RECOMMENDER COMPUTER SYSTEM WITH PROGRAM OF STUDY METHODS ANALYTICAL HIERARCHY PROCESS (AHP)

by Linda Marlinda

RECOMMENDER COMPUTER SYSTEM WITH PROGRAM OF STUDY METHODS ANALYTICAL HIERARCHY PROCESS (AHP)

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ABSTRACT

Higher education is a continuation of secondary education which was held to prepare students to be members of the public who have academic ability and / or professionals who can implement, develop and / or creating science, technology. Based on region III Kopertis decision about structuring and codification of study programs at universities number: 163/DIKTI/Kep/2007 there are 524 courses that opened by the entire university in Jakarta [Director General of Higher Education socialization Guide], in general and specifically for Community Development Informatics Facility Study Program which 42 have opened. based on data from Kopertis writer made a course recommender system by using Hierarchy Process (AHP), a decision method that requires calculation of several needs. By applying the AHP it is expected that all the factors that play a role in problems of course can be considered to obtain the best possible recommendations. So that prospective students in completing the questionnaire directly obtain the desired decision.

Keywords: Recommender Systems, Analytical Hierarchy Process (AHP), Election Study Program

1. INTRODUCTION

Higher education is a continuation of secondary education was held to prepare students to be members of the public who have the ability and academic or professional who can apply, develop and or creating a science, technology. Continuing studies in college, maybe become a great hope for everyone. To achieve these expectations, all the effort and preparation done early. In reality, not all people can experience the place that favorite college, at least for economic reasons or do not pass the selection tests in college country. Based on region III Kopertis decision about structuring and codification of programs of study at college numbers: 163/DIKTI/Kep/2007 there are 524 courses opened by the entire university in Jakarta[1].

Factors affecting the selection of courses consists of three factors, namely the first factor: Internal self-potential new students which consists of: talent, interests, and majors from the school. The second factor that is career or stacholder required by the company consisting of: able to analyze and mendesaign software and hardware, able to analyze and mendesaign able to analyze accounting systems and computers. The third factor is comprised of external factors: parental choice, the influence of friends, weights, or course, the cost of courses, accreditation of courses and facilities building (stew area, library, laboratory software and hardware, kanting, musollah, LCD, air conditioning)

Because so many factors that will be selected criteria decision making problems the program of study will undoubtedly consider many criteria. Therefore, in this issue techniques used Multi Criteria Decision Making (MCDM), namely decision-making method that requires calculation of multiple needs.

2. FRAMEWORK FOR THOUGHT

Recommender system itself can be defined as a system that produces individualized recommendations as output or system that has the effect to guide the user with a personalized way to select objects of interest and useful among the many possible choices (Burke, 2002).

Recommender systems can be classified with a rating estimation approaches and can be proposed in the literature and will provide various types of surveys Recommender systems. Commonly accepted recommendations. In addition, Recommender systems are usually classified into the following categories (Adomavicius, 2005):

1. Content-based recommendation (Content-based Filtering): The user will be recommended items similar to the user preferred in the past;
2. Collaborative recommendations: (Collaborative Filtering): Users will be recommended items that people with similar tastes and preferences like in the past;
3. Hybrid approach (hybrid collaboration): These methods combine collaborative and content-based methods.

Recommenders systems aim to predict absolute values will give the user ratings have not seen the items, the filtering based on preference, which is relatively predict user preferences.

Content-based Recommender System Recommender System approach to Content-based Filtering (CBF) will provide recommendations by comparing representations of content (content) contained by an item on the representation content of the items attracting users.

Collaborative Filtering (CF)
Recommender System with Collaborative Filtering approach (CF) will work by collecting user feedback in the form of ratings for items within a given domain and exploit similarities and differences between the profiles of several users in determining how to recommend an item.

Hybrid Methods
Several recommendation systems use a hybrid approach combining collaborative and content-based methods, which helps to avoid certain limitations of content-based and collaborative systems.

Process Analytic Hierarchy Process (AHP) Analytic Hierarchy Process (AHP) was introduced by the MADM method (Saaty Saaty, 1988). AHP uses a hierarchy structure between the goals, criteria, sub criteria, until an alternative.

