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Decision Supporting System In Selection of Online Games Players From One Team To One Esports Medan using Naïve Bayes (*Case PT. Satu E-Sport)*

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Abstract

Esports is present in Indonesia as an official sport in Indonesia with the appointment of PB ESI (Indonesian Esports Association) as the main organization which is recognized by the government to manage the esports ecosystem. The selection of players (athletes) is one of the determining factors in sports to achieve the goal of winning. PT. One Esports Indonesia, which is the first legal incorporated esports organization in the city of Medan, has the opportunity to join the Indonesian professional mobile legends league known as the Mobile Legends Development League (MDL). To get and determine the players who will play, so that is determined by the coach using a 7-point Likert scale. This research comes up from this background to help in the selection of players in an open and systematic way. This study uses the nave Bayes classification method to determine the role of players, i.e : Roam/Jung/Mid, XP, and Gold. In this studying to use of players from each role through the calculation of the ranking points of capable players which are the final result of a decision supporting system for coaches to be able to determine the athletes who will fight a duel

Keywords: *E-Sport, player selection, nave bayes*

1. Introduction

At the moment digital developments greatly affect community activities, one of which is playing games. In the past, games were only made to be given to children, with at the moment development of technology, games are not only just games. At this time the game is included in the sport, where the sport only requires dexterity, speed of thought, and endurance with electronic systems as the main medium. At this time sports that use electronic devices are called as e-sports. E-Sports is an abbreviation of electronic sports or electronic sports that use games as a competition arena [1]. Gaming are played online with a multiplayer schedule who can participate people from all over the world. This ease of access making eSports as a new sport which are in great demand by various age groups. The higher enthusiasm of the community for esport, many companies create championship events on a regional and international scope with enormous prizes. Due to the prizes that were given,then makes various teams who are formed and also working professionally.

Several teams register as competitors in the competition to find players and champions in an e-sport match, there are several game platforms that many are involved and fighted a duel on, one of which is Mobile Legends. This game features single team gameplay of 5 players where one player controls a character commonly referred to as a "hero". Each hero has different skills from other heroes. There are 6 hero categories that have different roles, namely: assassin, tank, mage, fighter, support and marksman [2]. This hero category, it will be used in a team of 5 players who will fight another team with the same number of 5 vs 5, in a professional team there will be 5 players who will be played and also have reserves as substitutes. However, coaches are often confused about determining the players to play in a gaming because of the selection of these players is based on the criteria that have been determined to solid players for gaming.players To determine

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which player who are elected, a decision supporting can be used, to serve as a coach's reference in order to determine player which will be fighted a duel.

Based on previous research conducted by [3] to make predictions to determine the win rate in mobile legend games using the Naïve Bayes method, it is found that out of 20 fighting a duel that were undertaken with probabilistic naïve Bayes calculations from the prediction results and real results that compared to getting 15 correct fight a duel and 5 wrong fight a duel so that are obtained 75% correct accuracy and 25% wrong accuracy. This research on the decision-making system for selecting vendors based on performance using the Naïve Bayes method, the result is obtained from 135 training data that have been processed by using the Naïve Bayes method that is obtained a probabilistic value for accepting class of 0.725925 and the non-accepting class of 0.274075 so that the accuracy value is obtained by conflusion matrix of 86.67%[4], rekomendasi pemilihan baju wanita dengan metode naive bayes Pada penelitian ini didapatkan hasil akurasi dengan menggunakan metode Naïve bayes sebesar 80% sehingga dengan metode naïve bayes, mampu memberi rekomendasi pada pemilik toko berdasarkan class "*Dresses", "Blouses", "Jackets"*dan "Jeans"[5].

Based on the description above, and reviewed from the journal references using, a research topic is proposed with the title *"Decision Support System in the Selection of Online Game Players from Team One Medan Esports Using Naive Bayes"*. Through this research, it is hoped that it can become a reference for coaches to be able to select players for preparation to be joined in the team.

