

hw7: Teaching dimension

April 18, 2023

1. Continue from hw6. You should have three tasks: the 4-rectangle, the 3-Gaussian, and your own dataset. You should also have the greedy sequence of teaching items on each task. From each greedy sequence, create a sequence of plots showing the dataset, the greedy teaching set up to that point, and the teaching set's 1NN decision boundary (this is what we showed during our group meeting, but only for the 4-rectangle task).
2. Read “On the Complexity of Teaching” by Goldman and Kearns. Consider integer items (instances) $x_1 = 1, x_2 = 2, \dots, x_n = n$. Consider a hypothesis space (concept class) $C = \{c_{ab} : 1 \leq a \leq b \leq n\}$ where each hypothesis (concept) c_{ab} labels integers in the interval $[a, b]$ as positive, and integers outside the interval as negative. a, b are both integers. What is the teaching dimension of a particular c_{ab} ? What is the teaching dimension of C ? Show your proof.
3. We augment the hypothesis space above into $C = \{c_{ab}, \bar{c}_{ab} : 1 \leq a \leq b \leq n\}$, where \bar{c}_{ab} is the complement of c_{ab} which labels integers in the interval $[a, b]$ as negative, and integers outside the interval as positive. What is the teaching dimension of c_{ab} ? What is the teaching dimension of \bar{c}_{ab} ? What is the teaching dimension of C ?