AHP is the working principle of simplifying a complex issue that is not structured, strategic, and dynamic into its parts, and arrange in a hierarchy. Then the importance of each variable is given a numerical value is subjective about the importance of these variables relative to other variables

AHP has many advantages in explaining the decision making process, as can be depicted graphically, so it can be understood by all parties involved in decision making. With the AHP, a complex decision process can be broken down into smaller decisions that can be handled more easily.

The working principle of the AHP are as follows:

1. Compilation hierarchy
2. Assessment Criteria and Alternatives Criteria and alternatives assessed through comparison of pairs. Qualitative opinion of the value and definition of Saaty scale comparisons can be seen in the following table:

Table 1.1 Comparison Scale Saaty
(Marimin, 2005)

VALUE	DESCRIPTION
1	Criteria / Alternative A as important as the criterion / alternative B
3	A little more important than B

VALUE	DESCRIPTION
5	A clearly more important than B
7	A is clearly more important than B
9	A is absolutely more important than B
2,4,6,8	If in doubt between two adjacent values

1. Determination of Priority
   For each criterion and alternative, should be paired comparison (pairwise comparisons).

2. Logical consistencyenentuan Prioritas.

Framework Concept
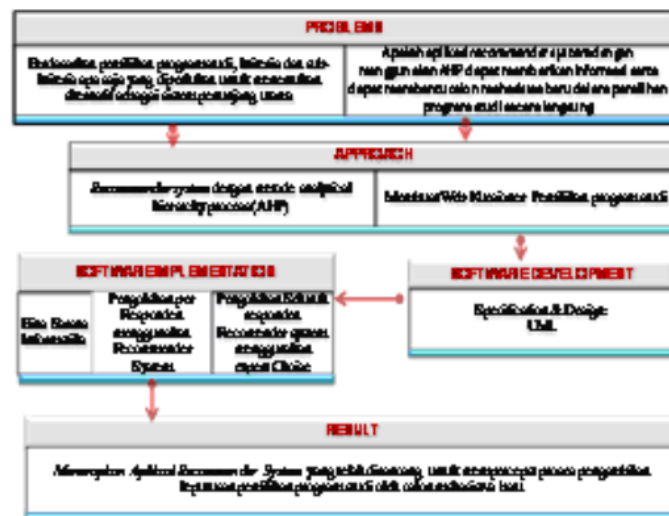
All the elements are grouped logically and consistently ranked in accordance with a logical criterion.

3. RESEARCH METHOD AND SYSTEM DEVELOPMENT

The study begins with the observation of elections Recommender system implementation program of study that aims to minimize errors that will result from the failure of elections due course. This research uses descriptive analytical method by presenting a summary of the survey questionnaires and interviews in the form manually (previous studies). Sampling / Method of Sampling

In this study the data and information collected from respondents prospective new students by using interviewing techniques, observation and charging directly on Recommender systems selection of courses that will be selected. Expected after doing this research prospective new students can choose courses appropriate to their studies as they want, based on alternative weighting ranking obtained, so as to minimize failure or not sesuaiannya charging on Recommender systems applications election study programs.

Data Collection Methods

The study begins by analyzing your needs and create a model in the form of questionnaires. Furthermore, this questionnaire was given to a number of respondents who acted as an expert. Where the process of collecting primary data through surveys and interviews of respondents in the field according to the needs and conditions based on the selection of courses that students want to be selected by the candidate at the time to register.

At the same time, researchers also look for secondary data obtained through mengisian directly, in terms of filling the questionnaire study program through a laptop researchers, where respondents can immediately see whether it is appropriate that the selection manually by Recommender systems courses. The final phase of this study is to perform data processing approach that has been obtained by analytical hierarchy process (AHP) to formulate

the problem and get the ranking of alternatives that will be done when implementing the selection of prospective students courses .

