

Development of expert systems for analyzing electronic documents

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Abstract. The paper analyses a Database Management System (DBMS). Expert systems, Databases, and database technology have become an essential component of everyday life in the modern society. As databases are widely used in every organization with a computer system, data resource control and data management are very important [1]. DBMS is the most significant tool developed to serve multiple users in a database environment consisting of programs that enable users to create and maintain a database. This paper focuses on development of a database management system for General Directorate for education of Diyala in Iraq (GDED) using Clips, java Net-beans and Alfresco and system components, which were previously developed in Tomsk State University at the Faculty of Innovative Technology.

1 Introduction

Since 1960, especially in the developed countries, most businesses began to store and save files on the computer; the experts of computing began to think about the development of theories and methods for re-using files that are stored in the computer. These files are called computerized.

The Department of employees' affairs (DEA) is one of the important sections in GDED and is a measure of the level of management in the organization. Some routine and burdensome types of work need accuracy and cannot contain errors, for example, in basic information for employees, work management etc. Staff specialists in this department spend much time and make great efforts while managing these actions manually [2]. There are unmatched features through the use of computers to manage the information obtained from applications and documents of people who want to get a job in GDED. These features include the speed of search, security, large memory space, long life, low cost, great reliability and proper search, which can improve the effectiveness of employee information management [3].

2 Case study: Department of employees Affairs (DEA)

The DEA is being the most important administrative department in any organization because of being involved in relations with all organization's employees. They are the basis of the work process, so the advancement of employees' affairs leads to the advancement of the whole organization.

The methods adopted for the management of this department are manuals represented by records and files relating to the information of employees, as shown in Figure 1. Every employee in GDED has a dossier containing all the information and its own administrative orders, CV from the moment of admission, details about attendance and absence at the working place and other types of information [4].





Figure 1. Dossiers of the employees used in the department.

2.1 Problems with the old methods used in DEA

Several problems can be summarized because of using old and traditional methods:

- Delays in the delivery of services because of the manual work.
- The department requires an adequate number of staff in order to make its administration because of existing manual employee's information system.
- Information and data stored in several places lead to delay and inaccuracies in the task completion.

2.2 The Purpose of the Study

The main purpose of this study is to design database for constructing an employees' information management system in the department of employees' affairs in GDED. This system will solve most of the problems and obstacles resulting from the old methods and techniques that have been previously mentioned. This will allow transforming the work in this department from manually to a computer based-system, which, in turn, will improve accuracy, efficiency, security and so on. The problems arising from the purpose include the following:

- How to reduce the errors and inaccuracies in the process of managing employee's information.
- How to reduce the time and efforts required to do routine operations of the DEA.
- How to support the administration of the organization in the decision-making process.

2.3 Implementation of the system design

After setting goals and vision, for which the SIS was designed, we implemented the process of the system design in order to meet the needs of the GDED. The system represents a system for processing employees' data and organizing it in the form of useful information for the management of the organization. The system allows improving the management process in employees' affairs department and increasing speed of operations completion with high efficiency and low errors. An information system (IS) can be defined as a set of interconnected components that collect, process, store and distribute information to support decision-making, organizing and control in an organization. Furthermore, information systems may also help managers and workers to analyze problems, imagine complex subjects and create new products. The general model of an IS is in the form of a collection of semantic services.

Information systems contain information about important people, places and things within the organization or in the surrounding environment. Information is the data that was designed into a form that is meaningful and useful to human beings. Data, in contrast, are streams of raw facts representing events occurring in organizations or the physical environment before they have been organized into a form that people can understand and use as shown in Figure 2.

Therefore, the primary function of information systems is to hold a series of operations on the data and turn them into information in order to help decision-makers in the organization to take the proper decision as soon as possible.

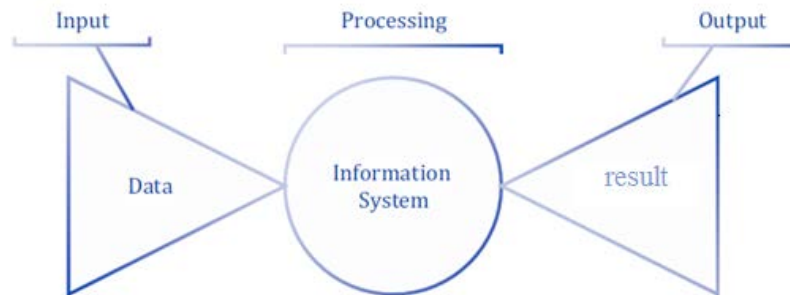


Figure 2. Information system.

3 Documents and requests receiving by using (Alfresco)

People who want to apply to get a job in GDED, have to fill down all the required information using Alfresco. Then, through NetBeans, Alfresco will send information about the person's qualifications to Clips, which, in turn will analyze the person's qualifications and make a decision (Figure 3).

Application form	
1	Name
2	Age
3	Sex
4	Know office
5	Measurement
6	Program language
7	Photography
8	Web design
9	Photocopy
10	Years of experience
11	Certificate
12	Kind of certificate
13	English

Figure 3. Application form using Alfresco.

