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Design Expert System for Auditing Financial Accounts

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Abstract. This paper presents an account audition system based on (Expert System), an artificial intelligence technique. This paper presents an account audition system based on (Expert System), an artificial intelligence technique.

Since the limited studies dealt with using artificial intelligence in a general and expert system in auditing accounts in Iraq (within the researcher's knowledge limits), the researcher tried to tackle these two subjects in his current study to apply them in reality. The expert system that is designed within rules and facts of knowledge base analyzes, audits, and extracts data from financial tables within accounting distributions consist included such as names of accounts and their numbers whose values are represented within cost centers represented by certain symbolic numbers that differ from one institution to another and obtaining the required results by using an applicable knowledge base. The Proposed system approach offers a practical method of auditing and distributing the required data by using the expert systems manually by many auditors.

Using the expert system led to lessening time and effort taken to make audits and the accuracy of obtaining results.

Keywords: Expert Audit System, Expert Auditing, Smart Check ,expert system.

1. Introduction

The change of the universal economic environment and the presence of information and communication technology in different fields such as accounting and auditing devoted a type of new responsibilities in front of accountants and auditors whom they found themselves facing this great responsibility and the necessity to adapt to such changes and developments that influenced clearly on various audition procedures which became unable to achieve their goals in the light of large duty and procedures besides the switching from (paper environment) to (digital environment) related to accounting information systems. Hence the need for expert systems emerged as one of the most important applications that resulted from artificial intelligence in carrying out these new duties and liabilities and making decisions depending on the inputs that provide the system that simulates the way that the human mind thinks and the logical steps in dealing with problems in a particular area of interest or a specific specialization, based on the foregoing, we will try to study the impact of taking on expert systems in auditing the financial accounts process in light of the comprehensive environment of information technology[1].

Accordingly, accounts auditing system has been made by using artificial intelligence techniques through setting expert system that shows the required results depending on the knowledge base resulting

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from explicit experiences and implicit knowledge in the minds of working individuals which facilitate auditors tasks in terms of speed and effort, as well as high accuracy in extracting the required results.

2. Artificial Intelligence and Expert Systems

Artificial intelligence is nothing but the culmination of long processes started from the interest in replacing the machine (technology) with humans or workers in manual labour and then replacing the machine with the human in mental work[2].

Artificial intelligence is a branch of computer science that is concerned with designing, setting, and auditing computer systems with intelligent qualities that qualify him to learn new concepts and tasks in response to the surrounding conditions and can interact with humans with pictures and sound[3].

Artificial intelligence systems have been classified into various classifications. Expert systems are considered one of the most important artificial intelligence classifications and are characterized as the field where knowledge is represented and controlled search within the knowledge base. It is also known as an intelligent computer program that uses knowledge and inference steps to solve difficult problems that need to consult the experts to be solved[4].

Artificial intelligence aims to understand the nature of human intelligence via a computer program that can imitate the human behaviour marked with intelligence through representing the human knowledge with a certain form and put them in special rules called knowledge bases to make use of them in solving problems confronting decision-makers at later times[5].

Expert system is considered the first field and one of the most important applications representing artificial intelligence. They are programs that include huge amounts of information owned by a human expert in a certain field. Some of these programs approved their activity to ensure high capability in this field[6]. This program can make intelligent decisions that usually require human experience. Knowledge engineer meets with experts in a certain field and tries to embody knowledge in computer programs to carry out certain duties.

Expert systems have replaced the human expert for their superior ability to solve complex problems that require great human effort and thought, as they are characterized with speed and accuracy in answering many questions and problems that the worker may encounter during his work. Expert systems were among the first forms of success for artificial intelligence programs. It has a unique architecture, different from traditional software. It is divided into two parts, one of which is static (independent): the inference engine and the other is variable: the knowledge base[7].

The inference engine thinks of the knowledge base like a human to run the expert system. In the 1980s, the third part was launched: the dialogue interface for communicating with users. This part is used to hold a conversation with users, later called the "conversation"[8].

3. Proposed Expert System

The proposed expert system consists of the following technical components:

3.1. Knowledge Acquisition Subsystem

Knowledge is acquired through extracting knowledge from experts and auditors via interviews and foundation financial statements analysis to set a complete knowledge base[9].

