



COMPARING CONFIDENCE RATE OF NOVEL ITEM-ITEM COLLABORATIVE FILTERING ALGORITHM WITH APRIORI TECHNIQUE FOR BOOK RECOMMENDATION SYSTEM

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Abstract

Aim: Comparing confidence rate of Novel ITEM-ITEM collaborative filtering algorithm with Apriori Technique for efficient recommendation of top ranked books on different disciplines in computer science.

Materials and Methods: The Novel ITEM-ITEM (N=10) and Apriori Algorithm (N=10) these two algorithms are calculated by using 2 Groups and I have taken 20 samples for both algorithm and accuracy in this work.

Results: Based on the Results Accuracy obtained in terms of accuracy is identified by Novel ITEM-ITEM(94.1%)over Apriori algorithm (93%).Statistical significance difference between Novel ITEM-ITEM algorithm and Apriori Algorithm was found to be 0.04 ($p < 0.05$).

Conclusion: The Prediction of finding efficient recommendation of top ranked books on different disciplines in computer science Novel ITEM-ITEM when compared with Aprioris.

Keywords: Novel ITEM-ITEM, Apriori, Accuracy, Prediction, Book recommendation, machine learning.

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1. Introduction

The Internet, with countless pages around the world, has turned into the best wellspring of data that has at any point existed. In this specific situation, data recovery frameworks are fundamental devices to direct clients to the data they are looking for (Youngblood 2020). In particular, clients request customized search frameworks, not simply restricted to recovering the most important things, yet in addition more sufficient for their specific preferences or interests. This is the point of recommender frameworks (Brusilovski, Kobsa, and Nejdl 2007). They use data about clients, client profiles, to anticipate the utility or significance of a specific thing, subsequently giving customized proposals. Recommender frameworks have shown to be valuable in settings, for example, internet business, and they certainly have a promising future in numerous different areas, similar to Web web indexes, computerized TV program recommenders, and so on. As of not long ago, recommender frameworks have been utilized fundamentally in two errands. In the first place, they have been utilized to anticipate the utility of a given thing to the client (Brusilovski, Kobsa, and Nejdl 2007). In this assignment, regularly known as explanation in setting, the client first chooses the thing (or things) in which he is intrigued (Aggarwal 2016). This is generally done later playing out a hunt, perusing an internet based index, and so on. The recommender framework then, at that point, predicts the rating the client would provide for that thing. Second recommender frameworks have been utilized, to prescribe a rundown of things to the client (Catania et al. 2013). For this situation, regularly called the observe great things task, the framework picks the things that it considers the most applicable. All things considered, recommender frameworks can likewise be utilized for different errands, like track down generally great things, suggested succession, simply perusing or find solid recommender albeit these poor person yet pulled in much interest among specialists. The procedure of cooperative separating that suggests things in view of the assessments of different clients ("Multi-Objective Optimization Recommendation Algorithm Based on Collaborative Filtering and Item Similarity" 2019), is exceptionally well known, particularly in internet business, given its great outcomes. Lately, various calculations in view of various thoughts furthermore ideas have been created to resolve this issue. Tragically, works that look at these strategies are scant, making it challenging to choose the best calculation or calculations in a given circumstance.

In Last 5 years 2017-2021 the Google Scholar has published more than 196 papers and the IEEE published more than 200 papers about the efficient book recommendation of top ranked books on different disciplines in computer sciences (Liu et al. 2017). The analysis of Novel ITEM-ITEM Algorithm and Apriori Algorithm in high performance efficiency has been made using an experimental approach. My study opinion is the efficient book recommendation of top ranked books on different disciplines in computer science using a comprehensive of the efficient book recommendation of top ranked books on different disciplines in computer science prediction to Apriori (Sharma and Yadav 2020).

