



Decision Support System to Determine the Level of Addiction to Mobile Legends Online Games Using the Naïve Bayes Method

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ABSTRACT

Addiction is liking and possessing something so much that you forget about other things. Gaming addiction is a type of addiction caused by internet technology. Game addiction itself is caused by several factors including Dominion, Timeless, Mood Swing, Healtium, Insocial and, Maladiprive Daydreaming. The purpose of this study is to accurately calculate and classify the level of online game addiction of FST UINSU students. The type of method used is a systematic quantitative analysis method of Naïve Bayes Algorithm. After completing the calculation procedure, the search results show that the value obtained is very high at 91.67%. Healtium and Dominum factors are the highest causes of addiction because obviously these two factors have very high weight values.

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1. INTRODUCTION

The rapid development of information and communication technology, especially in the gaming industry, has greatly increased the popularity of online games. The emergence and increasing popularity of online games among players, especially students, has brought new risks, one of which is addiction to playing games. Addiction to games can have a very negative impact on physical and mental health [1].

There are many effects of addiction including decreased academic performance, sleep disturbances, increased anxiety, uncontrolled emotions and social isolation are associated with gaming addiction[2][3]. Several studies have reported that online gaming addiction also causes physical problems including obesity, dry skin and decreased eye function.

The classification of the level of online game addiction needs to be applied as a benchmark to the faculty so that it is able to take policies against addiction to online games, especially at the UINSU Faculty of Science and Technology.

There are also several previous studies that have conducted research, including those with the title "Position Increase Decision Support System Using the Naïve Bayes Classifier Algorithm Method" has been done using the Naive Bayes Clasifier method on the classification of job increases can draw conclusions after testing on RapidMiner, the level of accuracy produced using the naive bayes clasifier method is 91.67%, which shows a good model [4].

The Decision Support System itself is a system that is able to solve problems or the ability to communicate semi-structured problems. This system is able to solve problems that occur in determining the ranking quickly and is able to know the range from the highest value to the lowest value in a selection process. The system is a

computer software-based system and can solve management problems to produce a good alternative to support the decision of the problem maker [5].

Naive Bayes algorithm is a method of dividing problems into classes based on similarities and differences that uses a statistic that can predict the probability of the class. Naive Bayes calcification is also a classification with simple probabilities based on the application of Bayes' theorem by assuming that the variables are independent of each other [6][7].

2. RESEARCH METHODE

This research uses quantitative methodology which is a structured method and is an analytical technique that uses quantitative data as a measuring tool [8].

Research methods are usually carried out using quantitative methods through experiments used to determine the effect of independent variables and variables under controlled conditions. The work process carried out in this study goes through several stages, namely:

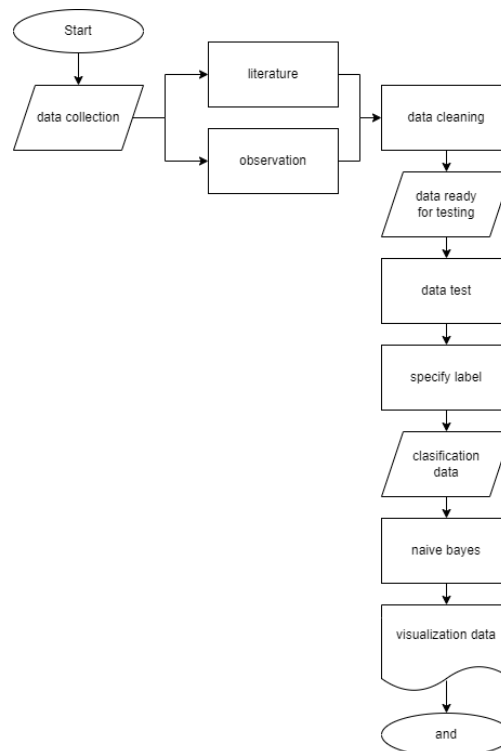


Figure 1. Flowchart

- Collection of data is done by questionnaire technique by distributing a set of questions to students of the Faculty of Science and Technology UINSU.
- Data Cleaning is done by cleaning the data by separating the research data from damaged or empty data, errors and incomplete data.
- Determine the label is done by determining the label on the data to be processed with the naive bayes algorithm.
- Data visualization is used to display the results of data obtained by classification and to determine the class level of online game addiction that occurs to UINSU science and technology students.
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Table 1. Addiction data

No	Name	NIM	Generation	Level Addiction
1	Kardandi Alfarizi Siregar	0701222089	2021	Low
2	Fathul Hadi Raya	0701222032	2022	High
3	Muhammad Rizky Akbar	0701222033	2022	Low
...
322	Asrul	0701202089	2020	Low

3. RESULT AND ANALYSIS

3.1 Classification of Mobile Legends Game Addiction Level with Naïve Bayes

Based on the KBBI, classification is also a systematic arrangement in a group or a group according to the rules or standards of determination.