Analysis of the application of multi-criteria selection Recommender systems courses using Content-based Filtering (CBF). The process of filtering information on course selection Recommender system is a process that aims to produce a result of execution that can make a recommendation that is expected by the selection of prospective new students. This process is done by classifying the criteria, sub criteria and alternatives in existing questionnaires. The process of filling the questionnaire by the respondents should be consistent in order to produce the expected outputs. This can be described under a single file relationship with the files contained on Recommender systems namely the selection of study programs
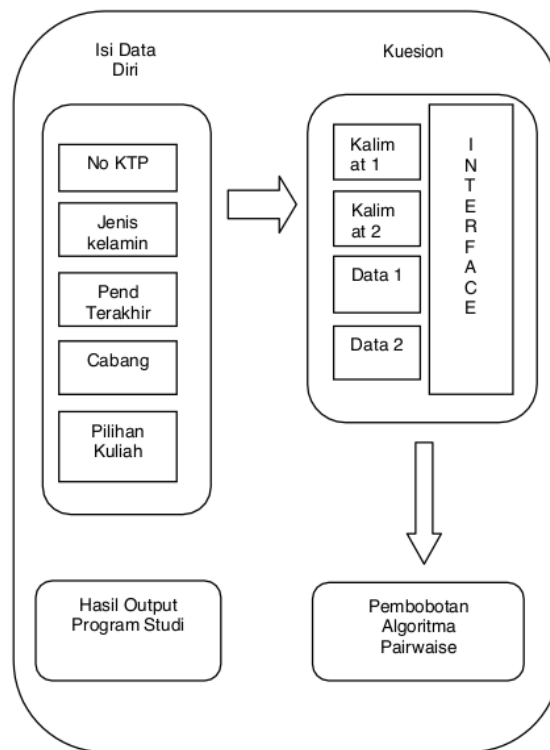
The process of filtering criteria categories, sub criteria and alternatives contained on Recommender systems study programs conducted at the time of the data by the

respondents themselves who must fill out an ID card number, gender (male and female), education end (high school, vocational and Others) and choice early college.

Recommender systems have the characteristics of the electoral program of study as a container or a place to give advice on the criteria - what criteria will be selected or filled in by the respondents. This system will transmit information through a questionnaire study program selection. The selection process for the program in the campus environment in general is as follows:

1. Colleges offer courses that opened to prospective students with information through media advertising (TV, radio, brochures) and others - others. So that the prospective new students find courses that will be selected.

2. Prospective Students prepare for election information on the qualifications desired study program based on internal factors,

external and Career or information for future jobopportunities.

3. Prospective Students select the desired program of study according to their preferences.

In this study developed an algorithm for Recommender system that can facilitate the prospective new students in the process of implementing the second and third. Discussion of the establishment of the system using UML diagrams diataranya: Activity diagrams, Sequential diagram, Class diagram, the relationship between files, Entity Relationship Diagram, (Munawar, 2005).

Activity diagrams illustrate the flow of activity in the system being designed, how each flow starts, the decision might have been, and how they ended.

