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Implementation of the Naïve Bayes Method to Determine Student Interest in Gaming Laptops

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Abstract: The development of the times resulted in the development of technology to date. With the existence of technology, many people have used technology to help their daily activities. In this study, the author will discuss the technology that is often used by students to help them with their assignments, namely laptops. Laptop is a technology that has been widely used by students, teachers and the public. Having a laptop can make things easier. Until now, each laptop brand continues to develop their laptop production laptops with good specifications. Until now, almost all laptop brands have made gaming laptops that are actually intended for people-people who play games. But with good specifications, gaming laptops can also be used for daily activities. With an attractive design and good specifications, of course you can attract student and public interest in gaming laptops. Therefore the authors made a study of student interest in gaming laptops. With good design and specifications on gaming laptops, the author aims to classify the number of students who are interested and not interested in gaming laptops. The classification will be carried out using the Naïve Bayes method with the number of sample data used as many as 100 student data in data mining. The classification results obtained were 55 students (55% representation) interested in gaming laptops and 45 students (45% representation) had no interest in gaming laptops. The results show that not all students are interested in gaming laptops, even though they have laptops design and great specs.

Keywords: Classification, Data Mining, Gaming Laptops, Naïve Bayes, Students

INTRODUCTION

The continuous development of the times has resulted in many technological developments that have occurred to date. In the development of technology to give effect significantly in everyday life. Many people use technology to help their daily activities. One example is giving and being given information, previously only sending messages by mail and developing to be able to send messages using cellphones. Not only that, someone has talked to other people from different regions with technology commonly referred to as Video Calls. From this example, it can be seen that technological developments have a positive impact on everyday life. But the development of technology also has a negative impact, as an example of addiction to playing games. Technological developments that will be discussed by the author redevelopment technology Laptops. Laptop is a technology that is used by someone to make reports, data.

A laptop is a technology created to make it easier for people to make reports, such as financial reports, and make letters. Currently, laptops have a very positive effect on the public, especially for students. That's because in the scope of lectures, on average all courses already use laptops, such as making PowerPoint presentations, making term papers. But it's a different matter for computer engineering students. This is due to the needs of Engineering students' computers not just existing, but they need a laptop with good specifications. That's because the applications or software they use are also quite heavy and require good laptop specifications. Therefore, there are many laptop brands that are competing to make laptops with good specifications. As of now, there have been many laptop brands that make gaming laptops, basically gaming laptops are made for people who play games. But with good specifications, gaming laptops are suitable for computer engineering students. But in essence it is not only students who study computer technology who need a laptop with good specifications, but other students with different majors also need a laptop with good specifications. That's because the application that until now continues to provide updates and of course the application will be heavier and heavier and run on a laptop with normal specifications. Therefore, there are many laptop brands that make laptops with good specifications. But in this discussion, the author will make a study of student interest in gaming laptops. This is because the gaming laptop

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has good specifications and certainly attracts students' interest, not only that, but the design given to the gaming laptop is also very good. Therefore writer make research to see and determine student interest in gaming laptops. This study aims to see how many students are interested in gaming laptops. This research will be conducted on data mining.

Data mining is a technique used to process data into useful information (Hussain, Dahan, Ba-Alwib, & Ribata, 2018) (Watratan, B, Moeis, Informasi, & Makassar, 2020) (Indrayuni, 2019). Data mining is also a Technique to extract knowledge from a dataset by using Techniques Statistics and mathematics (Uçar & Karahoca, 2021). In the data mining process, the author will carry out a data classification. Data classification is a process carried out to categorize data based on certain data provisions (Pour, Esmaeili, & Romoozi, 2022). In the classification process that is carried out, it will require a method that is capable of carrying out a data classification. The method that will be used in this study is the naïve Bayes method. The naïve Bayes method is a method that is often used for research with a classification model. The point is that the Naïve Bayes method is often used to classify data.