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3.2. Knowledge Base

The knowledge base is considered the core or the basis of the expert system. It represents the experience and knowledge learned from specialized experts in auditing, and it includes rules and facts to solve problems and core data related to the problem. The knowledge base is made by the knowledge engineer who transfers real human experience into data or knowledge in a form that the computer can understand[10].

3.3. Interference Engine

It is a chaining technique that acts as an interpreter that analyzes and processes rules; it includes a deduction mechanism that imitates human work and logic when submitting advice to solve the problem, where forwarding chaining or the so-called (Data Drives) was used[11].

3.4. User Interface

The interaction between the final user and the expert system takes place through the system interface, making this system easier and the great proximity to the personal dialogue method. The user interface is primarily designed based on the user's needs and requirements, and therefore it is called the final user interface[12].Fig.1 shows the Flowchart Of Expert System in Auditing Financial Accounts, and Fig.2 shows the main menu of the proposed expert system.

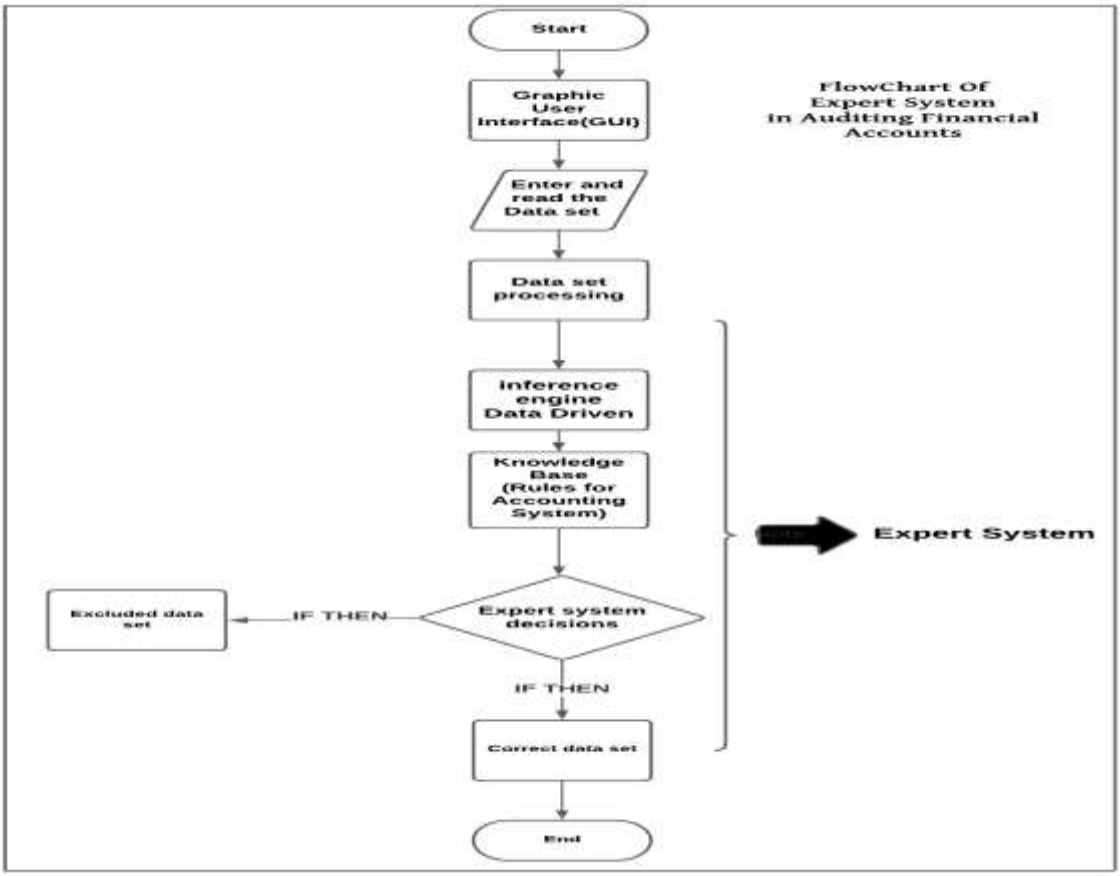

Fig. 1. Flowchart Of Expert System in Auditing Financial Accounts

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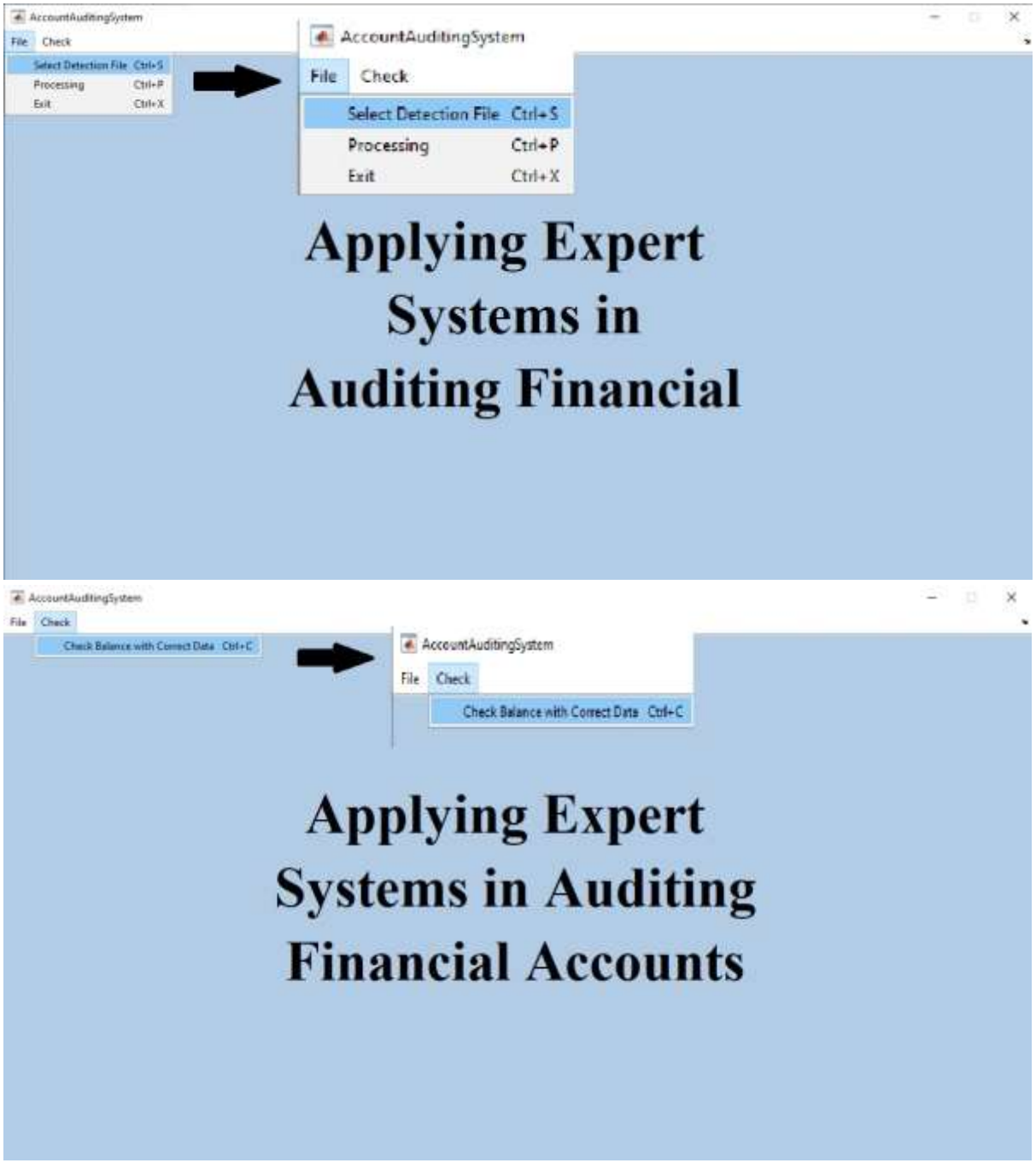

Fig.2. The main menu of the proposed expert system

4. Financial Auditing:

It is the validation of the financial statements following international accounting standards and to ensure their correctness and integrity. Auditing is related to accounting, but it is an independent speciality. The auditor's job lies in collecting evidence to verify the validity of the data and discover mistakes. The financial audit process aims to provide physical evidence to ensure the validity of the data. Financial statements or not after examining those statements in all respects and giving a true and fair view of those reports, to increase the value and credibility of the financial statements issued by the management[13].

