utilizing deep learning based object detectors such as Faster-RCNN,SSD etc.
- **In and Around CNNs, April 2017, Tokyo** Delivered a talk on the working of CNNs and how they are used in latest applications across varied domains in computer vision.