SIGML - LECTURE
SPECIAL INTEREST GROUP IN MACHINE LEARNING
[Samsung IITK research day]

Title :   Samsung-IITK research day

Speaker :   Vivek, Kundan, Rahul & Pawan

Day :   Dec 3 , 2015 , Thu

Time :   3 Dec , 10:30 AM - 1:30 PM

Vivek Gupta (Dual Degree Final Year , Joint Work Flipkart Dr Ravindra Babu and IIT Kanpur Prof Harish Karnick)

Hierarchical classification of e-commerce products is challenging task and have broad application at e-commerce. Large amount of data needs to be categorized into large no of verticals (subcategory) for efficient searching. Item categories are extremely sparse and highly non uniform. Worked on supervised hierarchical text classification (categorization of items) on catalog unstructured unbalanced data. Use deep net embedding like Word2vec & Glove for embedding document in lower dimension. Applied various approaches for formation of document vectors. Use multi level deep classification & ensemble approach for final classification. Graph based algorithm is used for grouping of similar & confused classes. These groups is finally relearn using weak classifier like knn/svm & further classified in subgroup using another classifier. Worked on various performance measure to evaluate the model.

Rahul Kumar Selveka (PhD student under Nishal K Verma)

A common feature of Machine fault diagnosis is that the data dealt can be very inconsistent. Hence for robust diagnosis, the algorithm used for classification needs to have high generalization ability. This paper shows that a class of classifiers named Majority Vote Point (MVP) classifiers, on account of very low VC dimension can exhibit high generalization ability, which is even greater than that of linear

classifiers. The paper proceeds by theoretically formulating an upper bound on MVP classifier's VC dimension, and through empirical analysis the exact value of VC dimension is estimated to be 3, irrespective of the number of features. Further, a case study on Acoustic based Leakage Inlet Valve fault detection in air compressor is successfully performed, and the results re-validate that MVP classifier has greater generalization ability than that of linear Support Vector Machine.

Pawan Kumar (Phd Student Under Prof Harish Karnick)

Recurrent neural networks (RNNs) using long short-term memory (LSTM) and recently proposed gated recurrent units (GRU) have successfully been used for learning general sequences. Specifically in machine translation RNNs have opened a new paradigm called neural machine translation (NMT). For a number of language pairs NMT have lead to state-of-the-art results. Talk will discuss recent research in RNN based encoder-decoder models for machine translation.

Kundan Kumar (BT Final Year , Prof Vinay Namboodari and Prof Amitabh Mukerjee)

Visual Question Answering: A Neural Approach We aim to teach computers to understand the image and answer natural language questions based on it. Formally, the task is to generate natural language answer given an image and a question. We use convolutional neural network based approach to get features for images. Natural language words are represented in continuous vector space. These word vector embeddings are learnt using a large text corpus. Finally, we use recurrent neural network architecture to encode the input (variable length questions and the image features) into a fixed length latent feature vector and use it to get the answer. Primary contribution made through this project is the novel cost function that takes into account regularity in word vector embedding space.

Sanil Jain (Author couldn't present due to work)

Convolutional neural networks have shown outstanding capability for application in various machine learning problems, especially in tasks aimed at learning from images and videos. This project is an attempt to understand the effectiveness of convolutional neural nets in understanding the concepts of chess from analysis of chess boards. The main focus in this project has been on understanding if convolutional nets are able to generate some kind of evaluation to tag board as winning or losing just from the current board configuration, is there some kind of manifold that demarcates winning positions from losing and analyzing their correlation with human coded heuristics for board evaluation. The learned evaluators are further used to analyze chess games to track the evaluator's predictions as the game progresses and observe if any significant observations are made.

Note : **Dr Piyush Rai also talk about learning from heterogeneous or multi-modal data using cross view learning. He talk about parametric and nonparametric bayesian learning way for the same.**