

# ROHIT GAJAWADA

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## RESEARCH INTERESTS

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Computer Vision, Machine Learning, Generative Models, Domain Adaptation, Deep Model Compression

## EDUCATION

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**International Institute of Information Technology, Hyderabad** *August 2015 - Present*  
*Bachelors of Technology (Honors in Computer Vision) in Computer Science and Engineering*  
CGPA: 8.39/10; Major CGPA: 8.86/10  
**FIITJEE Jr College, Hyderabad** *May 2012 - April 2014*  
Specialization: Math, Physics, Chemistry; Board of Intermediate Education: 96.7%

## WORK EXPERIENCE

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**Computer Vision Center - Universitat Autònoma de Barcelona** *May 2018 - July 2018*  
Worked with Dr. Antonio Lopez on domain adaptation of end-to-end deep imitation learning agents for autonomous vehicles from simulation to real world using the CARLA Simulator.  
**Center for Visual Information Technology - IIIT Hyderabad** *March 2017 - Present*  
Working with Dr. Anoop Namboodiri on several projects revolving around deep model compression, deep learning in biometry, deep representation learning using GANs and spoof detection.  
**Teaching Assistant - IIIT Hyderabad**  
CSE251 Computer Graphics (180+ bachelors students) *January 2018 - May 2018*  
CSE578 Computer Vision (150+ students including bachelors, masters and PhD) *January 2019 - Present*

## PUBLICATIONS

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***Universal Material Translator: Towards Spoof Fingerprint Generalization***, Rohit Gajawada, Additya Popli, Tarang Chugh, Anoop Namboodiri, Anil K Jain submitted to **ICB 2019**  
We proposed a framework to improve the generalization and performance of a spoof detector on unknown spoof materials using a few samples of the target material to synthesize spoof fingerprints via a style transfer based GAN.  
***Hybrid Binary Networks: Optimizing for Accuracy, Efficiency and Memory***, Ameya Prabhu, Vishal Batchu, Rohit Gajawada, Sri Aurobindo Munagala, Anoop Namboodiri accepted in **WACV 2018**  
We show that binarizing input activations to the right areas in the network can contribute significantly to speed-ups, without damaging the overall accuracy as compared to end-to-end binarized networks.  
***Distribution-Aware Binarization of Neural Networks for Sketch Recognition***, Ameya Prabhu, Vishal Batchu, Sri Aurobindo Munagala, Rohit Gajawada, Anoop Namboodiri accepted in **WACV 2018**  
We show that binary networks are potentially as accurate as infinite precision networks and present a distribution-aware approach to binarizing deep networks that allows us to achieve the full capacity of a binarized network.

## MAJOR RESEARCH PROJECTS

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**Domain Adaptation of Deep Imitation Learning Agents using GANs:** *May 2018 - Present*

- Implemented PixelDA, CoGAN, CycleGAN, UNIT, WDGRL and LSDSEG baselines for domain adaptation.
- Developed an end-to-end approach where images from source and target domain are encoded into a common VAE latent space using adversarial training from which steering is predicted and it requires only source labels.
- The models were trained using PyTorch and deployed using a mini truck, a Jetson TX2 and a Raspberry Pi.

**Binarization of Deep Convolutional Neural Networks:** *April 2017 - December 2017*

- Implemented the XNOR and BNN algorithms for weight and activation binarization of deep CNNs in PyTorch.
- Developed a full binarization approach that obtains an 8% increase in accuracy and 21.2x increase in compression.
- Developed a distribution-aware approach for binarizing deep CNNs and obtained 2.5% increase in accuracy.

**Fingerprint Spoof Generalization:***August 2018 - January 2019*

- Developed a GAN setup that uses style transfer approaches and an orientation loss to convert live fingerprints to spoofs of target materials which can be used to improve the performance of the detector towards these materials.

**Adversarial Model Compression using Teacher-Student Networks:***July 2018 - August 2018*

- Developed a method for model compression using a generative adversarial network (GAN) loss for knowledge distillation in PyTorch which improved the accuracy of the compressed (student) network by 2%.

**Multimodal OCR:***March 2017 - May 2017*

- Worked on an end to end multimodal deep learning model in PyTorch to improve word level accuracy where text CNN and stroke CNN outputs are fused and passed into a Bidirectional LSTM and trained using CTC loss.

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**ACADEMIC PROJECTS****Eye Gaze Detection using Attention Modelling:***November 2017*

- Implemented a deep learning model in PyTorch that follows the gaze of people in an image and identifies the salient objects in the scene that they are looking at by extracting head pose and gaze orientation.

**Unsupervised Depth Estimation from Video:***March 2018*

- Implemented an unsupervised deep learning framework to learn disparity and depth maps by using a single view depth network and a multiple view pose network from the KITTI dataset in PyTorch.

**Sketch Based Image Retrieval:***October 2017*

- Implemented a sketch based image retrieval system by perceptual edge grouping based on Gestalt principles using a RankSVM, graph cut optimization and energy filtering in MATLAB.

**Sample Efficient Off-Policy Actor Critic:***November 2018*

- Implemented the sample efficient ACER deep reinforcement learning algorithm in PyTorch and OpenAI Gym.

**One Shot Tracker:***March 2018*

- Implemented a GOTURN based deep learning tracker in Keras that tracks an object throughout an entire video.

**Ultimate Tic-Tac-Toe Bot:***February 2017*

- Developed a tree search based game bot using minimax algorithm and alpha beta pruning in Python.

**Reinforcement Learning Algorithms***September 2018*

- Implemented Deep Q-Network, Double Deep Q-Network, Policy Gradient and Actor-Critic agents in PyTorch, and Epsilon Greedy, Upper Confidence Bound and Exp3 multi-arm bandits in Python.

**BrickBreaker, Bloxorz and 3D Aquarium***February 2017*

- Brickbreaker and Bloxorz are 2D and 3D games respectively implemented from scratch in OpenGL and C++ without using any physics/game engine. 3D Aquarium is an aquarium simulation implemented in JS and WebGL.

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**TECHNICAL SKILLS**

<b>Programming Languages</b>	Python, C, C++, MATLAB, Bash, Java
<b>ML/DL/CV</b>	PyTorch, Keras, Tensorflow, Caffe, OpenCV, scikit-learn, scikit-image
<b>Other Libraries and Tools</b>	Git, LaTeX, OpenGL, WebGL, CUDA, MySQL, PyGame, MPI
<b>Web</b>	HTML, CSS, JS, PHP, Web2py
<b>Embedded</b>	Raspberry Pi, Nvidia Jetson TX2
<b>Simulators</b>	OpenAI Gym, MuJoCo, CARLA

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**RELEVANT COURSES**

Computer Vision, Statistical Methods in AI, Digital Image Processing, Optimization Methods, Artificial Intelligence, Computer Graphics, Reinforcement Learning, Computer Programming, Data Structures, Algorithms, Scripting and Web Development, Distributed Systems, Computer Networks, Operating Systems, Computer System Organization