Our institution is keen on working on latest research trends and has extensive knowledge and research experience which resulted in quality publications (Rinesh et al. 2022; Sundararaman et al. 2022; Mohanavel et al. 2022; Ram et al. 2022; Dinesh Kumar et al. 2022; Vijayalakshmi et al. 2022; Sudhan et al. 2022; Kumar et al. 2022; Sathish et al. 2022; Mahesh et al. 2022; Yaashikaa et al. 2022). The Accuracy of existing research is not properly existing in the system. The existence of the experiment is totally and the improvement of accuracy of a proposed machine learning algorithm system compared the existing model by improving (Johnson 2018). To overcome these issues a Novel ITEM-ITEM algorithm is implemented to improve efficient book recommendation of top ranked books on different disciplines in computer science in a network by comparing the proposed one with an Apriori Algorithm (Burrows and Rollo 2020). Now by the Above two Machine learning Algorithms that we have taken their own Advantages and Disadvantages in the Current survey (Ratchev 2018). On applying Novel ITEM-ITEM Algorithm Memory to the Dataset followed by Performing Observations using Apriori and the results were plotted on a graph then there two techniques are compared based on the Result. Finally getting the best algorithm for predicting (Hirose et al. 2016).

2. Materials And Methods

The research work is carried out in the Machine Learning laboratory lab at Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai. The sample size has been calculated using the GPower software by comparing both of the controllers in Supervised learning. Two numbers of groups are selected for comparing the process and their result. In each group, 10 sets of samples and 20 samples in total are selected for this

work(Bearfield, Berman, and Dubnick 2020). The pre-test power value is calculated using GPower 3.1 software (g power setting parameters: statistical test difference between two independent means, $\alpha=0.05$, power=0.80, Two machine algorithms (Novel ITEM-ITEM and Apriori Algorithm) are implemented using Technical Analysis software(Wolfer 2021). In this work, no human and animal samples were used so no ethical approval is required.

Novel ITEM-ITEM Algorithm:

Novel ITEM-ITEM collaborative filtering, or thing based, or thing-to-thing, is a type of cooperative sifting for recommender frameworks in light of the closeness between things determined utilizing individuals' appraisals of those things. Thing cooperative separating was designed and utilized by Amazon.com in 1998.

Pseudocode Novel ITEM-ITEM:

Input: $R = \{R_{u,i} \mid u \in U, i \in I\}$ – set of previous ratings

Output: $C_{u,i}$ – confidence estimate for active user u and active item i

$C_{u,i} = \frac{1}{|v|} \sum_{v \in I} \{U_{Tr} : i \in v\}$

Apriori Algorithm:

The Apriori algorithm is a machine learning association rule algorithm created by Agrawal and Srikand is the primary calculation to create all continuous thing sets and sure affiliation rules. From that point forward, the strategy was altered and renamed Apriori by. The calculation is a managed strong methodology for digging regular things set for Boolean affiliation rules. It takes weblog document S of t visited and least guest page portrayed as fragments of t as information. Apriori calculation creates all the greatest incessant things: $F_1, F_2, F_3 \dots F_k$ as yield. The calculation recognizes the reshaped dataset and is considered for making regular IP sets in the main pass. In the resulting passes regular IP sets perceived in the past pass are stretched out with one more IP to produce incessant thing sets. After k passes in the event that no incessant k -thing set is found the calculation is finished.

Pseudocode Apriori:

Input: S - Log Data, rare_visitor - Minimum visitor page Threshold

Output: F - Large Frequent item set

Begin Step 1: $k = 1$

Step 2: Find frequent visitor set F_k from C_k Scan database S and count each visitor set in C_k If the count $>$ rare_visitor then Add that visitor set to F_k

Step 3: Form C_{k+1} from F_k

For $k = 1, C_1 =$ all visitor sets of length-1

For $k > 1$, generate C_k from F_{k-1} as $C_k = k-2$ way join of F_{k-1} with itself;

If both $\{I_1, \dots, I_{k-2}, I_{k-1}\}$ and $\{I_1, \dots, I_{k-1}, I_k\}$ are in F_{k-1} then Add $\{I_1, \dots, I_{k-2}, I_{k-1}, I_k\}$ to C_k
Remove $\{I_1, \dots, I_{k-2}, I_{k-1}, I_k\}$ if does if it does not contain a large $(k-1)$ subset; Step 4: $k = k + 1$

Step 5: Repeat steps 2, 3 and 4 until C_k is empty
End

Statistical analysis

SPSS software is used for statistical analysis of novel approaches on efficient book recommendation of top ranked books on different disciplines in computer sciences using Novel ITEM-ITEM compared to Novel ITEM-ITEM z with improved accuracy.(Cooksey 2020) The independent variable is Novel ITEM-ITEM accuracy and the dependent variable is efficiency. The independent T test analyses are carried out to calculate the accuracy of the Novel ITEM-ITEM for both methods.

