There are a number of possible applications of the Used Car data supplied:

1. A used car dealership can use the data to determine what a reasonable acquisition price is for a used vehicle given a target profit margin, and a description of the vehicle. This type of information would be crucial in a negotiation.
2. A car dealership can also use the data in combination with a predictive model to get a sense of how competitors are likely to price their products. This would allow the business to undercut competitors’ prices if so desired.
3. Consumers often choose to enter into lease agreements with manufacturers for vehicles. In these cases, a manufacturer is responsible for reselling the vehicle after the lease term is over, and is therefore concerned about the determinants of a car’s residual value. Using this data in conjunction with a predictive model may provide manufacturers with better information so that lease terms and installments will be appropriately determined.

The following approach may be used for variable selection. It mirrors some methods that we have discussed briefly such as bagging and random forests:

1. Randomly separate the data into different segments or folds.
2. For each fold, fit the regression tree (for constant $\alpha$)
3. At each node, calculate a weighted impurity decrease e.g. Mean Decrease Gini function for the predictor $p\_{i}$ used.
4. Add up the weighted impurity decreases across the tree for each predictor. This gives us a way of ranking the predictive power of each variable.
5. Repeat this process for the other folds, and take an average for each predictor to determine the overall result.
6. We can choose the most influential predictor using the average weighted impurity decreases across all folds.
7. The process can be modified to randomize the predictor choices at each node (as in a Random forest). We can then average results across all random forests for our mean impurity decrease function. This would probably be particularly helpful with the issue of correlated predictors.