METHOD

The naïve Bayes method is a method used to carry out a simple classification by calculating the combination probability of a particular data (Murwantara, Yugopuspito, & Hermawan, 2020)(Azzahra & Wibowo, 2020). The naïve Bayes method is used to classify certain data with simple probabilities that are arranged and designed so that they can be used with assumptions between variables by using Techniques Statistics and mathematics (Santoso et al., 2020). Statistical techniques will be used as a medium for calculating certain probabilities in accordance with existing assumptions and those that will be used. Meanwhile, mathematical techniques will be used to calculate certain existing data and those that will be used. The naïve Bayes method will be applied to the data mining process and is carried out using the orange application. The orange application is an application that can be used to perform data mining. In this study the authors used the Naïve Bayes method, because the Naïve Bayes method is suitable for use as a method with data classification techniques. But to use a method for data mining, it should be noted that the pattern and content of each widget must be adjusted so that it becomes a system that can be used for data mining (Damuri, Riyanto, Rusdianto, & Aminudin, 2021).

$$\mathbf{P\ (A \mid B):}\ \frac{P\ (B\ |A)\ P\ (A)}{P\ (B)} \qquad \text{(Di \& Duan, 2014)}$$

Information:

A	:	hypothesis of data A (specific class)
B	:	data with unknown classes
P (A | B)	:	Probability of hypothesis based on condition B
P (A)	:	Probability of hypothesis A
P (B | A)	:	Probability B when condition A
P (B)	:	Probability

(Azzahra & Wibowo, 2020)

The naïve Bayes method is a method by calculating other related probabilities. After being applied to the Naive Bayes algorithm, this formula produces a basic assumption. In looking at a feature, this algorithm always assumes that the feature is independent, equal, and has a contribution to the result. The way it works is that we try to find the probability of event A, if event B is true. Event B is also referred to as evidence. For P(A) is the a priori of A (the prior probability, i.e. the probability of the event before the proof is seen) and the proof is the attribute value of the unknown instance (event B). For P(A|B) is the posteriori probability of B, that is, the probability that it will occur after the evidence is shown.

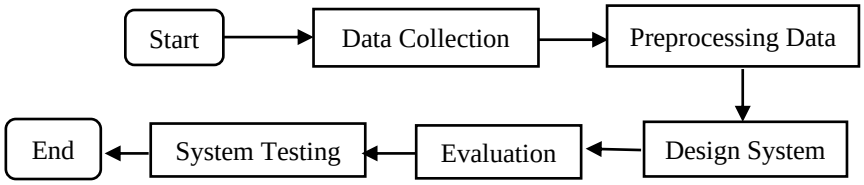

Fig 1. *Naive Bayes Method Process Design*

The flow of the method to be used in this study is in accordance with the flowchart in the picture above, which is as follows:

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1. Data Collection : The process of collecting student data which will become research sample data by distributing questionnaires to students.
2. Preprocessing Data : After the data is collected, the data will be selected so that data that is suitable for use can be determined and the data will be converted into an appropriate form so that it can be used in the data mining process.
3. Design System : This stage is the process of manufacturing and designing a system which will be used in the data mining process with a classification model and using the naïve Bayes method.
4. System Testing : This stage is the process of testing (implementation) systems previously created in data mining. This process is carried out in order to obtain the results of data classification in the data mining process.
5. Evaluation : The process carried out to compare the results of the accuracy of the several widgets used.

Confusion Matrix

Confusion matrix is an easy to use and effective tool to perform a data classification and easy to be able to determine the results of classification (Yun, 2021). The confusion matrix can be used to carry out a work evaluation of a model and can be used to determine the results of the data mining process.

Table 1. Confusion Matrix

Classification	Predicated Class	
	True	False
Actual: True	True Positive (TP)	False Positive (FP)
Actual: False	False Negative (FN)	True Negative (TN)

To determine the calculation of the confusion matrix, we can do it by calculating accuracy, precision and recall.