Proses input quesioner
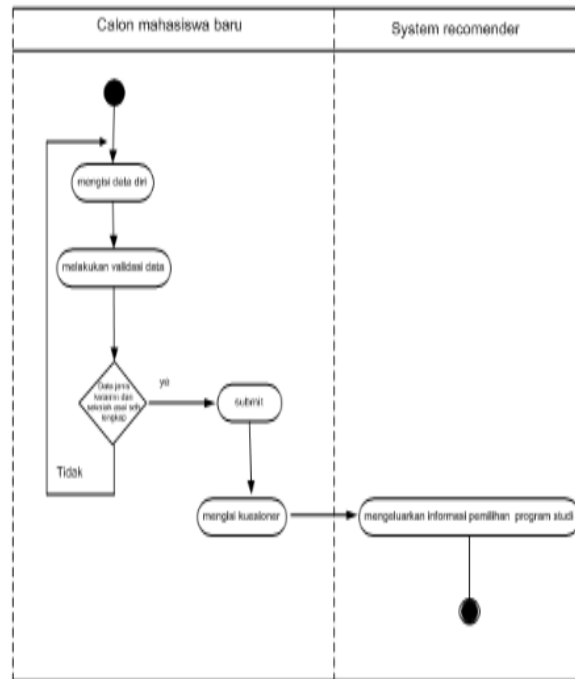
Use Case describes the expected functionality of a system. The emphasis is the "what" is done the system, and not "how"....
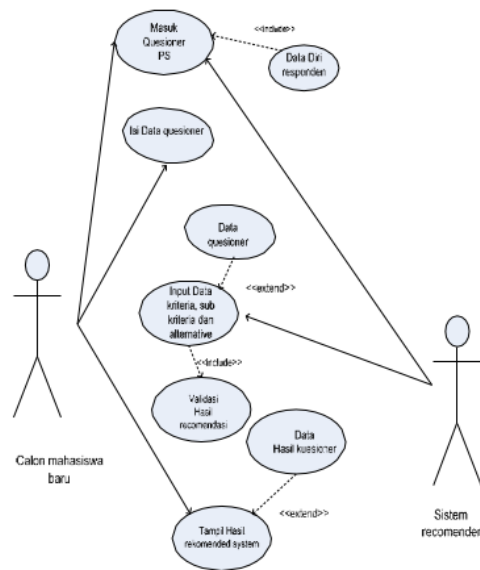
ERD is a model of a relational database based on the perception in the real world, the world is always composed of a set of objects that are interconnected with each other. An object called the entity and the relationships he has called the relationship.
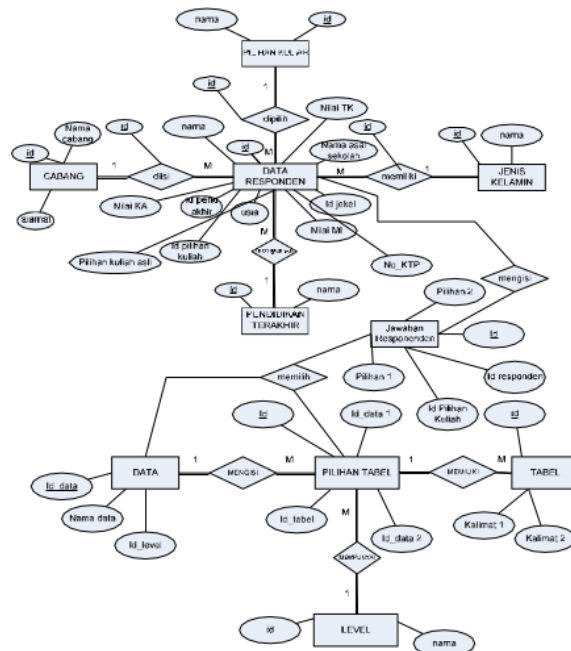
Relations describe the relationship between files on the file relation to one another are interconnected to form a database of questionnaires that can be seen in PHP MyAdmin and can be described as follows

HUBUNGAN RELASI FILE RESPONDEN

HUBUNGAN RELASI FILE PERHITUNGAN AHP
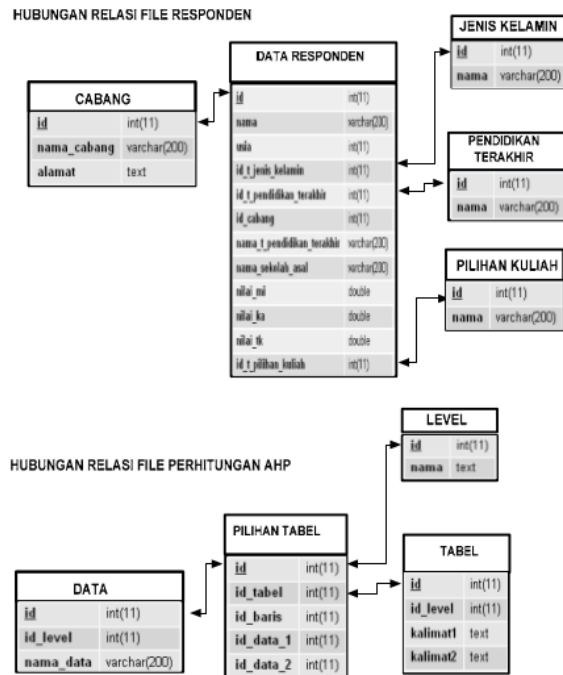
Class is a specification that if diinstansiasi will generate an object and is at the core of the development and object-oriented design

CLASS DIAGRAM AHP
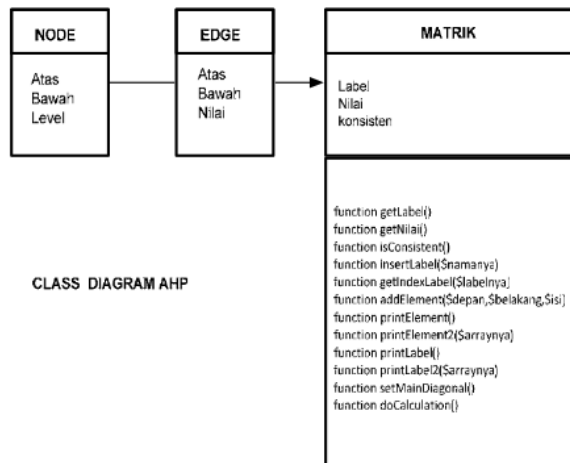
4. RESULTS AND DISCUSSION

Recommender systems testing this application that will be generated by the respondents Approach to the selection process according to (Samsudin, 2005) consists of two, namely:

- Selection approach consists of Succesive Hurdles
- Approach Compensantory

Factors affecting prospective students during the process of filling the questionnaire data consists of:
1. No.KTP
2. Gender
3. The course of study or majors from the school (final education)
4. The initial choice when charging the respondents to the courses that will be selected.

