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Expert System to Determine the Priority Scale of Case in Laboratory of Forensic Using Forward Chaining and Backward Chaining Methods Rule Based

Setiawan Widiyanto [a], Bayu Surarso[b], Oky Dwi Nurhayati [c]
Master of Information Systems, Diponegoro University, Indonesia [a]
Faculty of Science and Mathematics, Diponegoro University, Indonesia [b]
Departement of Computer Engineering, Diponegoro University, Indonesia [c]

Abstract*— To know finished priority scale of case in Laboratory of Forensic, in this thesis we developed an expert system with forward and backward chaining methods rule based, used some criteria of case. Priority scale of case is done to sort data and determine the stage of case, which will be used, for examination. This process needs an evaluation in a number on aspect in accordance with the criteria and characteristics of the case. The capabilities of this system accommodates input data cases which user needs, priority scale and stages according to the standard operating procedure in Indonesian National Police especially in Laboratory of Forensic branch in Semarang and gives the visual picture like groove determining of the priority scale also the best solution from the several alternatives used forward and backward chaining methods rule based. The result showed a good and ideal decision for solved case by quickly recommendation and main priority of case with the result of compatibility level was 100%.

Keywords : ***Expert System , Forward Chaining, Backward Chaining, Rule Based***

I. INTRODUCTION

Every state has a law enforcement agency with the task force sub scientific disclosure. Labfor is part of the Police who served as a support in the resolution of civil and criminal cases. In the field of law, civil and criminal court completion has grooves for settling disputes and the time limit of detention. The deadline for completion cannot be determined due to the extension of the detention time; the result is hard to predict when the docket will be completed. In the police are responsible for checks in support of the investigation and the investigation of criminal offenses referred to Labfor.

Expert System involving criminal expert opinion is applied to facilitate the judicial process to determine the punishment, which received a suspect who commits an offense to women [8]. The results of the study were able to provide the output of the system in the form of severe penalty imposed. The weakness at the end of the assessment process is carried out again by another expert assessment. Rule Based System (RBS) as the basis for the development of Expert System can be used to overcome these problems, with forward chaining a tracking method that starts from the fact that there is to produce a goal or draw conclusions. This method is particularly useful for monitoring the process in which the facts supporting the existing monitored to produce a conclusion [1].

While Rule Based with backward chaining a tracking method that starts from the expectations or objectives and then try to find evidence or facts that support the hypothesis [1]. This method is particularly useful for the process of giving feedback or suggestions should be made to meet an expectation or goal. Research on the application of Expert System (ES) that is used to solve other problems. Research that has been done by using an expert system rule-based, showed significant increases in the decision making process as an expert system for diagnosing pests, symptoms and diseases [2], [3],[6], [11] and [12]. Based implementation of the rules (Rule Based) have also been used in various areas to assist the process control and process monitoring [9], [4], [5], [7], [8], [9], [14], [10] and [15]. In the case of setting priorities, monitoring the process are needed. This process should be carried out because it can facilitate the leadership of the working unit monitoring the ongoing business processes to fit the purpose. Thus, the Expert System to determine case priorities using the Forward and Backward Chaining Chaining-based rules capable of providing simplicity in monitoring the completion and setting priorities based on the priority level cases that have been assigned to improve the performance of the completion effectively and efficiently in the Police.

II. EXPERT SYSTEM (ES)

An expert system is a model and procedures relating, in a particular domain, which can be compared with the level of expertise the expertise of an expert. According to Durkin, the expert system is a computer program designed to model problem-solving ability is what an expert. Some intervals later, that the expert system is a computer system that could match or mimic the ability of an expert.Architecture experts, composed of two main parts, namely the development environment (development environment) and environmental consultancy (consultation environment) [16]. The expert system development environment is used to enter into the rule base expert expert system environment, while the consulting environment used by non-expert users to obtain expert knowledge. The components of the expert system is divided into two parts and was found in Figure 1 as follows:

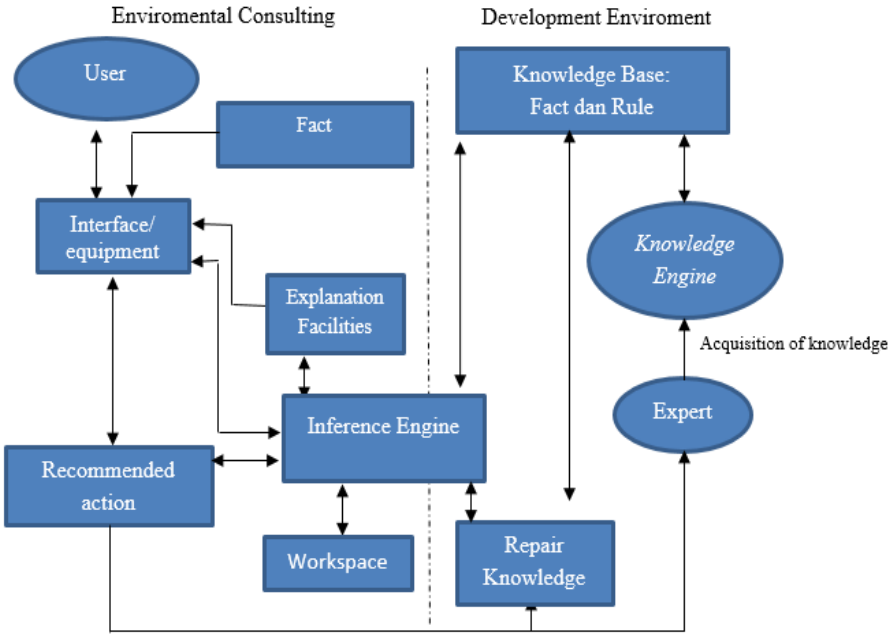

Fig 1. Architecture Expert System

In the implementation the knowledge base gained from the knowledge of experts and rules on the Police.

2.1 METHOD OF FORWARD CHAINING

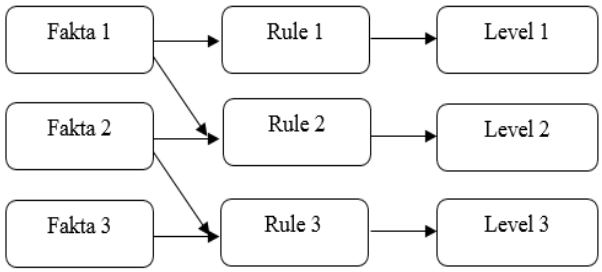

Fig 2. Forward Chaining

Forward chaining is a data-driven approach (data-driven) that is tracking that starts from the facts that there is to be matched at the IF or IF-THEN rules to produce a goal.

2.2 METHOD OF BACKWARD CHAINING

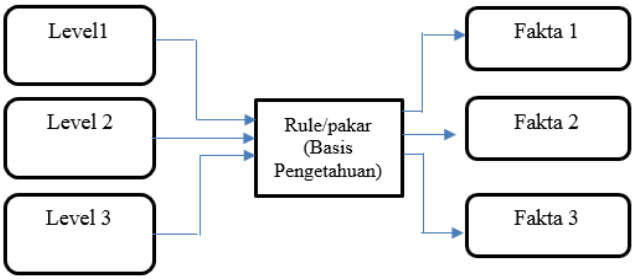

Fig 3. Backward Chaining

Tracking backward (backward chaining) is driven approach goal (goal driven) that is tracking that starts from the goal, then sought rules that have the purpose to conclusions. Furthermore, the tracking process using the premise of the rule as a new destination and looking for another rule with a new purpose as a conclusion.

III. METHOD

The data in this study using secondary data, the number of case with many type of examination cases are cases that have been tested with kriminalistic science in Forensic Laboratory in Semarang that have been reported on a monthly basis in Jateng ranks of the regional police and the regional police special region of Yogyakarta 2015.The data processing in this study conducted process using method 2 as the combination of forward and backward chaining method in which to forward method is used to determine the priority of the case, while backward is used to view the scale of the case have been examined.