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The audit profession derives its importance from the human need to verify the correctness of the accounting data on which he relies to make decisions and draw policies[14].

5. Expert System and Auditing System:

This paper aims to design an expert system based on the knowledge base set by the expert according to facts and rules that audit financial statements for the departments in charge of financial accounts[15]. Numbers and names of approved accounts tabulate these values. After auditing, these values are either valid values entered into the accounts of the productive institution or excluded values. They are included in detailed reports that are sent according to the returns of the reports to the departments required to be provided with these reports, which provided speed and high accuracy in the performance used for the audit process, exceeding this matter the rate of audit errors Possible and possible when checking this data manually by building a knowledge base that contains a set of rules, as shown below:

Rule(1): If the first two digits of the account number fall within the following group {35,36,37,38,39 (THEN)} they are excluded from the Excluded Values Table, See Table.1.

Table 1: Includes Excluded Values

532	Main production management center	
90000	liquid gas purchases	35111
Production sub-management headquarters	5321	
50000	Donations to others	3831
400000	Expenses of previous years	391
first Production Factory	532111	
30000	Expenses of previous years	391
Second Production Factory	532112	
60000	Expenses of previous years	391
40000	Transport of the main materials	35112
200000	Purchase of the main materials	35111
third Production Factory	532113	
70000	Expenses of previous years	391
Fourth Production Factory	532114	
70000	Expenses of previous years	391
Fifth Production Factory	532115	
45000	Expenses of previous years	391
Sixth Production Factory	532116	
70000	Expenses of previous years	391
Production factor of the investment sector	53212	
10000	Expenses of previous years	391
Sub Warehouse	53213	
Product Distribution Division	53214	
Technical Administration Division	53215	
70000	Expenses of previous years	391
first repair workshop	532151	
100000	Expenses of previous years	391

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Rule (2): If the first two digits of the account number fall within the following group {31,32,33,34} (THEN), the amount is considered valid and moved within the table of correct values, See Table.2.

Table 2: Includes Correct Values

Production sub-management headquarters	5321	
the amount	account name	account number
10000	Cargo transportation maintenance	331412
20000	banking services	3366
200000	Operation Services	342
70000	Travel and delegation for the purposes of the activity	33432
10000	Transportation of goods and merchandise	3342
300000	Rental of transportation and transportation	3354
20000	Passenger transportation maintenance	331411
10000	Publish and print	3332
40000	public communication	3344
5000	Other service expenses	3369
150000	Transfer of workers	3341
3000	Advertising	3331
10000	Maintenance of calculators, typewriters and reproductions	33164

Rule(3): If (the account number for the cost center in the correct values report in Table.1 matches the account number for the cost center in the Expense Review Balance report as shown in Fig.3) and the amounts are identical in the two reports, **then** the amount is posted with the account number and cost center in the identical amounts report Table.3.

Table 3: Includes different Values

Difference amount	The amount is in the balance	Correct Values report	Account name	Account Number	Cost center	Cost center name
15000	25000	40000	Spare tools and equipment	3232	5321	Production sub-management headquarters
30000	30000	60000	Spare tools and equipment	3232	532111	first Production Factory
50000	100000	150000	Spare tools and equipment	3232	532112	Second Production Factory
500	500	1000	Other backup tools	3236	5321	Production sub-management headquarters

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Operational Expenses Audit Balance by Cost Centers

532183	532172	532171	53216	532152	532151	53215	53214	532116	532115	532114	532113	532112	532111	5321	Account name	Account number
0	0	0	0	0	0	0	0	0	6000	0	0	0	0	10000	Car spare parts	3231
0	0	0	40000	0	0	0	0	10000	25000	60000	25000	130000	60000	25000	Spare tools and equipment	3232
0	0	0	25000	10000	0	0	0	10000	20000	2000	0	2000	20000	20000	Supplies and errands	3251
0	0	0	0	0	0	0	0	0	0	0	2000	30000	0	2000	Stationery	3252
0	0	0	0	0	0	0	0	0	0	0	0	0	0	50000	foodstuffs	3262
0	0	0	0	0	0	0	0	64000	0	9000	20000	0	0	3000	Electricity	3272
0	0	0	0	0	0	0	0	0	0	0	0	0	0	400000	Maintenance of service buildings	331213
0	0	0	0	0	0	0	0	0	20000	4000	0	0	60000	6750	Maintenance of machinery and equipment	3313
0	0	0	0	0	0	0	0	0	0	0	0	0	0	10000	Maintenance of printers and copiers	33164
75000	67000	350000	150000	75000	500000	25000	20000	0	40000	0	0	0	0	150000	workers transfer	3341
0	0	0	25000	0	0	0	10000	0	10000	10000	10000	10000	10000	40000	public communication	3344
0	0	0	0	0	0	0	0	0	0	0	0	0	0	20000	Banking Services	3366
75000	67000	350000	240000	85000	500000	25000	30000	84000	121000	85000	57000	172000	150000	736750	Total	