Nama (Optional) :	Putri Kemalawati
No KTP :*	3272045605910001
Jenis Kelamin :*	○ Laki-laki ◉ Perempuan
Pendidikan Terakhir :*	◉ SLTA ○ SMK ○ LAINNYA [ ]
Nama Sekolah asal :	SMAN 27
Cabang BSI :	BSI Kramat 18 ▾
Saat ini Anda sedang kuliah di jurusan / Menurut Anda jurusan yang paling cocok untuk Anda adalah*	◉ Manajemen Informatika (MI) ○ Komputer Akuntansi (KA) ○ Teknik Komputer (TK)

[submit] | Lihat Statistik | Lihat Statistik mis choice | Lihat Data kuesioner |

Lihat Kuesioner untuk peminat program studi (berdasarkan sistem) di Cabang :

[Semua Cabang] [BSI Kramat 18] [BSI Salemba 22] [BSI Cengkareng] [BSI Jatiwaringin] [BSI Bekasi]

Lihat Kuesioner untuk peminat program studi (berdasarkan pilihan awal / kuliah saat ini) di Cabang :

[Semua Cabang] [BSI Kramat 18] [BSI Salemba 22] [BSI Cengkareng] [BSI Jatiwaringin] [BSI Bekasi]

Then the respondents filled out the questionnaire which consists of sentences data kuesiner 1 (comparison criteria, sub criteria and alternatives), sentence 2 (a comparison between a single criterion with other criteria, the comparison between the criteria of one with another sub-criteria, the comparison between the criteria of each alternative the other, comparisons between sub criteria to each alternative) data 1 (criteria sub criteria and alternatives) with data 2 (criteria, sub criteria and alternatives) are comparable and fill in values or interfaces (value weighted by the algorithm pairwaise) on the questionnaire and can see on the picture below an example questionnaire:

RECOMMENDER SYSTEM PEMILIHAN PROGRAM STUDI DI BIDANG KOMPUTER (COMPUTING)

Silakan Isi quesioner di bawah

Batal Isi

Nomor KTP Anda : 3272045605910001

LEVEL 1 : PERBANDINGAN KRITERIA

1. Perbandingan Berpasangan Kriteria Utama

Dalam Strategi Pemilihan PROGRAM STUDI, kriteria manakah yang lebih penting dibandingkan kriteria-kriteria berikut?		Berapa Tingkat Kepentingannya?
◉ Internal Diri Calon Mahasiswa Baru	○ Karir (Stakeholder perusahaan / peluang kerja)	○1 ○2 ○3 ○4 ○5 ○6 ◉7 ○8 ○9
◉ Internal Diri Calon Mahasiswa Baru	○ Eksternal diri calon mahasiswa baru	○1 ○2 ○3 ○4 ○5 ○6 ◉7 ○8 ○9
◉ Karir (Stakeholder perusahaan / peluang kerja)	○ Eksternal diri calon mahasiswa baru	○1 ○2 ○3 ○4 ◉5 ○6 ○7 ○8 ○9

After the respondents filled out questionnaires last then select see the results directly, as shown below

Berdasarkan Hasil Kuesioner yang Anda isi

Dari hasil perhitungan AHP, kecocokan Anda untuk masuk ke jurusan adalah sebagai berikut

Nama Program Studi	Tingkat kecocokan
Manajemen Informatika (MI)	67.14 %
Komputer Akuntansi (KA)	25.62 %
Teknik Komputer (TK)	7.24 %

Berdasarkan kecocokan diatas, maka Anda paling cocok masuk ke jurusan : **Manajemen Informatika (MI)**

kembali

Lihat prosentase Berdasarkan Alternatif

Lihat Bobot Berdasarkan Kriteria

Lihat Bobot Berdasarkan Internal diri calon mahasiswa baru

Lihat Bobot Berdasarkan Karir (Stakeholder/Perusahaan/Peluang Kerja)

Lihat Bobot Berdasarkan External diri calon mahasiswa baru

Based on the results of one of the choice questionnaire respondents generated the weight value 0.6714 or 67.14% of the alternative selected from among computer accounting (25.62%) and Computer Engineering (7.24%).

