14.1

Problem- prediction of the number of comments in the upcoming 24 hours on

those blogs, The train data was generated from different base times that may

temporally overlap. Therefore, if you simply split the train into disjoint partitions,

the underlying time intervals may overlap. Therefore, the you should use the

provided, temporally disjoint train and test splits to ensure that the evaluation is

fair.

1. Read the dataset and identify the right features

Ans: topic not covered in class

1. Clean dataset, impute missing values and perform exploratory data analysis.

No missing values.

> summary(blogData\_train)

A B C D E F G H

Min. : 0.000 Min. : 0.000 Min. : 0.0000 Min. : 0.0 Min. : 0.00 Min. : 0.0000 Min. : 0.000 Min. : 0.000000

1st Qu.: 2.286 1st Qu.: 5.214 1st Qu.: 0.0000 1st Qu.: 29.0 1st Qu.: 0.00 1st Qu.: 0.8916 1st Qu.: 3.075 1st Qu.: 0.000000

Median : 10.631 Median : 19.353 Median : 0.0000 Median : 162.0 Median : 4.00 Median : 4.1507 Median : 11.051 Median : 0.000000

I J K L X X.1 X.2 X.3

Min. : 0.0 Min. : 0.000 Min. : 0.000 Min. : 0.000 Min. :0 Min. : 0.0 Min. : 0.00 Min. : 0.000

1st Qu.: 22.0 1st Qu.: 0.000 1st Qu.: 0.775 1st Qu.: 3.045 1st Qu.:0 1st Qu.: 22.0 1st Qu.: 0.00 1st Qu.: 1.825

Median : 121.0 Median : 1.000 Median : 3.817 Median : 11.001 Median :0 Median : 121.0 Median : 0.00 Median : 9.777

X.4 X.5 X.6 X.7 X.8 X.9 X.10 X.11

Min. : 0.000 Min. : 0.0000 Min. : 0.0 Min. : 0.00 Min. :-0.66667 Min. : 0.000 Min. :-1256.0 Min. : 0.0

1st Qu.: 4.529 1st Qu.: 0.0000 1st Qu.: 21.0 1st Qu.: 0.00 1st Qu.: 0.05797 1st Qu.: 4.087 1st Qu.: -369.0 1st Qu.: 19.0

Median : 16.073 Median : 0.0000 Median : 128.0 Median : 3.00 Median : 0.22381 Median : 14.501 Median : -107.0 Median : 116.0

X.12 X.13 X.14 X.15 X.16 X.17 X.18 X.19

Min. :-138.0000 Min. :0.0000 Min. :0.0000 Min. :0.000000 Min. : 0.000 Min. : 0.0000 Min. :0.00000 Min. :0.0000

1st Qu.: 0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.: 0.000 1st Qu.: 0.0000 1st Qu.:0.00000 1st Qu.:0.0000

Median : 0.0000 Median :0.1087 Median :0.3945 Median :0.000000 Median : 2.000 Median : 0.0000 Median :0.04317 Median :0.2482

X.20 X.21 X.22 X.23 X.24 X.25 X.26 X.27 X.28

Min. :0 Min. : 0.000 Min. :0.00000 Min. :0.00000 Min. :0.0000 Min. :0 Min. : 0.000 Min. :0.0000000 Min. :0.00000

1st Qu.:0 1st Qu.: 0.000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.0000 1st Qu.:0 1st Qu.: 0.000 1st Qu.:0.0000000 1st Qu.:0.00000

Median :0 Median : 2.000 Median :0.00000 Median :0.03763 Median :0.2321 Median :0 Median : 2.000 Median :0.0000000 Median :0.09264

X.29 X.30 X.31 X.32 X.33 X.34 X.35 X.36

Min. :0.0000 Min. :0.000000 Min. : 0.000 Min. : 0.0000 Min. :-0.05556 Min. :0.0000 Min. :-20.000 Min. : 0.000