3. Results

Below Table shows the simulation result of the proposed Novel ITEM-ITEM machine learning algorithm and the existing system Apriori were run at different times in the google colab with a sample size of 10(Zhou 2021). From the table, it was observed that the mean accuracy of the Machine learning Algorithms like Novel ITEM-ITEM was 94.1% and the Apriori algorithm was 93.6%(Molnar 2020).

The Mean, Standard Deviation and Standard Error Mean were calculated by taking an independent variable T test among the study groups(Vispoel et al. 2022). The Novel ITEM-ITEM algorithm produces a significant difference than the Apriori algorithm with a value of 0.220 and effect size=1.612(Schneider and Junghaenel 2022).

Table 2 represents the Mean of Novel ITEM-ITEM algorithm which is better compared with the Apriori algorithm with a standard deviation of 0.71799 and 0.73395 respectively(Ramteke, Kumar, and Madhan 2022). From Apriori algorithm and Novel ITEM-ITEM algorithm in terms of mean and accuracy[10](Zheng 2022). The mean results, the Novel ITEM-ITEM(94.1%) gives better accuracy than the Apriori algorithm (93.6%).

Figure 1 gives the comparison chart of Apriori accuracy of the Novel ITEM-ITEM algorithm is better than Novel ITEM-ITEM(Zheng and Chen 2022). It is therefore, conclusive that randomforest performs better than Aprioris. The resultant plots are shown below in figure(Choudhury 2022). The figure has been placed at the end of the paper.

4. Discussion:

Novel ITEM-ITEM and Apriori algorithms are implemented and compared for efficient book recommendation of top ranked books on different disciplines in computer science Prediction to improve the accuracy by review prediction. From obtained results it is concluded that the Novel ITEM-ITEM algorithm provides better accuracy results compared to the Apriori algorithm.

In this work, we look at changed procedures of cooperative sifting, distinguishing their primary benefits and impediments. We center around both comments in setting and find great things assignments. The assessment was performed after the most well-known system and measurements found in the writing. In addition, two new measurements that work on the assessment of the precision of calculations in the undertaking of observing great things are proposed. A new cooperative separating calculation, in light of an original idea, inclinations or varieties of things and clients, is likewise introduced. Our analyses show that it is an awesome calculation, by and large, particularly under inadequate information conditions on account of an exactness comparable to the best strategies considered and much lower computational intricacy. In this way, it is an optimal possibility for online frameworks or for frameworks including numerous clients as well as things. The article is organized as follows. To begin with, the documentation utilized in this article is introduced. Segment 3 momentarily depicts the cutting edge, putting unique interest on the assessment of recommender frameworks. The calculations assessed and the measurements applied in this assessment are additionally introduced. In Section 4, the inclinations based calculation proposed in this work is clarified. Then, at that point, we present two new measurements, that action the calculation accuracy on applicable items. We have additionally featured the qualities of the philosophy and measurements utilized, guiding out the impediments of the disconnected assessment toward decide the nature of the proposals, or at least, their utility for the client. As a commitment to the assessment of cooperative sifting frameworks, we have proposed two new measurements, GPIM and GIM, that emphasize on estimating the nature of a suggestion list utilizing expectation exactness strategies. They work on the assessment utilizing disconnected datasets, and simultaneously, they distinguish unfortunate inclinations in the forecasts.

From the above discussion, only a few articles ensure that they provide better

performance than the proposed Novel ITEM-ITEM and Apriori algorithm for improving accuracy of efficient book recommendation of top ranked books on different disciplines in computer science prediction. So, we can infer that the proposed Novel ITEM-ITEM and Apriori algorithm can be used to improve the accuracy.

