Knowledge_based System for Security Services

Yadanar Moe, Kalyar Myo San
University of Computer Studies,Yangon
Ydn.smile@gmail.com

Abstract

Artificial Intelligent (AI) can be considered as tools that emulate human thought to help in solving problems. Knowledge_based system is an important part of Artificial Intelligence. Knowledge_based systems are software systems that have structured knowledge about a field of expertise. They are able to solve some problems with their domain by using knowledge derived from experts in the field. The most common way that knowledge is represented in knowledge_based system is by IF-THEN rules. This system intends to implement for security services using rule based approach as forward and backward chaining methods. This system includes seven types of security services. The users choose necessary facts among the seven types of security services using forward chaining approach, the system produces the final result cost. The users can change their desired cost using backward chaining approach. Then, system can produce the facts rely on the users' desired cost.

Keywords: knowledge_based system, forward chaining, backward chaining, security services

1. Introduction

Artificial Intelligent (AI) is a subdivision of computer science devoted to create computer software and hardware that attempt to produce results such as those produced by people. Artificial Intelligent (AI) is the science of making computers smart. It is practiced both by those who want to make computers more useful and by those who want to understand the nature of intelligence. Knowledge_based system is a system which has knowledge embedded it. The knowledge can be represented by IF-THEN rules. The rule based system includes two main methods such as forward chaining and backward chaining. Forward chaining starts with the available data and uses inference rules to extract more data until a goal is reached. Backward chaining, goal-driven, which the system looks for the action in the (Then) clause of the rules that matches the specified goal. In this system, users can choose seven types of security services. If users choose one of these services, the system request the necessary facts and information. And then the system produces the final result cost using forward chaining approach. Then, the users can change their desired cost using backward chaining approach. The system can produce the facts rely on the users' desired cost.

2. Related Work

D.W.Bankert and M.Koller presented "Knowledge_basee system for All Branded Cosmetics Online Shopping". In this paper, it is based on the Rule-based Approach (forward and backward chaining). The users can choose all branded cosmetics what they like. The system accepts the inputs such as types of cosmetics (lipsticsk, lotion, make-up, loose-powder,etc), branded name, skin type, etc. The system produces the final cost. The user can be typed their appropriate cost. By using the system, we can know the variety of branded costemics and their cost[2].

M. KhineOo presented "Knowledge_base System for Categorizing Rice Items". In this paper, it is implemented for Rice agriculture in Myanmar, based on Rule-based Approach with inferencing with rule strategy. This is implemented to retrieve the knowledgeable information for the rice growers and agriculture students. This paper can be used from a number of different locations and also by relatively inexperienced staff from anywhere. The users can view the rice information and the system selects the most suitable region, growing period, type of soil. Soil PH, amount of Rainfall and temperature. By using this system, we can get the rice agriculture knowledge and

appropriate suggestion and decision more quickly than human expert[6].

3. Knowledge_Based System (KBS)

Knowledge_based system (KBS) is an important part of the AI. Knowledge_based systems are the software systems that have structured knowledge about a field of expertise. They are able to solve some problems with their domain by using knowledge derived from experts in the field. A knowledge_based system will take the knowledge and experience of an expert and make it available when people needed. The decision making will be consistent and reliable. Other novice users may also benefits from the use of KBS. These system can be applied to any kinds of knowledge in order to solve problems within their domain. The main components of the KBS consists of knowledge base, inference engine, user interface, explanation and learning facilities[3].

3.1. Knowledge Base

The knowledge base is the heart of Knowledge_based system. The knowledge base is simply the store of knowledge which our KBS may call on. This is a database of specific domain knowledge. It contains facts and rules and it represents this knowledge in a very simply form could be understood by human beings. The facts, such as the problem situation and theory of the problem area. The rules that direct the use of knowledge to solve specific problems in a particular domain. The information in the knowledge base is incorporated into a computer program by a process called knowledge representation.

3.2. Inference Engine

The inference engine is the main component of the KBS. The inference engine has the ability to look through the knowledge base and apply the rules to the solution of a particular problem. So, it is the driving force of the KBS. It is essentially a computer program that provides a methodology for reasoning about information in the knowledge base.

3.3. User Interface

The user interface communicates the user with the computer system. The user interface allows the user to type his/her questions to the system in simple English. The system would then recognize the meanings of the questions, and use its inference engine to apply the rules in the knowledge base to deduce and answer. The answer would be communicated back to user in simple English. So, the user interface is the most important part of any software system.

3.4. Explanation and Learning Facilities

A useful KBS should be able to explain the answer that it gives to its user. That is, the system should be able to explain exactly why it has given a particular answer, and what knowledge it has used to reach a particular conclusion. A good KBS should be able to learn from its experiences. A KBS should develop with time as it learns from its own experiences and mistakes. So, knowledge base will grow as the system is used.