1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.: 0.000 1st Qu.: 0.0000 1st Qu.: 0.00000 1st Qu.:0.0000 1st Qu.: -7.000 1st Qu.: 0.000

Median :0.3713 Median :0.000000 Median : 2.000 Median : 0.0000 Median : 0.00000 Median :0.3277 Median : -2.000 Median : 2.000

X.37 X.38 X.39 X.40 X.41 X.42 X.43 X.44

Min. :-0.5000000 Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.0 Min. :-1256.000 Min. : 0.0000 Min. : 0.0000

1st Qu.: 0.0000000 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.00 1st Qu.: 0.0 1st Qu.: -1.000 1st Qu.: 0.0000 1st Qu.: 0.0000

Median : 0.0000000 Median : 3.00 Median : 0.00 Median : 0.00 Median : 2.0 Median : 0.000 Median : 0.0000 Median : 0.0000

X.45 X.46 X.47 X.48 X.49 X.50 X.51 X.52

Min. : 0.0000 Min. : 0.0000 Min. :-20.00000 Min. : 0.00 Min. : 0 Min. :0.000000 Min. :0.0000 Min. :0.00e+00

1st Qu.: 0.0000 1st Qu.: 0.0000 1st Qu.: 0.00000 1st Qu.:14.00 1st Qu.: 93 1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.00e+00

Median : 0.0000 Median : 0.0000 Median : 0.00000 Median :35.00 Median : 1859 Median :0.000000 Median :0.0000 Median :0.00e+00

X.53 X.54 X.55 X.56 X.57 X.58 X.59 X.60

Min. :0.0000000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.000000 Min. :0.000000 Min. :0.000 Min. :0.00e+00

1st Qu.:0.0000000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.000 1st Qu.:0.00e+00

Median :0.0000000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.000000 Median :0.000000 Median :0.000 Median :0.00e+00

X.61 X.62 X.63 X.64 X.65 X.66 X.67 X.68

Min. :0.0000000 Min. :0.000000 Min. :0.00e+00 Min. :0.0000 Min. :0.000000 Min. :0.0000 Min. :0.00e+00 Min. :0.00e+00

1st Qu.:0.0000000 1st Qu.:0.000000 1st Qu.:0.00e+00 1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.00e+00 1st Qu.:0.00e+00

Median :0.0000000 Median :0.000000 Median :0.00e+00 Median :0.0000 Median :0.000000 Median :0.0000 Median :0.00e+00 Median :0.00e+00

X.69 X.70 X.71 X.72 X.73 X.74 X.75 X.76

Min. :0.00000 Min. :0.000000 Min. :0.0000000 Min. :0.0000000 Min. :0.00000 Min. :0.0000000 Min. :0.00000 Min. :0.00000

1st Qu.:0.00000 1st Qu.:0.000000 1st Qu.:0.0000000 1st Qu.:0.0000000 1st Qu.:0.00000 1st Qu.:0.0000000 1st Qu.:0.00000 1st Qu.:0.00000

Median :0.00000 Median :0.000000 Median :0.0000000 Median :0.0000000 Median :0.00000 Median :0.0000000 Median :0.00000 Median :0.00000

X.77 X.78 X.79 X.80 X.81 X.82 X.83

Min. :0.0000000 Min. :0.0000000 Min. :0.0000000 Min. :0.000000 Min. :0.00e+00 Min. :0.0000000 Min. :0.00000

1st Qu.:0.0000000 1st Qu.:0.0000000 1st Qu.:0.0000000 1st Qu.:0.000000 1st Qu.:0.00e+00 1st Qu.:0.0000000 1st Qu.:0.00000

Median :0.0000000 Median :0.0000000 Median :0.0000000 Median :0.000000 Median :0.00e+00 Median :0.0000000 Median :0.00000

X.84 X.85 X.86 X.87 X.88 X.89 X.90 X.91

Min. :0.00e+00 Min. :0.0000000 Min. :0.0000000 Min. :0.000000 Min. :0.0000 Min. :0.00000 Min. :0.00000 Min. :0.00000

