



PERFORMANCE COMPARISON OF RULE BASED CLASSIFIER: JRIP AND DECISIONTABLE USING WEKA DATA MINING TOOL ON CAR REVIEWS

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Abstract-

Today Huge amount of data generated over the internet. The WEKA is data processing tool contain organized collection of state of art machine learning algorithm. However, convenient interactive graphical user interfaces are provided for data exploration, for setting up large-scale experiments on distributed computing platforms, and for designing configurations for streamed data processing. This paper has been carried out to make a performance evaluation of JRip and DecisionTable Rule based classification algorithm. The paper sets out to make comparative evaluation of two Rule based classifiers from WEKA, JRip and DecisionTable in the context of dataset of car reviews to maximize true positive rate and minimize false positive rate. The WEKA tool used for result processing. The results in the paper on dataset of car reviews also show that the efficiency and accuracy of JRip is excellent than DecisionTable for Test mode Training Set.

Keywords— Classification, Data mining, Decision Table, JRip, WEKA.

INTRODUCTION

Today the rapid growth of internet, product related word-of-mouth conversation have migrated to online markets, creating active electronic communication that provide a wealth of information. The huge amount of data is generated from various resources com. In data mining, the data is stored electronically and the search is computerized or at least augmented by machine. Data mining is a topic that involves learning in a practical, non-theoretical sense. We are interested in techniques for finding and describing structural patterns in data, as a tool for helping to explain that data and make predictions from it. Experience shows that in many applications of machine learning to data mining, the explicit knowledge structures that are acquired and the structural descriptions are at least as important as the ability to perform well on new examples. People frequently use data mining to gain knowledge, not just predictions^[8].

Nowadays, more and more e-commerce platforms offer product reviews. A product review is a textual review of a customer or expert, who describes the characteristics of a product. A product rating and reviews on the other hand represents the customer's and expert opinion on a specified scale. In the given research paper we have used car review data set. Form Comparative analysis rule based classifier which contains JRip and DecisionTable classifier.

DATA MINING TOOL

Data Mining is a powerful technology with great ability to help organizations focus on the most important information in their data center. It also predict future trends, behavior and with result. It also contains variety of analytical tools that used for data analysis. It allows users to analyze the data from many different aspects, categorize it, and summarize the identified relationships. There are many Data Mining tools are available such as the WEKA, KNIME, Orange, SPSS, and MATLAB etc. These tools provide a set of Data Mining methods and algorithms that help in better implementation of data and information available to users. The available Data Mining tools can be divided into two types which are open source/non-commercial software and commercial software. These types of tools have their own strengths and weaknesses in terms of data types and the application methods. From the given set of tool in my research work we have used WEKA tool^[16].

WAIKATO ENVIRONMENT FOR KNOWLEDGE ANALYSIS

WEKA was developed at the University of Waikato in New Zealand. The name stands for Waikato Environment for Knowledge Analysis The system is written in Java and distributed under the terms of the GNU General Public License[12][16]. It runs on almost any platform and has been tested under Linux, Windows, and

Macintosh operating systems. And even on a personal digital assistant. It provides a uniform interface to many different learning algorithms, along with methods for pre and post processing and for evaluating the result of learning schemes on any given dataset. WEKA provides implementations of learning algorithms that can be easily apply to dataset. It also includes a variety of tools for transforming datasets, such as the algorithms. This tool also supports the variety file formats for mining include ARFF, CSV, LibSVM, and C4.5. The easiest way to use WEKA is through a graphical user interface called Explorer as shown in Fig. I. Fig. II Shows the ARFF File Opening by WEKA and Fig. III ARFF file processing by JRip.



