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Research on Analysis of Students Using Mobile Phones in Ideological and Political Classrooms by Apriori Algorithm of Association Rules

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Abstract

The phenomenon of college students using mobile phones in class is very common. Few students can do not use mobile phones in class, and most students have great dependence on mobile phones. Although students will use mobile phones in class according to their needs, in most cases the number of students using mobile phones will increase with the increase of classroom teaching time. In this paper, the association rule mining algorithm Apriori algorithm is used to analyze the current situation of mobile phone use of full-time college students in ideological and political courses in Suzhou Vocational University. Then, the Apriori algorithm based on association rules analyzes the mobile phone usage and improvement of students in ideological and political courses: cluster analysis is introduced in the preprocessing stage, and finally the algorithm is applied to the learning guidance of students' ideological and political courses, and points out the use of mobile phones by students in class. The root cause and further in-depth research on the use of mobile phone discussions in ideological and political classes.

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Keywords: Association rules; apriori algorithm; using mobile phones; ideological and political courses

1. Introduction

Data mining is a new type of data analysis method, which extracts valuable information from the massive data in the information world for human use. The association rule mining in data mining technology is to automatically mine many related rules from a large number of real data by computer. In association rule mining technology, the

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most classic algorithm is the Apriori algorithm. For this algorithm, it uses the iterative method of layer-by-layer search to find out the relationship of itemsets in the database and form rules. The Apriori algorithm has been initially applied in business, finance and other fields, and achieved good results.

With the advancement of ideological and political courses in my country's higher education courses, how to ensure the effective learning of students in ideological and political courses, and how to effectively analyze and deal with students' use of mobile phones in ideological and political courses, so as to further optimize teaching resources and improve teaching quality, has become a new topic to be studied. It is an inevitable trend of the development of social informatization for management decision-makers in colleges and universities to understand and master the situation of students' use of mobile phones in ideological and political courses through modern informatization tools, and then make various decision-making arrangements. The realization of management decision support system (Decision Support System) is to solve how modern information tools can provide decision makers in colleges and universities with information about the rapid changes in the educational situation, development trends, development and utilization of historical data, and to extract hidden potential and in-depth data. Hierarchical, valuable information is the key issue [1].

2. Definition of association rules and basic ideas of algorithms

Association rules are an important subject proposed by Rabesh et al. of IBM Almaden in the United States in 1993. Association rules are in transaction data, relational data or other information carriers to find frequent patterns, association correlations or causal structures that exist between item sets or object sets, and determine which things will go together by analyzing the relationship between data or records. occur. The method of association analysis is used to discover the relationships of interest hidden in large data sets, and the discovered connections are expressed in the form of association rules or frequent sets.[5]

In 1993, Agrawal et al. first proposed the problem of mining association rules between itemsets in customer transaction databases. Since then, many researchers have done a lot of research on the problem of association rules mining. Their work includes optimizing the original algorithm, For example, the idea of random sampling and parallelism is introduced to improve the efficiency of algorithm mining rules; the application of association rules is promoted. The basic idea of its algorithm is:

(1) Generation of frequent itemsets. Find all frequent itemsets through the minimum support given by the user, that is, all itemsets whose support is not less than the minimum support. These frequent itemsets may have inclusion relationships. Generally, we only care about the so-called frequent large itemsets that are not contained by other frequent itemsets, and these frequent large itemsets are the basis for forming association rules.[6].

(2) Generate association rules. With the minimum confidence given by the user, the association rules with the confidence not less than the minimum confidence are found in each maximum frequent item set. The overall performance of mining association rules is determined by the generation of frequent itemsets, and it is relatively easy to generate association rules.

The algorithm initially scans the data set in a single pass to determine the support of each item. Once this step is completed, the set F1 of all frequent itemsets is obtained. Then, the algorithm will use the frequencies found in the previous iteration to generate new candidates. The generation of candidates is implemented using the Apriori-gen function. Next, in order to count the support for the candidates, the algorithm needs to scan the dataset again. Use the subset function to determine all candidate item sets contained in each transaction t. Finally, after calculating the support count of the candidate items, the algorithm will delete all candidate item sets with support less than minsup. Finally, when no new frequent itemsets are generated, the algorithm ends.

3. The application of association rules in the analysis of college students' use of mobile phones in ideological and political courses

3.1. Data status

Smartphones are the carrier of micro-media. In the "micro-era" where "machines never leave hands", this paper takes college students in Suzhou Vocational University as the research object to investigate the current situation of

using mobile phones in ideological and political courses. The current situation includes: ideological and political courses There are three aspects: mobile phone status settings, the duration of mobile phone use in ideological and political courses, and the purpose of mobile phone use in ideological and political courses. [7]

First, the mobile phone status setting of ideological and political courses. In ideological and political classes, only 3.39% of students choose to shut down, 60.02% of students choose to mute, and 15.66% of students choose to vibrate [8]. It can be seen that most students can follow the minimum classroom order in class, shut down or adjust their mobile phones to mute or vibrate. state, but also 20.94% of students do not follow classroom discipline, set to bell [9]. As shown in Fig. 1:

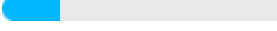
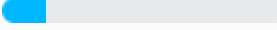

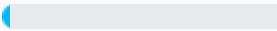
Options	total	Proportion
A、 bell	742	 20.94%
B、 shock	555	 15.66%
C、 mute	2127	 60.02%
D、 shutdown	120	 3.39%

Fig. 1. mobile phone status setting of ideological and political courses.

