

After Sale Service Customer Satisfaction with Personalized Attributes for Indian Tractor Industry

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Abstract: Agriculture industry plays very important role in Indian Economy. Tractor industry is related with machines in Agricultures. In this paper, we analyse how a customer view personalized services. In other words, we want to study how a customer views the types of after sales services provided to him. We collected the customer satisfaction data for after sale service for six attributes. Many regression methods were used to study the data. The results suggest that linear regression method has best prediction of total satisfaction with these service attributes.

Keywords: After sale service, Personalized attributes, Customer satisfaction, Regression methods.

I. Introduction

Agriculture is the main occupation in India. There is a high potential of growth of tractor industry in this country. India have a variety of crops production which includes Paddy, Wheat, Maize, Black gram, Peas, Cotton, Sugarcane, Pulses, Millets, Soya bean, Mustard, Barley, Pumpkin, Bitter Gourd, Tea, Coffee, Tobacco, etc.

Talking about the condition of land, it is not proportional throughout. There are diversities in the sizes of land, ownership of land, types of soils, crops produced, etc. Indian Tractor Industry is a growing industry which has a wide area of scope for development. This Industry not only fulfils the domestic needs but also export its products [1].

This simplifies that if an industry wants to grow in India, it has to consider all the above described aspects before the launch of any product or any change in existing product. Accordingly the customer services are to be drawn for maximum level of customer satisfaction, loyalty and other aspects needed for the growth of the company.

There are various practices done in India like Sub soiling, Ploughing, Tilling, Harrowing, Puddling, Levelling, Bund/Ridge Forming, Post Hole Drilling. For these practices different implements and tractors with different power range are needed. For different practices tractors having different power range are required. So, customer is also focused on getting the maximum power at lower price and selecting a brand for assurance of getting the rated power.

Services are intangible economic activities offered by one party to another. Customer Services are the services provided by the industry to the customer for establishing better relations with customer, satisfying their needs; make the customer feel simply good and ensuring customer loyalty.

After sale support or service is a very important component of marketing. Each activity has its own cost impact. No company has unlimited fund to spend on service activities. Company has to take the decision on priorities. Different processes are applied to improve the accuracy of these decisions. Market research is a very important tool to understand the viability and acceptance of customers. This allows companies to discover their target market, customer thinking and expected amount customer is ready to pay for added service features.

We carried out survey for five personalized service attributes and total customer satisfaction. In this paper, we will discuss how the regression methods can be used to predict the total satisfaction on the basis of these five attributes.

The paper is organized in following manner. In Section 2 we discuss the regression methods used in the paper. The Section 3 describes the data. The experiments are presented in Section 4. Section 5 has conclusion and future work.

II. Regression Methods

We used following regression methods [2] in this paper.

1. Linear Regression – In this method, a linear relationship between input variables and output variable is computed. The advantage of this method is that this relationship can be explained easily. However, when the relationship is not linear it gives bad results.
2. Neural Networks – Neural networks are very popular regression methods. They can learn nonlinear functions. However, the computational complexity is high and parameter setting is difficult.

3. Support vector machines- These are very powerful regression methods. They can learn any nonlinear function if a proper kernel is selected. However, results can be bad if proper kernel is not selected.
4. Regression trees- These are very popular regression methods [4] . These are easy to create and can be easily understandable by human. They are not as accurate as neural networks and support vector machines.
5. Ensembles- Ensembles [3, 5] are combination of many methods. The final result is the combination of the results of all the members. The result of an ensemble is generally more accurate than the results of individual models. In this paper, we will use Bagging ensemble method [6]. In this method, different datasets are created by selecting data points without replacement. In each dataset, some data points are selected more than one and some data points are not selected. This creates diverse datasets. Diverse datasets create diverse models. The combination of these models gives accurate results.

III. DATA

The data was collected from customer all over India about the satisfaction from service. Following six questions were asked

1. Is any company representative available in the village
2. Average time taken in each service.
3. Behaviour of the dealer after the warrantee.
4. Whether the dealer provide any scheme for service.
5. Whether the dealer or the company provides service at door steps.
6. Overall satisfaction.

The customer was asked to grade the question from 1 to 5 as 5 is the best and 1 is the worst. Data was collected from 103 customers.

IV. Experiments

We used WEKA software for our experiments. The default values given in WEKA software for different regression methods were used in experiments. In Bagging method, the size of ensemble was set to 10. Ten cross-fold validation was used in the experiments.

Results were presented in Table 1 – Table 5. Results presented in different tables suggest that Single Linear Regression gives the best result for Correlation coefficient. Single Linear Regression gives the best result for Mean absolute error. Single Linear Regression gives the best results for Root mean squared error. Linear Regression with Bagging gives the best result for Relative absolute error. These results suggest that Linear Regression method is the best method for this application.

Table 1. Results for Linear regression method.

Linear Regression	Correlation coefficient	Mean absolute error	Root mean squared error	Relative absolute error
Single	0.60	0.57	0.72	75.28 %
Bagging	0.56	0.59	0.75	74.99 %

Table 2. Results for Neural Networks.

Neural Networks	Correlation coefficient	Mean absolute error	Root mean squared error	Relative absolute error
Single	0.41	0.72	1.12	94.23 %
Bagging	0.54	0.64	0.80	83.44 %

Table 3. Results for Support Vector Machines.

Support Vector Machines	Correlation coefficient	Mean absolute error	Root mean squared error	Relative absolute error
Single	0.55	0.59	0.75	76.74 %
Bagging	0.57	0.58	0.74	75.74 %

Table 4. Results for Regression trees.

REP tree	Correlation coefficient	Mean absolute error	Root mean squared error	Relative absolute error
Single	0.44	0.65	0.82	84.44 %
Bagging	0.47	0.65	0.79	84.42 %

V. Conclusion

In the present paper, we analyzed customer satisfaction data for tractor service. We found that the customers like the service at their door step. Various regression methods were used to study the dataset. There was no regression method that gave the best results for all the error measures. It suggests that a proper regression method should be selected for given error measure.

References

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