Accuracy is calculated with the condition that the prediction number (TP + TN) is divided by the number of samples available, to calculate accuracy, the following formula can be seen (Patil & Tamane, 2018):

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} \times 100\% \quad (1)$$

Precision is used to identify positive cases with a high false positive rate, which can be calculated as follows (Agustina, Adrian, & Hermawati, 2021):

$$\text{Precision} = \frac{TP}{TP+FP} \times 100\% \quad (2)$$

In contrast to precision, recall serves to identify positive cases with high false negative values. Recall can be calculated by (Normawati & Prayogi, 2021):

$$\text{Recall} = \frac{TP}{TP+FN} \times 100\% \quad (3)$$

RESULT

3.1. Data Analysis

Table below is the student data that became the research sample. The data was obtained by distributing questionnaires to students. There are several parameters used in this study, namely full name, gender, laptop type, reason, laptops design, laptop specifications, comfort, battery usage, and category.

Table 2. Student Data (Sample Data)

Full Name	Gender	Laptop Type	Reason	Laptops Design	Laptop Specifications	Comfort	Battery Usage
Agil Choirul Fadli	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Agus Budiawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical

*name of corresponding author

Aidah Hasibuan	Woman	Laptop Acer	The quality is good	Really good	Good	Comfortable	Economical
Aliyah Syahfitri Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Alwi Nasution	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Andri Gunawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Andy Firmansyah	Man	Laptop Asus	The quality is good	Just Normal	Good	Comfortable	Economical
Angel Friska Sari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Anggiat Rizky	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Anhar Putra Harahap	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Arief Genta Buana	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Arini Putri Nasution	Woman	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical
Arpin Ritonga	Man	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical
Avie Sienna	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Ayu Novita	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Good Cahyadi	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Bayu Prasetyo	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Bela Apriliani	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Bela Rahmawati	Woman	Laptop Gaming	The quality is good	Good	Very good	Very Comfortable	Economical
Diah Nur Afiani	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Diana Juni Triani	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Dikki Putra Damanik	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Dimas Hanabi	Man	Laptop Gaming	The quality is good	Really good	Very good	Comfortable	Economical
Dimas Ricardo	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Dita Syahfitri	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Dzikri Abdillah	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Ebrika Nadia	Woman	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical
Elisa Gustina	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Fadlin Syahputra	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Farida Ritonga	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Finky Kartika Sari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Fitri Ariyani Hasibuan	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Fitri Hasibuan	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Heru Handoko	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Husnul Khotimah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Indri Cahaya Indah	Woman	Laptop Acer	The quality is good	Good	Very good	Comfortable	Economical
Inka Sasmitha Nasution	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical
Intan Permatasari	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical

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Irwansyahputra Harahap	Man	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Ismal Ibrahim	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Juwita Riama	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical
Khoirul Anwar Rambe	Man	Laptop HP	The quality is good	Good	Good	Comfortable	Economical
Latipa Hanim Pane	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical
Lia Amelia	Woman	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical
Lianah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Maisa Sasmitha	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Mardiana Rambe	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical
Meliana	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Metty Lia	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical
Mualimah	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical
Muammar Siregar	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Muhammad Ridwan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Nanda Munazhif	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Nia Putri Panjaitan	Woman	Laptop Acer	The quality is good	Good	Good	Very Comfortable	Economical
Nina Wati	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Nova Indriyani	Woman	Laptop Acer	The quality is good	Good	Very good	Comfortable	Economical
Novia Ramadhani	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Nur Addina	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Comfortable	Economical
Nurholizah Harahap	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical
Nurul Fadillah Harahap	Woman	Laptop Acer	The quality is good	Good	Very good	Very Comfortable	Economical
Nurul Fatma	Woman	Laptop Dell	The quality is good	Good	Good	Just Normal	Economical
Putri Nadia	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rahma Djuwita	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical
Rahmad Husna	Man	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical
Ram Ade Pratama	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rani Mutia Siregar	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rena Junita	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Ria Rizky Fauziah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rico Fadly	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Ridwan Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Risda Kesuma Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rizal Siregar	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rizky Abadi	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Rizky Arifin	Man	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical

