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Green Product Promotion using mobile recommender system with C-KNN approach

[1]Priya Saini
M-Tech Scholar
E-mail:cutepriyasaini1992@gmail.com
Swami Sarvanad Institute of Engineering & Technology,Dinanagar

[2]Harjinder Kaur
Head of Department
E-mail:harrysaini988@gmail.com
Swami Sarvanad Institute of Engineering & Technology,Dinanagar

ABSTRACT

Today many distinct products exist along with the configuration. Technology is advancing as well, proposed system deals with recommender system based on KNN clustering techniques. KNN along with filtering mechanism is introduced as a base mechanism to predict most likely products to be promoted through the recommender system. Simulation results indicates that the C-KNN(Content based K nearest neighbour technique is better than individual approaches of KNN and content based filtering. The result is specified in the form of F-Score, execution time, specificity, sensitivity and classification accuracy. The mechanism employed in the proposed system shows the improvement in the result by 20 to 30% proving the worth of the study.

KEYWORDS

Configuration, Recommender system, KNN, C-KNN

1. INTRODUCTION

Recommender system is technological advancement which helps the users to take decision which is optimal or best one. The system being studied helps user to form decision about electronic products. For doing so KNN and content filtering is utilized. Collaboratively it is known as C-KNN. Prediction results produced through the C-KNN shows better result as compared to KNN and content filtering alone.

(1)(2)proposes a KNN technique for detecting heart disease and performing prediction accurately by simplifying parameters. The nearest neighbourhood algorithm is used to identify elements having similar attributes values. These attribute values are grouped together using grouping functions. Grouping function generates certain value which is compared against the threshold value to determine problems. Problems are reflected in the form of deviation. The process is described by considering two points 'A' and 'B'. Let distance(A,B) is the distance between points A and B then

a. distance(A,B)=0 and distance(A,B) >=0 iff A=B
b. distance(A,B)=distance(B,A)
c. distance(A,C)<=distance(A,C)+distance(C ,B)

Property 3 is also known as transitive dependency. Distance if close to zero then prediction is accurate otherwise error is recorded. Error calculating metric is applied to determine accuracy of the approach. Accuracy is given as

Accuracy=1-Error_rate

where Error_rate is given as

$$\text{Error\_rate}=\frac{|X-X_a|}{X_a}$$

KNN is used in many distinct environments such as classification, interpolation, problem solving, teaching and learning etc. Major limitation of KNN is that its performance depends upon value of k. Accuracy is low and further work is required to be done to improve accuracy.

(3,4)Content filtering is used to filter the contents presented to the recommender system. Content filtering is widely used to filter the electronic products. Electronic product considered for evaluation in this case include cameras Clustering is accomplished through KNN and groups are fetched using content filtering mechanism.

Proposed system utilized the model for prediction as

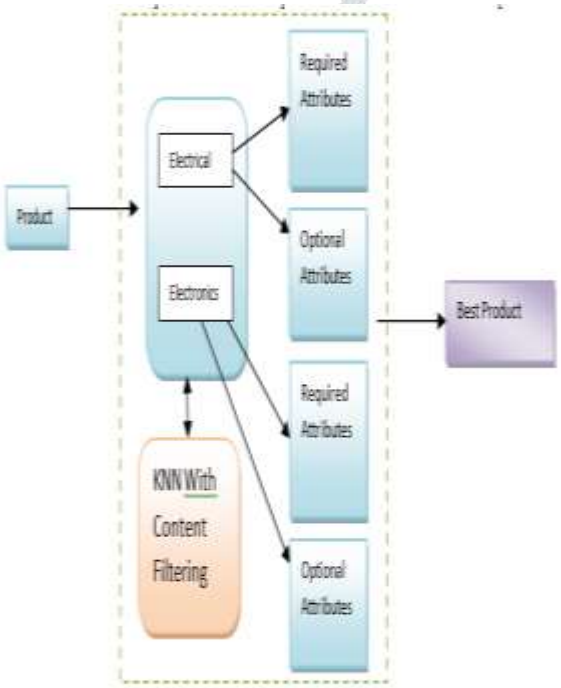

Figure 1:Proposed model for product promotion

Product promotion depends upon attributes and number of likes given by the user to the product. Highly rated or liked product is promoted as first place. The existing work is described in the next section.

