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CAR SERVICING AUTOMATION AND ANALYSIS SYSTEM

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Abstract

This project is based on Car Service Center. This project has content Image Processing as well as data mining algorithms for management of car service centers. The main part of this project has this total system is fully automated system and it detects car's information from car's number plate. All information regarding car owner and car modelhas been detected by the number plate of car.

A video camera detects the number plate of car and service center gets all over information regarding that car and does the servicing of that car and sends the detail information to the user about servicing and payment. Service center prepares the analysis from the stored data in the database.

Keywords:-MOPNAR, Sentimental Analysis Algorithm, Robust Algorithm, Data Mining techniques

I. INTRODUCTION.

Car Servicing Automation and Analysis System deals with the automated scanning of the number plate of the car and analysis of the feedback of the cars data. The automated scanning of the number plate of the car helps in processing the user's registration of the car. The analysis of the feedback data of the serviced car helps for analyzing which car has which type of faults and which car needs more or less servicing. All information regarding car owner and car model is detected by the number plate of car. This project uses Content Image Processing and Data Mining algorithms for management of car service centers. The feedback system will be a web based application which will be based on application development and Data Mining. After the servicing is completed a message will be sent to the user regarding the servicing and the payment.

What makes our system better :

This will be very helpful in management system of car service center, and will help to automatically detect car's information on the basis of image processing.

-Analysis of faults on which car model occurs regularly.

II. DESIGN AND IMPLEMENTATION OF SYSTEM

A. System Architecture

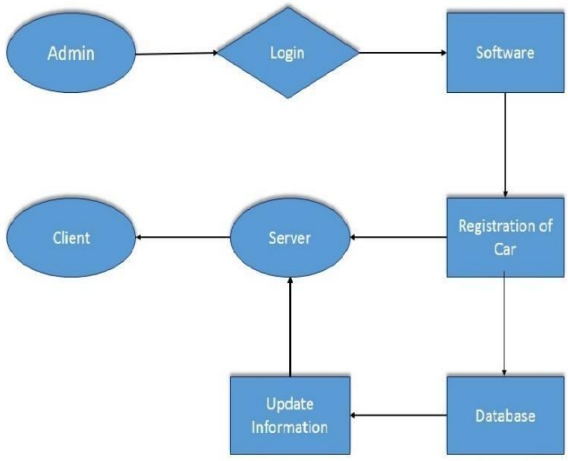


Fig. System Architecture of Car Servicing Automation and Analysis

The Consortium of components narrates the complete design of the system. It also provides indirect functioning of the system. Admin system implements the Robust algorithm for Image Processing and MOPNAR algorithm for providing solutions to the negative reviews. This system also implements Sentimental Analysis algorithm for segregation and analyzing the data. Hence, system provides services to admin and begin analyzing the problems regarding the servicing of the car. Implementation of the system . The system has developed using multiple edge cutting technologies like NetBeans, Java swing and Java web technology.

Net Beans used for developing web and applications which forwarded multiple requests to database provides data to the user.

User web application enables the facility like purchasing the product, view all reviews of a product. It also provides the functionalities like segregation of feedbacks as well as

viewing the solutions for negative feedbacks. Admin's web application is for administrator who's taking care of manage menu.
Web applications implemented collection of algorithms to provide service to admin and multiple users. Most predominant algorithms are Robust, Sentimental Analysis and MOPNAR algorithm.

III. TECHNOLOGIES USED

A. Abbreviations and Acronyms

1. MOPNAR: Multi Objective Positive Negative Association Rules

B. Technologies

- This system is mainly based on the Robust algorithm and Sentimental Analysis algorithm.
- MOPNAR (Multi Objective Positive Negative Association Rule) algorithm. Using MOPNAR algorithm the positive and negative reviews are analyzed.
- NLP i.e. Natural Language Processing and Machine Learning Concepts are also used.

1) ROBUST ALGORITHM.

Text detection in images or videos is an important step to achieve multimedia content retrieval. Therefore them Robust algorithm is used. Robust algorithm is an Efficient algorithm which can automatically detect, localize and extract horizontally aligned text in images with complex backgrounds is presented. The proposed approach is based on the application of a color reduction technique, a method for edge detection, and the localization of text regions using projection profile analyses and geometrical properties.

Fig. An image for processing the text from the image.

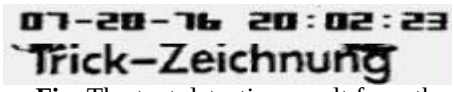


Fig. The text detection result from the given image.

The output of the algorithm are text boxes with a simplified background, ready to be fed into an OCR engine for subsequent character recognition. Robust algorithm is proposed as with respect to different font sizes, font colors, languages and background complexities. The performance of the approach is demonstrated by presenting promising experimental results for a set of images taken from different types of video sequences.

Finally, we plan to implement a hybrid system where connected component-based methods are combined with texture-based methods to possibly obtain further performance improvements.