5. Conclusion

Improved method for finding efficient recommendation of top ranked Books on different disciplines in computer science through ripening using Novel ITEM-ITEM in comparison over Aprioris with improved accuracy. The work involves Novel ITEM-ITEM Prediction to be proved with better accuracy of 94.1% when compared to Apriori accuracy is 93.66%.

Declaration

Conflict of Interests

No conflict of interest in this manuscript.

Authors Contributions

Author PPK was involved in data collection, data analysis and manuscript writing. Author AR was involved in the conceptualization, data validation and critical review of manuscript.

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Tables And Figures

Table 1. Comparison of prediction Accuracy between Novel ITEM-ITEM and APRIORI. The Novel ITEM-ITEM obtained accuracy of 94.01% compared to APRIORI having 93.00%.

Sample (N)	ITEM-ITEM Accuracy in %	APRIORI Accuracy in %
1	94.01%	93.00%
2	93.12%	92.19%
3	92.83%	91.26%
4	91.02%	90.74%
5	90.63%	89.92%
6	89.73%	88.42%
7	88.37%	87.18%
8	87.91%	86.63%
9	86.14%	85.83%
10	85.58%	84.91%

Table 2. Mean value of the Novel ITEM-ITEM mean value is 89.9340 and apriori Algorithm mean value is 89.0080. The below table will show the Novel ITEM-ITEM attained standard deviation means(2.92026) and Standard error means(0.92347).

	Algorithm	N	Means	Std deviation	Std error means
Accuracy	ITEM-ITEM	10	89.9340	2.92026	0.92347
	APRIORI	10	89.0080	2.81267	0.88944

Table 3. Independent Samples Test. The Accuracy increases and the error rate decreases. The 2-tailed significance is less than 0.004

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	f	sig	t	df	Sig (2-tailed)	Mean Diff	Std Error Difference	95% confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	0.002	0.966	0.722	18	0.004	0.92600	1.28215	-1.76769	3.61969
Equal variances not assumed	-	-	0.722	17.977	0.004	0.92600	1.28215	-1.76796	3.61996

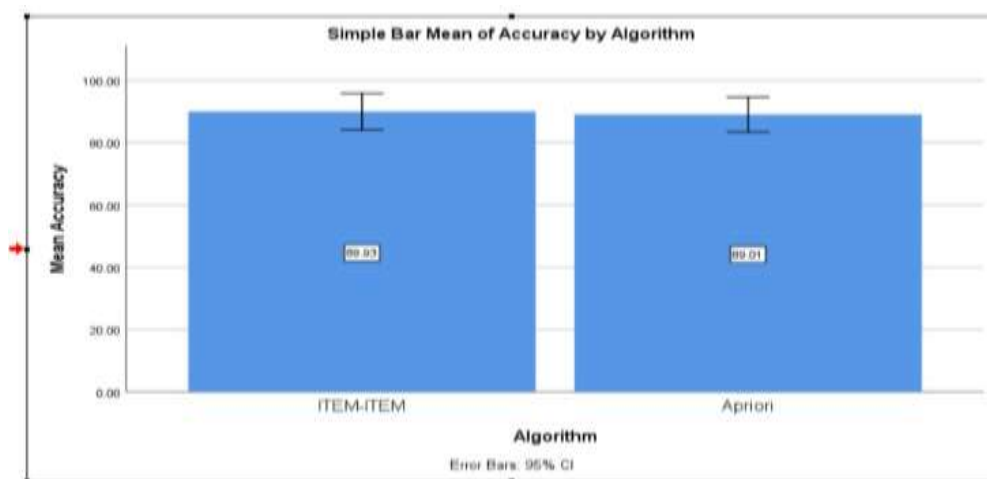


Fig 1. Bar Chart representing the comparison of Mean Accuracy of Novel ITEM-ITEM Algorithm and Apriori Algorithm. Mean accuracy of Novel ITEM-ITEM Algorithm is 89.9% appears to be better than Apriori Algorithm which is 89.0%. The X-axis represents Novel ITEM-ITEM Algorithm and Apriori Algorithm and Y-axis represents the mean accuracy \pm 1 SD.