Then respondenpun can see the results of the respondents based on the choice of alternative graphs are selected based on the respondents and completed questionnaires can be viewed as follows:
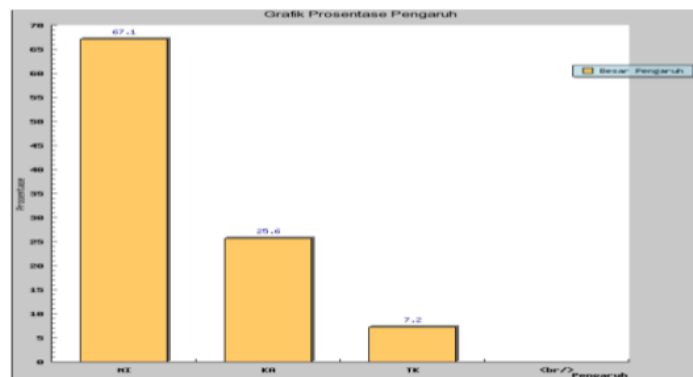
Graphics Image Processing Results of Respondents Based on Alternative Options

Conclusions from the results of the election chart a course based on factors - alternative factors (MI, KA, TK) obtained the largest selection of MI is a program of study with the weight value was 67.1% among study program trains with weights value is 25.62% and kindergarten courses with the weight value is 7.24%.
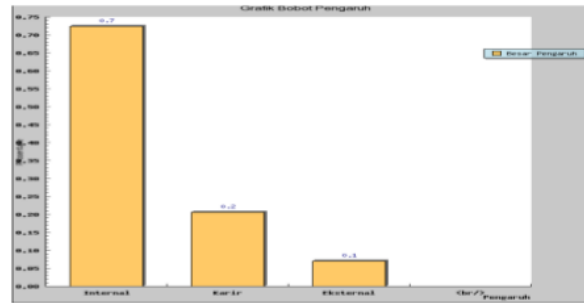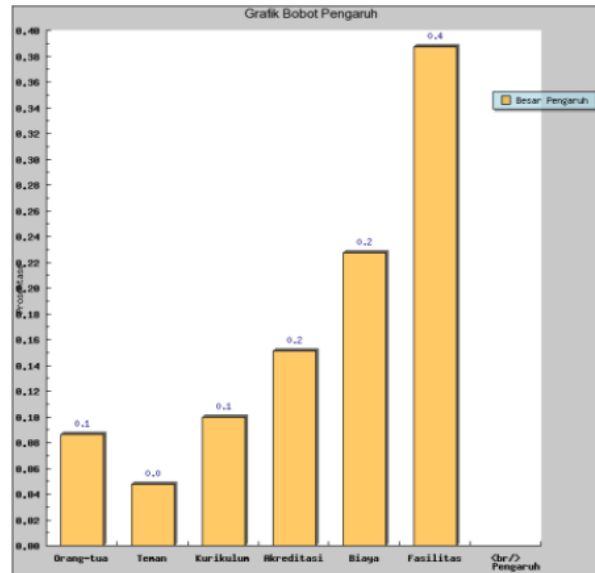
Conclusions from the results of the election chart a course based on factors - factors Sub criteria (Internal self, career and external self) is the largest available choice of internal self or 72.32% of 0.7 between Career 20.58% or by 0.2 and external self by 7% or 0.1