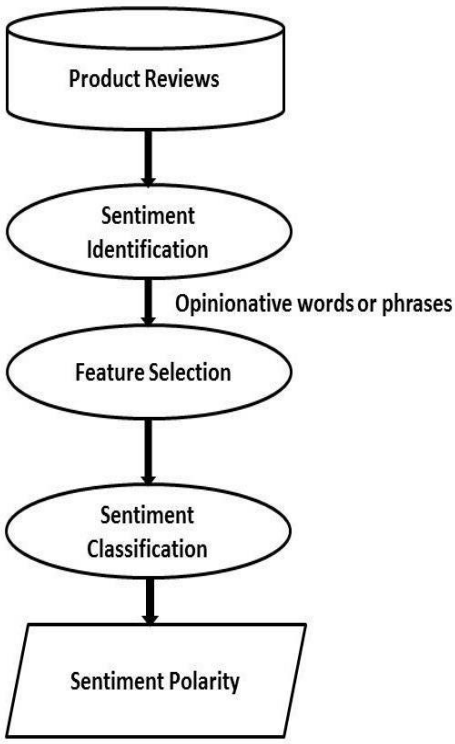
2) MOPNAR

In the last decade, the digital revolution has provided relatively inexpensive and accessiblemeans of collecting and storing data. This unlimited growth of data led to a situation in which the knowledge extraction process is more difficult and in most, cases, leads to problem of scalability and complexity. Association discovery is one of the most common data mining techniques used to extract interesting knowledge from large datasets. Association rules are used to identify and represent dependencies between items in dataset. These are representations of the type $X \rightarrow Y$, in which X and Y are item sets and $X \cap Y$. Therefore if the items in X exist in an example then it is highly probable that the items in Y are also in example, and X and Y should not have items in common. A high number of previous studies on mining association rules have focused on datasets with discrete or binary values; however in real world applications, data usually consists of quantitative values. Because of this, different studies have been presented for quantitative association rules(QARs) from datasets with quantitative values. Most of these algorithms usually extract positive QARs without paying particular attention to negative QARs. Nevertheless, rules such as$\rightarrow \neg Y$ may be taking account, as they relate the presence of X to the absence of Y. Negative association rules consider the same set of items as positive association rules but, in addition may also include negated items within the antecedent ($\neg X \rightarrow Y$) or consequent ($X \rightarrow \neg Y$) or both of them ($\neg X \rightarrow \neg Y$).

MOPNAR, a new MOEA (Multi Objective Evolutionary Algorithm), in order to mine with low computational cost a reduced set of positive and negative QARs (PNQARs)that are interesting, easy to understand, and with a good trade-off between the number of rules, support and coverage of the datasets. To accomplish this, our proposal, extends the recent MOEA based on decomposition MOEA/D-DE in order to perform a condition selection and an evolutionary learning of the intervals of the attributes for each rule, maximizing three

objectives: comprehensibility, interestingness and performance. Moreover, this proposal introduce a restarting process and an external population(EP) to the evolutionary model in order to promote diversity in the population, store all the non-dominated rues found, and improve the coverage of the datasets.

Sentimental Analysis algorithm is the computational study of people's opinion and attitudes and emotions toward an entity. The entity can represent individuals, events or topics. These topics are most likely to be covered by reviews. Sentimental Analysis can be considered a classification process as in the Fig.2. There are three main classification levels in Sentimental Analysis: Document-level, Sentence-level, and Aspect-level Sentimental Analysis. Document-level Sentimental Analysis aims to classify an opinion document as expressing a positive or negative opinion or sentiment. It considers the whole document a basic information unit.



Sentence-level Sentimental Analysis aims to classify sentiment expressed in each sentence. The first step is to identify whether the sentence is subjective or objective. If the sentence is subjective, Sentence-level Sentimental Analysis will determine whether the sentence expresses positive or negative opinions.

Aspect-level Sentimental Analysis aims to classify the sentiment with respect to the specific aspects of entities. This survey tackles the first two kinds of Sentimental Analysis.

3) *Sentimental Analysis Algorithm*

Sentimental analysis refers to the use of natural language processing, text analysis and computational linguistics to identify and extract subjective information in source material. Sentiment analysis is widely applied to reviews and social media for a variety of applications, ranging from marketing to customer service.

2ALGORITHMS USED

1) MOPNAR

Step 1: Generate positive association rules and negative association rules from frequent item set.

Step2: Initialize all the general parameters involved in genetic algorithm.