Classifying the level of addiction to mobile legends online games can be classified as follows:

Table 2. Interval

Level	Frequency	Probability
Low	298	0,93%
High	24	0,07%
Total	322	1

The classification of the level of online game addiction is classified into 6 criteria that affect the level of online game addiction, namely:

Cause	Parameter	Criteria	Score
Dominion	Active play	low	high 3 6
	Disrupts activities	low	high 3 6
	Prioritizing the game	low	high 3 6
Timeless	Play time	low	high 3 6
	Leisure time usage	low	high 3 6
	The limitation	low	high 3 6
Mood Swing	Mood playing	low	high 3 6
	When there is defeat	low	high 3 6
	Effects mood	low	high 3 6
Healtium	Reduced sleep	low	high 3 6
	Health problems	low	high 3 6
	Physical state after playing	low	high 3 6
Insosial	Insocial	low	high 3 6
	Cancellation of activities	low	high 3 6
	Difficulty interacting	low	high 3 6
Maladiprive Daydreaming	Impaired socialization	low	high 3 6
	Delusion and action	low	high 1 6
	Thinking about the game	low	high 3 6
	Difficult to focus	low	high 3 6

Figure 2. cause and parameter

The next stage is the stage after calculating parameters and classifying the level of addiction to mobile legends online games by determining the classification of data using the naive bayes methodology. The first is by determining the probability of each of these data.

The following table is a probability table by determining several matches for the class specified in each class, namely "High" and "Low".

Table 3. Frequency

No	Interval	Class Scoring
1	Low	<80
2	High	≥ 80

The following is a table of probability calculation results for each class on the causes of addiction to mobile legends online games.

addiction-causing classes	Frequency		Probability	
	low	high	low	high
Dominion	308	14	0,07 %	0,1 %
Time less	276	46	0,06 %	0,3 %
Mood swing	273	49	0,06 %	0,2 %
Healtium	271	51	0,06 %	0,2 %
Insosial	300	22	0,06 %	0,1 %
Maladiprive daydreaming	301	21	0,06 %	0,1 %
Total	4429	203	1	1

Figure 3. addiction-causing

After that, the calculation is also carried out to determine the class that has a probability, the next step is to calculate the probability of the data by multiplying the probability of each class. The following step uses the calculation process using the predetermined formula.

An example for calculating the probability of each data is:

$$\begin{aligned} \text{Probability } X|\text{high} &= P. \text{ clause class} * P. \text{ prior} \\ &= 0,2 * 0,07 \\ &= 0,14 \end{aligned}$$

$$\begin{aligned} \text{Probability } X|\text{low} &= P. \text{ clause class} * P. \text{ prior} \\ &= 0,06 * 0,93 \\ &= 0,055 \end{aligned}$$

The data that is carried out the calculation process is directly classified based on the addiction level class and the addiction cause class. As in the example data that has been calculated, there are "high" and "low" classes.

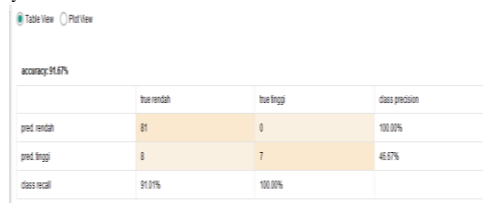
$$P X|\text{high} = 0,14$$

$$P X|\text{low} = 0,055$$

The first data after performing the calculation process can be immediately categorized as a "low" class that the level of addiction is at a low level.

3.2 Accuracy Value Using Naive Bayes Algorithm

The results of testing using the naive bayes algorithm are carried out on the data set, namely the results of the evaluation with an accuracy value of 91.67%.



	true rendah	true tinggi	class precision
pred rendah	81	0	100.00%
pred tinggi	0	7	45.57%
class recall	91.01%	100.00%	

Figure 4. accuracy

3.3 Naive Bayes

Naive Bayes algorithm is a system that can divide problems into classes based on identifying similarities and differences using statistics that can also predict the behavior of each class. Naive Bayes classification is also a classification model that can simplify based on the application of Bayes' theorem in assuming a clear hypothesis between independent and dependent variables [9].

The results of the naive bayes algorithm visualization also show that the range of game addiction in the low addiction level starts from a value of 54 - 78 with the highest position at a value of 0.06, while the range of game addiction in the high level starts from a value of 81 - 93 with the highest position at a value of 0.10.

3.4 Data Visualization

Data visualization is a way of implementing information by turning it into graphical images, charts, or other images. Data visualization can be interpreted as a way to convey the information contained in the data so that others can better understand it into something visual [8].

The following is a diagram of the visualization results of the data on the probability of game addiction and the probability of the cause of addiction. As in the picture as follows.

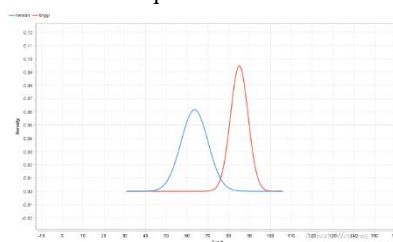


Figure 5. data visualization

The figure above shows that the level of addiction with a low level amounted to 298 students while the addiction with a high level amounted to 24 students in the research time span, namely in November 2023. The results of the diagram visualization are influenced by six factors that cause game addiction, namely Dominion, Timeless, Mood swing, Healtium, Insocial, and Maladiptive daydreaming. It can be concluded from the diagram above that the level of addiction to mobile legends online games on students is low.