3.5. Rule-Based System

The basic idea of this system is that knowledge is represented as production rules in the form of condition-action pair: IF this condition (premise occurs) then some result (conclusion or consequence) will occur. The rule-based system uses a simple technique: It starts with a rule-base, which contains all of the appropriate knowledge encoded into IF-THEN rules, and a working memory, which may or may not initially contain any data, assertions or initially known information. The system examines all the rule conditions (IF) and determines a subset, the conflict set, of the rules whose conditions are satisfied based on the working memory. Of this conflict set, one of those rules is triggered. Which one chosen is based on the conflict strategy. When the rule is fired, any actions specified in its THEN clause are carried out. These actions can modify the working memory, the rule-based itself or do just about things else the system programmer decides to include. This loop of finding rules and performing actions continues until one of two conditions is met: there are no more rules whose conditions are satisfied or a rule is fired whose action specifies the program should terminate.

Which rule is chosen to fire is a function of the conflict resolution strategy.

This system consists of two main methods. They are

- Forward Chaining Approach
- Backward Chaining Approach

3.5.1. Forward Chaining

A forward chaining, data-driven, system that compares data in the working memory against the conditions (IF parts) of the rules and determines which rules to fire. The reasoning starts from the known data and proceeds forward with the data. Each time only the topmost rule is executed. When fired, the rules add a new fact in the database. Any rule can be executed only once. The match fire cycles stops when no further rules can be fired.

3.5.2. Backward Chaining

A backward chaining, goal-driven, which the system looks for the action in the THEN clause of the rules that matches the specified goal. If a rule is found and fired, it takes each of that rules condition as goals and continues until the available data satisfies all of the goals or there are no more rules that match.

4. Application Background

There are seven types of security services in this system. These security services are:

1. Shopping Mall Security Service
2. Super Market Security Service
3. Stage Show Security Service
4. Construction Security Service
5. Residence Security Service
6. Exhibition Security Service
7. Factory Security Service

The shopping mall, super market and factory security services contain man-power service, fire protection service, monitoring service and then detectors.

The stage show and exhibition security services consists of man-power service and detectors.

The construction and residence security services contain man-power service.

Man-power service is security staff. And fire protection service consists of fire extinguisher, fire alarm panel, smoke detector, master bell and electronic bell. Then monitoring service also consists of indoor camera, outdoor camera and CCTV camera. The detectors are metal detector and hand detector.

By using this system, the users can calculate the cost for the requiring materials and security staffs' cost for their related services.

5. Overview of the System

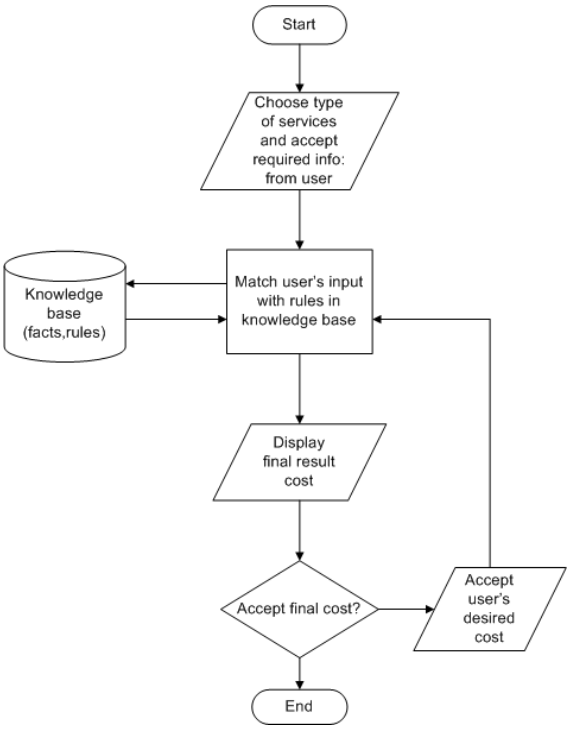


Figure 1. System Flow Diagram of the System

In this system, users can choose one of these services. The system accepts the required information from users. The system fixed the users' information to process in the forward and backward chaining methods. The users can choose the number of security staff and fire protection service and monitoring service and detectors between the minimum and maximum amount of defining rules. The system checks users' input (facts) with the rules in the knowledge base. If the rule exists in the knowledge base, the system will produce the final result cost (goal). If the users can't accept the final cost, they can be changed their cost. At that time, the backward chaining was started. The user's change cost (goal) exists in the knowledge base, the system will produce the

number of security staff, fire protection service, monitoring service and detectors (facts). But the users can be typed the change cost between the minimum and maximum cost that is defined by the system. If the users accept the final cost and materials, the system will terminate.

5.2. System Implementation

This system implemented knowledge_based system for security services using forward and backward chaining approaches. The following figure shows the example rules for Stage Show Security Service.

