

Application for Selection of Student Final Project Supervisors Based on the Selected Category and Expertise of Lecturers Using the Naive Bayes Classifier Method

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Abstract— At the end of the task the supervisor has an important role for the success achieved and graduation of students. For this reason, ideal supervisors are needed for students. As discussed in the STMIK Hang Tuah Pekanbaru in the process of submitting the title of this thesis, so are some of the problems that arise, namely regarding the matter of coaching because the process is still using conventional methods that is based on personal knowledge of the Head of Study Program, the difficulty of the development process of submitting the Student's final position for difficulties check the final supervisor's assignment. The application of selecting the final project supervisor for students is the solution of the debate. The supervisor lecturer recommendation system that can utilize the naïve bayes classifier algorithm as a determinant of the probability of the lecturer results students can choose. Naive Bayes is a prediction technique based on simple probabilities based on the application of the Bayes theorem (Bayes rule) with a strong assumption of independence. The selection is based on the final criteria for the assignment and expertise of the lecturer. From the application of this recommendation is obtained from the recommendations of supervisors in accordance with the concept of the student's final project. With reference data, training and Bayes rules obtained sufficient results to satisfy students in getting a supervisor who is in accordance with the topic of the student's final project.

Keywords— naïve bayes classifier, decision support system, supervisory lecturer selection application

I. INTRODUCTION

Students ask the supervisor of the final project that can be a means of consultation in the process of working on the student's final project was studied by leng [1]. Thus students are expected to be able to do the final project well, smoothly and finish on time was studied by qin [2].

One of the graduation requirements for STMIK Hang Tuah Pekanbaru students, be it Information Systems Study Program or Informatics Engineering Study Program, is to make a scientific paper in the form of a thesis which is the

final project was studied by Solanki [3]. In preparing the final project, students really need a supervisor as a place to consult and discuss in the progress and completion of student final assignments was studied by song [4]. Supervisors should be people who master the field that is the topic of student final assignments, so that the process of compiling and mentoring between students and supervisors can run optimally was studied by irawan [5].

The accuracy in selecting supervisors in the process of preparing student final assignments plays an important role in determining the success and graduation of student final assignments was studied by varuna [6]. Students need an ideal final assignment supervisor, namely a supervisor who can provide input, direction, explanation, and fully understand the themes, topics, and case studies in student final assignments was studied by chandrasekar [7].

The process of determining the student's final assignment supervisor at STMIK Hang Tuah Pekanbaru is currently the task of the Head of Study Program and is still using conventional methods was studied by muhardi [8]. Where students submit the title of the final project in the system then selected based on the criteria for the title of the student's final project and if the title of the student's final project is accepted, the Head of the Study Program will immediately determine the student supervisor based on personal knowledge of the specifications and competence of the lecturer's expertise in accordance with the topic of the student's final project was studied by wang [9].

Based on the process of determining the student's final assignment supervisor, there are still problems and obstacles that often lead to less than optimal decision results were studied by bhakre [10]., namely the possibility of errors in determining the student's final assignment supervisor because the Head of Study Program only relies on personal knowledge of the specifications and competence of the lecturer was studied by netti [11].

This will have bad consequences for the preparation of student final assignments, if the supervisor determined by the Head of the Study Program is not appropriate and does not master the topic of the student's final project under his guidance was studied by Irawan [12]. The consultation process will not run optimally and the results of the student's final project will be unsatisfactory was studied by baati [13].



Even though in the process of finalizing the final project, students really need a supervisor who is able to provide calm and enlightenment about the problems experienced by students was studied by wu [14], because in the preparation of final assignments students will experience the peak situation in the lecture process which is able to put a lot of pressure on students' thoughts and feelings was studied by lenardo [15].

As is the case with other universities, STMIK Hang Tuah Pekanbaru also implements a student quota system which will be guided by each lecturer who is assigned as the supervisor for student final assignments was studied by qiang [16].

The calculation of Lecturer Workload is based, among others, on the main activities of the lecturer which include: a) Planning, implementing, and controlling the learning process; b) Implementation of evaluation of learning outcomes; c) Guidance and training; d) Research; and e). Community service was studied by badriyah [17]. Activities in the form of implementing additional tasks; and supporting activities was studied by Irawan [18]. Lecturer Workload is at least 40 hours / week, or the equivalent of managing 12 (twelve) credits (Tridarma PT) per semester for lecturers who do not get additional assignments was studied by wahyuni [19]. Meanwhile, for lecturers who get additional assignments, the workload on the lecturers' main activities is adjusted to the amount of the additional assignment load was studied by adi [20]. The workload of the lecturer in guiding structured research in the framework of the preparation of a thesis / final project, thesis, dissertation, or other equivalent design / art / form is a maximum of 10 (ten) students was studied by Irawan [21].