Stages groove case investigation using forward and backward chaining method in this study are as follows:

1. *Enter the data docket in accordance with the facts,*
2. *incoming data will be processed in the inference engine, where in it has grown 16 rule of experts of 5 Subbid in forensic laboratories,*
3. *The next results of the process can be seen cases examined included in level 1 to 6.*

Fig. 4 Flowchart priority cases using Forward and Backward Chaining

IV. RESULT

Civil and criminal law is the rule of law regarding the violations and crimes that affect the social aspect. To impose a sentence that previously required a series of processes for settling disputes, therefore the required priority for settling disputes. As shown in Figure 4. With the above basic as forensic experts consisting of experts in each field Sub Division (Kasubbid Balmetfor, Kasubbid Dokupalfor, Kasubbid Narkobafor, Kasubbid Kimbiofor and Kasubbid Fiskomfor) divides the completion into 6 levels of completion (for a maximum of 3 days of drug cases and for cases other than drugs up to 28 days if more than 28 days, the case rises as a priority case. as for the facts that make the priority scale in Table 1.

TABLE 1. CRITERIA PRIORITY SCALE

No	Criteria Priority Scale
1	Offenders under 40 years of age
2	Occupation Victims
3	Performers = Public Works Leaders (Officer, Artist, etc.)
4	Event Time Range
5	The object of the crime is vital
6	There Attention Leaders

Based on Table 1, the criteria of priorities is the result of interviews that have been documented in the form of a letter of 5 experts, namely; Kimbiofor Subbid experts, experts Subbid Narkobafor, experts Subbid Dokupalfor, Subbid Balmetfor and Subbid Fiskomfor.

This study uses 16 rules in determining the level of priority cases. The results of the study there was no failure in the reading system. method forward chaining and backward chaining capable of being used in the implementation of Expert Systems to determine the priority of the case, as the result of system testing. In the system that has been created to show the performance of systems running properly so that it can be concluded that the performance of the system has been successfully created in accordance with the expected. Results by means of simulation on the process of implementation of the Expert System with the system. In Table 2, there are 6 cases in January from a total of 12 cases have different treatment according to experts in the handling of his case, adapted to the level of 1 to 6.

TABLE 2. TABLE SUMMARY OF THE CASE TESTED

case number	Tsk Age (years)	Occupation Victims	Work suspect	The time range (days)	TKP	Attention
2	17	-	Pelajar	7	Object Non-Vital	important people in the police
7	37	Staff polri	Staff polri	22	Obyek vital	none
4	39	staff administration	staff administration	20	Object Non-Vital	none
3	38	staff administration	staff administration	9	Object Non-Vital	none
10	40	Private	staff administration	12	Object Non-Vital	none
6	35	-	Private	9	Object Non-Vital	none

From the results of the implementation of the system found that the level of conformity of 6 cases tested in accordance with the results of the output system has 6 levels that matter.

TABLE 3. TABLE CONFORMITY WITH THE RESULTS OF THE EXPERT *SYSTEM*

TSK age (years)	Occupation Victims	Work suspect	Rentang waktu (hari)	TKP	Attention	Pakar	Sistem	Result
17	-	Pelajar	7	Object Non-Vital	Pejabat polri	1	1	conformity
37	Staff polri	Staff polri	22	Object vital	none	2	2	conformity
39	Staff administration	Staff administration	20	Object non-vital	none	3	3	conformity
38	Staff administration	Staff administration	9	Object non-vital	none	4	4	conformity
40	Private	Staff administration	12	Object non-vital	none	5	5	conformity
35	-	Private	9	Object non-vital	none	6	6	conformity

From the analysis of the results of the expert and testing of the system output with inputs 6 cases with six different levels of conformity results obtained 100%.

V. CONCLUSIONS

Expert system with methods forward chaining and backward chaining are implementing 16 rules and 6 facts with 8 conditions as well as 6-level scale of priorities using a suspect's age, occupation of victims, work actors, time frames the scene and attention as the basis for priority cases to the object Forensic laboratory Semarang branch have compatibility 100% and able to provide information cases that fall into six levels of priority examination is based on the rules which have been installed in the system that can be used as a reference to a certain level and also outputs information produced is capable of providing status information priorities periodically and periodic case to raise the completion level of case were targeted so that it can be used for monitoring the completion of case.

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