Doug Woodward

CS613 HW 11

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| # | Answer |
| 1 |  |
| 2 | a)  b)  c) 0,0 >4  -1,1 < 4  2,2 > 4  3,8 > 4  d) Bc the equation is quadratic, when expanded, it becomes linear. |
| 3 |  |
| 7 | library(ISLR)  library(e1071)  sink("11.out")  set.seed(32)  mpgMedian = median(Auto$mpg)  dummy = ifelse(Auto$mpg > mpgMedian, 1,0)  Auto$mpglevel = as.factor(dummy)  costs = list(cost = c(0.01, 0.1, 1, 5, 10, 100))  gone = tune(svm, mpglevel ~ ., data = Auto, kernel = "linear", ranges = costs)  summary(gone)  costs = list(cost = c(0.01, 3, 15, 20))  dgr = c(2,3,4)  gone2 = tune(svm, mpglevel ~ ., data = Auto, kernel = "linear", ranges = costs, degree = dgr)  summary(gone2)  costs = list(cost = c(0.01, 0.1, 1, 5, 10, 100))  gone = tune(svm, mpglevel ~ ., data = Auto, kernel = "linear", ranges = costs)  summary(gone)  svm.linear = svm(mpglevel ~ ., data = Auto, kernel = "linear", cost = 1)  svm.poly = svm(mpglevel ~ ., data = Auto, kernel = "polynomial", cost = 10,  degree = 2)  svm.radial = svm(mpglevel ~ ., data = Auto, kernel = "radial", cost = 10, gamma = 0.01)  plotpairs = function(fit) {  for (name in names(Auto)[!(names(Auto) %in% c("mpg", "mpglevel", "name"))]) {  plot(fit, Auto, as.formula(paste("mpg~", name, sep = "")))  }  }  plotpairs(svm.linear)  Parameter tuning of ‘svm’:  - sampling method: 10-fold cross validation  - best parameters:  cost  1  - best performance: 0.01532051  - Detailed performance results:  cost error dispersion  1 1e-02 0.07416667 0.06109023  2 1e-01 0.05115385 0.05921680  3 1e+00 0.01532051 0.02474291  4 5e+00 0.01788462 0.02108456  5 1e+01 0.02044872 0.02354784  6 1e+02 0.03326923 0.02974993  Parameter tuning of ‘svm’:  - sampling method: 10-fold cross validation  - best parameters:  cost  3  - best performance: 0.01019231  - Detailed performance results:  cost error dispersion  1 0.01 0.07410256 0.04415504  2 3.00 0.01019231 0.01315951  3 15.00 0.02557692 0.02702877  4 20.00 0.03326923 0.03833365  Parameter tuning of ‘svm’:  - sampling method: 10-fold cross validation  - best parameters:  cost  1  - best performance: 0.01019231  - Detailed performance results:  cost error dispersion  1 1e-02 0.07660256 0.04367058  2 1e-01 0.04602564 0.03970658  3 1e+00 0.01019231 0.01786828  4 5e+00 0.01782051 0.02105932  5 1e+01 0.02038462 0.02019157  6 1e+02 0.03576923 0.01801169  plot of chunk 7d  plot of chunk 7dplot of chunk 7d |