Rule1 IF no: of detector is 2 AND no: of staff is 34 THEN final cost is 710000

Rule2 IF no: of detector is 1 AND no: of staff is 34 THEN final cost is 610000

Rule 3 IF no: of detector is 2 AND no: of staff is 33 THEN final cost is 695000

Rule 4 IF no: of detector is 1 AND no: of staff is 33 THEN final cost is 595000

Figure 2.Examples of Rules for Stage show

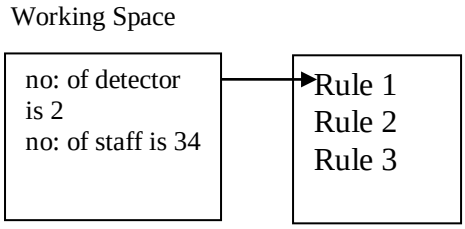
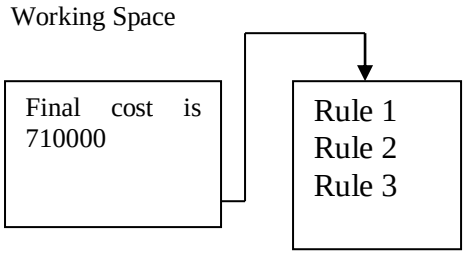
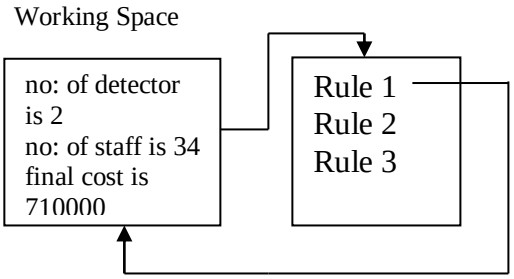


Figure 3. Working Space of Forward Chaining



(a)



(b)

Figure 4. Working Space of Backward Chaining

5.3. User's Input for Stage Show Security Service

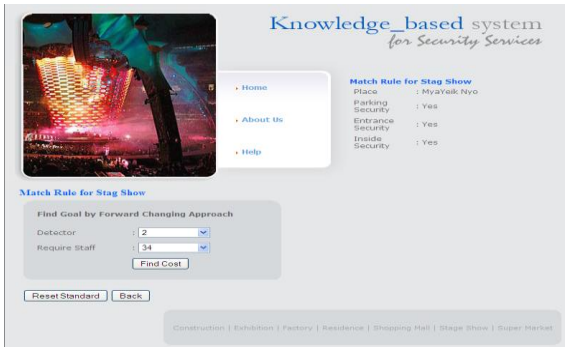


Figure 5. User's Input

Figure 5 shows the user's input of stage show security service. Users can choose no: of detectors and no: of staffs between the minimum and maximum. And then users click find cost button for finding the final cost.

5.4. Final Cost Calculation

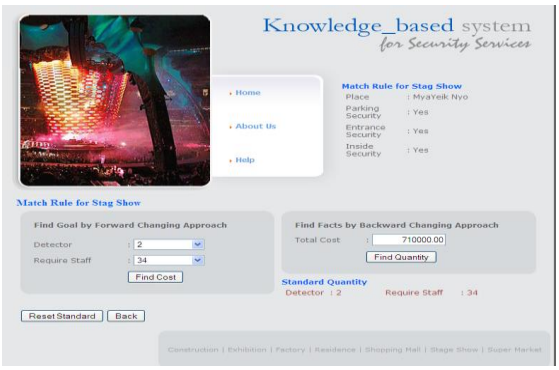


Figure 6. Final Cost Calculation

Figure 6 shows the final cost (goal) by forward chaining approach. In this page, users can change the final cost by backward chaining approach. The system shows the facts (no: of detectors and security staffs) depending on the user's change cost.

6. Conclusion

This system implemented the knowledge_based system for security services by using rule-base methods such as forward and backward chaining. In this system, users can choose seven type of security services what they needed. The system accepts the required information from users. In forward chaining approach, the users can choose the materials (facts) and security staffs between the minimum and maximum amount of materials and staffs that was defined by system. And the system produced the final result cost. The users can be changed the final cost and then the system produced the facts rely on the users' change cost. If user's change cost doesn't exist the rules in the knowledge base, the system produced the average cost consisting in the knowledge base. In the application area, this system is so useful for experience and inexperience person in the sense of security knowledge and users can forecast how many cost for security staffs and fire protection things and cameras and detectors to secure and safe in their business and buildings.

References

[1]. Angele, J., Fensel, D., Landes, D., and Studer, R, (1998) "Developing knowledge_based system with MIKE".

[2]. D.W.Bankert and M.Koller present "Knowledge_basee system for All Branded Cosmetics Online Shopping".

[3].EFRAIM TURBAN "Applied Artificial Intelligence and Expert System".

[4].Hayes, F., Waterman, D.A., and Leant, D.B. (1983) "Building Expert System".

[5].L. LAT LAT "Knowledge_based Interactive Rubber Agriculture Technological System in Myanmar". University of Computer Studies, Yangon, Myanmar.

[6].M. Khine Oo "Knowledge_based System For Categorizing Rice Items". University of Computer Studies, Yangon, Myanmar.

[7].P-H. Speel, A.Th. Schreiber, W.van Joolingen, G.van Heiijst "Conceptual Modelling for Knowledge_based System".

[8]Theingi Khin, Daw.
Managing Director. "Myanmar Safe and Sound Security Services(MS4) Co,Ltd.

[9]Win Htein. Manager (admin). "Myanmar Safe and Sound Security Services(MS4) Co,Ltd.