

CS/ENGRI 172, Fall 2002

9/27/02: Lecture Thirteen Handout

Topics: Nearest-neighbor learning; introduction to Turing machines, a general model of computation.

The nearest-neighbor learning algorithm

Assume that there is some function value distinguished as the *default*. As before, $\vec{x}^{(i)}$ denotes the i^{th} oracle example.

Output *default* as the guess of $\vec{x}^{(1)}$'s label

For each subsequent example $\vec{x}^{(i)}$

Find the stored instance $\vec{x}^{(j)}$, $j < i$, that minimizes $\text{dist}(\vec{x}^{(j)}, \vec{x}^{(i)})$

Output the oracle's (previously-given) label of $\vec{x}^{(j)}$

A sample Turing machine

This Turing machine has two internal states, q_1 and q_2 , with q_1 being the initial state. The Turing machine's symbols are A, B, \vdash , and \perp .

	\vdash	A	B	\perp
q_1	(q_1, \vdash, R)	(q_2, B, R)	(q_1, B, R)	(q_1, \perp, R)
q_2	—	(q_1, A, R)	(q_2, B, R)	(q_2, \perp, R)

Note that this TM never halts.