

The Correlation Between Intensity and Objectives of Using The Internet Towards Students Learning Achievement Using Apriori Algorithm

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Abstract. Internet is a basic need for everyone, including students. The internet can be used as a means to improve a student's learning achievement or vice versa, if the use of the internet is excessive. So that 3 categories were taken, including intensity, purpose of internet use and student GPA. This study aims to see the correlation between the intensity and purpose of internet use and student learning achievement which is implemented in a web-based system. The method used in this research is apriori method, which is a method for finding patterns or correlations between items. Data taken with a total of 100 data. The results of this study resulted in a combination of the goal item set, intensity and GPA along with the association rules. The highest item obtained was social media with a value of 64 and for the correlations of the correlation between intensity, goal and student GPA, the 3 highest association rules were obtained as follows: 'Online Game, Rare Intensity → Low GPA' with a confidence value 100, 'Very Frequent Intensity, Search Engine →GPA Medium' with a confidence value 85.71 and 'social media, Frequent Intensity→High GPA' with a confidence value 41.38.

Keywords: Apriori, Association Rule, Data Mining, Internet, Students

1 Introduction

Per the most recent review led by the Relationship of Indonesia Internet service provider Association (APJII), web access clients in Indonesia in 2018 contacted 171.17 million individuals out of an all-out populace of 264.16 million individuals in Indonesia. Overviews in light old enough expressed that the broadest web clients were matured 15-19 years. The overview in light of occupations that utilize the web the most are business people and online merchants, trailed by understudies with a level of 92.1% [1]. From this information, when seen from age, most web clients are at understudy ages, one of which is undergrads.

Understudies are a gathering that supposedly is more powerless against reliance on the web than other local gatherings. Since understudies are in the period of arising adulthood, to be specific the change period from late immaturity to youthful adulthood and are encountering mental elements. So the utilization of the web turns out to be a higher priority than what others do as a rule because internet-based exercises can grow their informal community [2].

Unnecessary utilization of the web is likewise extremely compelling for the learning accomplishment of an understudy. One of the terrible impacts of over-the-top web use among understudies is a decline in

understudy inspiration and learning accomplishment which affects understudy GPA because a ton of significant investment utilized will be spent utilizing the web.

The Apriori Algorithm technique is a strategy utilized so PCs can learn affiliation rules, searching for examples of connections between at least one thing in a data set.

The exploration directed by [3] Execution of the Apriori Algorithm in Determining the Study Programs Taken by Students. This study plans to decide the grouping of the review program that will be taken by understudies with the Data Mining strategy utilizing the Apriori Algorithm technique. By utilizing the Apriori Algorithm, the outcome is a standard which is an assortment of continuous thing sets with high certainty esteem.

In light of the portrayal over, exploration will be directed with the title "The Relationship Between Intensity and Purpose of Internet Use Against Student Learning Achievement Using Apriori Algorithm".

2 Literature Review

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2.1 Internet

The web is an open worldwide correspondence organization and interfaces millions and even billions of PC organizations of different endless types, utilizing correspondence types like phone, satellite, etc [4].

2.2 Apriori algorithm

The Apriori algorithm uses the knowledge of attribute frequencies that have been known previously to process further information. The apriori algorithm determines the possible candidates by paying attention to the minimum support and minimum confidence. Support is the value of support or the percentage of a combination of an item in the database [5].

The formula for the support of an item is obtained by the following formula:

$$Support(A) = \frac{Number\ of\ Transactions\ Containing\ Support\ A}{Total\ Transaction} \quad (1)$$

The support formula for 2 items is obtained with the following formula:

$$Support(A) = \frac{Number\ of\ Transactions\ Containing\ Support\ A\ and\ B}{Total\ Transaction} \quad (2)$$

While confidence is the value of certainty, namely the strength of the relationship between items in an apriori. Confidence can be searched after the frequency pattern of the appearance of an item is found [6].

The formula for calculating confidence is as follows:

$$Confidence\ P(A|B) = \frac{Number\ of\ Transactions\ Using\ Support\ A\ and\ B}{Number\ of\ Transactions\ Containing\ A} \quad (3)$$

The lift ratio test value is a supporting value to see the strength of an association rule with the condition that if the lift ratio value is more than 1 (lift ratio value > 1), it will produce a positive correlation, and the higher the lift ratio value, the stronger the association rule formed. The formula for calculating the lift ratio is as follows:

$$Lift\ Ratio = \frac{Support(A \cup B)}{Support\ A \times Support\ B} \quad (2)$$

3 Result

3.1 Data Needs

Data collection was carried out on Unkhair Informatics Engineering Students with data taken, namely the intensity and purpose of internet use (on mobile devices) and student GPA using questionnaires (Google Forms). The data taken are 100 data for research. Meanwhile, for the data sample, only 5 data were taken. The following are the categories in this study: [1]

1. Categories of Internet Use Purposes include Social Media, Online Games, Online Videos, Search Engines, Education Applications, and E-Commerce Applications.

2. Internet Usage Intensity Category
 - The intensity in a day < 4 Hours with Rare Category
 - The intensity in a day is 4 Hours - 8 Hours with Frequent Category
 - The intensity in a day > 8 Hours with a Very Frequent Category
3. Student GPA Category (In Academic Rules)
 - GPA 0.00-2.50 with Low GPA category
 - GPA 2.51-3.50 with Medium GPA category
 - GPA 3.51-4.00 with High GPA category

Data Sample. For the data sample, only 5 data were taken for later calculations using the apriori algorithm.