Fig.3. Expense audit balance

Rule(4): If (the account number of the cost center in the correct values report Table.1 matches the account number of the cost center in the Expense Audit Balance as shown in Fig.3) and the amounts are not identical in the two reports, **then** the amount is posted with the account number and cost center in the report of the mismatched amount Table.4.

Table 4: Includes Similar Values

The amout is in the balance	Correct Value sreport	Account name	Account number	Cost center	Cost center name
20000	20000	temporary wages	3121	5321	Production sub-management headquarters
2000	2000	fuel machine	3221	5321	Production sub-management headquarters
300000	300000	fuel machine	3221	532111	first Production Factory
30000	30000	fuel machine	3221	532112	Second Production Factory
40000	40000	fuel machine	3221	532113	third Production Factory
10000	10000	fuel machine	3221	532114	Fourth Production Factory
10000	10000	fuel machine	3221	532115	Fifth Production Factory
10000	10000	Spare equipment and tools	3232	532116	Sixth Production Factory
20000	20000	Supplies and gear	3251	5321	Production sub-management headquarters
20000	20000	Supplies and gear	3251	532111	first Production Factory
2000	2000	Supplies and gear	3251	532112	Second Production Factory
2000	2000	stationery	3252	5321	Production sub-management headquarters
50000	50000	foodstuffs	3262	5321	Production sub-management headquarters

In summary, the importance of the study lies in linking the expert system to auditing. Perhaps this justifies the importance of the study in the context of growing research interests to deal with the performance of the company under study with a perspective that goes beyond the traditional frameworks that have received intense interests in expert systems in exchange for limited research efforts concerning auditing systems Calculations based on expert systems. The study also provides a theoretical and applied framework that links the expert system with the financial statements specialized in the company in question for auditing. Fig.3 shows the proposed expert system in the audit work:

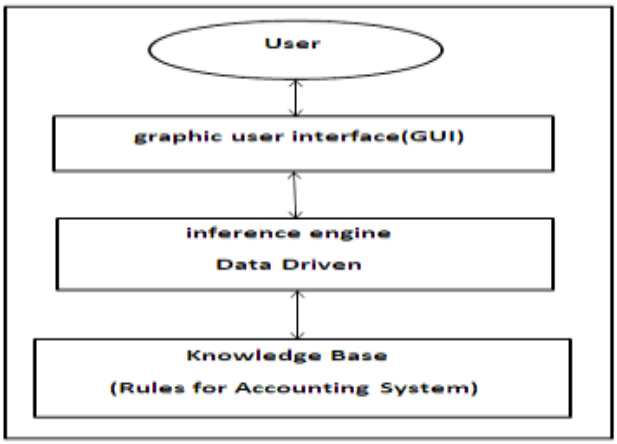

Fig.3. Expert System in Auditing

6. Conclusions:

It was concluded that expert systems offer many advantages for individuals working on these systems in auditing accounts within the institution, including:

1. The ability to store, represent and retrieve knowledge and use it in solving problems by the expert while providing direct support in the decision-making process.
2. Provides a solution to the problem of losing knowledge and accumulated experiences as a result of natural causes such as transportation, illness, and death of the expert person.
3. Expert systems work at any time, everywhere, and upon request, and there is no relationship between the efficiency of the expert system and the physical, psychological and social environment, which does not affect the system's work while greatly affecting the performance of the human expert.
4. Expert systems are used in computing routine tasks and activities to avoid human errors, which may lead to huge material damage and losses, with the possibility of transferring expertise to geographically remote places to benefit from these experiences.
5. It is considered an ideal method for training individuals with low experience. It is a way to develop workers to a higher level of expertise without an expert.

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