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Romtika Manurung	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Ruri Apriyani	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical
Safrina Maizura	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical
Sahlan Hasibuan	Man	Laptop Gaming	The quality is good	Good	Very good	Comfortable	Economical
Sakinah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Sandy Ritonga	Man	Laptop Dell	The quality is good	Good	Very good	Comfortable	Economical
Sano Rita	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical
Santi Nur Cahyani	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical
Santi Syahputri	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Shintiya Lestari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Siska Harahap	Woman	Laptop HP	The quality is good	Good	Very good	Comfortable	Economical
Siti Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Siti Juleha Rambe	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical
Siti Kholizah	Woman	Laptop HP	The quality is good	Really good	Good	Comfortable	Economical
Sri Ningsih	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical
Syah Fitri Rahma	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Talia Putri Cantika	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical
Tasya Dhea	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Wan Yuli Firmansyah	Man	Laptop Acer	The quality is good	Really good	Good	Comfortable	Economical
Warman Siregar	Man	Laptop HP	The quality is good	Good	Very good	Comfortable	Economical
Wawan Kurniawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical
Wulandari	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical
Yoga Pratama	Man	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical
Yudi Firmansyah	Man	Laptop Lenovo	The quality is good	Just Normal	Just Normal	Comfortable	Economical
Yusuf Ardiansyah	Man	Laptop Acer	The quality is good	Good	Very good	Very Comfortable	Economical
Zakia Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical

In table 2 is student data obtained from a questionnaire of 100 student data. This data will be used as research sample data to be carried out on data mining. The data will be classified based on certain categories using the Naïve Bayes method.

Table 3. Student Data Attributes

No	Attribute	Text	Description
1	Full Name	Text	Student's full name
2	Gender	Categorical	Student Gender
3	Laptop Type	Categorical	Preferred type of laptop
4	Reason	Categorical	Reasons to choose the laptop
5	Laptops Design	Categorical	Preferred Laptop Design
6	Laptop Specifications	Categorical	The quality of the laptop hardware
7	Comfort	Categorical	Convenience of students using laptops
8	Battery Usage	Categorical	Lots of nay laptop battery usage

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In table 3 above are the student data attributes along with their explanations. These attributes will be used as sample data and also as parameters for data classification.

3.2. Data Training

The training data is the data that will be used to determine the prediction results using the Naïve Bayes method. The training data was obtained from the results of the questionnaire and then arranged in the form of file.xlsx format so that it can be used and processed in data mining.

Table 4. Data Training

Full Name	Gender	Laptop Type	Reason	Laptops Design	Laptop Specifications	Comfort	Battery Usage	Category
Ahmad Rifai	Man	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Aini Lestari	Woman	Laptop Acer	The quality is good	Really good	Good	Comfortable	Economical	Not Interested
Aldy Nasution	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Angela Silalahi	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Angga Juledi	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Arhan Rizky	Man	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Arhan Syahputra	Man	Laptop Asus	The quality is good	Just Normal	Good	Comfortable	Economical	Not Interested
Arif Nasution	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Arifin Syahputra	Man	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Arman Maulana	Man	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Auliah Putri Ningsih	Woman	Laptop HP	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Erika Ricardo	Woman	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Indra Gunawan	Man	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Intan Harahap	Woman	Laptop HP	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Juwita Mega	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Muhammad Rizky	Man	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Nadiva Siregar	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Nina Br Nasution	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Nina Maya Dewi	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rahmad Syahputra	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rama Putra Hasibuan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rani Shintiya	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Romadon Hasibuan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rury Ariska	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Sandi Harahap	Man	Laptop Dell	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Zasyifa Najwa	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical	Not Interested

Table 4 contains student data that will be used to assist in the process of classifying data that will be processed in the data mining process using the Naïve Bayes method.

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Table 5. Student Column Data

No	Attribute	Type	Role	Values
1	Full Name	Text	Meta	
2	Gender	Categorical	Feature	Man, Woman
3	Laptop Type	Categorical	Feature	Laptop Acer, Laptop Asus, Laptop Dell, Laptop Gaming, Laptop HP, Laptop Lenovo
4	Reason	Categorical	Feature	The Quality is Good
5	Laptops Design	Categorical	Feature	Good, Just Normal, Really Good
6	Laptop Specifications	Categorical	Feature	Good, Very Good
7	Comfort	Categorical	Feature	Comfortable, Very Comfortable
8	Battery Usage	Categorical	Feature	Economical
9	Category	Categorical	Target	Interest, Not Interested

On table 5 above is data attribute and column data which are research parameters on classifying student interest in gaming laptops. On Table above, each attribute has a certain category which is the content of the classification parameters. The classification will be carried out using the naïve Bayes method, the role on the category attribute with the feature type is changed to a target. This is so that the data can be classified between students who are interested and who are not interested in gaming laptops.