The process of preparing student final assignments is very influential on the final results achieved was studied by seth [22]. At STMIK Hang Tuah, students are required to be able to produce a tangible result from the final project that has been compiled was studied by ordila [23]. If in the design process the student is not mature and the ability of the supervisor who is not in his / her field will produce a real output that is not optimal was studied by fonda [24], the worst possibility is that the student will be unable to complete the final project and will hinder graduation was studied by aksoy [25].

So it is very important to determine the supervisor of the student's final project according to the theme of the student's final project and the scientific field of the supervisor was studied by wahyuni [26]. So that the process of preparation and consultation between students and supervisors runs optimally and the final results of the student's final project can be achieved and satisfying was studied by seref [27].

II. METHODS

The method of making applications in this study uses a prototype method which consists of several stages. The stages in Prototyping are as follows:

1. Collection of needs, based on the problem of selecting the student's final assignment supervisor at STMIK Hang Tuah Pekanbaru and designing the application format to be made.
2. Build prototyping, at this stage build a temporary design of the application to be made and focus on presentation.

The system design process is carried out through three processes, namely:

- a. Process Modeling
Process modeling is carried out using Use Case Diagrams and Sequence Diagrams.
 - b. Data Modeling
Data modeling is done using Class Diagrams.
 - c. Interface Design
The design of the system interface for users is done using the features available in Microsoft Word.
3. Evaluation of prototyping, at this stage an evaluation is carried out based on the prototyping that has been built for application users. If it is appropriate then step 4 will be taken. If not, the prototyping is revised by repeating steps 1, 2, and.
 4. Encoding the system, the stage of translating data or solving problems that have been designed into a specific programming language. In this study, coding was carried out using the PHP programming language and MySQL database.
 5. Testing the system, Testing the system that has been made to prove how accurate the system is designed. The author tests the features of the system, whether it is running according to the design or not. If there are still errors in the program, it will return to the manufacturing process. Testing is done by testing black box to demonstrate the function of the system being operated.
 6. System Evaluation, the user evaluates whether the finished system is as expected. If yes, step 7 is done, if not, repeat steps 4 and 5.
 7. Using the system, at this stage the application is ready for use.

III. IMPLEMENTATION

In this implementation chapter will display the pages contained in the application *monitoring* housing that has been designed and made as described in the previous chapter. This stage is an activity of making a system or application using the help of software or hardware in

accordance with the analysis. and design to produce a working system. Furthermore, an evaluation of the test results is carried out, if the test results have Project.

1. Display The Login

Figure 1 is the login display on the Application for Student Supervisory Lecturer Selection Based on the Choice Category and Lecturer Expertise Using the Naive Bayes Classifier Method. The display of the login menu is shown in Figure 1.

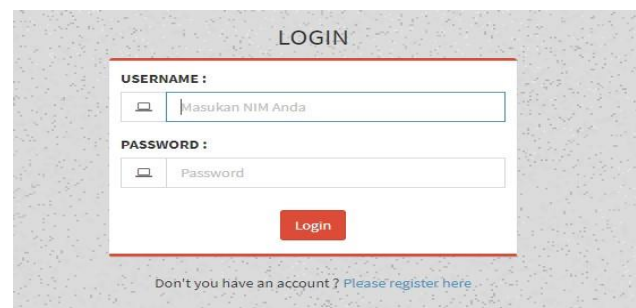


Fig.1. Display the login

The image above is the Login display which is the display after registering from the Application. Where before logging in, you must enter the username and password that was previously registered.

2. Display of Student User Menu for Submission of Results.

Figure 2 is a display of the menu for Student Submission of Results.

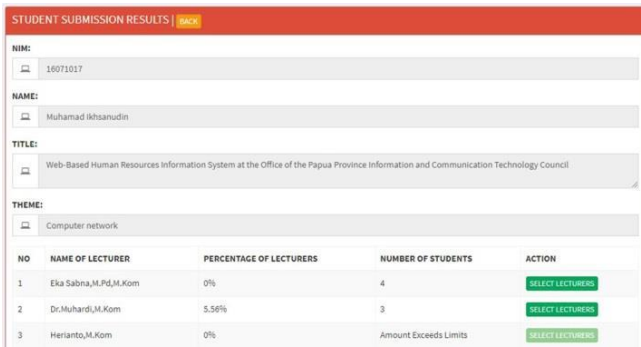


Fig.2. Display submission of result

Figure 2 is a menu display of the results of student submissions that have been inputted previously.

