CSCI/ARTI 8950 Machine Learning

Assignment Number 5: Due 4/21/2016 **(in class)**

1. **[20 points][MID2] Short answers please**

   (a) Why is Bagging more suitable for parallel implementation than Boosting?

   (b) Give one advantage to using the Pittsburgh approach over the Michigan approach for learning classifier systems.

   (c) Give one advantage to using the Michigan approach over the Pittsburgh approach for learning classifier systems.

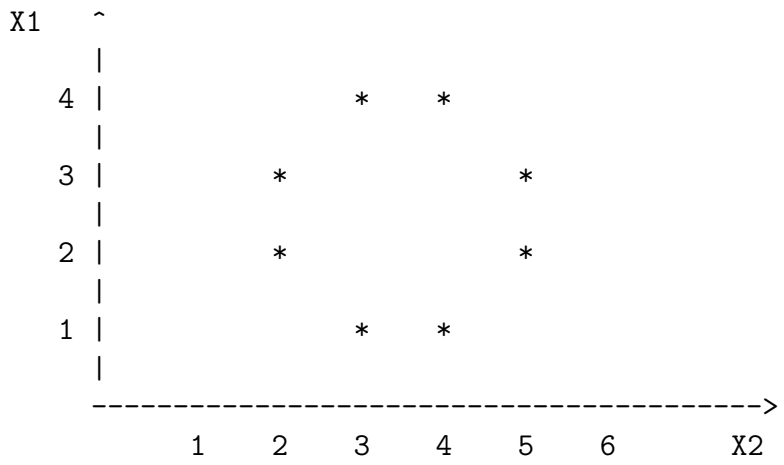
   (d) Give one advantage to using K-nearest neighbor (with K>2) over nearest neighbor.

2. **[20 points][FIN]**

   (a) Propose a lazy version of the back-propagation algorithm for training neural networks. What are the advantages and disadvantages of your algorithm, compared to the original back-propagation algorithm?

   (b) Propose an eager version of the nearest neighbour algorithm for classification. What are the advantages and disadvantages of your algorithm, compared to the original nearest neighbour algorithm?

3. **[20 points][FIN]** Consider the following diagram of a set of 8 instances for machine learning:



(a) Consider the hypothesis space H1 consisting of all possible **circles** in the plane (i.e. each hypothesis h in H1 is a circle which classifies all points in it as positive and all points outside it as negative). Does H1 shatter the given set of instances? Briefly justify your answer.

(b) Consider the hypothesis space H2 consisting of all possible **rectangles** in the plane. Does H2 shatter the given set of instances? Briefly justify your answer.

(c) Based **only** on your answers to parts (a) and (b) above, what can you conclude about the VC dimentions of H1 and H2?