Reading Assignment 5

Q1. The following steps describe what happens at training stage

1. Apply initial-state annotation to the training data.
2. Examine all possible transformation and choose the one that yields the greatest error reduction (highest score).
3. Add the transformation to the training data to create a new training corpus
4. Go through (2-3) again until no transformation can be found to further reduce errors beyond some pre-specified threshold.
5. Add the best rule to the ordered list of transformation.

Q2. The following steps describe what happens at testing stage

1. Apply initial-state annotation to the testing data.
2. Apply the transformation in the same order as they were learned in training.

Q3. The first difference is when training a decision tree, the average amount of training data is reduced or halved each time the depth of tree is increased. On the other hand in the transformation based learning process, the entire data set is always available for finding all transformation.

The second difference is that transformation based learning is ordered and each transformation depends on the outcome of earlier transformation. This allows intermediate results from classifying one object to be available for classifying other objects. In contrast we would need to know the full extend of a tree structure and path to achieve similar effect.

The third difference is that a transformation based learner is a processor and this is unlike the classifying characteristics of a decision tree. This allows a transformation based learner to be used as a postprocessor to any annotation system where rules can be learned to improve performance or facilitate further refinement of mature annotation systems.

The fourth difference lies in the application of the objective function. In transformation based learning, the objective function used in training may be the same as the one used for evaluation. In a decision tree, using system accuracy as an objective function for training would typically yield poor performance.

Q4. In a text classification task, transformation will occur in the form of switching from one class to another class and this will be subjected to certain rules that are specified in terms of the presence of specific features.

For example, for each transformation the trigger event is the presence of a specific feature and the current class. The transformation will also include a rewrite rule that will state the change from the current class to another class.

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