Second, the length of time spent using mobile phones in ideological and political courses. Among the students who did not turn off the phone, 44.45% of the students used mobile phones for no more than 15 minutes in the ideological and political class (90 minutes) [10], 26.78% of the students used mobile phones for 15 to 30 minutes, and 17.06% of the students used mobile phones. The time between 30 and 60 minutes is between 30 and 60 minutes, and 11.71% of the students use mobile phones for more than 1 hour in class. It can be seen that the phenomenon of "head bowing" in ideological and political courses is very common, and the time for students to bow their heads is also longer [11]. Third, the purpose of using mobile phones in ideological and political courses, which is shown in Fig. 2:


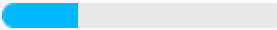
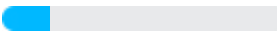
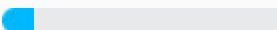
Options	Total	Proportion
A、 10minute	1522	 44.45%
B、 15minute	917	 26.78%
C、 30minute	584	 17.06%
D、 60minute	401	 11.71%

Fig. 2. length of time spent using mobile phones in ideological and political courses.

In order to further understand the purpose of using mobile phones for college students in the classroom, the research group refined the questions and set up multiple options for students to choose [12]. The survey results show that 81.98% of students use mobile phones to check information, and 25.32% to take pictures. There are also many students who swipe micro-videos and Moments in class, accounting for 21.23% and 14.28% respectively. There are also a small number of students who play online games and visit Taobao, accounting for 5.49% and 5.55% respectively. As shown in Fig. 3:

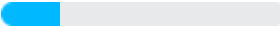
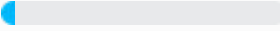
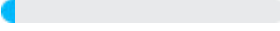
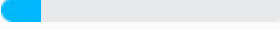
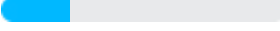

Options	Total	Proportion
A、micro-videos such as Douyin and Kuaishou	727	 21.23%
B、online games	188	 5.49%
C、Taobao	190	 5.55%
D、Circle of friends	489	 14.28%
E、Photograph	867	 25.32%
F、research	2807	 81.98%

Fig. 3. purpose of using mobile phones in ideological and political courses.

3.2. Data analysis

In this case, the most standard and effective way to deal with it is to conduct a simple correlation analysis, so as to this seemingly regular relationship is eliminated, where the correlation is measured by the following formula:

$$\text{Corr A , B} = P(A \cup B) / (P(A) * P(B)) = P(B|A) / P(B)$$

The result can be easily calculated from the above formula, for the correlation coefficient between event A and event B, When it is less than 1, it is called negative correlation. When the final rule is formed, the negatively related rules should be deleted.

Association rules are used to analyze the use of mobile phones in ideological and political courses for college students. Different groups of students put forward reasons, and each student responds to the reasons. The types of responses can be divided into four ways: propose, support, oppose, and inquire. For example, student E1 proposed that "the teaching content is boring and new methods such as micro-media cannot be used" (claim 1). Student E2 responds to proposition 1, supporting "the teaching content is boring, and new methods such as micro-media cannot be used" and "thinking". Political classroom management is lax" (Claim 2), or students E3 support "the teaching content is boring and new methods such as micro-media are not used" and oppose "lax ideological and political classroom management" (Claim 4), students E4 support uncontrollable, mobile phone dependence (Claim 3)) at the same time in favor of "not interested in ideological and political courses". It can be seen from the above that we can put claim 1 and claim 2 together, and claim 3 and claim 4 together, and perform similarity clustering to study the relationship between related claims. Among them, the claims made by students are called items, and the students' responses to each claim are called transactions.

The application of Apriori algorithm in analyzing the current situation of mobile phone use is as follows:

Input: ①Database D;

②The minimum support threshold min_sup.

Output: frequent itemsets L in D.

process: STEP1: $L_1 = \{\text{large 1-itemsets}\}$ //get frequent 1 itemsets

STEP2:

for($k = 2$; $L_{k-1} \neq \Phi$; $k++$)

{

$C_k = \text{apriori-gen}(L_{k-1})$; //Connect the frequent itemset k-1 to get the candidate itemset k

for all transaction $t \in D$

{

```

C t = subset(C k ,t) // Traverse the transaction database set to see if C k is in transaction t
for all candidates c ∈ C t
{
c.count++; // count C k after traversal and included in a transaction t
}
}
L k = { c ∈ C t | c.count ≥ min_sup }

```

3.3. Analysis results

In the analysis of the use of mobile phones in the ideological and political courses of college students, the correlation model can reveal the connection between the propositions supported by the students.

