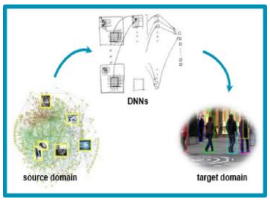
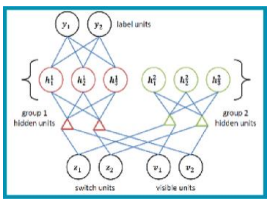
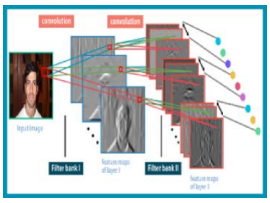
Recent Projects



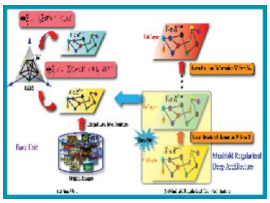
Domain Adaptive Representation Learning with Deep Nets (Ongoing)
Deep neural network (DNN) has recently shown outstanding image classification performance. However, learning DNN for generic visual task is still a tough work because it needs to estimate millions of parameters. In this work, we propose a method to transfer representation learned from DNNs trained in a fully supervised fashion on large-scale dataset to other visual tasks (e.g., scene understanding, tracking, *etc.*).



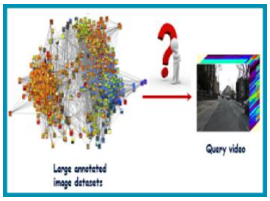
Adaptive Gated Neural Networks (Ongoing)
Deep learning algorithms have recently shown to be successful at learning features from raw data. However, most deep learning algorithms are not robust to variation in types of pattern beyond what it has seen during training. To address this limitation, we propose the adaptive gated neural networks, a novel technique of combining multiple neural networks by computing optimal gated weights.



Non-parametric Bayesian Convolutional Neural Networks
In this work, we propose a novel deep learning network for image classification. In the original convolutional networks, parameters of the whole network are trained in a supervised manner using the error backpropagation algorithm. We focus on unsupervised learning of features at every layer of network. The data-adapting convolutional parameters are learned by non-parametric Bayesian inference.



Scene Recognition by Manifold Regularized Deep Learning Architecture
Most of semantic modeling methods learn shallow, one-layer representations for scene recognition, while ignoring the structural information related between images, often resulting in poor performance. In this work, we propose a manifold regularized deep architecture which exploits the structural information of data, making for a more powerful mapping between visible layer and hidden layer.



Label Transferring from Images to Videos
Recent years have witnessed a growing interest in understanding the semantics of videos in a wide variety of applications. However, video labeling remains an open problem, due to the difficulty in acquiring sufficient video labels towards training effective classifiers. In this work, we overcome this challenge by utilizing the existing massive semantic labeled image dataset from decade-long community efforts, such as ImageNet.

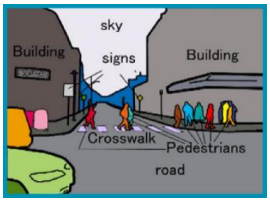
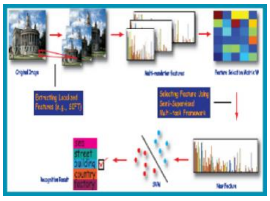
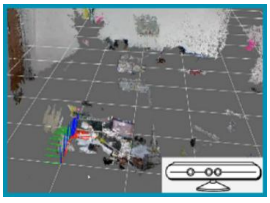


Image Parsing from An MAP Perspective
In this work, we propose a new image parsing method which integrates the visual feature and spatial information in a Bayesian framework. A low rank representation based classification (LRRC) algorithm is used to learn the posterior probability distributions from the visual feature, Then, contextual information is included using a Markov random field prior. Finally, a maximum a posteriori parsing is efficiently computed.



Semi-Supervised Multi-task Learning for Scene Recognition
While much progress has been made to multi-task classification and subspace learning, multi-task feature selection has long been largely unaddressed. In this work, we propose a multi-task feature selection algorithm which considers the feature correlation and apply it to scene recognition. The proposed method achieves state-of-the-art performance compared with other methods.



Real-time 3D SLAM with RGB-D Sensor
Recently, there are great expectations that RGB-D sensors (e.g., Microsoft Kinect and Asus Xtion) will provide a new way to parse indoor scenes using 3D perspective. In this work, we focus on 3D mapping and localization using RGB-D sensors and develop software to implement real-time 3D SLAM.