.
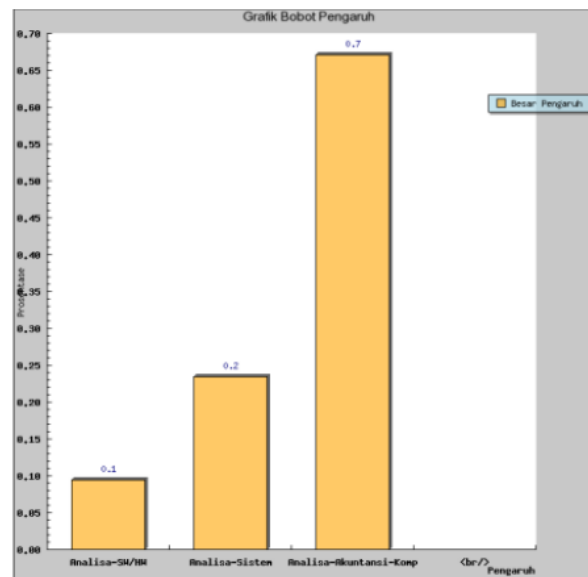
Conclusions from the results of the election chart a course based on factors - factors of the Career of sub criteria analysis SW / HW, systems analysis and accounting analysis computer obtained the largest selection of computer analysis accounting for 67.1% or 0.7 Sub-criteria analysis between the SW / HW 9.4% or by 0.1 between system analysis 23.4% or by 0.2

Conclusions from the results of the election chart a course based on factors - the external factors of self-sub criteria is the choice of parents, peer influence, curriculum or course weights, accreditation, cost, building facilities acquired the largest selection of building facilities for 38.7% or 0 , 4 among the Sub-criteria cost of 0.2 or 22.7%, 15.1% or accreditation of 0.2, the curriculum is 9.9% or by 0.1, the choice of parents by 8.6% or by 0.1 and the influence of friends by 4.7%

7 CONCLUSION

Recommender system is a system that produces individualized recommendations as output or system that has the effect to guide the user with a personalized way to select objects of interest and useful among the many possible choices that are multi-criteria. Data processing is done by the AHP approach, due to the advantages of this analysis technique that is unified single model that is easily understood, is capable of solving complex problems, and can handle the mutual dependence of elements in the system and does not impose a linear thought. Based on the selection criteria for the study program, subkriteria needed to support the alternative as a decision support system:

1. The selection criteria for prospective freshmen internal self 0.364, Career ((stakeholder company or job opportunities) and external self .492 prospective freshmen 0.143. That has the inconsistency = 0.03. Selection Criteria for Career (stakeholder company or job

opportunities) are the main criteria for Recommender System of concern to prospective students in selecting courses at tertiary institutions.

2. Selection Criteria Sub Interests, Talents, Department of the Home school, Ability to control and analyze software and hardware, Capable of analyzing and designing the system. Able to analyze computer accounting, Parents Choice, Peer Influence, course fee, weight or course, course accreditation, Building Facilities (Locations PS, stew area, Library, Facilities Class (AC, LCD, Comp), SW & HW Lab ,Diner, Field Sports, Musollah. are as follows:

- Internal self Criteria prospective students, interest (0.671), talent (.221) and home school majors (.108), which has the inconsistency = 0.20. Selection of interest is a sub-career self-main criteria of concern to prospective students prospective students in selecting courses.

- Criteria Career (stakeholder company or job opportunities): able to control and analyze software and hardware (.484), were able to analyze and mendesaign system (0.343) and were able to analyze computer accounting 0.172. Who have inconsistency = 0.16. Able to control and analyze the selection of software and hardware is a sub-main criterion Career (stakeholder company or job opportunities), which became the attention of prospective students in selecting courses.

- Criteria for external self-selection of prospective students consisting of 0.096 parents, peer influence 0.100, 0.136 curriculum, course accreditation 0.280, 0.210 cost, building facilities (locations PS, stew area, library, classroom facilities (air conditioning, LCD, Computer) Lab Software and hardware, canteen, sports fields, musollah) 0.178. Who have inconsistency = 0.05. Accreditation of study programs is the selection of sub-main criteria external self to the attention of prospective students prospective students in selecting courses.

3. Recommender alternative electoral systems courses are as follows: The alternative electoral system Recommender study programs such as MI (0.632), KA (.242) and TK (0.126). Selection of study programs MI Recommender systems are an alternative to the attention of prospective new students in selecting courses.

Applications Recommender systems can provide information and recommendasi options as possible so that can help new students in selecting courses directly. Use of Recommender system can produce a very quick decision when the respondents fill in the selection of courses, is the use of manual application using expert chiose respondents can not get the results directly or quickly. Recommender weakness of this system can not display inconsistensi per respondent as a matter contained in the software assistant that can provide expert choise inconsistensi details on each - each criterion, and alternative subkriteria

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