k-Nearest Neighbor Homework

- Assume the following training set
- Assume a new point (.5, .2)
  - For all below, use Manhattan distance, if required, and show work
  - What would the output class for 3-nn be with no distance weighting?
  - What would the output class for 3-nn be with squared inverse distance weighting?
  - What would the 3-nn regression value be for the point be if we used the regression labels rather than the class labels and used squared inverse distance weighting?

x	*y*	*Class Label*	*Regression Label*
.3	.8	A	.6
-.3	1.6	B	-.3
.9	0	B	.8
1	1	A	1.2

k-Nearest Neighbor Homework

- Assume a new point (.5, .2)
  - For all below, use Manhattan distance, if required, and show work
  - What would the output class be for 3-nn with no distance weighting?
    - A wins with 2 out of 3 votes
  - What would the output class be for 3-nn with distance weighting?
    - B wins: 2.78 vs 1.56+.592 = 2.15 for A
  - What would be the 3-nn egression value be for the point be if we used the regression labels rather than the class labels?
    - No distance weighting: (.6 + .8 + 1.2)/3 = .87
    - $(.6/.8^2 + .8/.6^2 + 1.2/1.3^2)/(1/.8^2 + 1/.6^2 + 1/1.3^2) = 3.87/4.93 = .785$

x	*y*	*Class Label*	*Regression Label*	*Distance*	*Weighted Vote*
.3	.8	A	.6	.2 + .6 = .8	$1/.8^2 = 1.56$
-.3	1.6	B	-.3	.8 + 1.4 = 2.2	$1/2.2^2 = .207$
.9	.0	B	.8	.4 + .2 = .6	$1/.6^2 = 2.78$
1	1	A	1.2	.5 + .8 = 1.3	$1/1.3^2 = .592$