3.3. Data Selection Process (Preprocessing)

The data selection process is a process carried out to select the data to be used (Watratan et al., 2020) (Negara, Muhardi, & Putri, 2020). This was done so that the data that became the research sample could be classified properly and get perfect results. So in this process, data will checked feasibility to be sample data, data will be arranged according to needs (Al-Rasheed, 2021). After data selection process and can determine the data that is feasible to use, then the data will be compiled so that it can be used during the data classification process in data mining using the naïve Bayes method.

3.4. Data Mining Process

The data mining process will be carried out using a data classification model using the naïve Bayes method. The classification model in question is to categorize data based on certain categories. In this study, the authors will classify student data based on students' interests and not interest in gaming laptops.

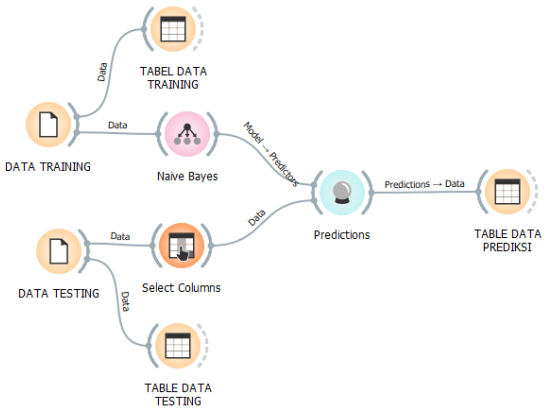

Fig 2. *System Design Process in Data Mining*

Figure 2 shows the widget design process in data mining to build a data classification system using the Naïve Bayes method. The design of this system is done so that the sample data used can be classified perfectly. This system will later be used as a data testing system that will be classified in the data mining process.

3.5. Classification Model Testing Process

In this process a testing process system with a classification model is done so that data can be categorized according to their respective classes. This process is also a data mining process to be able to classify the sample data used using the Naïve Bayes method.

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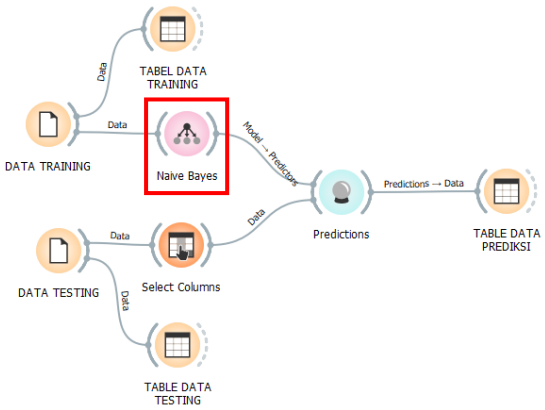

Fig 3. *Classification Process in Data Mining*

Figure 3 shows the data prediction process in data mining to obtain classification results using the Naïve Bayes method. With this process, the data will be classified based on the class that has been determined. In this study, the classification used was to determine student interest in gaming laptops. So the classes in this classification are students' interest and not interest in gaming laptops. In the widget located inside the red box is the naïve Bayes method used as a classification method.

3.6. Classification Model Predictions Process

This process is the result of a prediction with a classification model in data mining using the Naïve Bayes method. The prediction results can be seen in the table under This.