2. Research Methodology

2.1. Data Collection

Data collection in this study uses several methods including:

a) Observation is undertaken by observing directly the object to be studied regarding the problems to be discussed, i.e: by visiting the location of the object to see and observe the activities between the customer and the manufacture of the product.
b) Interviews were undertaken at several home tailors in Palembang on April 30, 2019, concluded that the problems faced were promotions that were not maximized due to not available of promotional media such as media websites.

2.2. System Development Method

In developing the system in this study using the SDLC (Software Development Life Cycle) method. SDLC is a process of developing and modifying systems as well as the models and methodologies that is used in building system development. The are several SDLC methods that can be used, this research will use the waterfall method and which can be seen in the figure below:

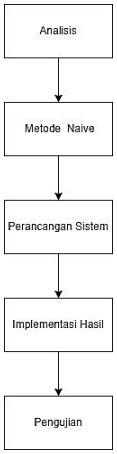

Figure 1. Waterfall system framework

Based on Figure 2.2, the description of the figure above will be explained:

a) Analysis is the step of software requirements analysis that is undertaken continously to determine system requirements to understand what the user are needed
b) The Naïve Bayes method is used to determine which groups of players will be divided into 3 groups, roam, gold and exp groups. Then it will be determined as a capable players and Not capable player.
c) Design is a process that focuses on designing that has been designed in visualized in the initial layout design and system testing so that it can be implemented into a program on the next step
d) Implementation is the result of a designing that has been built based on the initial layout design which is developed to fulfill this research so that it can be used by users
e) Testing is a step that is taken to test the flow of logic and functions with steps to reduce the error rate

2.3. Analysis System

This system analysis can be interpreted as the decomposition of a complete information system into its component parts with the aim of identifying and evaluating problems that happening. This sub-chapter will be explained the steps or processing that will be undertaken on the system. *Naïve Bayes* adalah algoritma probabilistik yang digunakan untuk memprediksi suatu situasi. Algoritma ini menggunakan teori probabilitas yang diajukan oleh ilmuwan Inggris Thomas Bayes[6]. Cara kerja metode ini adalah dengan memprediksi kejadian masa depan berdasarkan data pembelajaran masa lalu. Naïve Bayes dapat digunakan untuk mendefinisikan grup kelas untuk dokumen teks[7].This process can be seen in Figure 2.

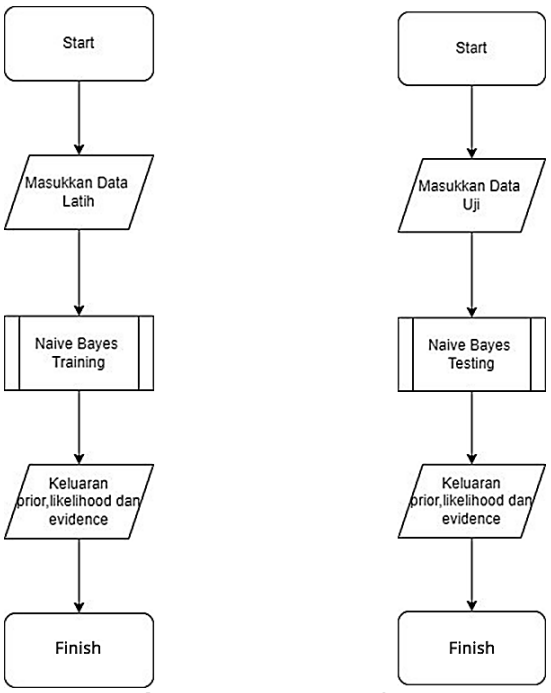

Figure 2. System Flow

a) Naïve Bayes Training

In this section, Calculations will be undertaken, Prior, likehood and evidence. The process in this section can be seen in Figure 3.