2. BACKGROUND

Highest rated products are those that consumes relatively less energy. These products fall into the category of green products. The pollution is causing the environment to go from bad to worst. More and more people are aware of the critical condition related to the environment. In order to solve the problem Green Products are used. Green products have less impact in the corruption of the environment. Legions of work have been done toward this issue. One of the most commonly used mechanisms in order to solve the problem is recommender system. (5) Recommender system will be the one which takes into account the requirements of the user and produce the result accordingly. Web Based recommender system is one of the commonly used mechanism under this category. The recommendations can be transmitted to the mobile environment also. The preferences of the user will be stored within the database in this case. The products will be fetched and presented according to the preferences stored within the database. The storage space will be required which could be large in nature. (6) there exists large number of applications of the recommender system. The applications will be in the area of multi sites and multi domains. The recommender can be merged with the sites which are commonly used. Today impact of ecommerce websites is huge on the users. So the recommender will be merged along these sites to help user take the decision about the product they choose. The quality and quantity will be target of the above said paper. (7) the recommender system can have number of phases associated with it. The word to mouth communication will be discontinued when the recommender system comes into existence. The preferences of the user will serve as the constraints which must be satisfied in order for the product to come under the category of recommended. Hence fully automated system will be formed taking into consideration the user requirements. (8) the recommender system will utilize the mechanism of filtering in order to decide which products must be favored. Major work in concern to recommender system is formation of the algorithms which can be used for deciding whether the product should be recommended or not. The algorithms will utilize either content filtering or collaborative filtering. The recommender system which takes the views of the user is considered best one. Hence collaborative filtering is generally considered better as compared to content based filtering. However, this is not true always. In some situations content based filtering is required. The situations in which similar products are to be located then content based filtering will be used. (9) the mobile environment is the common area now days in which recommender is utilized. The most common are is the multimedia retrieval. The recommender under that situation will be used in order to provide the user with the multimedia according to the preferences set by the user. The K- Nearest Neighbor algorithm will be utilized in

order to determine the similar product. The contents which are retrieved is more than one. The contents will be ordered according to the degree of similarity. The highest matched content will be specified at first place and so forth. (10) the recommender system which is considered is dynamic in nature which means that the requirements which are specified within the recommender are continuously changing. The recommender can change the preference order. Some products may be at the top of the list earlier but after some of the reviews the recommender may change the order in which preferences are listed. In this case user reviews play very important role. If the user reviews are negative then the product will down the list and if the user reviews are positive then the product will move up the order. Green marketing has become an important method for organization to remain in profit and competitive in the market as the public and governments are more concerned about environmental issues. However, most online shopping environments do not consider greenness of the products in their recommender systems. The above said work aims to propose the use of recommender systems to enhance the green shopping process and to promote green products consumerism basing upon the benefits of recommender systems and a compliance technique called foot-in-the-door (FITD). In this study, the architecture of a recommender system for green consumer electronics is proposed. Customers' decision making process is modeled with an adaptive fuzzy inference system in which the input variables are the degrees of price, feature, and greenness and output variables are the estimated rating data. The architecture has three types of recommendation: information filtering, candidate expansion, and crowd recommendation. Ad hoc customization can be applied to tune the recommendation results. The findings are reported in two parts. The first part describes the potentials of using recommender systems in green marketing and the promotion of green consumerism; the second part describes the proposed recommender system architecture using green consumer electronics as the context. Discussion of the proposed architecture and comparison with other systems are also included in this part. The proposed architecture provides a capable platform for personalized green marketing by offering customers shopping advices tailored to their preferences and for the promotion of green consumerism. (11) the recommender system found its application in the area of ecommerce also. The ecommerce portals use the recommender in order to make the user know about the unknown products. The unknown products could be the one which could be most liked by the users. Environmental issues are common and more and more users are aware about these issues. So, most ecommerce sites have set their attention towards the promotion of the Green Products.(3) The recommender system will take the decision on the basis of constraints specified. The products satisfying maximum requirement will be promoted using the recommender system. Normally there does not exists the way to verify whether the product is satisfying the user requirements or not but with the help of recommender system this situation will never appears. In order for the requirements to be proper requirement specification document can be prepared. These requirements should be verified against the requirements specified by the user. Once satisfied, these requirements will be added within the Recommender so that comparison and promotion can be made.