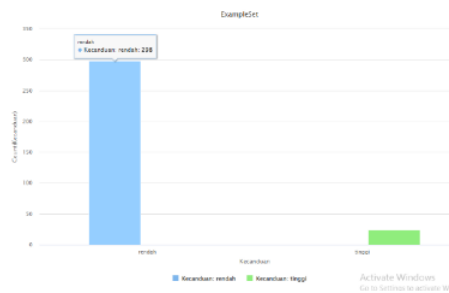


Figure 6. addict level

The diagram above shows the causes of addiction, namely Dominion with a low addiction level of 181 students and a high addiction level of 141 students, Timeless with a low addiction level of 297 students and a high addiction level of 25 students, Mood Swing with a low addiction level of 264 students and a high addiction level of 58 students, Healtium with a low addiction level of 95 students and a high addiction level of 227 students, Insocial with a low addiction level of 304 students and a high addiction level of 18 students, Maladriptiv Daydreaming with a low addiction level of 280 students and a high addiction level of 42 students.

Then for a total diagram of the level of addiction to mobile legends online games can be seen in the following diagram:

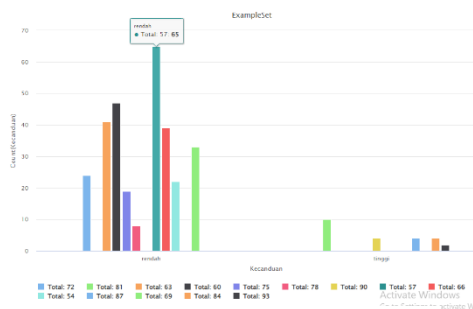


Figure 7. total addiction level

The diagram above shows the total level of addiction to online games that occurs in students of the Faculty of Science and Technology UINSU.

Based on the calculations that have been made, overall, students of the Faculty of Science and Technology UINSU have the potential to get addicted to online games, based on the causes of online game addiction in the diagram above, based on the cause of the highest online game addiction, Healtium with a low addiction level of 95 students and a high addiction level of 227 students. In addition, Dominion is also a cause of game addiction with a low addiction level of 181 students and a high addiction level of 141 students.

4. CONCLUSION

This research itself has the aim of calculating the level of accuracy and classification of the level of addiction to mobile legends online games on FST UINSU students by using the application of the Naïve Bayes method. After analyzing the parameters of the game addiction level factor, we managed to get a high accuracy rate of 91.67%.

The main factors causing addiction are Healtium and Dominion. This is because the class obtained a very high value on the weighting among the six causes of addiction that have been described.

REFERENCES

- [1] Mais, F. R., Rompas, S. S., & Gannika, L. (2020). Online Game Addiction with Insomnia in Adolescents. *Journal of Nursing*, 8(2), 18-27.
- [2] Ankara, H. G., & Baykal, D. (2022). The socioeconomic and sociodemographic factors affecting digital gaming addiction among Generation Z. *Telematics and Informatics Reports*, 8, 100032.
- [3] Zaman, M., Babar, M. S., Babar, M., Sabir, F., Ashraf, F., Tahir, M. J., ... & Pakpour, A. H. (2022). Prevalence of gaming addiction and its impact on sleep quality: A cross-sectional study from Pakistan. *Annals of Medicine and Surgery*, 78, 103641.
- [4] Sudarsono, B. G., Leo, M. I., Santoso, A., & Hendrawan, F. (2021). Data Mining Analysis of Netflix Data Using Rapid Miner Application. *JBASE-Journal of Business and Audit Information Systems*, 4(1).
- [5] El Faritsi, D. M., Saripurna, D., & Mariani, I. (2022). Decision Support System for Determining Teaching Staff Using the MOORA Method. *Journal of Triguna Dharma Information Systems (JURSI TGD)*, 1(4), 239-249.
- [6] Putro, H. F., Vulandari, R. T., & Saptomo, W. L. Y. (2020). Application of Naive Bayes Method for Customer Classification. *Journal of Information and Communication Technology (TIKomSiN)*, 8(2).
- [7] Zulfikar, M., & Fahmi, H. (2019). Application of Decision Support System with Naive Bayes Method in Determining the Quality of Superior Rice Seedlings at Pasar Miring Agricultural Center. *National Journal of Computing and Information Technology (JNKTI)*, 2(2), 159-165.
- [8] Musfirah, I. B., Afifah, N., & Sari, S. N. (2022). *Quantitative Research Methods*. Solok: Insan Cendekia Mandiri Publisher.
- [9] Chandra, A., & HP, D. F. (2022). DESIGNING A WEB-BASED CARBURETOR MOTORCYCLE DAMAGE SOLUTION APPLICATION USING THE WATERFALL METHOD. *JATI (Journal of Informatics Engineering Students)*, 6(2), 696-701.