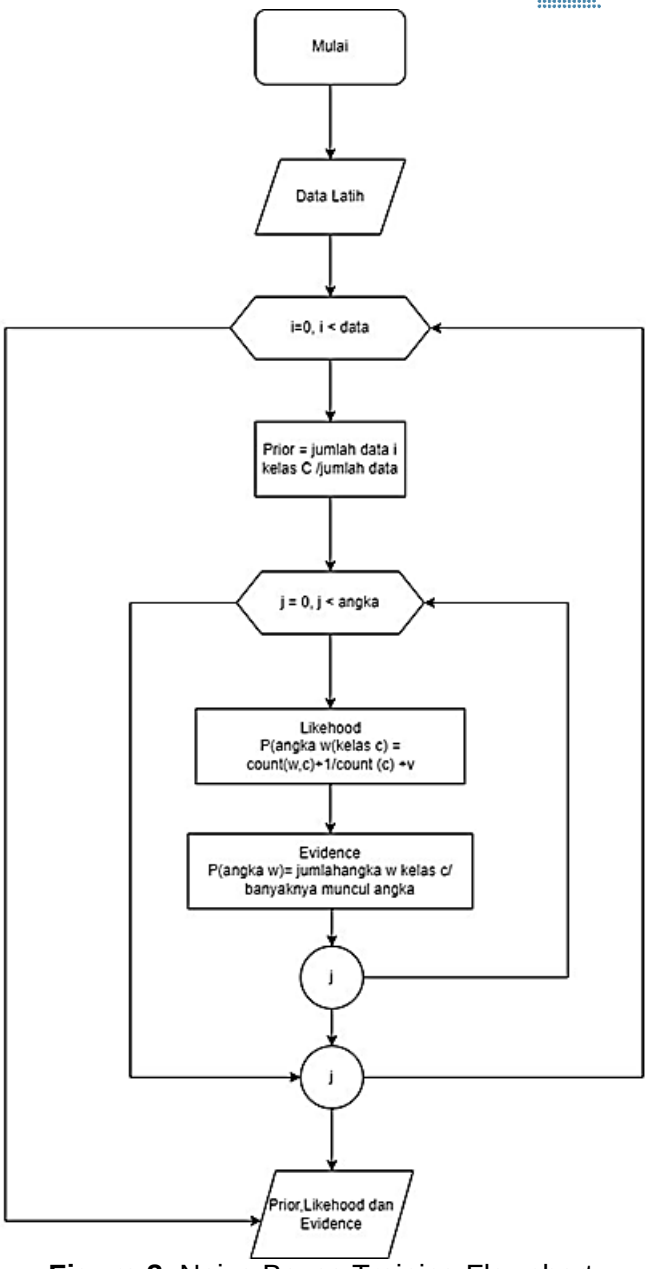

Figure 3. Naive Bayes Training Flowchart

Based on Figure 3, the training process begins with data. Then it is repeated as many times as there are classes and then the prior calculation is undertaken or the probability of each class and reapetly are as many as the number of criteria. Then the likelihood or conditional probability calculation of a word w is then is undertaken for class c and the calculation of evidence or the probability of the word w appearing on the whole happening. The results of this process are prior values, likelihood and evidence.

b) Naïve Bayes Testing

In the testing section, do posterior calculations. The process in the testing section can be seen in Figure 4.

