Chosen Approach

In the delivered scripts are reported all the analyzed approaches that include:

- Multiple Linear Regression(used only as a comparison, aware of the fact that it is not a good approach)
- Stepwise selection using the hybrid approach with BIC and AIC to estimate test MSE
- Ridge
- Lasso
- ElasticNet

Following are reported the obtained results:

Comparison between MAEs				
	Ridge	Lasso	ElasticNet	Subset selection AIC and BIC
Test MSE	9712.763	4478.796	4595.025 with alpha=0.95	AIC: 7281.48 BIC: 7154.536
N. of Regressors	46	10	10	AIC: 11 BIC: 9

Starting from these results it is possible to see that the best value of test MSE has been obtaining with Lasso. This is reasonable because observing correlation matrix, it is clear that only a small subset of the regressors are really significant for the response, and so an approach that performs variable selection is required. This is also confirmed by the observation of ElasticNet behavior varying the alpha parameter. In fact alpha is a parameter that varies in the range 0-1 and weighs more Lasso penalty term or Ridge's one. It is possible to see as much as alpha tends to 1 and so to Lasso, the performance improves. This is because Ridge only shrinkage coefficients towards zero but does not set one of this to exactly zero.

In particular it is possible to notice from the script that also with stepwise hybrid selection approach, good performances have been obtained, especially with BIC that has a more stringent penalty respect to AIC. Only for test purposes we have also tried to increase BIC's penalty terms, and we note the performance increases a lot, selecting only three variables.

Finally, the obtained clue is: "GoT".