

DECISION SUPPORT SYSTEM TO DETERMINE SPORTING INTERESTS AND TALENTS USING THE BAYES METHOD

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Abstract

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The identification of talent interests has been developed and its benefits have been felt in producing athletes who can excel at the national and international levels. Decision support system can be chosen because it is an appropriate way to determine interest and talent in sports, basically the concept of a decision support system is limited to activities to help assess a decision. In this study, using the Bayes method with this method requires probability information on each alternative to the problems faced to produce an expected value as a basis for decision making. The trial of calculations using the Bayes method on 50 samples of students who were successfully tested, namely 18 students with interests and talents in soccer, 13 gifted students in volleyball, 9 gifted students in badminton, 6 students who are gifted in sports. basketball, 4 gifted students in table tennis. In the application of the decision support system to determine interests and sports talents has been successfully made and running well to assist and facilitate the decision-making process of sports interests and talents.

Keywords: Interest, Sports Talent, Bayes Method, Decision Support System

1. Introduction

Talent identification has now been widely developed and is very useful in producing athletes who are able to excel at the international level. Several important aspects can promote maximum performance in the future, including physiological, psychological and sports aspects, which are identified in many sports interest and talent recommendations.

The system is a network of interrelated procedures that are combined together to perform an activity or achieve a specific goal. Emphasis on systemic factors means a set of elements that interact to achieve certain goals (Andayati, 2012).

Decision support system is a system that is able to provide the ability to solve a problem and provide a solution to a problem. Decision support systems have the ability to solve a problem by providing information or suggesting a decision, DSS can be defined as a system that supports the work of a manager in making decisions about a problem. (Hamdhani & Imbar, 2015).

This decision support system was created to make it easier for sports teachers, especially with this decision support system it can help schools to increase students' interests and talents in the field of sports.

In determining the interests and talents of this sport, students can choose when they first register as prospective students and students in the form on the registration form. The existence of this support system proves that it is easier to group the interests and talents of students and is also more optimal in developing the interests and talents of students.

The method applied to this decision support system is the Bayesian method, the Bayesian method is one of the most widely used decision-making methods, developed to solve decision-making problems by determining the probabilistic value of events and the value of the evidence obtained. on the object being searched for. Decision making with this method requires information about the possibilities of each alternative to the problem being solved to produce the expected value on which the decision is based. Some of the advantages of the Bayes method are that it is easy to understand, simple coding and faster calculations (Rangkuti, 2011).

In general, Bayesian weighting is carried out based on the level of belief, confidence, experience, including the context of decision making. Bayesian decision making is done by determining the condition of an event and then determining the event from 0 to 1, the Bayesian method is used in decision making by calculating the probability of the cause of an event depending on the degree of influence that can be obtained.

2. Method

2.1 Bayes

The Bayes theorem method is part of probability engineering that is capable of dealing with everyday life, emphasizing the concept of probability and proof (Manik Prihatini, 2011).

This research is used to quickly identify and classify sports talent interests. By using the Bayesian method decision system can make it easier to classify the interests of sports talent from students and students. As well as assisting teachers in making decisions to determine the interests of students' sports talent.

For example, X and Y are two events in the sample space S, there are 2 types of conditional events including:

1. The probability of an event X with the condition that Y is written $P(X|Y)$ is the probability of the occurrence of a known event X being known if event Y has occurred. The probability of X in Y is the percentage of the number of X in Y. The probability of X in Y can be found by dividing the probability of interaction between X and Y by the probability of Y.

$$P(X|Y) = \frac{p(X \cap Y)}{p(Y)}$$

Or

$$P(X \cap Y) = P(X|Y)P(Y)$$

2. The probability that Y will occur if X is written $P(Y|X)$ is the probability that Y will occur if event X has occurred. The probability of X in Y is the percentage of the number of Y in X.

$$P(Y|X) = \frac{p(X \cap Y)}{p(X)}$$

Or

$$P(X \cap Y) = P(Y|X)P(X)$$

Referring to equation 2 and equation 4, it is obtained:

$$P(X|Y)P(Y) = P(X \cap Y) = P(Y|X)P(X)$$

$$P(X|Y) = \frac{p(X \cap Y)}{p(Y)} = \frac{p(Y|X)P(X)}{p(Y)}$$

$$P(X|Y) = \frac{p(Y|X)P(X)}{p(Y)}$$

Where :

$P(X|Y)$ = probability of occurrence of event X provided that event Y has occurred;

$P(Y|X)$ = probability of occurrence of event Y provided that occurrence of X has occurred;

$P(Y)$ = probability that Y will occur.