3. PROPOSED SYSTEM

In today's environment the idea of establishing business without the use of internet is not possible. More and more users are shifted towards online systems. So companies are also converged toward the online business. Every company in their attempt to establish strong foots required some sort of mechanism which can promote their product. So recommender system comes into existence. (12,13)The recommender system is the filtering system which will detect the preferences of the users. By looking at the preference of the users companies can decide which product to be launched in the market and which is not. So recommender system is the need of the hour. Recommender systems are used for wide variety of applications which includes movies, music, news, life insurance etc.

Recommender using KNN and content filtering mechanism is proposed through this literature. The proposed model is listed as under

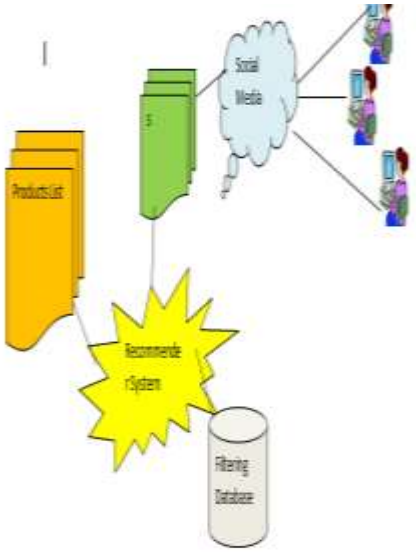

Figure 2:Recommender System for Camera Products

s listed as under

Algorithm Hybrid Model of Green Product Promotopn

- Take the input from the Dataset
  $Input_i$=Dataset
  Parameter="Likes"//Prediction on the basis of Likes from dataset
- Apply filtering mechanism to obtain filtered values in distinct classes
  $Class_i=Filter_{Condition}(Input_i)$
- Apply KNN to group nearest neighbors together
  In k-NN grouping, the yield is a class participation. A question is grouped by a larger part vote of its neighbors, with the protest being doled out to the class most normal among its k closest neighbors (k is a positive number, regularly little). On the off chance that k = 1, then the protest is essentially alloted to the class of that solitary closest neighbor.
  In k-NN relapse, the yield is the property estimation for the question. This esteem is the normal of the estimations of its k closest neighbors.
- Predict Group with most "Likes"

4. RESULTS AND PERFORMANCE ANALYSIS

Through the implication of C-KNN results are obtained in terms of prediction accuracy. Prediction accuracy is obtained to be high as

The algorithm for the proposed system i

compared to individual KNN or content filtering. The time consumption is one of the critical parameters indicating success of the proposed system. The proposed system execution time is significantly reduced. The time is estimated in the form of milli- seconds.

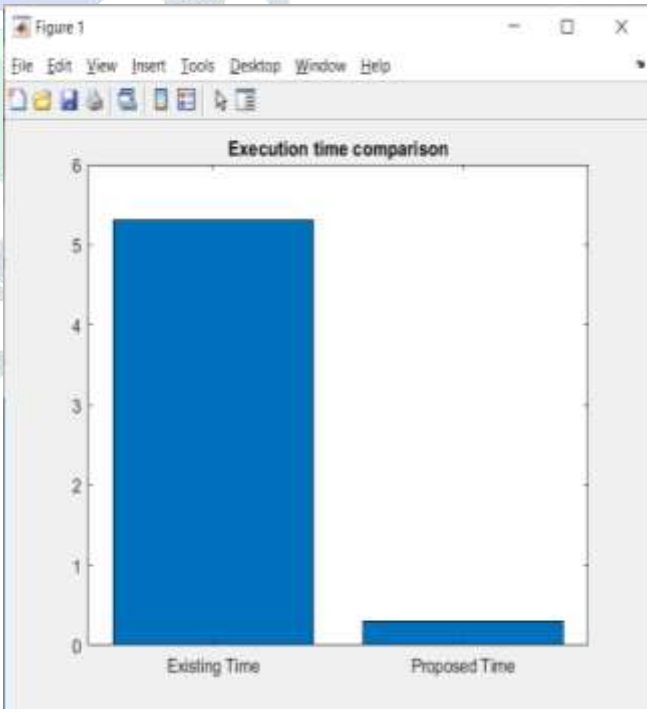

Figure 3: Execution time comparison

The classification accuracy indicates degree of correct predictions made through the proposed and existing system. Within the proposed mechanism clustering is merged along with collaborative and content filtering to enhance the result.