Table 6
Classification Model Prediction Results

Full Name	Gender	Laptop Type	Reason	Laptops Design	Laptop Specifications	Comfort	Battery Usage	Category
Agil Choirul Fadli	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Agus Budiawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Aidah Hasibuan	Woman	Laptop Acer	The quality is good	Really good	Good	Comfortable	Economical	Not Interested
Aliyah Syahfitri Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Alwi Nasution	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Andri Gunawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Andy Firmansyah	Man	Laptop Asus	The quality is good	Just Normal	Good	Comfortable	Economical	Not Interested
Angel Friska Sari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Anggiat Rizky	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Anhar Putra Harahap	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Arief Genta Buana	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Arini Putri Nasution	Woman	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Arpin Ritonga	Man	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Avie Sienna	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Ayu Novita	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Good Cahyadi	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Bayu Prasetyo	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest

*name of corresponding author

Bela Apriliani	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Bela Rahmawati	Woman	Laptop Gaming	The quality is good	Good	Very good	Very Comfortable	Economical	Interest
Diah Nur Afiani	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Diana Juni Triani	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Dikki Putra Damanik	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Dimas Hanabi	Man	Laptop Gaming	The quality is good	Really good	Very good	Comfortable	Economical	Interest
Dimas Ricardo	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Dita Syahfitri	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Dzikri Abdillah	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Ebrika Nadia	Woman	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Elisa Gustina	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Fadlin Syahputra	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Farida Ritonga	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Finky Kartika Sari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Fitri Ariyani Hasibuan	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Fitri Hasibuan	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Heru Handoko	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Husnul Khotimah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Indri Cahaya Indah	Woman	Laptop Acer	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Inka Sasmitha Nasution	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical	Not Interested
Intan Permatasari	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical	Not Interested
Irwansyahputra Harahap	Man	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Ismal Ibrahim	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Juwita Riama	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Khoirul Anwar Rambe	Man	Laptop HP	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Latipa Hanim Pane	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Lia Amelia	Woman	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Lianah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Maisa Sasmitha	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Mardiana Rambe	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Meliana	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Metty Lia	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Mualimah	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical	Not Interested
Muammar Siregar	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Muhammad Ridwan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Nanda Munazhif	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest

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Nia Putri Panjaitan	Woman	Laptop Acer	The quality is good	Good	Good	Very Comfortable	Economical	Not Interested
Nina Wati	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Nova Indriyani	Woman	Laptop Acer	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Novia Ramadhani	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Nur Addina	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Comfortable	Economical	Not Interested
Nurholizah Harahap	Woman	Laptop HP	The quality is good	Really good	Good	Very Comfortable	Economical	Not Interested
Nurul Fadillah Harahap	Woman	Laptop Acer	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Nurul Fatma	Woman	Laptop Dell	The quality is good	Good	Good	Just Normal	Economical	Not Interested
Putri Nadia	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rahma Djuwita	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Rahmad Husna	Man	Laptop Asus	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Ram Ade Pratama	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rani Mutia Siregar	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rena Junita	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Ria Rizky Fauziah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rico Fadly	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Ridwan Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Risda Kesuma Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rizal Siregar	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rizky Abadi	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Rizky Arifin	Man	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Romtika Manurung	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Ruri Apriyani	Woman	Laptop HP	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Safrina Maizura	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Sahlan Hasibuan	Man	Laptop Gaming	The quality is good	Good	Very good	Comfortable	Economical	Interest
Sakinah	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Sandy Ritonga	Man	Laptop Dell	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Sano Rita	Woman	Laptop Acer	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Santi Nur Cahyani	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Santi Syahputri	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Shintiya Lestari	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Siska Harahap	Woman	Laptop HP	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Siti Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Siti Juleha Rambe	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Siti Kholizah	Woman	Laptop HP	The quality is good	Really good	Good	Comfortable	Economical	Not Interested
Sri Ningsih	Woman	Laptop Acer	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested