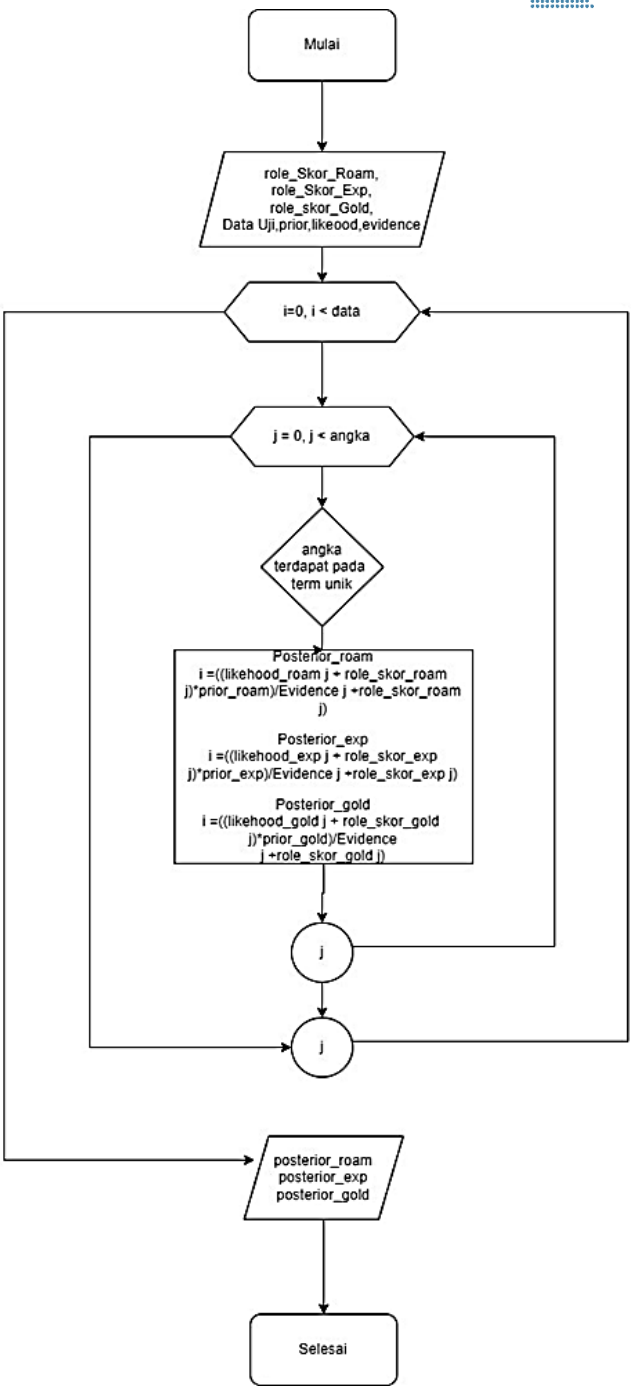

Figure 4. Flowchart of Naive Bayes Testing

Based on Figure 4, this process begins with the input of objectivity values, data testing, prior values, likelihood values and evidence values. The next, it is repeated as many numbers as possible. Then a selection is made whether the number is in a unique term. If not, the process will be terminated. If yes, it will be multiplied by the posterior value for each class, i.e: by adding the likelihood value with the ObjScore first and then multiplied by the prior value. Furthermore, the result of the multiplication will be divided by the sum value between the evidence value and the ObjScore. The result of the testing process is the posterior value which is used to determine the class of the testing data.

3. Result and Discussion

3.1. Research result

In accordance with the analysis and design as is described in the previous chapter, i.e: the research method, this section presents the results of the system research is built by using the design which is undertaken in the earlier chapter. This chapter discusses the results is built and functional systems.

3.2. System Interface

The decision support system application for determining the player is designed to consist of several pages, i.e: the dashboard page, training data, SPK Naïve Basyes, report on input results, conclusion.

3.2.1. Dashboard page

On this page a Dashboard will be appeared which displays the number of training and testing datasets. The display can be seen in Figure 4.