Figure 1: WEKA GUI Explorer



Figure 2 ARFF File Opening by WEKA

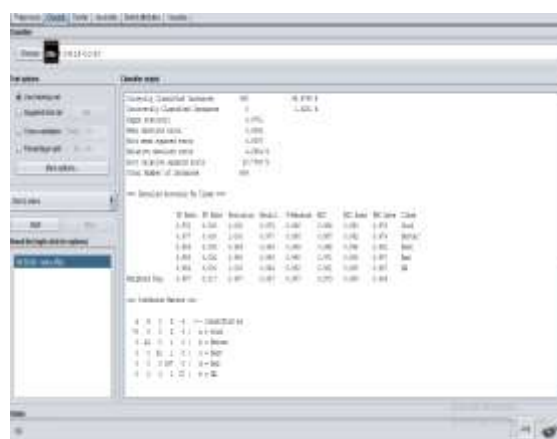


Figure 3 ARFF File Processing by WEKA

RULE BASED CLASSIFIER

The process in which idea and object are recognized, differentiated and understood is called as classification. Classifications also refer as Categorization. In the terminology of machine learning, classification is considered an instance of supervised learning, i.e. learning where a training set of correctly identified observation is available. The corresponding unsupervised procedure is known as clustering or cluster analysis and involved

grouping data into categories based on measure of inherent similarity ^[11]. The Rule based classifier is use the concept of IF-THEN rules. Standard created guidelines comprise of two sections. Starting side is called precursor or IF part and second part is ensuing or THEN part. Left hand forerunner and right hand subsequent. Predecessor can have one or numerous conditions which must be valid with the end goal for ensuing to be valid for given precision though resulting is simply single condition.

JRip

JRip is proposed by William W. This executes propositional rule student, Repeated Incremental Pruning to Produce Error Reduction (RIPPER). JRip is surmising and governs based student (RIPPER) that attempts to concoct propositional rules which can be utilized to group components. JRip is base up strategy learns. It is one of basic and most surely understood Algorithm.

DecisionTable

Decision Table utilizes wrapper technique to discover great subset of characteristics for consideration in table utilizing best-first search. By discarding properties that contribute about nothing or nothing to display of dataset, count reduces likelihood of over-fitting and settles on humbler and solidified decision table. In portrayal of dataset using planning dataset diverse overseer have been created on reason of gathering of characteristics. These credits are amassed together to make various improvements of principles. These rules have been completed on testing dataset for computation of assistance and sureness regard.

SYSTEM DESIGN

In order to co-relate Reviews with the categories, a model based on the machine learning and XML search was designed. As an input to the model, various quality car reviews are considered which are available online.

Around 606 car reviews samples were collected on above repository. In order to extract context from the car reviews, the car reviews was process with stop word removal, stemming and tokenization on the car reviews contents. The car reviews then separated into 5 categories GOOD, BETTER, BEST, BAD, NA (not applicable) and then converted into the term frequency matrix for further analysis purpose. Due to classification in above 5 categories we are also able to find the GOOD, BETTER, BEST, BAD, NA count on every data set which help for market analysis, product rating and much more purposes. Based on this data, features (i.e. metadata) were extracted so that contextual assignment of the car reviews to the appropriate content can be done. This process is known as metadata processing [10].

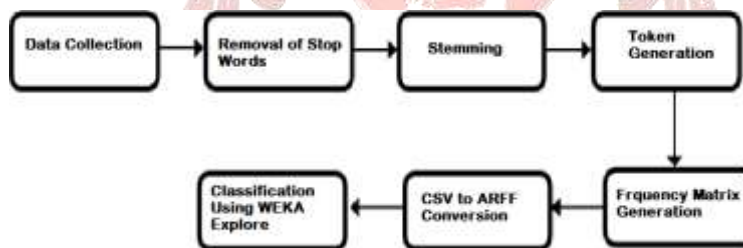


Figure 4 Process Flow Chart

DATA COLLECTION

Hence, it was proposed to generate car reviews data. Consequently the national and international resources were used for the research purpose. Data for the purpose of research has been collected from the various online resources .They are downloaded and after reading the car reviews they are manually classified into 12(Twelve) categories. There were 606 car reviews in total. The details are as shown in following table. The attributes consider for this classification is based on GOOD, BETTER, BEST, BAD, NA count each classification having their own data dictionary and based on this they are classified, the review are made by expert and user. Hence, there will be drastic enhancement in e-Contents when we refer to the latest material available in this regards ^[14]
^[15]