3. Training Menu Display

Figure 3 is a display of the Training Menu.



Fig.3. Display menu display

Figure 3 is a training application data display consisting of Expertise and Lecturers.

4. Lecturer Traffic Menu Display

Figure 4 is a display of the Lecturer Traffic Menu in the application which can be seen as follows. Picture above is a display of lecturer traffic at STMIK Hang Tuah Pekanbaru.

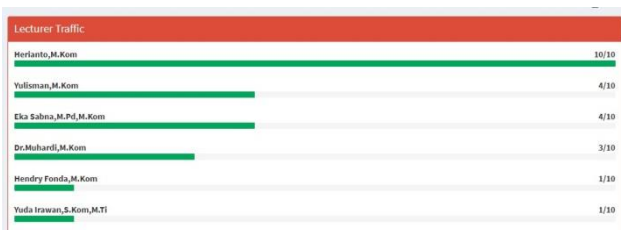


Fig.4. Display lecturer traffic menu display

5. Display of Expertise Probability

Figure 6 is a display of the Expertise Probability Menu of lecturers that has been inputted in the Application for Selection of Student Final Project Supervisors Based on the Choices and Expertise Categories of Lecturers Using the Naïve Bayes Classifier Method.

NO	Name Of Lecturer	Computer network	Operating system	Data Mining	Decision Support System	Expert system	Software engineering	Analysis Information Systems	Computer Accounting	Computer Graphics	Programming language	Artificial Intelligence
1	Herianto,M.Kom	0%	0%	0%	0%	0%	0%	0%	50%	0%	50%	0%
2	Yulisman,M.Kom	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	Eka Sabna,M.Pd,M.Kom	0%	0%	33.33%	0%	33.33%	33.33%	0%	0%	0%	0%	0%
4	Dr.Muhardi,M.Kom	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	Hendry Fonda,M.Kom	0%	0%	50%	50%	0%	0%	0%	0%	0%	0%	0%
6	Yuda Irawan,S.Kom,M.TI	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
7	Anita Febrina,S.T,MTI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

Fig.5. Display of Expertise Probability

Figure 5 is a display of the probability menu of STMIK Hang Tuah Pekanbaru lecturers.

6. Lecturer Probability Menu Display

Figure 6 is a display of the Lecturer Probability Menu.

NO	Naem Of Lecturer	Probability
1	Herianto,M.Kom	11.11 %
2	Yulisman,M.Kom	11.11 %
3	Eka Sabna,M.Pd,M.Kom	16.67 %
4	Dr.Muhardi,M.Kom	11.11 %
5	Hendry Fonda,M.Kom	11.11 %
6	Yuda Irawan,S.Kom,M.TI	5.56 %
7	Anita Febrina,S.T,MTI	5.56 %
8	Yulanda,M.Kom	5.56 %
9	Rika Melyanti,M.Kom	5.56 %

Fig.6. Lecturer probability menu display

The picture in Figure 6 is a display of the probability of a lecturer consisting of the name of the lecturer and the probability.

7. Viewing Menu Display

Figure 7 is a display of the Submission Menu.

Academic Year	Student	Title	Theme	Result	Action
20161	Fikri	Web-Based Home Interior and Exterior Design Reservation Information System Case Study in CI. Graha Anggun Abadi Yogyakarta	Computer network	Select Lecturer 1 Select Lecturer 2 LOOK THE RESULT	PRINT EDIT DELETE
20161	Fikri	Web-Based Student Value Data Processing Information System at Vocational High School (SMK) PGRI 1 Pacitan	Computer network	Select Lecturer 1 Select Lecturer 2 LOOK THE RESULT	PRINT EDIT DELETE
20161	Arif Nurhidayatulloh	Drug Sales Information System at Apotek Jati Farma Arjosari	Computer network	Select Lecturer 1 Select Lecturer 2 LOOK THE RESULT	PRINT EDIT DELETE
20161	Arif Nurhidayatulloh	Web-Based Geographical Information System for Mapping Tourism in Glanyar Regency (Case Study at the Glanyar Regency Tourism Office)	Computer network	Select Lecturer 1 Select Lecturer 2 LOOK THE RESULT	PRINT EDIT DELETE

Fig.7. Viewing menu display

The picture in Figure 7 is a display of the Submission Menu which is used by students in submitting titles to this application.

8. Sample Submission

Table 1 is the sample submission in the research.