1st Qu.:0.00e+00 1st Qu.:0.0000000 1st Qu.:0.0000000 1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.00000

Median :0.00e+00 Median :0.0000000 Median :0.0000000 Median :0.000000 Median :1.0000 Median :0.00000 Median :0.00000 Median :0.00000

X.92 X.93 X.94 X.95 X.96 X.97 X.98 X.99

Min. :0.000000 Min. :0.000000 Min. :0.000000 Min. :0.00000 Min. :0.0000000 Min. :0.00000 Min. :0.0000000 Min. :0.0000000

1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.00000 1st Qu.:0.0000000 1st Qu.:0.00000 1st Qu.:0.0000000 1st Qu.:0.0000000

Median :0.000000 Median :0.000000 Median :0.000000 Median :0.00000 Median :0.0000000 Median :0.00000 Median :0.0000000 Median :0.0000000

X.100 X.101 X.102 X.103 X.104 X.105 X.106 X.107

Min. :0.0000000 Min. :0.0000 Min. :0.00000 Min. :0.0000 Min. :0.00000 Min. :0.00000 Min. :0.00000 Min. :0.0000

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Median :0.0000000 Median :0.0000 Median :0.00000 Median :0.0000 Median :0.00000 Median :0.00000 Median :0.00000 Median :0.0000

X.108 X.109 X.110 X.111 X.112 X.113 X.114 X.115

Min. :0.00000 Min. :0.0000 Min. :0.000000 Min. :0.0000000 Min. :0.0000 Min. :0.0000000 Min. :0.000000 Min. :0.00000

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Median :0.00000 Median :0.0000 Median :0.000000 Median :0.0000000 Median :0.0000 Median :0.0000000 Median :0.000000 Median :0.00000

X.116 X.117 X.118 X.119 X.120 X.121 X.122 X.123

Min. :0.0000000 Min. :0.00e+00 Min. :0.000000 Min. :0.00e+00 Min. :0.0000000 Min. :0.0000 Min. :0.00000 Min. :0.00000

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Median :0.0000000 Median :0.00e+00 Median :0.000000 Median :0.00e+00 Median :0.0000000 Median :0.0000 Median :0.00000 Median :0.00000

X.124 X.125 X.126 X.127 X.128 X.129 X.130 X.131

Min. :0.000000 Min. :0.00000 Min. :0.0000 Min. :0.00000 Min. :0.00000 Min. :0.000000 Min. :0.0000 Min. :0.000000

1st Qu.:0.000000 1st Qu.:0.00000 1st Qu.:0.0000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.000000

Median :0.000000 Median :0.00000 Median :0.0000 Median :0.00000 Median :0.00000 Median :0.000000 Median :1.0000 Median :0.000000

X.132 X.133 X.134 X.135 X.136 X.137 X.138 X.139

Min. :0.000000 Min. :0.000000 Min. :0.000000 Min. :0.0000000 Min. :0.00e+00 Min. :0.000000 Min. :0.0000 Min. :0.00000

1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.0000000 1st Qu.:0.00e+00 1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.00000

Median :0.000000 Median :0.000000 Median :0.000000 Median :0.0000000 Median :0.00e+00 Median :0.000000 Median :0.0000 Median :0.00000

X.140 X.141 X.142 X.143 X.144 X.145 X.146 X.147

Min. :0.00000 Min. :0.00000 Min. :0.0000000 Min. :0.00e+00 Min. :0.000000 Min. :0.0000 Min. :0.0000 Min. :0.000000

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Median :0.00000 Median :0.00000 Median :0.0000000 Median :0.00e+00 Median :0.000000 Median :0.0000 Median :0.0000 Median :0.000000

X.148 X.149 X.150 X.151 X.152 X.153 X.154 X.155

Min. :0.00e+00 Min. :0.00000 Min. :0.0000 Min. :0.000000 Min. :0.000000 Min. :0.00e+00 Min. :0.000000 Min. :0.0000000