If $X \cap Y = \emptyset$, then the occurrence of event X does not affect the occurrence of event Y or $P(X|Y) = 0$, as well as occurrence of event x or $P(X|Y) = 0$, so that X and Y are independent or not. Interplay. Two events X and Y are independent if and only if $P(Y|X) = P(Y)$ and $P(X|Y) = P(X)$.

Calculations with Bayes' theorem can use the following equation (Conditional et al., 2016)

$$P(H_i|E_1, E_2, \dots, E_n) = \frac{P(E_1 E_2 \dots E_n | H_i) P(H_i)}{\sum_{k=1}^m P(E_1 E_2 \dots E_n | H_k) P(H_k)}$$

Description :

$P(H_i|E)$ = Probability of event H occurring if evidence E occurs

$P(E|H_i)$ = Probability of occurrence of evidence E if event H occurs

$P(H_i)$ = Probability of event H regardless of any evidence

$P(E)$ = Peluang kejadian *evidence E* tanpa memandang apapun

3. Results and Discussion

3.1 Rule Formation

The formation of this rule is used to define the search process or determine identity. It can be seen that there are five criteria in determining the selection of sports interests and talents, namely the value of height, weight, interests, talents, discipline and achievements in a predetermined order. As for these criteria, a level of importance for the criteria is determined based on the weight value that has been determined into the Bayes number. The suitability rating for each criterion is as follows

Table 1. Weight Value

<i>Alternatif</i>	<i>Olah Raga</i>
A1	Sepak Bola
A2	Bola Volly
A3	Bola Basket
A4	Bulu Tangkis
A5	Tenis Meja

Table 2. Alternative Sports

<i>Bilangan Bayes</i>	<i>Nilai</i>
Rendah	0,6
Cukup	0,7
Tinggi	0,8
Sangat Tinggi	0,9

3.2 Data Analysis

The data collected in the form of data on height, weight, interests, talents, disciplines and types of sports along with the rules of the Bayes theorem. Along with other supporting data. Following are the results of the suitability rating for each alternative criteria, namely:

Table 3. of Compatibility Rating of Each Alternative

	<i>ALTERNATIF</i>	<i>KRITERIA</i>				
		C1	C2	C3	C4	C5
1	Siti Aisyah Nasution	0.7	0.7	0.8	0.7	0.7
2	Abdul Hadi Nasution	0.8	0.8	0.8	0.7	0.8
3	Adinda Lubis	0.7	0.7	0.7	0.7	0.7
4	Ahmad Ridoan Hsb	0.8	0.8	0.7	0.7	0.9
5	Ahmad Yani Hsb	0.7	0.7	0.8	0.7	0.7
6	Ahmad Ashari	0.8	0.8	0.8	0.8	0.8
7	Ali Mustamin Hsb	0.7	0.8	0.8	0.8	0.7
8	Andri Harahap	0.8	0.7	0.7	0.7	0.8
9	Baginda Hasibuan	0.9	0.8	0.8	0.7	0.8
10	Borkat Nauli	0.9	0.8	0.7	0.7	0.8
11	Dewina Lubis	0.8	0.8	0.7	0.7	0.9
12	Hamidi Akbar Lbs	0.7	0.6	0.8	0.8	0.8
13	Hamzah Pansuri	0.8	0.8	0.9	0.8	0.7
14	Icha Rianti Hrp	0.7	0.7	0.7	0.6	0.8
15	Iqbal Saleh	0.8	0.8	0.8	0.7	0.7
16	Isnan Batara	0.7	0.8	0.7	0.7	0.9
17	Joni Hamdani	0.8	0.7	0.7	0.7	0.9
18	Juliana Nasution	0.7	0.8	0.7	0.6	0.7
19	Khoirul Azwar	0.8	0.7	0.8	0.7	0.8
20	Lenni Irawati Hsb	0.8	0.8	0.8	0.8	0.8
21	Lisda Khairani Dly	0.7	0.6	0.6	0.6	0.8
22	M Mulyadi Nst	0.7	0.7	0.8	0.7	0.7
23	Maradongan Pasaribu	0.7	0.7	0.8	0.8	0.7
24	Maysaroh Hasibuan	0.7	0.7	0.7	0.6	0.7
25	Melisah Harahap	0.8	0.8	0.7	0.7	0.9
26	Mhd Ali Gusnan	0.8	0.9	0.8	0.7	0.8
27	Mhd Rajab Hsb	0.7	0.7	0.8	0.7	0.8
28	Mhd Riski Sihombing	0.8	0.8	0.8	0.8	0.8
29	Miftahuddin Hsb	0.8	0.8	0.8	0.7	0.6
30	Misran Nasution	0.7	0.7	0.8	0.8	0.7