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Syah Fitri Rahma	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Talia Putri Cantika	Woman	Laptop Lenovo	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Tasya Dhea	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Wan Yuli Firmansyah	Man	Laptop Acer	The quality is good	Really good	Good	Comfortable	Economical	Not Interested
Warman Siregar	Man	Laptop HP	The quality is good	Good	Very good	Comfortable	Economical	Not Interested
Wawan Kurniawan	Man	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest
Wulandari	Woman	Laptop Lenovo	The quality is good	Really good	Very good	Very Comfortable	Economical	Not Interested
Yoga Pratama	Man	Laptop Asus	The quality is good	Good	Good	Comfortable	Economical	Not Interested
Yudi Firmansyah	Man	Laptop Lenovo	The quality is good	Just Normal	Just Normal	Comfortable	Economical	Not Interested
Yusuf Ardiansyah	Man	Laptop Acer	The quality is good	Good	Very good	Very Comfortable	Economical	Not Interested
Zakia Harahap	Woman	Laptop Gaming	The quality is good	Really good	Very good	Very Comfortable	Economical	Interest

Table 6 shows the prediction results obtained from the classification model in data mining using a sample data of 100 student data. The results obtained were 55 students (representation of 55%) interested in gaming laptops and data of 45 students (representation of 45%) had no interest in gaming laptops.

3.7. Classification Model Evaluation Results

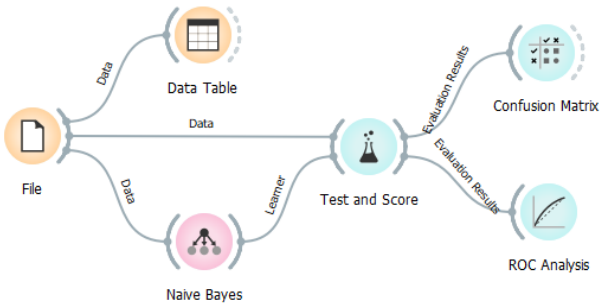

Fig 4. *Design Widget Evaluation Process*

Figure 4 is an evaluation classification to determine results, tests and scores from the data mining process that has been done before. After that, the results for the confusion matrix and ROC analysis will also be determined. These results are used to determine the graphical results of data classification using the Naïve Bayes method. To get these results, the data to be used is data from classification results that already have class categories from predetermined classifications.

Table 7. Result of Test and Score

Model	AUC	CA	F1	Precision	Recall
Naïve Bayes	0.998	0.930	0.929	0.934	0.930

After the authors carried out an evaluation with the Classification model using the Naïve Bayes method, the results for the test and score were obtained. The results obtained were AUC 0.998, CA results 0.930, F1 results 0.929, Precision results 0.934 and Recall results 0.930.

3.8. Evaluation Result with Confusion Matrix

The confusion matrix is a widget that is used as a measuring tool for classification techniques by calculating the correct power that has been classified using the Naïve Bayes method.

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Table 8. Results of the Confusion Matrix

Actual \ Predicted	Interest	Not Interested	∑
Interest	54	1	55
Not Interested	6	39	45
∑	60	40	100

Table 8 is the result of the confusion matrix obtained from the evaluation of the Classification model. The results of the confusion matrix are True Positive (TP) is 54. True Negative (TN) is 39, False Positive (FP) is 1 and False Negative (FN) is 6. Then the values for accuracy, precision and recall are as follows:

$$\boldsymbol{Accuracy} = \frac{54+39}{54+39+1+6} + \mathbf{100\%}$$ Then the Accuracy value = 93%

$$\boldsymbol{Presisi} = \frac{54}{54+1} + \mathbf{100\%}$$ Then the Precision value = 98%

$$\boldsymbol{Recall} = \frac{54}{54+6} + \mathbf{100\%}$$ Then the Recall value = 90%

3.9. Evaluation Result with ROC Curve

Roc Analysis is obtained from the evaluation results of the Classification model with the addition of the ROC Analysis widget. The ROC Analysis results will be displayed in the form of graphic images obtained from data mining processing.