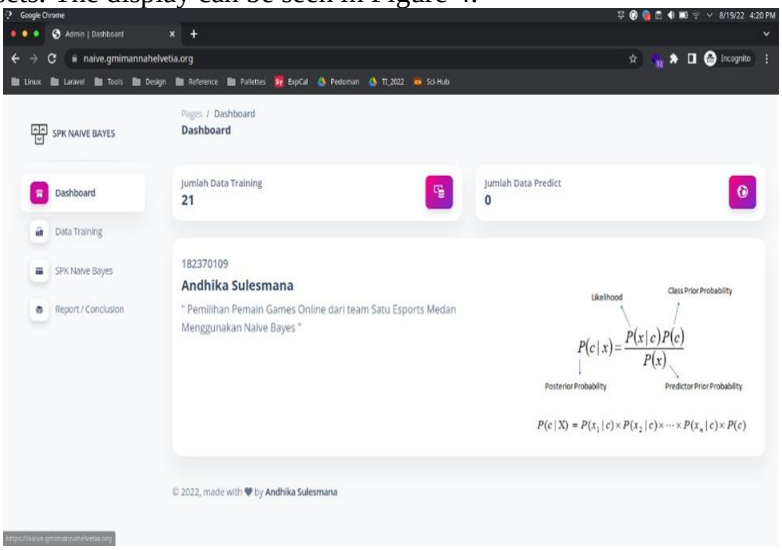

Figure 4. Dashboard page

3.2.2. Training Page

This page will display data as training data. Users can upload training data files in csv form and the training data is used coming from 21 Indonesian national team player data that is obtained from the Indonesian national team coach which will be divided into 2, i.e: ingame assessment and personal assessment which can be seen in Figure 4 and for personal assessment will be shown in Figure 5.

NAMA	ROTASI	SHOUTCALLING	FARMING	FLANKING	POSITIONING	LANING PHASE	ENGAGE	DAMAGE DEALER	SKILL SHOT	PLATING
RAPHAEL	6	6	3	3	6	4	6	4	6	2
RAYHAN	6	6	3	2	6	4	6	5	6	3
ALBERT	6	5	2	2	4	4	5	3	4	2
VITO	6	6	2	2	4	3	4	4	5	1
HERU SITOMPUL	7	7	3	3	7	4	7	5	7	3
AGANOV	6	5	1	1	4	5	4	3	3	1
RAFIF	3	4	6	3	7	7	3	7	4	7
AXEL	3	3	7	3	6	7	4	7	4	7
ALDO	6	4	4	7	6	7	7	5	6	3
STEFANUS	6	5	4	6	6	7	7	3	4	3
Ananda Asa Pradipta	1	1	5	1	2	4	1	5	2	5
Risky Dermawan	2	2	6	1	3	6	1	6	2	6
Muhammad Asadurrahman RAsyad	5	5	3	4	5	3	6	2	3	2
Andre Pilo	3	1	5	1	5	6	1	3	2	6
Ujang kurniawan	6	4	3	3	3	2	4	2	3	1
Donny Maulana	2	1	2	4	3	2	5	4	2	2
Felix Deffrio Vondra	3	2	3	5	5	3	5	2	3	2
Farhan	4	3	2	2	4	2	5	2	3	1
Muhammad Smith	2	1	4	1	3	4	1	4	2	4
Muhammad Fadly	4	1	3	6	5	4	6	2	3	2
Frendi antuli	4	5	2	3	5	3	5	3	2	2

Figure 5. Ingame training data

NAMA	ATTITUDE	DISIPLIN	ADAPTASI	KERJASAMA	KESEHATAN	MENTAL	KOMITMEN	KETANGKASAN	KETAHANAN	PENGALAMAN
RAPHAEL	6	7	7	6	7	7	6	7	7	7
RAYHAN	6	6	7	6	6	7	7	7	7	6
ALBERT	6	6	4	5	6	3	7	5	5	6
VITO	7	6	4	5	6	3	6	6	5	6
HERU SITOMPUL	7	7	7	7	6	7	7	6	6	7
AGANOV	7	6	4	6	6	4	6	4	6	5
RAFIF	6	7	7	7	7	7	7	6	7	6
AXEL	6	7	7	6	7	6	7	7	6	6
ALDO	7	7	7	6	7	6	7	7	6	7
STEFANUS	7	7	7	7	6	6	7	6	5	7
Ananda Asa Pradipta	7	5	4	6	5	6	5	6	5	6
Risky Dermawan	7	4	4	5	6	6	6	6	5	7
Muhammad Asadurrahman RAsyad	5	5	4	5	5	5	4	5	5	3
Andre Pilo	1	2	1	1	5	2	5	2	2	1
Ujang kurniawan	2	2	2	2	7	6	4	4	4	4
Donny Maulana	2	2	2	3	5	5	2	4	6	2
Felix Deffrio Vondra	4	2	4	3	5	5	2	5	3	2
Farhan	5	4	3	4	5	4	4	3	3	4
Muhammad Smith	5	2	4	5	6	3	2	5	3	2
Muhammad Fadly	5	3	3	4	5	6	7	4	5	4
Frendi antuli	4	4	3	4	5	6	5	4	5	5