CAR DATASET CLASSIFICATION

Sr. No	Car Companies	Numbers of reviews
1	Chevrolet	38
2	Fiat	27
3	Ford	36

4	Honda	47
5	Hyundai	59
6	Mahindra R Mahindra	63
7	Maruti Suzuki	95
8	Renault	53
9	Skoda	23
10	Tata Motors	90
11	Toyota	41
12	Volkswagan	34
	Total	606

PERFORMANCE INVESTIGATION

The car reviews so collected needed a processing. Hence as given in the design phase, all the review were processed for stop word removal, stemming, tokenization and ultimately generated the Frequency matrix based on GOOD, BETTER, BEST, BAD, NA count. Stemming is used as many times when review is printed, for a same there can be many variants depending on the tense used or whether it is singular or plural. Such words when processed for stemming, generates a unique word. Stop words needs to be removed as they do not contribute much in the decision making process. Frequency matrix thus generated can be processed for generating a model and the model so generated was used in further decision process. With the model discussed above, Rules Based classifier JRip and DecisionTable, Were used on the data set of 606 car reviews. For processing WEKA APIs were used. In following tables showing figures for true positive rate and false positive rate. The 1.0 represent the best, whereas the worst is 0.0. The result after processing is given in the form of confusion matrix which is shown in Table II, IV. And table no III and V showing true positive and false positive rate of JRip and DecisionTable [10] [13].

CONFUSION MATRIX FOR JRIP

CLASSIFIED AS	GOOD	BETTER	BEST	BAD	NA
GOOD	70	0	0	2	0
BETTER	0	42	0	1	0
BEST	0	0	62	1	0
BAD	0	0	3	397	0
NA	0	0	0	1	27

TABLE SHOEING TRUE POSITIVE AND FALSE POSITIVE RATE OF JRIP

CLASS	TP RATE	FP RATE	PRECISION	RECALL	F-MEASURE	ROC AREA
GOOD	0.972	0.000	1.000	0.972	0.986	0.990
BETTER	0.977	0.000	1.000	0.977	0.988	0.992
BEST	0.984	0.006	0.954	0.984	0.969	0.994
BAD	0.993	0.024	0.988	0.993	0.990	0.988
NA	0.964	0.000	1.000	0.964	0.982	0.988
Weighted Avg.	0.987	0.017	0.987	0.987	0.987	0.989

CONFUSION MATRIX FOR DECISIONTABLE

CLASSIFIED AS	GOOD	BETTER	BEST	BAD	NA
GOOD	70	0	0	2	0
BETTER	0	37	0	6	0
BEST	0	0	48	15	0

BAD	1	0	0	399	0
NA	0	0	0	1	27

TABLE SHOWING TRUE POSITIVE AND FALSE POSITIVE RATE OF DECISIONTABLE

CLASS	TP RATE	FP RATE	PRECISION	RECALL	F-MEASURE	ROC AREA
GOOD	0.972	0.002	0.986	0.972	0.979	0.992
BETTER	0.860	0.000	1.000	0.860	0.925	0.995
BEST	0.762	0.000	1.000	0.762	0.865	0.984
BAD	0.998	0.117	0.943	0.998	0.970	0.987
NA	0.964	0.000	1.000	0.964	0.982	0.999
Weighted Avg.	0.959	0.077	0.961	0.959	0.957	0.989

CONCLUSION

As per the previous performance investigation of Car review from dynamic resources can be done with the propose model, we used two classifier i.e. JRip and Decision Table to analyze the data sets. As a result it is found that JRip algorithm performs well in categorizing 606 instances all the car review. Overall Performance of JRip algorithm is acceptable, i.e. Correctly Classified Instances are 598 out of 606 the average percentage of this is 98.6799%, Incorrectly Classified Instances is 8, the average percentage of this is 1.3201%, whereas DecisionTable Classifier performs less efficient i.e. Correctly Classified Instances are 581 out of 606 the average percentage of this is 95.8746%, Incorrectly Classified Instances are only 25 the average percentage of this is 4.1254%.

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