



# A Case Study: Predicting Consumers' Likelihood to Install Solar Equipment

## Background

A solar company wanted to gain insights on their in-market shoppers, who are likely to install a solar equipment at their homes. Insight Que Solutions developed a propensity-to-buy model based on customers' historical attributes, which allowed the company help decide where to focus on their marketing efforts to close-in consumers

## Approach

Various consumers' attributes such as customers demographics (e.g., marital status, gender), housing attributes (# of bedroom, # of bathroom), financial information (e.g., Net worth, estimated median income, etc), geographic information (e.g., city, zip-code, zip+4, etc.), solar attributes (e.g., current consumers has interest in home improvement, solar sq-foot, has a solar target etc.) were used to build the model. The dataset involve consumers information from one of the mountain states within united States contains over 3000 samples with multiple zip-codes.

- Initially, Missing values were imputed using statistical modeling
  - CART (Classification and Regression Trees were used)

The original data-set contains 302 observations (8.13%) for Has\_Solar\_Target

Initial dataset was split into Train and Test datasets

Multiple Machine Learning models were trained; these models were tested and validated against historical data. Finally, the best performing model was selected.

## Results

### Variables with highest predictive power to determine if a home owner will

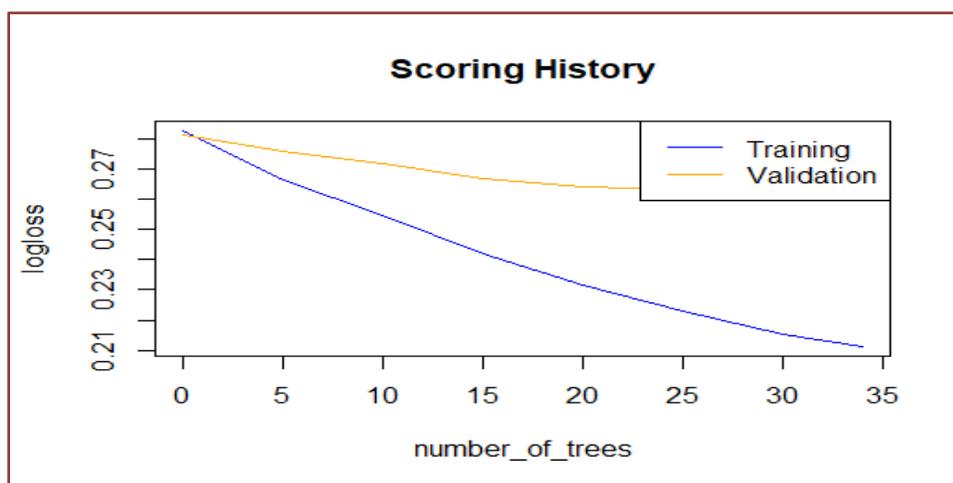
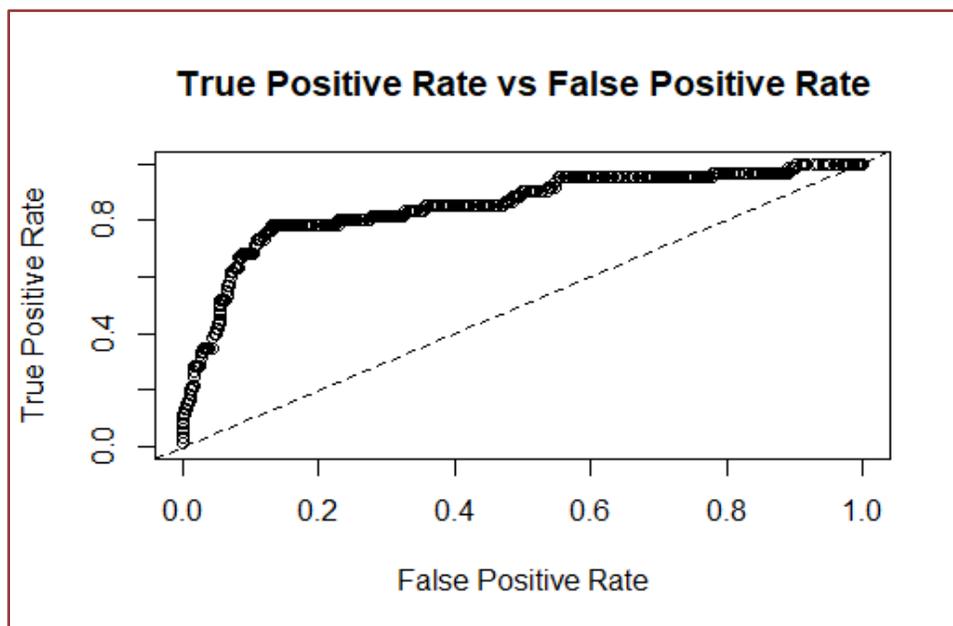
1. Land Value
2. Home Purchase Price
3. Estimated Income Amount
4. Solar Sqft Roof Space
5. Estimated Home Value

Final Model: Gradient Boosting Method (GBM)

Accuracy: ~84% -- Model was able to identify the if a consumer is likely to install a solar product at their homes with 84% accuracy

Confusion Matrix (vertical: actual;  
across: predicted)

	0	1	Error	Rate
0	627	55	0.080645	=55/682
1	20	40	0.333333	=20/60
Total	647	95	0.101078	=75/742





### **Concluding Remarks**

Applying data-driven predictive marketing, Insight Que Solutions provided insights to the solar company about their in-market shoppers. The precise accuracy of the Machine Learning model helped to pinpoint the consumers if they are likely to install a solar product in their homes in the near future.

For more information: please schedule a consultation using the following email:

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