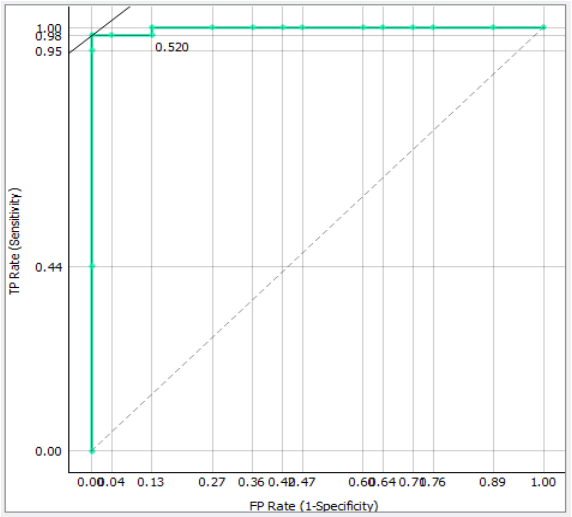

Fig 5. *ROC Analysis of Students Interested in Gaming Laptops*

Figure 5 is the result of ROC Analysis students who are interested in gaming laptops using the naïve Bayes method. The results obtained were 0.520.

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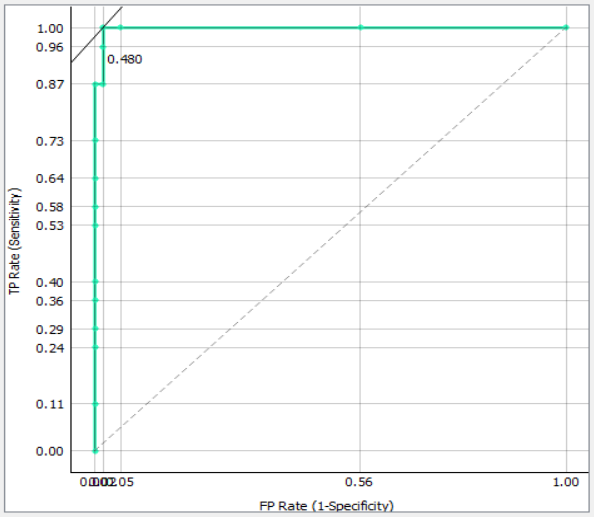

Fig 6. *ROC Analysis of Students with No Interest in Gaming Laptops*

Figure 6 is the result of ROC Analysis students who are not interested in gaming laptops using the naïve Bayes method. The results obtained were 0.480.

DISCUSSIONS

Data mining is a technique used to process data into information. There are several models that can be used in data mining, namely classification, association, clustering, regression, forecasting, sequencing and descriptive. But in this study, the author will carry out a data classification of student interest in gaming laptops. The classification was carried out using the Naïve Bayes method with the amount of data as big 100 student data. The classification results obtained were 55 students (55% representation) interested in gaming laptops and 45 students (45% representation) had no interest in gaming laptops. These results are a 10% difference and there are more students who are interested in gaming laptops than students who are not interested in gaming laptops. Even though gaming laptops are given good designs and specifications, not all students are interested in gaming laptops.

After the classification results are found, then the classification results will be evaluated in order to obtain accurate results from the classification that has been carried out. To determine the results of accuracy, the authors still use the Naïve Bayes method. The accuracy results obtained from the test widget and a score of 0.998 (for a representation of 99.8%) and the accuracy results obtained from the confusion matrix widget are 93%. From the results of the two accuracy's own difference of 7%. The comparison of the two widgets is 1:1, even though there is a difference, the accuracy results obtained from the two widgets are not too far away. The accuracy obtained from the two widgets is very good. That's because the results of its accuracy is more than 90%.

CONCLUSION

This data mining was carried out to determine student interest in gaming laptops. In data mining, the author will carry out a data classification using the naïve Bayes method in data mining with a classification model about student interest in gaming laptops. The classification results obtained were 55 students interested in gaming laptops and 45 students not interested in gaming laptops. These results state that not many students are interested in gaming laptops, even though the design and specifications provided are very good. But also the price given is also not cheap, ranging from 10-30 million and some even cost over 30 million. That could also be a consideration too. Therefore there are still many students who are not interested in gaming laptops. So to be interested in something is not only seen in terms of its advantages, but also to pay attention to other things that can be a consideration.

Basically a person's interest is not only seen from the good of a product or item, but also from the need for that item. Therefore, gaming laptops are given a good design and specs. If someone's needs are not met on the laptop, then that person will not be interested in the laptop. With this research, it can be a lesson and insight for conducting data mining and can develop the concept of data mining.

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