TABLE I. SAMPLE SUBMISSION

No	Lecturer Expertise	Lecturer Name
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No	Lecturer Expertise	Lecturer Name
1	Computer network	Dr.Muhardi,M.Kom
2	Computer network	Yulisman,M.Kom
3	Operating system	Dr.Muhardi,M.Kom
4	Operating system	Yulisman,M.Kom
5	Data Mining	Eka Sabna,M.Pd,M.Kom
6	Data Mining	Hendry Fonda,M.Kom
7	Decision Support System	Hendry Fonda,M.Kom
8	Expert system	Eka Sabna,M.Pd,M.Kom
9	Software engineering	Eka Sabna,M.Pd,M.Kom
10	Software engineering	Uci Rahmalisa,S.Kom,M.Ti
11	Analysis Information Systems	Rika Melyanti,M.Kom
12	Analysis Information Systems	Akhmad Zulkifli,M.Kom
13	Computer Accounting	Herianto,M.Kom
14	Computer Graphics	Refni Wahyuni,S.Kom,M.Ti
15	Computer Graphics	Yuda Irawan,S.Kom,M.Ti
16	Programming language	Herianto,M.Kom
17	Programming language	Yulanda,M.Kom
18	Artificial intelligence	Anita Febriani,S.T,M.Ti

Student thesis theme or the expertise of the elective final assignment supervisor lecturer = Software Engineering.

First of all, the posterior supervisor of the final assignment must be searched for the sample.

$$\begin{aligned}
 &P(\text{Herianto,M.Kom}) \\
 &= 2/18/100 = 11.11 \% \\
 &P(\text{Yulisman,M.Kom}) \\
 &= 2/18/100 = 11.11 \% \\
 &P(\text{Eka Sabna,M.Pd,M.Kom}) \\
 &= 3/18/100 = 16.67 \% \\
 &P(\text{Dr.Muhardi,M.Kom}) \\
 &= 2/18/100 = 11.11 \% \\
 &P(\text{Hendry Fonda,M.Kom}) \\
 &= 2/18/100 = 11.11 \% \\
 &P(\text{Yuda Irawan,S.Kom,M.Ti}) \\
 &= 1/18/100 = 5.56 \% \\
 &P(\text{Anita Febriani,S.T,M.Ti}) \\
 &= 1/18/100 = 5.56 \% \\
 &P(\text{Yulanda,M.Kom}) \\
 &= 1/18/100 = 5.56 \% \\
 &P(\text{Rika Melyanti,M.Kom}) \\
 &= 1/18/100 = 5.56 \%
 \end{aligned}$$

$$P(\text{Akhmad Zulkifli,M.Kom})$$

$$= 1/18/100 = 5.56 \%$$

$$P(\text{Refni Wahyuni,S.Kom,M.Ti})$$

$$= 1/18/100 = 5.56 \%$$

$$P(\text{Uci Rahmalisa,S.Kom,M.Ti})$$

$$= 1/18/100 = 5.56 \%$$

Next, you must first look for the Posterior, the supervisor of the student's final project with the skills of the lecturer for the sample.

$$P(\text{Herianto,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Yulisman,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Eka Sabna,M.Pd,M.Kom} | \text{Software engineering})$$

$$= 3/1/100 = 0.33 \%$$

$$P(\text{Dr.Muhardi,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Hendry Fonda,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Yuda Irawan,S.Kom,M.Ti} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Anita Febriani,S.T,M.Ti} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Yulanda,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Rika Melyanti,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Akhmad Zulkifli,M.Kom} | \text{Software engineering})$$

$$= 2/0/100 = 0 \%$$

$$P(\text{Refni Wahyuni,S.Kom,M.Ti} | \text{Software engineering}) =$$

$$2/0/100 = 0 \%$$

$$P(\text{Uci Rahmalisa,S.Kom,M.Ti} | \text{Software engineering}) =$$

$$1/1/100 = 100 \%$$

Furthermore, all probability data are multiplied based on the data from the final assignment supervisor for the sample.