Table 1. Data Before Categorized.

Purpose	Intensity	GPA
Social media	9-12 hour	3.50
Game Online	>12 hour	2.50
Social media	5-8 hour	3.64
Game Online	9-12 hour	2.47
Online Videos	2-4 hour	3.84

After that, the data obtained is then described as follows:

1. Social Media, Very Often, Medium GPA
2. Online Games, Very Often, Low GPA
3. Social Media, Frequent, High GPA
4. Online Games, Very Often, Low GPA
5. Online Videos, Rare, High GPA

Determining the Minimum Support and Minimum Confidence Value. The amount of data as much as 5 with the minimum support value will be given a value of 2 with the relative support value calculated from the minimum support/number of data = 2/5 = 0.4 and the minimum confidence value of 60.

Item set Candidate Formation. Formation of candidate item set, Candidate k-item set is formed from the combination (k-1) item set obtained from the previous iteration. The formation of the item set starts from item set 1 using the data in Table 5, so that it is obtained for item set 1 as shown in table 2.

Table 2. Results of Item set 1.

Item	Amount	Support
Social media	2	0.4
Game Online	2	0.4
Online Videos	1	0.2
Very often	3	0.6
often	1	0.2
Rarely	1	0.2
High GPA	2	0.4
Medium GPA	1	0.2
Low GPA	2	0.4

After data item set 1 has been described, the data that meets the minimum support requirements will be selected. If the previously determined minimum support

is 2 or the support value is 0.4, then data with a value below the minimum support of 0.4 will be removed, so that the results are as shown in table 3:

Table 3. Results of Item set 1 that passed

Item	Jumlah	Support
Social media	2	0.4
Game Online	2	0.4
Very often	3	0.6
High GPA	2	0.4
Low GPA	2	0.4

4 Research Result Data

4.1 System Implementation

In the apriori algorithm system to see the relationship between the intensity and purpose of internet use on student learning achievement, there are several pages or menus including the login page, home page, category, student data, data input, data update, apriori process, rule results and logout. The following will display one of the page views, namely the student data page display.

No	Tanggal Pengisian	Nama	Angkutan	IPK	Intensi	Tujuan	Klasifikasi Data	Aksi
1	2020-03-10	Sania Dita Susana	2186	3.86	4.0 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus
2	2020-03-10	Nurhalimah	2186	3.50	4.0 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus
3	2020-03-10	Muhammad Al Gendil	2186	3.84	4.0 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus
4	2020-03-10	NurFitria Citra	2186	3.7	4.0 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus
5	2020-03-10	Satrio Alga	2186	3.5	4.8 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus
6	2020-03-10	Aliwandi Almg	2186	3.22	4.0 jam	Media Sosial	Media Sosial Interaksi Sering Pk 7-10ppj	Detail Hapus

Fig. 1. Student Data Page Display

4.2 Apriori Algorithm Testing with Minimum Value Variations

Tests were carried out with varying minimum support and confidence values, namely from minimum support of 6,10,15, and 20 and minimum confidence of 60,70, and 80.

From the calculation results with a minimum support value of 6,10,15, the highest Item set value is obtained as follows:

Item set 1: Social Media (64)

Item set 2: Social Media, Medium GPA (40)

Item set 3:

1. Social Media, Frequent Intensity, Medium GPA (17)
2. Social Media, Very Frequent Intensity, Medium GPA (17)

Meanwhile, for the highest rule results from the minimum support value of 6.10.15 and minimum confidence of 60.70, the highest association rule is obtained, as follows:

1. Min. Support 6 & Min. Confidence 60, 70, 80:

Intensity Very Frequent, Search Engine → Medium GPA: 85, 71

2. Min. Support 10 & Min. Confidence 60, 70: Search Engine → Medium GPA: 75.00

3. Min. Support 15 & Min. Confidence 60,70: Frequent Intensity, Medium GPA → Social Media : 73.91

4.3 Correlation of Internet Use and Student Achievement

To see the correlation or relationship between internet use and student GPA, it can be seen in the association rules in terms of the Student GPA category.

Here are the 3 highest association rules for Low GPA, Medium GPA and High GPA as follows:

1. Game Online, Infrequent Intensity → Low GPA
Confidence: 100 (Not Passed on Min Support above 2)
2. Intensity Very Often, Search Engine → Medium GPA
Confidence: 85,71 (Not Passed on Min Support above 6)
3. Social Media, Frequent Intensity → High GPA
Confidence: 41,38 (Not Qualified at Minimum Confidence above 41 and Minimum Support above 12)

If discussed, the three association rules are as follows:

1. If students use the internet to access Online Games with Infrequent Intensity, these students tend to have low GPAs.
2. If a student uses the internet with a Very Frequent Intensity to access Search Engines, the student has a Medium GPA.
3. If a student uses the internet to access Social Media with frequent intensity, then the student has a high GPA.

5 Conclusion

The correlation between internet use and student learning achievement is obtained by analyzing the highest association rules, among others, if students use the internet to access Online Games with Rare Intensity, the student tends to have a low GPA. If a student uses the internet with a Very Frequent Intensity to access Search Engines, then the student has a Medium GPA. If students use the internet to access social media with Frequent Intensity, then the student has a high GPA.

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