31	Munawir	0.7	0.7	0.8	0.8	0.6
32	Nina Sagala	0.8	0.7	0.7	0.6	0.8
33	Nurul Hasanah Lubis	0.7	0.7	0.7	0.7	0.7
34	Palahuddin Nasution	0.8	0.8	0.7	0.7	0.7
35	Pardamean	0.7	0.7	0.8	0.7	0.8
36	Paujan Daulay	0.7	0.9	0.8	0.8	0.7
37	Rika yanti Hasibuan	0.7	0.7	0.7	0.6	0.7
38	Riswan Fahmi Nst	0.8	0.8	0.7	0.7	0.7
39	Rizkina Nasution	0.7	0.8	0.8	0.8	0.7
40	Rizky Wahyuni Lbs	0.8	0.8	0.8	0.8	0.8
41	Sabar Iranto	0.7	0.6	0.8	0.9	0.7
42	Sahrudi	0.8	0.7	0.7	0.7	0.8
43	Sela Marisa Nasution	0.7	0.6	0.7	0.7	0.7
44	Siti Aminah	0.8	0.7	0.7	0.6	0.7
45	Siti Soleha Hasibuan	0.7	0.7	0.7	0.7	0.8
46	Subuh Nurjannah	0.8	0.8	0.7	0.7	0.8
47	Suhandri	0.8	0.7	0.8	0.7	0.9
48	Suryani Lubis	0.7	0.8	0.7	0.6	0.8
49	Torkis Muda Nst	0.7	0.7	0.8	0.8	0.7
50	Zakiah Khairani Hrp	0.8	0.8	0.8	0.8	0.8

3.3 Data Representation

Bayes calculation trials are applied to the criteria for interest and sports talent to get results from each sport, the steps for calculating Bayes are as follows:

1. Determine the probability value, first define the probability of each evidence for each hypothesis based on the existing sample data using the Bayesian probability formula.
2. To find the universe can be added from the above hypothesis :

$$\sum_{k=a}^n = C1 + C2 + C3 + C4 + C5$$

3. After obtaining the sum above, the formula for calculating the universe is obtained
4. Determine the probability value of the hypothesis $P(H_i)$ after the value of $P(H_i)$ is known, the probability value of the hypothesis H regardless of any evidence.

$$\sum_{k=a}^n = P(H_i) \times P(E|H_i - n)$$

5. Determining the value of $P(H_i | R)$ looks for the P value ($H_i | E$) or the probability that the H_i hypothesis is true if given evidence of E .

$$P(H_i|E) = e^x = \frac{P(E|H_i) * P(H_i)}{\sum_{k=1}^n P(E|H_k) * P(H_k)}$$

6. After getting all the P values ($H_i | E$), then add up all the Bayes values with the following formula:

$$\sum_{k=a}^n Bayes = P(E|H_1) * P(H_1|E_1) + \dots + P(E|H_i) * P(H_i | E_i)$$

Table 4. Sports Data Analysis Results

No	Nama Siswa	(C1)	(C2)	(C3)	(C4)	(C5)	Nilai Teorem a	Minat dan Bakat
1	Ahmad Ashari	0.18616	0.18616	0.17656	0.20896	0.17536	93	Bola Basket
2	Baginda Hsb	0.26505	0.18616	0.17656	0.14	0.17536	94	Bola Basket
3	Hamza Pansuri	0.18616	0.18616	0.25137	0.20896	0.11746	95	Bola Basket
4	Lenni Irawati	0.18616	0.18616	0.17656	0.20896	0.17536	93	Bola Basket
5	Ali Gusnan	0.18616	0.26505	0.17656	0.14	0.17536	94	Bola Basket
6	Mhd Riski	0.18616	0.18616	0.17656	0.20896	0.17536	93	Bola Basket
7	Rizky wahyuni	0.18616	0.18616	0.17656	0.20896	0.17536	93	Bola Basket
8	Zakia khairani	0.18616	0.18616	0.17656	0.20896	0.17536	93	Bola Basket
9	Abdul Hadi	0.18616	0.18616	0.17656	0.14	0.17536	86	Bola Volly
10	Ahmad Ridoan	0.18616	0.18616	0.1183	0.14	0.24966	88	Bola Volly
11	Ali Bustamin	0.12474	0.18616	0.17656	0.20896	0.11746	81	Bola Volly
12	Borkat Nauli	0.26505	0.18616	0.1183	0.14	0.17536	88	Bola Volly
13	Dewina Sari	0.18616	0.18616	0.1183	0.14	0.24966	88	Bola Volly
14	Iqbal Saleh	0.18616	0.18616	0.17656	0.14	0.11746	81	Bola Volly
15	Isnan Batara	0.12474	0.18616	0.1183	0.14	0.24966	82	Bola Volly
16	Joni Hamdani	0.18616	0.12474	0.1183	0.14	0.24966	82	Bola Volly
17	Khairul azwar	0.18616	0.12474	0.17656	0.14	0.17536	80	Bola Volly

