# NTU Test Question 1

From the paper *Obtaining Spatially Resolved Tumor Purity Maps Using Deep Multiple Instance Learning In A Pan-cancer Study*, the Multiple Instance Learning model was introduced.

For the Multiple Instance Learning model in this paper, first on both sides of the slide for the tumor sample, a couple of patches to form a bag as the input for the nueral network for prediction, and then the MIL neural network is introduced.

The MIL model consists of a module for feature extracting, where for each patch in the bag a feature vector is extracted. Then, the extracted features go through a MIL filter for pooling, and then the bag-level representation transformation is used for predicting the tumor purity.

For our model for regression of MNIST dataset on digit 0 and digit 7, we use python to do the regression process. First we download the MNIST dataset and then only use the 12188 samples of digit 0 and 7, and generate bags of 100 samples with random proportion of 0 and 7. And then, we apply the MIL model on them to prediction the porportion of 0.