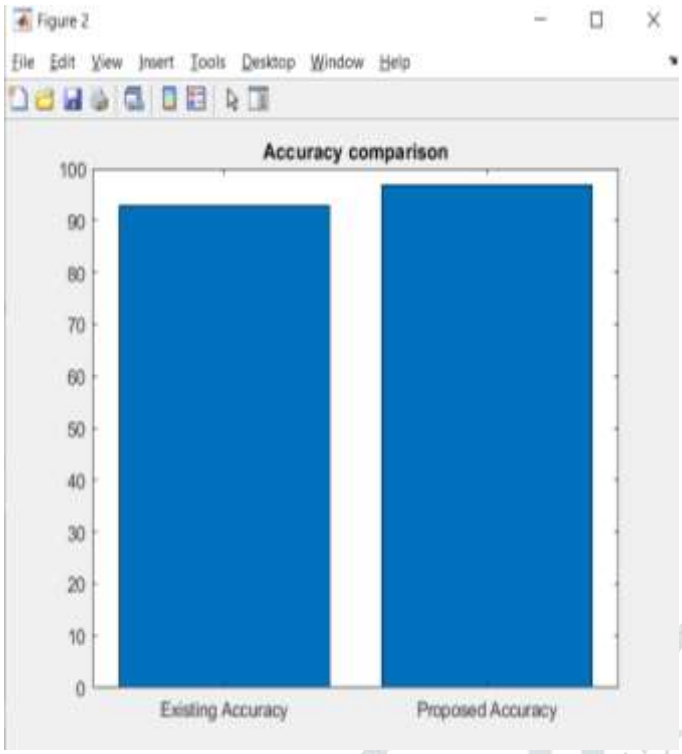

Figure 4: Classification Accuracy

The next comparison is in the form of specificity. This parameter indicates degree of true positive values predicted with the proposed system. The degree of true positive values must be high in case recommender system is working properly.

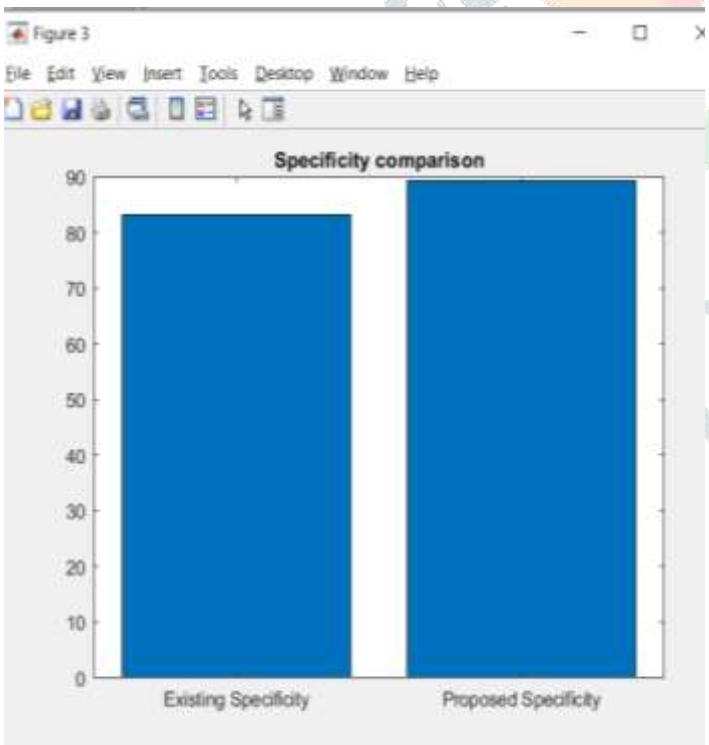

Figure 5: Specificity Comparison

Sensitivity indicating degree of true negative values. The true negative values indicates that our system does not predicted wrong values rather it predicts only corrective values. The correct green products having rating greater than 3 is used to predicted through the proposed approach.

