**Student’s name: Nguyen Van Ty (M5231130)**

**Report of Machine Learning Course #2**

**IDEA TO CONDUCT MULTI-LABELED LEARNING**

In multi-label learning each instance is represented by a set of labels. For example, a document can be associated with a range of topics, such as sports, finance, and education; or an image may be tagged with both beach and tree. The task of multi-label learning is to learn a function that can predict the proper label sets for unseen instances. Nowadays it is becoming more and more relevant to a number of applications, ranging from document classification to gene function prediction and automatic image annotation.

Embedding methods have shown promising performance in multi-label prediction, as they can discover the dependency of labels. Most embedding methods cannot well align the input and output, which leads to degradation in prediction performance. Besides, they suffer from expensive prediction computational costs when applied to large-scale datasets. To address the above issues, Co-Hashing (CoH) method by formulating multi-label learning from the perspective of cross-view learning. CoH first regards the input and output as two views, and then aims to learn a common latent hamming space, where input and output pairs are compressed into compact binary embeddings. CoH enjoys two key benefits: 1) the input and output can be well aligned, and their correlations are explored; 2) the prediction is very efficient using fast cross-view kNN search in the hamming space. Moreover, we provide the generalization error bound for our method. Extensive experiments on eight real-world datasets demonstrate the superiority of the proposed CoH over the state-of-the-art methods in terms of both prediction accuracy and efficiency.

For more details about Co-Hashing, please read the following reference

**Reference**

[1]. **JXiaobo Shen, Weiwei Liu, Ivor W. Tsang, Quan-Sen Sun, Yew-Soon Ong** (2018). Compact multi-label learning.