4 Data analysis using Expert system (Clips)

In order to enable the DBMS to classify requests from people who want to get a job in the organization and send the request to specific department according to person's skills, we have to determine the requirements of each department, such as person's specifications, skills, experience and academic achievement, etc. We determine all these things using Clips and java NetBeans by writing the programming code in Clips system.

5 Making API for the system

To make an Application Programming Interface (API) we need to connect Java with Clips, therefore, we use NetBeans as shown in the Figure 4.

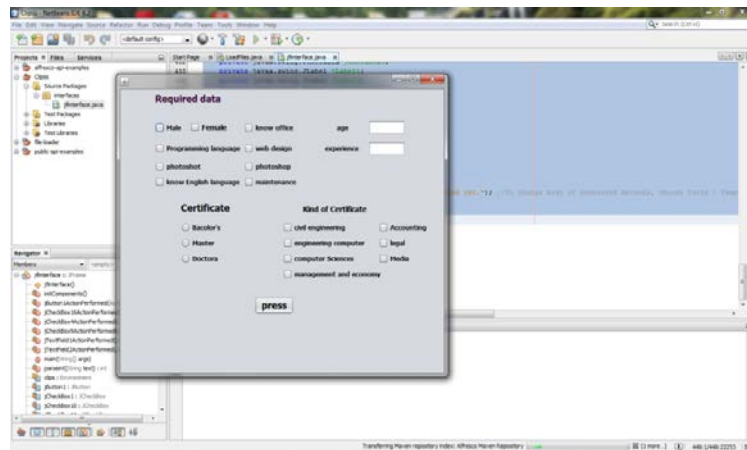


Figure 4. Interface (API).

6 System working

After filling the person's qualifications, the system will analyze these qualifications and choose the perfect department for the person to work in (Figure 5).

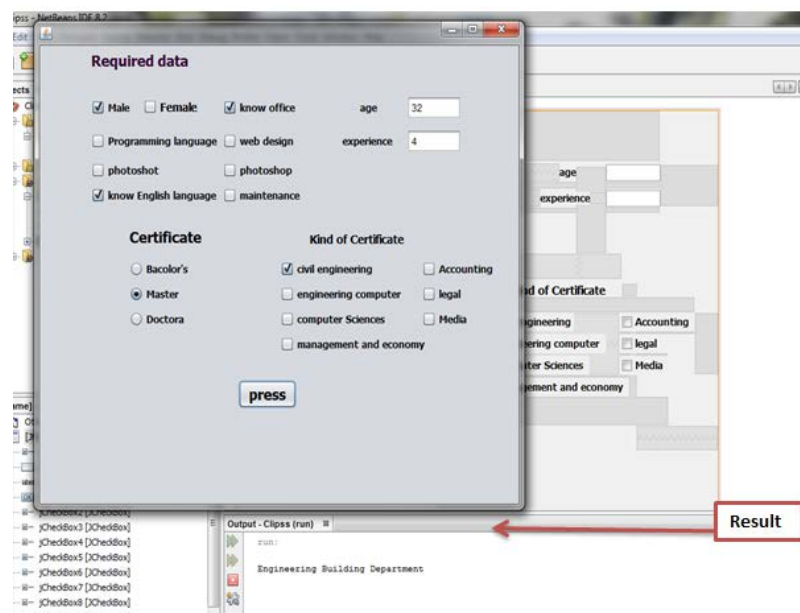


Figure 5. System interface and result.

In the case presented in Figure 5, the system has chosen the engineering building department for the person.

7 Conclusion

In this paper, we have introduced a database management system for employees in GDED. The main objective of designing and carrying out this system is to get the possibility to collect employees' data in one place, make various transactions and modifications on it, and retrieve this data according to requirements of the organization. This objective as well as the desired system functions were achieved. This system will transfer the manual work in this department to the computer-based system. In addition, this system can promote the management of organization to carry out its tasks more effectively. The Employees Information System can reduce time and efforts required in the process of managing employee' information as well as the need for a large number of staff to carry out the

functions of the DEA because managing of this system needs to only one employee. Moreover, it will help the organization's administration to speed decision-making because the system allows using real-time data when making decisions, which benefits to the organization.

The system presented in this paper needs to be in service for the transition phase.

The further development of the system includes plans to link the employee Information Management System (EIMS) with the GDED website. This will enable people who want to apply for a job in this organization to apply directly through the online interface embedded on the GDED website and make requests online, thus, reducing time processing.

Acknowledgments

This study (research grant No № 8.2.24.2018) was supported by the Tomsk State University competitiveness improvement programme.

References

- [1] Rumyantseva T B, Syryamkin M V, Syryamkin V I , Vaganova E V 2016 *Technology Management. Part 3. Technology Project Management: textbook* (Tomsk, STT)
- [2] Introduction to Computer Information Systems / Database URL: <http://www.webopedia.com> – lang.Eng
- [3] Shimozone K, Itsukiy M, Harasaka Y and Furukawa Z 2010 *User Management in an Educational Computer System: Personal Information Management* (Fukuoka, Japan)
- [4] General Directorate for education of Diyala URL: <http://www.diy.epedu.gov.iq/>