

# SAVEETHA SCHOOL OF ENGINEERING

## SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

### ITA 0443 - STATISTICS WITH R PROGRAMMING FOR REAL TIME

#### PROBLEM

#### DAY 4– LAB MANUAL Part 2

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#### LOGISTIC REGRESSION ANALYSIS IN R

##### Exercise

5. Create a logistic regression model using the “mtcars” data set with the information given below.

The in-built data set “mtcars” describes different models of a car with their various engine specifications. In “mtcars” data set, the transmission mode (automatic or manual) is described

by the column am which is a binary value (0 or 1). Create a logistic regression model between the columns “am” and 3 other columns - hp, wt and cyl.

```
A)data(mtcars)
```

```
model <- glm(am ~ hp + wt + cyl, data = mtcars, family = binomial)
```

```
summary(model)
```

The screenshot shows two windows from an R environment. The 'R Console' window on the left displays the following text:

```
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.  
  
[Previously saved workspace restored]  
  
> data(mtcars)  
> data(mtcars)  
> model <- glm(am ~ hp + wt + cyl, data = mtcars, family = binomial)  
>  
> summary(model)  
  
Call:  
glm(formula = am ~ hp + wt + cyl, family = binomial, data = mtcars)  
  
Deviance Residuals:  
    Min       1Q   Median       3Q      Max   
-2.17272 -0.14907 -0.01464  0.14116  1.27641  
  
Coefficients:  
            Estimate Std. Error z value Pr(>|z|)        
(Intercept) 19.70288    8.11637   2.428  0.0152 *        
hp           0.03259    0.01886   1.728  0.0840 .      
```

The 'R Editor' window on the right shows the code being executed:

```
data(mtcars)  
model <- glm(am ~ hp + wt + cyl, data = mtcars, family = binomial)  
summary(model)
```

## POISSON REGRESSION ANALYSIS IN R

Exercise :

6. Create a Poisson regression model using the in-built data set “warpbreaks” with information given below.

In-built data set “warpbreaks” describes the effect of wool type (A or B) and tension (low, medium or high) on the number of warp breaks per loom. Consider “breaks” as the response variable which is a count of number of breaks. The wool “type” and “tension” are taken as predictor variables.

A)

```
data(warpbreaks)
```

```
head(warpbreaks)
```

```
model <- glm(breaks ~ wool + tension, data = warpbreaks, family = poisson)
```

```
summary(model)
```

```
coef(model)
```

R Console

```
breaks wool tension
1      26      A      L
2      30      A      L
3      54      A      L
4      25      A      L
5      70      A      L
6      52      A      L
> model <- glm(breaks ~ wool + tension, data = warpbreaks, family = poisson)
> summary(model)
```

Call:

```
glm(formula = breaks ~ wool + tension, family = poisson, data = warpbreaks)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.6871	-1.6503	-0.4269	1.1902	4.2616

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	3.69196	0.04541	81.302	< 2e-16 ***
woolB	-0.20599	0.05157	-3.994	6.49e-05 ***
tensionM	-0.32132	0.06027	-5.332	9.73e-08 ***
tensionH	-0.51849	0.06396	-8.107	5.21e-16 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)

Null deviance: 297.37 on 53 degrees of freedom

Residual deviance: 210.39 on 50 degrees of freedom

AIC: 493.06

Number of Fisher Scoring iterations: 4

C:\Users\ADMIN\Documents\S chandras reddy.R - R Editor

```
data(warpbreaks)
head(warpbreaks)
model <- glm(breaks ~ wool + tension, data = warpbreaks, family = poisson)
summary(model)
coef(model)
```