$$\text{Posterior}(\text{Herianto,M.Kom})$$

$$= P(\text{Herianto,M.Kom}) * P(\text{Herianto,M.Kom} | \text{Software engineering})$$

$$= 11.11 \% * 0 \% = 0 \%$$

$$\text{Posterior}(\text{Yulisman,M.Kom})$$

$$= P(\text{Yulisman,M.Kom}) * P(\text{Yulisman,M.Kom} | \text{Software engineering})$$

$$= 11.11 \% * 0 \% = 0 \%$$

$$\text{Posterior}(\text{Eka Sabna,M.Pd,M.Kom})$$

$$= P(\text{Eka Sabna,M.Pd,M.Kom}) * P(\text{Eka Sabna,M.Pd,M.Kom} | \text{Software engineering})$$

$$= 16.67 \% * 33.33 \% = 5.56 \%$$

$$\text{Posterior}(\text{Dr.Muhardi,M.Kom})$$

$$= P(\text{Dr.Muhardi,M.Kom}) * P(\text{Dr.Muhardi,M.Kom} | \text{Software engineering})$$

$$= 11.11 \% * 0 \% = 0 \%$$

$$\text{Posterior}(\text{Hendry Fonda,M.Kom})$$

$=P(\text{Hendry Fonda, M.Kom}) * P(\text{Hendry Fonda, M.Kom} | \text{Software engineering})$
 $= 11.11 \% * 0 \% = 0 \%$

Posterior(Yuda Irawan, S.Kom, M.Ti)
 $=P(\text{Yuda Irawan, S.Kom, M.Ti}) * P(\text{Yuda Irawan, S.Kom, M.Ti} | \text{Software engineering})$
 $= 5.56 \% * 0 \% = 0 \%$

Posterior(Anita Febriani, S.T, M.Ti)
 $=P(\text{Anita Febriani, S.T, M.Ti}) * P(\text{Anita Febriani, S.T, M.Ti} | \text{Software engineering})$
 $= 5.56 \% * 0 \% = 0 \%$

Posterior(Yulanda, M.Kom)
 $=P(\text{Yulanda, M.Kom}) * P(\text{Yulanda, M.Kom} | \text{Software engineering})$
 $= 5.56 \% * 0 \% = 0 \%$

Posterior(Rika Melyanti, M.Kom)
 $=P(\text{Rika Melyanti, M.Kom}) * P(\text{Rika Melyanti, M.Kom} | \text{Software engineering})$
 $= 5.56 \% * 0 \% = 0 \%$

Posterior(Akhmad Zulkifli, M.Kom)
 $=P(\text{Akhmad Zulkifli, M.Kom}) * P(\text{Akhmad Zulkifli, M.Kom} | \text{Software engineering})$
 $= 5.56 \% * 0 \% = 0 \%$

Posterior(Refni Wahyuni, S.Kom, M.Ti)
 $=P(\text{Refni Wahyuni, S.Kom, M.Ti}) * P(\text{Refni Wahyuni, S.Kom, M.Ti} | \text{Software engineering})$
 $= 5,56 \% * 0 \% * 0 \% = 0 \%$

Posterior(Uci Rahmalisa, S.Kom, M.Ti)
 $=P(\text{Uci Rahmalisa, S.Kom, M.Ti}) * P(\text{Uci Rahmalisa, S.Kom, M.Ti} | \text{Software engineering})$
 $= 5.56 \% * 100 \% = 5.56 \%$

Then the calculation results can be obtained with the sample data Software Engineering as the theme of student thesis or the expertise of lecturers are Eka Sabna, M.Pd, M.Kom and Uci Rahmalisa S.Kom, M.Ti with a value of 5.56%.

And the system will automatically calculate the number of guidance students from the supervisor, if the number of guidance students exceeds 10 students, the name of the supervisor will automatically no longer be selected as the student's chosen final assignment supervisor.

IV. CONCLUSION

At the end of this practical work report, the author will present some conclusions that can be drawn and suggestions based on the research findings. In general, the authors conclude that the process of selecting student final assignment supervisors at STMIK Hang Tuah Pekanbaru after using the Application for Student Final Project Supervisor Selection based on the Expertise of Lecturers and the Choice Category Using the Naïve Bayes Classifier Method greatly affects the effectiveness of the process of selecting the final assignment supervisor for students at

STMIK. Hang Tuah Pekanbaru. More specifically, the authors can draw the following conclusions:

1. The application for the selection of the student's final assignment supervisor at STMIK Hang Tuah Pekanbaru was built using the appropriate calculation method and can calculate the probability of conformity between the needs of the student's final project and the supervisor.

2. This application is made based on the category of choice and expertise of lecturers at STMIK Hang Tuah Pekanbaru. There are as many as 12 lecturers who are the supervising lecturers of the final project with 11 skills of the lecturers who are friends of the students' final assignments.

3. The student's final assignment supervisor will be able to be selected by the student directly using the application based on the calculation results listed on the application, so that the selection of the student's final assignment supervisor is appropriate and appropriate to the student's needs.

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