Figure 6. Personal Training Data

From the data in Figures 6 and 3.3 it will be processed on the web that has been built which can be seen in Figure 7.

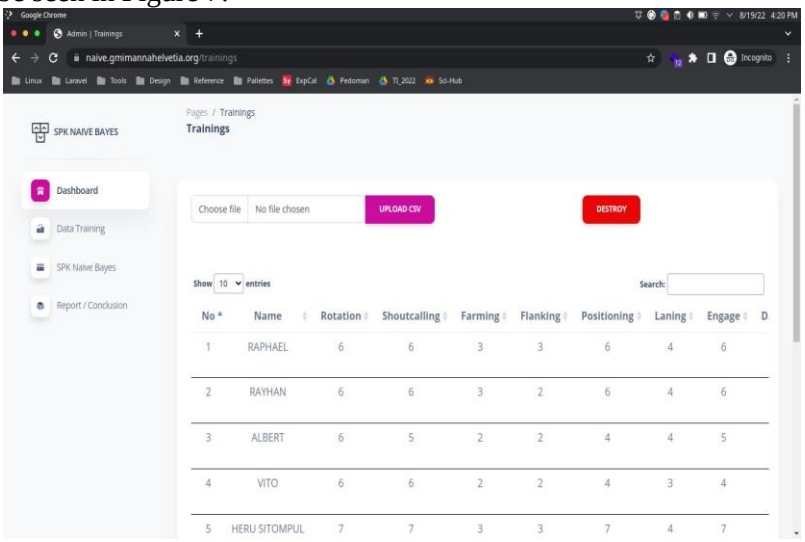

Figure 7. Page Data Training

3.2.3. SPK Naives Bayes page

Data testing will include numbers on a scale of 1-7 by inputting values with the 20 available criteria which can be seen using the scores given by the coach of the one esport team to 15 players which are divided into 2 groups of in-game assessments and personal assessments displayed on Figure 8 and Figure 9.

NAMA	ROTASI	SHOUTCALLING	FARMING	FLANKING	POSITIONING	LANING PHASE	ENGAGE	DAMAGE DEALER	SKILL SHOT	PLATING
Saiful Ramadhani	7	5	3	3	6	4	7	5	7	1
Filbert jonathan	6	6	2	2	7	5	6	6	7	2
Ryan nugraha tarigan	7	6	2	2	7	5	7	7	7	1
Marvin Oswald	5	4	1	2	5	3	6	5	6	1
Heles T ziero	6	6	2	2	7	5	6	6	7	2
Ampin Siagian	6	6	3	4	6	3	6	3	6	1
andhika sulesmana	7	7	2	5	7	3	7	5	7	4
dio ananda damanik	6	3	3	7	6	5	7	4	6	3
Fachrizal Fashya	5	3	4	6	5	4	7	3	6	2
Adrian fransiscus siburian	7	5	2	3	7	2	7	2	6	1
Maulana aziz faldiarsya sihotang	4	3	7	2	7	7	3	7	3	7
Kenny Ramadhan	3	2	6	3	6	6	4	6	4	6