18	Melisah Hrp	0.18616	0.18616	0.1183	0.14	0.24966	88	Bola Volly
19	Pauzan Dly	0.12474	0.26505	0.17656	0.20896	0.11746	89	Bola Volly
20	Rizkina Nst	0.12474	0.18616	0.17656	0.20896	0.11746	81	Bola Volly
21	Subuh Nurjannah	0.18616	0.18616	0.1183	0.14	0.17536	81	Bola Volly
22	Suhandri	0.18616	0.12474	0.17656	0.14	0.24966	88	Bola Volly
23	Maradongan Psr	0.12474	0.12474	0.17656	0.20896	0.11746	75	Sepak Bola
24	Palahuddin Nst	0.18616	0.18616	0.1183	0.14	0.11746	75	Sepak Bola
25	Sabar Rianto	0.12474	0.07854	0.17656	0.29754	0.11746	79	Sepak bola
26	Riswan Fahmi	0.18616	0.18616	0.1183	0.14	0.11746	75	Sepak Bola
27	Mhd Rajab	0.12474	0.12474	0.17656	0.14	0.17536	74	Sepak Bola
28	Hamidi Akbar	0.18616	0.07854	0.17656	0.20896	0.17536	76	Sepak Bola
29	Miftahuddin	0.18616	0.18616	0.17656	0.14	0.07398	76	Sepak Bola
30	Munawir	0.12474	0.12474	0.17656	0.20896	0.07398	71	Sepak Bola
31	Andri Hrp	0.18616	0.12474	0.1183	0.14	0.17536	74	Sepak Bola
32	Torkis Muda	0.12474	0.12474	0.17656	0.20896	0.11746	75	Sepak Bola
33	Misran Nst	0.12474	0.12474	0.17656	0.20896	0.11746	75	Sepak Bola
34	Pardamean	0.12474	0.12474	0.17656	0.14	0.17536	74	Sepak Bola
35	Sahrudi	0.18616	0.12474	0.1183	0.14	0.17536	74	Sepak Bola
36	Ahmad Yani	0.12474	0.12474	0.17656	0.14	0.11746	68	Bulu Tangkis
37	Siti Aisyah Nst	0.12474	0.12474	0.17656	0.14	0.11746	68	Bulu Tangkis
38	Adinda Lubis	0.12474	0.12474	0.1183	0.14	0.1746	63	Bulu Tangkis
39	Icha Rianti Hrp	0.12474	0.12474	0.1183	0.8814	0.17536	63	Bulu Tangkis
40	Juliana Nasution	0.12474	0.18616	0.1183	0.8814	0.11746	63	Bulu Tangkis

41	M Mulyadi	0.12474	0.12474	0.17656	0.14	0.11746	68	Bulu Tangkis
42	Nina Sagala	0.18616	0.12474	0.1183		0.17536	69	Bulu Tangkis
43	Nurul Hasanah	0.12474	0.12474	0.1183	0.08814	11746	63	Bulu Tangkis
44	Siti Aminah	0.18616	0.12474	0.1183	0.08814	0.11746	63	Bulu Tangkis
45	Siti Soleha	0.12474	0.12474	0.1183	0.14	0.17536	68	Bulu Tangkis
46	Suryani Lubis	0.12474	0.18616	0.1183	0.8814	0.17536	69	Bulu Tangkis
47	Sela Marisa	0.12474	0.07854	0.1183	0.14	0.11746	58	Tennis Meja
48	Rika Yanti Nst	0.12474	0.12474	0.1183		0.11746	57	Tennis Meja
49	Maysaroh Hsb	0.12474	0.12474	0.1183	0.08814	0.11746	57	Tennis Meja
50	Lisda Khairani	0.12474	0.07854	0.07446	0.08814	0.17536	54	Tennis Meja

4. Conclusions

From the results of the analysis that has been carried out, it can be concluded that the research carried out is: The application of a decision support system that identifies sports interests and talents has been successfully established and is running well to assist and simplify the decision-making process for sports interests and talents at SMA N 1 Barumun Selatan. From the results of the trial, 05 samples of students to try calculations using the Bayes theorem method which were applied to the criteria for the interests and talents of sports students of SMA Negeri 1 Barumun Selatan got the results that 8 students had interests and talents in basketball, 14 students were gifted in volleyball, 13 gifted students in soccer, 11 gifted students in badminton, 4 gifted students in table tennis.

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