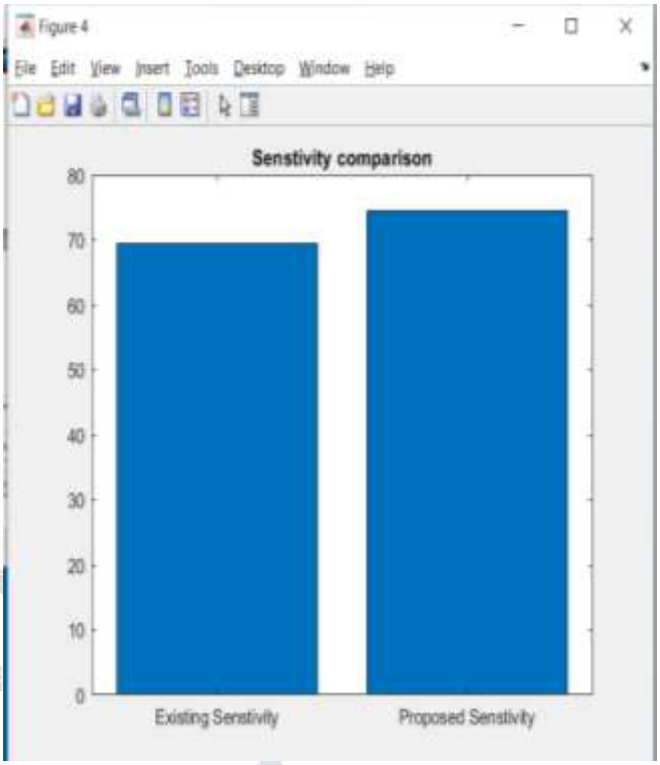

Figure 6: Sensitivity Comparison

F-Score is the final metric that is used in the proposed mechanism. In the proposed mechanism F-Score shows great improvement. This metric indicates that almost 30% improved results are shown through the proposed system.

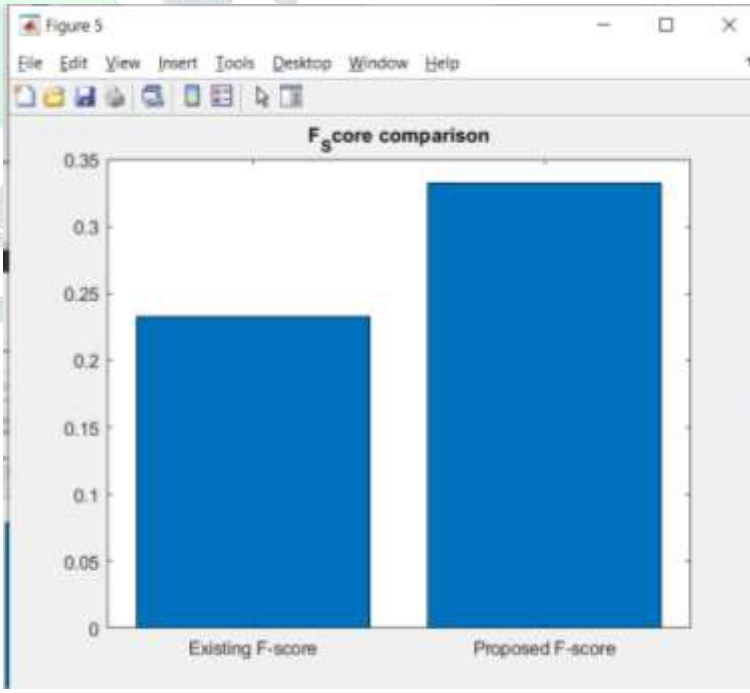

Figure 7: F-Score

Results indicates that the proposed system performs better as compared to existing system and hence prove worth of study.

5. CONCLUSION AND FUTURE WORK

Product promotion is critical as, companies seek profit. This promotion required falsifying information over the internet. In order to promote genuine product proposed system(C-KNN) is utilized. Rating and likes formed over the social media can be used for product promotion. The dataset derived from the internet is used to determine accuracy of the system being used.

The future work may include K means clustering along with Euclidean distance for determining products for promotion.

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