Figure 8. In-game testing data

NAMA	ATTITUDE	DISIPLIN	ADAPTASI	KERJASAMA	KESEHATAN	MENTAL	KOMITMEN	KETANGKASAN	KETAHANAN	PENGALAMAN
Saiful Ramadhani	6	6	7	7	7	7	6	7	7	6
Filbert jonathan	7	6	7	7	7	5	6	7	7	5
Ryan nugraha tarigan	7	4	7	5	7	4	6	5	5	6
Marvin Oswald	5	6	5	6	6	4	4	5	6	3
Heles T ziero	7	6	7	6	7	5	6	7	7	5
Ampin Siagian	6	5	7	5	5	7	5	6	7	6
andhika sulesmana	6	7	7	7	6	7	7	7	7	7
dio ananda damanik	5	6	6	7	7	7	6	7	6	6
Fachrizal Fashya	5	6	5	6	6	5	6	7	6	5
Adrian fransiscus siburian	6	5	6	5	7	6	5	6	7	5
Maulana aziz faldiarsya sihotang	7	7	7	7	6	6	7	7	7	6
Kenny Ramadhan	6	7	7	6	7	6	7	7	6	6

Figure 9. Personal Testing Data

From the data that can be seen in Figure 8 and Figure 9, it will be inputted into the website page on the SPK Naïve Bayes page which will be displayed in Figure 10

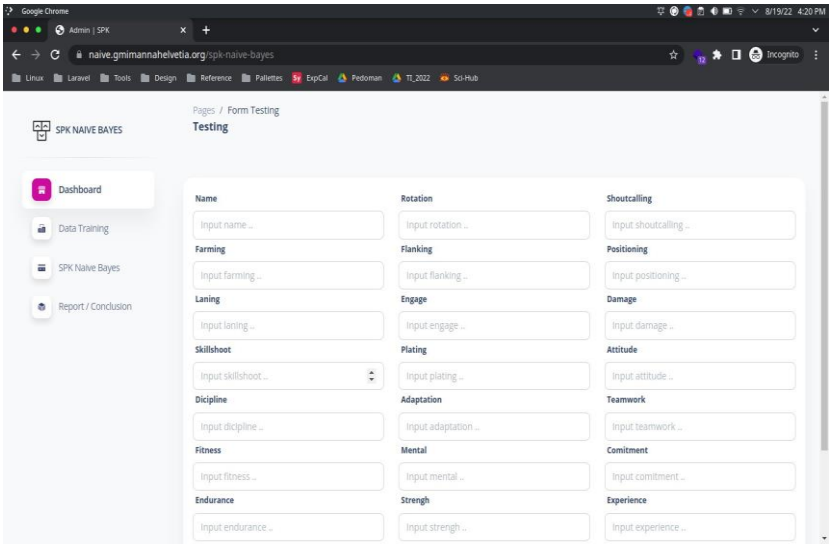

Figure 10. the website page on the SPK Naïve Bayes page

3.2.4. Report page

This page will display a report page on the results of the data that has been inputted and processed on the Naïve Bayes SPK page by producing data on 15 players who have been grouped into exp, gold and roam roles. Then you can see which players have capable or not which will be shown in Figure 11.

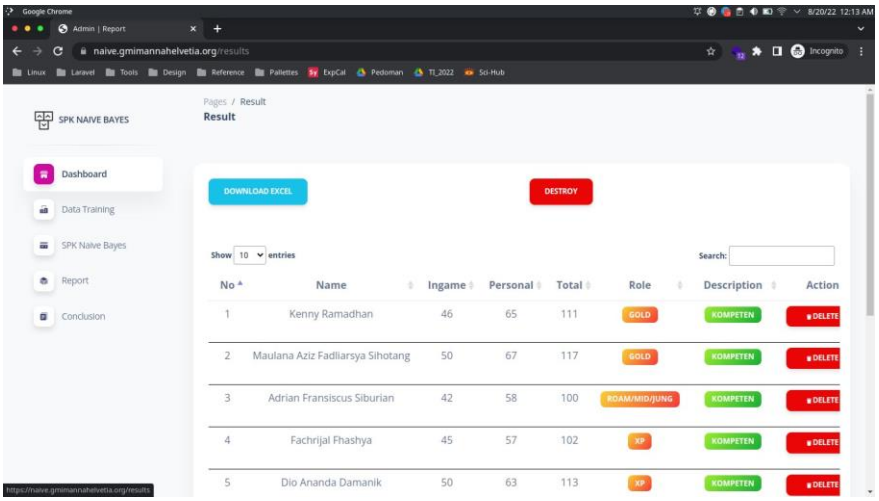

Figure 11. Report Pages

3.2.5. Conclusion page

This page will display the results of player ranking based on the total score obtained based on each role group which can be used as a reference for making decisions to choose which players will play which can be seen in Figure 12.

