ASHISH SINGH

Ph.D. Student
College of Information and Computer Sciences
University of Massachusetts Amherst

PH NO. - (413)552-9886
EMAIL: ashishsingh@cs.umass.edu
WEBPAGE: ashishsingh.me
GOOGLE SCHOLAR: ashis. scholar

EDUCATION:

University of Massachusetts Amherst (Amherst, MA, USA) Jan. 2019 – Present
Ph.D. Student, College of Information and Computer Sciences
Advisor: Professor Erik G. Learned-Miller

University of Massachusetts Amherst (Amherst, MA, USA) Sept. 2016 – Dec. 2018
M.S. Computer Science, College of Information and Computer Sciences
Advisor: Professor Erik G. Learned-Miller
CGPA: **3.89/4.0**

National Institute of Technology Silchar (Silchar, India) Sept. 2012 – May 2016
Bachelor of Technology in Electronics and Communication
CGPA: **8.19/10**

PUBLICATION:

- **Ashish Singh***, Hang Su*, SouYoung Jin, Huaizu Jiang, Chetan Manjesh, Geng Luo, Ziwei He, Li Hong, Erik Learned-Miller, and Rosemary Cowell, **Half&Half: New Tasks and Benchmarks for Studying Visual Common Sense**, In CVPR 2019 Workshop on Vision Meets Cognition

- Aruni Roy Chowdhury, Prithvijit Chakrabarty, **Ashish Singh**, SouYoung Jin, Huaizu Jiang, Liang Liang Cao, Erik Learned-Miller. **Automatic adaptation of object detectors to new domain using self-training.** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR) 2019

- SouYoung Jin, Aruni Roy Chowdhury, Huaizu Jiang, **Ashish Singh**, Aditya Prasad, Deep Chakraborty, Erik Learned-Miller. **Unsupervised Hard Example Mining from Videos for Improved Object Detection**. Proceedings of the European Conference on Computer Vision (ECCV) 2018

- Nihal Paul*, **Ashish Singh***, Abhishek Midya, Partha Pratim Roy, Debi Prosad Dogra. **Moving object detection using modified temporal differencing and local fuzzy thresholding**. The Journal of Supercomputing. 2016. DOI: 10.1007/s11227-016-1815-7

WORK & RESEARCH EXPERIENCE:

GRADUATE RESEARCH ASSISTANT Sept. 2017 – Current
Computer Vision Lab, CICS and **Computational Memory and Perception Lab**, PBS
UMass Amherst

- **Self-supervised Visual Search**. (**Python, Pytorch**)
  - Developing framework to learn intelligent visual search strategies in space (visual navigation) and time (object instance search in videos, fast video retrieval) by utilizing object co-occurrence statistics in existing labeled datasets as the self-supervisory signal.
  - Designed new tasks and benchmark to quantify effect of co-occurrence information for object recognition using only non-local visual evidence.
  - Working on extending co-occurrence based visual prediction for commonsense based inference and continual learning in intelligent agents.

- **Unsupervised Hard example mining from videos**. (**Python, Pytorch, Caffe**)
  - Improving exiting object detectors on source domain by using temporal consistency in videos to extract hard examples. Designed pipeline to improve vanilla Faster-RCNN on face and pedestrian detection by integrating a simple tracker.
  - Extended the work for unsupervised domain adaptation for object detectors using self-training. Improved detection performance for autonomous driving object detection in different weather conditions.
- **Deep embedding learning for unsupervised face clustering**. (**Python, Pytorch**)
  - Designed baseline models for embedding learning and its application for face clustering in videos.
  - Working on improving the embeddings by adding contextual information conditioned on face-id. Experimenting with different inductive biases (hypersphere) and attention-based prediction.

RESEARCH INTERN May 2018 – Aug 2018

Research and Development, **Sony Interactive Entertainment**

- **Simultaneous Localization and Mapping using monocular camera.** (**C++, OpenCV**)
  - Proof-of-concept study by developing an end-to-end Visual inertial navigation system
  - Designed and Implemented tightly coupled, IMU pre-integration based sensor fusion.
  - Optimized visual odometry and loop closure pipeline.

STUDENT RESEARCHER May 2017 – Jan 2018

Advanced Human & Health Analytics Lab, CICS, UMass Amherst

- **Unconstrained Handwritten text recognition and reconstruction using Wearable sensors**.
  - Designed an Iterative feedback-based reconstruction and recognition pipeline using IMU data by incorporating Time/Frequency domain analysis (EMD, Wavelet) and Siamese network-based Clustering.

RESEARCH INTERN May 2018 – Aug 2018

Research and Development, **Sony Interactive Entertainment**

- **3D Computer Vision Based applications.** (**C++, OpenCV, OpenGL**)
  - Proof-of-concept study by developing an end-to-end Rigid Body tracking.
  - Designed sensor fusion pipeline for Infrared and RGB camera sensors.
  - Implemented novel key-point prediction algorithm.

RESEARCH PROGRAMMER Sept 2014 – May 2016

Digital Signal Processing Lab, NIT Silchar India

- **Moving object detection using modified temporal differencing.** (**C++, OpenCV, MATLAB**)
  - Moving object detection in video sequences by generating saliency images based on motion contrast. Utilized Fuzzy based adaptive local thresholding method for object segmentation
- **Modelling dynamic background in video streams for robust foreground segmentation**. (**C++, OpenCV, MATLAB**)
  - Developed clustering models (GMM, Adaptive kernels) for moving foreground detection in video.

SKILLS:

LANGUAGES: Python, C/C++, MATLAB.
TOOLS: Pytorch, Caffe, Keras, OpenCV, ROS, Eigen, Ceres-Solver.