1st Qu.:0.00e+00 1st Qu.:0.00000 1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.00e+00 1st Qu.:0.000000 1st Qu.:0.0000000

Median :0.00e+00 Median :0.00000 Median :0.0000 Median :0.000000 Median :0.000000 Median :0.00e+00 Median :0.000000 Median :0.0000000

X.156 X.157 X.158 X.159 X.160 X.161 X.162 X.163

Min. :0.00e+00 Min. :0.0000 Min. :0.0000000 Min. :0.00e+00 Min. :0.0000000 Min. :0.000 Min. :0.000000 Min. :0.000000

1st Qu.:0.00e+00 1st Qu.:0.0000 1st Qu.:0.0000000 1st Qu.:0.00e+00 1st Qu.:0.0000000 1st Qu.:0.000 1st Qu.:0.000000 1st Qu.:0.000000

Median :0.00e+00 Median :0.0000 Median :0.0000000 Median :0.00e+00 Median :0.0000000 Median :0.000 Median :0.000000 Median :0.000000

X.164 X.165 X.166 X.167 X.168 X.169 X.170 X.171

Min. :0.000000 Min. :0.0000000 Min. :0.00e+00 Min. :0.00000 Min. :0.00000 Min. :0.000000 Min. :0.00000 Min. :0.0000

1st Qu.:0.000000 1st Qu.:0.0000000 1st Qu.:0.00e+00 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.000000 1st Qu.:0.00000 1st Qu.:0.0000

Median :0.000000 Median :0.0000000 Median :0.00e+00 Median :0.00000 Median :0.00000 Median :0.000000 Median :0.00000 Median :0.0000

X.172 X.173 X.174 X.175 X.176 X.177 X.178 X.179

Min. :0.0000000 Min. :0.00000 Min. :0.00000 Min. :0.000000 Min. :0.00000 Min. :0.00e+00 Min. :0.0000 Min. :0.00000

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Median :0.0000000 Median :0.00000 Median :0.00000 Median :0.000000 Median :0.00000 Median :0.00e+00 Median :0.0000 Median :0.00000

X.180 X.181 X.182 X.183 X.184 X.185 X.186 X.187

Min. :0.0000 Min. :0.0000 Min. :0.00000 Min. :0.00000 Min. :0.00000 Min. :0.00e+00 Min. :0.0000000 Min. :0.00e+00

1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.00e+00 1st Qu.:0.0000000 1st Qu.:0.00e+00

Median :0.0000 Median :0.0000 Median :0.00000 Median :0.00000 Median :0.00000 Median :0.00e+00 Median :0.0000000 Median :0.00e+00

X.188 X.189 X.190 X.191 X.192 X.193 X.194 X.195

Min. :0.000000 Min. :0.0000 Min. :0.0000000 Min. :0.000000 Min. :0.00000 Min. :0.000000 Min. :0.00000 Min. :0.00000

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Median :0.000000 Median :0.0000 Median :0.0000000 Median :0.000000 Median :0.00000 Median :0.000000 Median :0.00000 Median :0.00000

X.196 X.197 X.198 X.199 X.200 X.201 X.202 X.203

Min. :0.000000 Min. :0.0000 Min. :0.000000 Min. :0.00e+00 Min. :0.0000 Min. :0.0000000 Min. :0.000000 Min. :0.00000

1st Qu.:0.000000 1st Qu.:0.0000 1st Qu.:0.000000 1st Qu.:0.00e+00 1st Qu.:0.0000 1st Qu.:0.0000000 1st Qu.:0.000000 1st Qu.:0.00000

Median :0.000000 Median :0.0000 Median :0.000000 Median :0.00e+00 Median :0.0000 Median :0.0000000 Median :0.000000 Median :0.00000

X.204 X.205 X.206 X.207 X.208 X.209 X.210 X.211

Min. :0.0000000 Min. :0.000000 Min. :0.00000 Min. :0.000000 Min. :0.00000 Min. :0.000000 Min. :0.0000000 Min. :0.0000000