(1) Teaching content is boring and new methods such as micro-media are not used.

Mobile phone media has the characteristics of grassroots, interactivity, and immediacy. The thinking, learning styles and living habits of "post-00s" college students are deeply influenced by micro-media. They are all ahead of teachers, so they put forward higher requirements for ideological and political courses, need fresher materials to be integrated into the classroom, and are eager to communicate with ideological and political teachers on an equal footing. "One mouth, one pen, one blackboard for half a day, and one PPT for several years"[1] is a true portrayal of traditional ideological and political courses. The case is outdated, which is incompatible with the diversified, personalized and precise needs of college students in the "micro era", and the teaching content and teaching methods are out of touch with the times, causing many students to feel that ideological and political courses are boring.

(2) Ideological and political classroom management is lax

Ideological and political courses in higher vocational colleges generally consist of 2 to 3 co-classes, and do not follow the small-class teaching model in primary and secondary schools, which puts forward higher requirements for the management of ideological and political teachers. College students also advocate freedom and individuality, so students with poor self-discipline are difficult to manage.

(3) Uncontrollable, mobile phone dependence

College students' "screen swiping addiction" is on the rise. We media on mobile phones, online games, etc. have generally introduced intelligent algorithm mechanisms to cater to their interests. Many college students are trapped in the Internet and cannot extricate themselves. Some scholars have compared micro-media to "spiritual opium", and pointedly pointed out: "If you want to destroy a young person's future, let him download Douyin. This is an algorithm that eats time with empty content." Therefore, Online entertainment for the purpose of pursuing economic interests has a strong nature of 'fooling the people', which can easily lead to 'alienation' of students' online thinking and online behavior."

(4) Not interested in ideological and political courses

There are two main reasons why students are not interested. On the one hand, ideological and political courses are highly theoretical, and the content of the textbook is abstract, not readable, not practical, and lacks deep integration with reality; on the other hand, most of the content of the textbook has been learned in high school, and some teachers teach the way And the teaching content overlaps with the high school period and lacks new ideas.

4. Conclusion

This paper uses the association rule method in data mining technology, uses the Apriori algorithm to discretize the data, calculates the support and credibility, and is beneficial to the decision-making information hidden in the analysis of mobile phone information used by college students in ideological and political courses. knowledge mining. This paper makes an intentional attempt to excavate the use of mobile phone analysis in ideological and political courses of college students, and has achieved certain results.

References

- [1] Zuo Diansheng. Research on Internet Ideological and Political Education for College Students [M]. Beijing: People's Publishing House, 2019: 67, 245.
- [2] Gao Pan. Dilemma and way out: A review of the deep integration of information technology and ideological and political theory courses in colleges and universities [J]. Journal of Higher Education, 2021 (02): 58-62.
- [3] Zhan Zhihua, Dong Hao. Review of Mobile Media Management Strategies in Ideological and Political Classrooms in Colleges and Universities [J]. Education Review, 2015(11): 90-94.
- [4] Noguera P A, Alicea J A. Structural racism and the urban geography of education[J]. Phi Delta Kappan, vol. 102, no. 3, pp. 51-56, 2020.
- [5] Fang, Y., Zhu, X., Wang, N., Zhang, X., Yang, D., Nie, J., & Ma, G. (2019). Biodegradable core-shell electrospun nanofibers based on PLA and γ -PGA for wound healing. European Polymer Journal, 116, 30-37.
- [6] Zhu, M., Lan, J., Zhang, X., Sui, G., & Yang, X. (2017). Porous carbon derived from Ailanthus altissima with unique honeycomb-like microstructure for high-performance supercapacitors. New Journal of Chemistry, 41(11), 4281-4285.
- [7] Gao, L., Zhang, Q., Zhu, M., Zhang, X., Sui, G., & Yang, X. (2016). Polyhedral oligomeric silsesquioxane modified carbon nanotube hybrid.
- [8] Zhang Peng. The current situation of college students' use of smartphones in the new media era and the exploration of ideological and political education methods [J]. China Youth, 2015(19):1.
- [9] Wan Shan, Wang Xiaowen, Li Chaoyang. Research on the influence of college students' widespread use of smartphones on ideological and political theory courses [J]. Youth and Society, 2015(5):2.
- [10] Zhang Xiuping. Investigation and Analysis of the Current Situation of College Students' Mobile Phone Use in Classroom [J]. China Adult Education, 2016(21):4.
- [11] Chen Baihe, Lv Xinxin. Relying on "course ideology and politics" to optimize the quality of college students' career guidance courses [J]. 2020.
- [12] Wei Liang. Investigation and Countermeasure Analysis of the Use of Mobile Phones in the Classroom of College Students: Taking Jiangsu University as an Example [J]. Youth and Society, 2015(5):3.