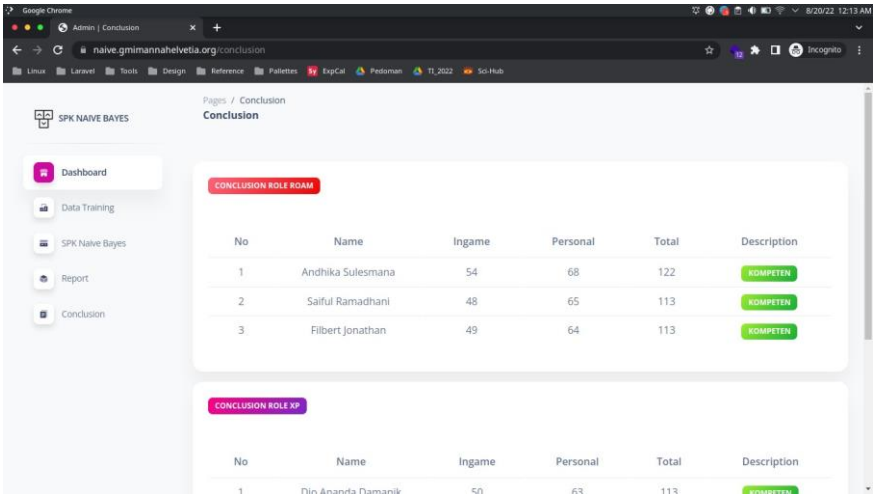

Figure 12. Conclusion pages

3.3. Discussion

The design of a decision supporting system application to determine players is made with the aim of producing an application that can help PT. Satu Esport, especially coaches. This application, the trainers of PT. Satu Esport do not need to choose the players to be played manually. The using of the waterfall method has been successfully applied, i.e: by analyzing systems and data, system design, implementation in applications and system testing. The programming language used by the author is PHP and MySQL database. The author designs a user or user interface with a system that is simple and easy for users to understand. So that users easily and have no problems running the application. Users only need to click on the menu, fill in details, and click buttons that are already available in the application according to user needs. Then nsystem will process everything automatically. In the application of a player selection decision support system at web-based PT.Satu esport using the Naïve Bayes method starting from:

Step 1 : Fill in the training data.
Step 2 : Input the testing value
Step 3 : The process of calculating the value based on the criteria
Step 4 : The results of the calculation of the Naïve Bayes Method will display the distribution of roles and categories of players including capable or not capable

3.4. System Testing

This system test is undertaken to debug the system is working properly or not and find errors in the system. The following is a test of a decision supporting system application in selecting online game players from esports team using Naïve Bayes:

Table 1. Function Testing Table

No	Testing	Status Status
1.	Data Training page, data uploaded data can be deleted and can see all data	Well
2.	Naïve Bayes SPK page, by inputting values with a scale of 1-7,	Well
3.	Result page, delete data by pressing the destroy button and can download excel data by pressing the download excel button	Well
4.	Conclusion page, can only see the results	Well

4. Conclusion

Based on the test results and analysis of the application of the Naïve Bayes method to e-sport player decision-making systems, it can be concluded as follows the Application of the Naïve Bayes method In SPK the selection of e-sport players can be applied as a tool for determining player roles. The application of the naïve Bayes method can solve problems in determining which players to play. The final total ranking after using the Naïve Bayes method is the final result of the system for determining player selection.

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