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Median :0.0000000 Median :0.000000 Median :0.00000 Median :0.000000 Median :0.00000 Median :0.000000 Median :0.0000000 Median :0.0000000

X.212 X.213 X.214 X.215 X.216 X.217 X.218 X.219

Min. :0.000000 Min. :0.0000 Min. :0.000000 Min. :0.000 Min. :0.000000 Min. :0.0000 Min. :0.000000 Min. :0.0000

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Median :0.000000 Median :0.0000 Median :0.000000 Median :0.000 Median :0.000000 Median :0.0000 Median :0.000000 Median :0.0000

X.220 X.221 X.222 X.223 X.224 X.225 X.226 X.227

Min. :0.0000 Min. :0.00000 Min. :0.000000 Min. :0.00e+00 Min. :0.000000 Min. :0.000000 Min. :0.0000000 Min. :0.000000

1st Qu.:0.0000 1st Qu.:0.00000 1st Qu.:0.000000 1st Qu.:0.00e+00 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.0000000 1st Qu.:0.000000

Median :0.0000 Median :0.00000 Median :0.000000 Median :0.00e+00 Median :0.000000 Median :0.000000 Median :0.0000000 Median :0.000000

X.228 X.229 X.230 X.231 X.232 X.233 X.234 X.235

Min. :0.00000 Min. :0.00000 Min. :0.00e+00 Min. :0.0000000 Min. :0.00000 Min. :0.0000 Min. :0.0000 Min. :0.0000

1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.00e+00 1st Qu.:0.0000000 1st Qu.:0.00000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000

Median :0.00000 Median :0.00000 Median :0.00e+00 Median :0.0000000 Median :0.00000 Median :1.0000 Median :0.0000 Median :0.0000

X.236 X.237 X.238 X.239 X.240 X.241 X.242 X.243

Min. :0.00000 Min. :0.00e+00 Min. :0.00000 Min. :0.000000 Min. :0.0000000 Min. :0.00000 Min. :0.00000 Min. :0.0000000

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Median :0.00000 Median :0.00e+00 Median :0.00000 Median :0.000000 Median :0.0000000 Median :0.00000 Median :0.00000 Median :0.0000000

X.244 X.245 X.246 X.247 X.248 X.249 X.250 X.251

Min. :0.00000 Min. :0.00000 Min. :0.000000 Min. :0.000000 Min. :0.000000 Min. :0.0000000 Min. :0.0000 Min. :0.0000

1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.000000 1st Qu.:0.0000000 1st Qu.:0.0000 1st Qu.:0.0000

Median :0.00000 Median :0.00000 Median :0.000000 Median :0.000000 Median :0.000000 Median :0.0000000 Median :0.0000 Median :0.0000

X.252 X.253 X.254 X.255 X.256 X.257 X.258 X.259 X.260

Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000

1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000

Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000

X.261 X.262 X.263 X.264 X.265 X.266 X.267 Target

Min. :0.0000 Min. :0.00000 Min. :0.00000 Min. : 0.0000 Min. :0 Min. : 0.000 Min. : 0.0000 Min. : 0.000

1st Qu.:0.0000 1st Qu.:0.00000 1st Qu.:0.00000 1st Qu.: 0.0000 1st Qu.:0 1st Qu.: 0.000 1st Qu.: 0.0000 1st Qu.: 0.000

Median :0.0000 Median :0.00000 Median :0.00000 Median : 0.0000 Median :0 Median : 0.000 Median : 0.0000 Median : 0.000

[ reached getOption("max.print") -- omitted 3 rows ]

1. Visualize the dataset and make inferences from that?

Ans : same as Que e

d. Perform any 3 hypothesis tests using columns of your choice, make conclusions

According to t-test, p value is 0.0128 which is less than 0.05. hence there is correlation

> t.test(blogData\_train$A, mu = 40.30467)

