
CMSE381 - Quiz 2

I will adhere to the Spartan Code of Honor in completing this assignment.

Signed: _____ Print Name: _____

We are training a linear model to predict sales from TV, radio, and newspaper advertising. We get this output from our code.

	Coefficient	Std. error	t-statistic	p-value
Intercept	2.939	0.3119	9.42	< 0.0001
TV	0.046	0.0014	32.81	< 0.0001
radio	0.189	0.0086	21.89	< 0.0001
newspaper	-0.001	0.0059	-0.18	0.8599

1. What is the equation of the learned model?

$$y = 2.939 + 0.046 \cdot X_{TV} + 0.189 \cdot X_{radio} - 0.001 \cdot X_{newspaper}$$

2. Which variable are we least confident in and why?

$X_{newspaper}$, as it has a large p

3. You get the best fitting plane $\hat{f}(X_1, X_2, X_3) = X_1 + X_2$ after doing multiple linear regression based on the training dataset in the table below.

	Training data		Testing data	
X1	1	0	1	2
X2	2	1	-1	1
X3	1	3	0	1
Y	1	2	1	1

Compute the TSS, RSS, and the F -statistic. What is the null hypothesis being tested by the F -statistic?

$$\bar{y} = \frac{1+2}{2} = 1.5 \quad TSS = (1-1.5)^2 + (2-1.5)^2 = 0.5$$

$$RSS = (3-1)^2 + (2-1)^2 = 5$$

$$F = \frac{(TSS - RSS)/p}{RSS/(n-p-1)} = \frac{(0.5 - 5)/3}{5/(2-3-1)}$$