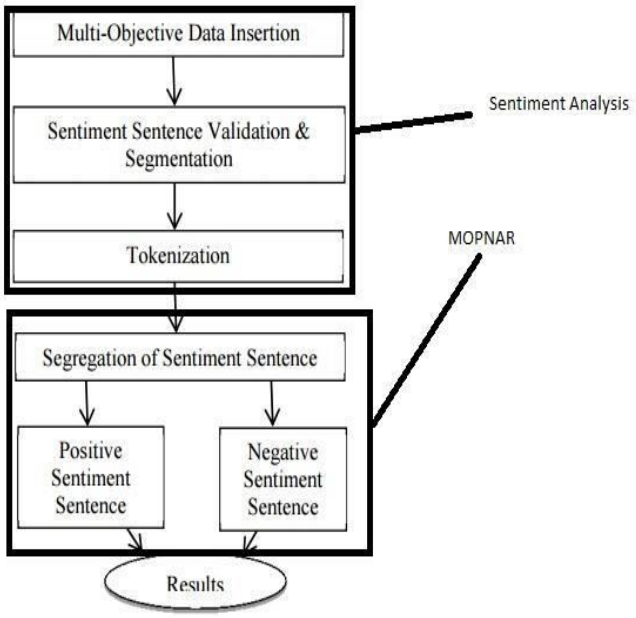
Step 3: Generate the child chromosomes of the positive and negative association rules and calculate the fitness value of each individual child chromosomes. Compare the individual fitness value of each child with average fitness value and regenerate positive and negative association rules.

Step 4: Crossover and mutate the remaining child chromosomes and reinitialize the fitness value and rechargeable and regenerate final positive and negative rules.

2) Robust Algorithm

Stage 1: *Image Preprocessing.* If the image data is not represented in YUV color space, it is converted to this color space by means of an appropriate transformation. In contrast to the approaches presented in our system only uses the luminance data (Y channel of YUV) during further processing. After that, luminance value thresholding is applied to spread luminance values throughout the image and increase the contrast between the possibly interesting regions and the rest of the image.

Stage 2: Edge Detection. This step focuses the attention to areas where text may occur. We employ a simple method for converting the gray-level image into an edge image. Our algorithm is based on the fact that the character contours have high contrast to their local neighbors. As a result, all character pixels as well as some non-character pixels which also show high local color contrast are registered in the edge image. In this image, the value of each pixel of the original image is replaced by the largest difference between itself and its neighbors. Despite its simplicity, this procedure is highly effective. Finally, the contrast between edges will be increased by means of a convolution with an appropriate mask.



Stage 3: Detection of Text Regions. The horizontal projection pole of the edge image is analyzed in order to locate potential text areas. Since text regions show high contrast values, it is expected that they produce high peaks in horizontal projection. First, the histogram F is computed, where-HG F is the number of pixels in line of edge image exceeding a given value. In subsequent processing, the local maxima are calculatedly. In a later step, the x-coordinates of the leftmost and rightmost, top and bottom point of the text region. Finally, the exact Coordinates for each of the detected areas are used to create bounding boxes.

Stage 4: Enhancement and Segmentation of Text Regions. First, geometric properties of the text characters like the possible height, width, width to height ratio are used to discard those regions whose geometric features do not fail into the pretend ranges of values. All remaining text candidates undergo another treatment in order to generate the so called text image where detected text appears on a simplified background. The binary edge image is generated from the edge image, erasing all pixels outside the pretended text boxes and then finalizing it. This is followed by the process of gap line. If one white pixel on the binary edge image is surrounded by two black pixels in horizontal, vertical or diagonal direction, then it is also called with black. The gap image is used as a reference image to the localization of the detected text candidates. Text segmentation is the next step to take place. It starts with extraction of text candidates from the gray image. Then, the segmentation process concludes with a procedure which enhances text to background contrast on the text image.

3. Sentimental Analysis algorithm

N: number of sentences in the form of paragraph; x={x1,x2,x3…xN}.

Output: (1) Positive, Negative and Neutral sentences are separated.

(2) Positive, negative and neutral sentences count.

(3) Values for different parameters.

Steps: 1) Upload input data file containing ‘n’ number of paragraphs.

2)Data will be validated using sentiment sentences validation.

3)Sentences will be segmented.

4)Tokens will be separated from all sentences.

5)Process of segregation is performed for finding the positive, negative and neutral words by matching the words with POS tagging words.

6)Calculate all parameters values using their formulas.

IV.Result and Discussion

In this paper of the Car Servicing Automation and Analysis System the performance of the registration d the analysis of the data is improved. With the help of the algorithms like Robust algorithm, MOPAR algorithm and Sentimental analysis algorithm the car servicing and automation helps reducing the manually work of the service center. It helps in automatic detection of the car’s registered number plate which saves time and manual work which is required to collect the information of the car’s number plate. The MOPNAR algorithm helps in the analysis of the data that is created after the servicing of the car is done. The collected data of the car after the servicing is done is then analyzed together and helps in getting information of the cars positive and negative feedback .

V.Conclusion

With the help of the algorithms like robust algorithm, MOPAR algorithm and Sentimental analysis algorithm the car servicing and automation helps reducing the manually work of the service center.

It helps in automatic detection of the car’s registered number plate which saves time and manual work which is required to collect the information of the car’s number plate.

The MOPNAR algorithm helps in the analysis of the data that is created after the servicing of the car is done. The collected data of the car after the servicing is done is then analyzed together and helps in getting information of the cars positive and negative feedback .

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