One Sample t-test

data: blogData\_train$A

t = -2.4895, df = 52396, p-value = 0.0128

alternative hypothesis: true mean is not equal to 40.30467

95 percent confidence interval:

38.76668 40.12165

sample estimates:

mean of x

39.44417

According to chi square test, p value is 1 which is more than 0.05. hence there is no correlation

> chisq.test(blogData\_train$A, blogData\_train$Target)

Pearson's Chi-squared test

data: blogData\_train$A and blogData\_train$Target

X-squared = 171770, df = 188780, p-value = 1

According to Anova test, p value is 0.000 which is less than 0.05. hence there is correlation

> results<- aov(A~Target, data = blogData\_train)

> summary(results)

Df Sum Sq Mean Sq F value Pr(>F)

Target 1 77304518 77304518 16156 <2e-16 \*\*\*

Residuals 52395 250708202 4785

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

e. Create a linear regression model to predict the no.of comments in the next 24hrs (relative to basetime)

> summary(mod)

Call:

lm(formula = blogData\_train$A ~ blogData\_train$Target)

Residuals:

Min 1Q Median 3Q Max

-1311.76 -30.97 -21.92 6.08 1089.09

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 32.553104 0.307019 106.0 <2e-16 \*\*\*

blogData\_train$Target 1.018677 0.008014 127.1 <2e-16 \*\*\*

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

Residual standard error: 69.17 on 52395 degrees of freedom

Multiple R-squared: 0.2357, Adjusted R-squared: 0.2357

F-statistic: 1.616e+04 on 1 and 52395 DF, p-value: < 2.2e-16

**For 1 unit increase there will be 1.01 unit of increase in no.of comments**

**These 3 terms, t-statistics (127.1), Std Error of regression coefficient (0.008014) and Probability (of committing Type I Error) is 2e-06 [2/1000000 = 0.00000200 = almost 0] are associated with a t test which tests following Null Hypothesis:**

**Ho: The slope of no.of comments is not significant**

**Ha: The slope of no.of comments is significant**

**0.008014 = standard error of regression co-efficient**

**As p value is 0.000 which is less than 0.05, Reject the Ho (and accept Ha) and conclude that “slope is significant”**

**Multiple R-squared = 0.2357**

**23.5% of the variance in Average can be explained by no.of comments [Remaining 76.5% is unexplained variance....due to factors outside the model]**

> pred<- predict(lm(blogData\_train$A~blogData\_train$Target))

> pred

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

33.57178 32.55310 32.55310 33.57178 60.05738 32.55310 32.55310 60.05738 41.72120 41.72120 32.55310 32.55310 34.59046 32.55310 45.79590

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

47.83326 35.60913 47.83326 45.79590 33.57178 53.94532 33.57178 53.94532 33.57178 35.60913 35.60913 35.60913 35.60913 34.59046 34.59046

31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

37.64649 37.64649 32.55310 32.55310 53.94532 32.55310 32.55310 35.60913 32.55310 32.55310 32.55310 34.59046 32.55310 32.55310 32.55310

46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

32.55310 46.81458 44.77723 39.68384 32.55310 32.55310 32.55310 32.55310 32.55310 32.55310 32.55310 32.55310 32.55310 39.68384 35.60913

61 62 63 64 65 66 67 68 69 70 71 72 73 74 75

33.57178 33.57178 33.57178 34.59046 34.59046 32.55310 32.55310 37.64649 49.87061 37.64649 32.55310 34.59046 32.55310 33.57178 32.55310

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

33.57178 40.70252 32.55310 32.55310 69.22547 33.57178 34.59046 44.77723 41.72120 40.70252 41.72120 40.70252 36.62781 40.70252 33.57178

91 92 93 94 95 96 97 98 99 100 101 102 103 104 105

33.57178 35.60913 35.60913 34.59046 34.59046 33.57178 33.57178 35.60913 35.60913 34.59046 34.59046 35.60913 35.60913 59.03870 34.59046

106 107 108 109 110 111 112 113 114 115 116 117 118 119 120

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