

Design and implementation of Karbala Real Estate Information System

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Information system

Abstract

Starting from the fact that the Information Technology is a Transformer Technology, this fact applied to one of the most complex Iraqi directorates, which is Karbala Real Estate Registration Directorate, by converting its hardcopy and complicated processes to simple digital one.

A big challenge for most of the countries was to digitize this moderate, firstly because storing precious personal properties on a computer or making property transaction is difficult to be assured. The second reason is that this moderate is connected with other moderates to finalize its processes such as the tax office or municipality. The third reason is that converting legislations to software is a very difficult task. The implemented system performed three main processes which were property transaction, property division and property registration. The first step in implementation was by converting the Act of Iraqi Real Estate Registration to software workflow, as it describes any process related to estates (transaction, division, leasehold,...etc.). The second step was entering the real estate's information in the database. The current process is reengineered and reduced the complications of the routines by means of software security and facilities that provided by the programming language that have been used. The system can solve a number of the sever problems in this moderates, but required to be fully operational by implementing the other parts of the system and connecting it with other moderates.

الخلاصة

أنطلاقاً من فكرة ان تقنية المعلومات اصبحت تكنولوجيا تحويل و ليست فقط تسهيل كانت الفكرة لأنشاء نظام الكتروني لواحدة من اعقد المديرية الحكومية و هي دائرة التسجيل العقاري , حيث قمنا بتحويل عمل تلك الدائر الشاق و المعقد الى نظام الكتروني بسيط. باستخدام نظم المعلومات، يمكننا تخزين المعلومات كقاعدة بيانات وأيضاً جعل البرنامج يقوم بعملية مشابهة لمتابعة المعاملات و لكن بصيغة الكترونية. من هذه الحقائق نحاول البدء في تنفيذ نظام معلوماتي لدائرة التسجيل العقاري في كربلاء. يعد هذا النظام من الأنظمة الضخمة لما يحويه من معلومات مهمة و دقيقة و كبيرة. حيث قمنا بتحويل قانون التسجيل العراقي الى سير العمل في تلك الدائرة حيث يصف هذا القانون أي عملية تتعلق بالعقارات (تحويل ملكية، تقسيم، المستأجرة، ... الخ) من وجهة نظر قانونية تشريعية، كما قمنا بعادة هندسة لتلك الدائرة و التقليل من كمية التعقيد في سير المعاملة باستخدام الأمكانيات الأمنية و الحرفية التي توفرها اللغات البرمجية.

1. Introduction:

With intensified use and stronger family or individual rights, it became necessary to define and delimit the areas concerned both for social and economic factors [1]. This delimitation led to define the real estate (or land) property. Documenting these properties is essential to save the rights for the individuals at the land register office. Land registration could be described as the process of recording legally recognized interests (ownership or/and use) in land [2]. Land register is a public register of deeds and rights concerning real property. Now, the registration of a real property means making an entry in the official register [2]. After these long decades of documenting on a paper based, many problems had raised such as writing time, paper cost, securing data, difficult searching and double checking efforts. After the invention of information systems, it had become an essential

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need to create an information system for land registration system, which can enhance the obvious problems. Creating such a system would require new legislations to make it possible use digitization in governmental data. The system should be built upon the Land Registering Act which is valid for each country. The used terms or language in the system should be similar to that used in the Act. In English, 'Land' meaning not only (dry) parts of the earth, but also goods that are more or less immovable, such as trees, buildings and other improvements (regularly called real estate or real property) and areas covered with water [1]. So using Land in English countries is more formal which refers to any property, but in Arabic it is different because using real estate is the formal and familiar word.

The adoption of e-governance in Iraq will constitute a process of change that will help expand the means of citizens and business to participate in a new knowledge-based economy. In order to have the full potential of e-governance enforced, it is necessary to reform the administration structure, the management of business processes and information. It is also necessary to change the mindset and line of action of the people in the public administration, as well as their work attitude and their way of communication with citizens and business [3].

The aim of this research is to maintain and develop stable and effective land information systems for Karbala Province as the cornerstone for the creation and free movement of interests in Land. On behalf of the local governorate is to guarantee title to registered lands and interests in land for the whole of Karbala Province. To provide ready access to up-to-date and guaranteed land information, so enabling confident dealings in property and security of title.

In the below sections, the literature review will be examined, and then the proposed system will be explained by comparing the original workflow and the problems it had with the new reengineered workflow. Section five will explain the main actors of the system. Section six will explain the workflow steps for each process. As the system implemented using OOP and centralized database, so section seven will give a brief explanation about the classes used, database design and GUI examples from the system. Section eight will describe the security procedures that protect system from threats. At last conclusion and drawback will be mentioned.

2. Literature review

The electronic based systems had been used and developed since 1986 by using databases to store all land properties, but using E-registration had begun in London at 1999 and then in Toronto. After that date many developed countries had adopted these systems also few of the developing countries had adopted these systems especially after the new development in the ICT. This revolution had started since 2001 till today. In the Arabic world, just UAE (2005) and Jordan (2008) had deployed such a system.

3. The Proposed System Overview

The system has been built upon Iraqi Real Estate Registration Act No.25 1971, and the requirement was taken from Karbala Real Estate Registration Directorate manager in addition to what such process needs.

After making analysis of the current workflow and starting the design of the system, it was found that in using software, many of the steps which were performed by different employees had been canceled.

The system was created as a unified database for real estates in Karbala province .It was built using PHP and MYSQL combination, so it is web-based Intranet and centralized database located at the server "Many Web applications use an architecture called the three-tier architecture, which adds an Intermediate layer between the client and the database server . This intermediate layer is sometimes called the application server and sometimes the Web server, depending on the application. This server plays an intermediary role by storing business rules (procedures or constraints) that are used to access data from the database server. It can also improve database security by checking a client's credentials before forwarding a request to the database server. Clients contain GUI interfaces and some additional application-specific business rules [4]. The intermediate

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server accepts requests from the client, processes the request and sends database commands to the database server, and then acts as a conduit for passing (partially) processed data from the database server to the clients, where it may be processed further and filtered to be presented to users in GUI format. Thus, the user interface, application rules and data access act as the three tiers [5].

The first step in implementing the system was to identify the legal and administration steps or the essential processes that should be taken in account when designing the new system. The second step was identifying the repeated or trivial processes that could be eliminated by means of the software. The third step was designing the new workflow or the reengineered. But if any company that cannot change the way it thinks about information technology cannot reengineer [6].

4. Reengineering For the Karbala Office

4.1 The mechanism in Karbala office is:

1. An employee has to search for the dossier.
2. Checking if the real estate of the property is at leasehold estate then everything will be aborted until the amount of the hold is to be paid.
3. Making primary confession by filling a blank page (which is illegal because it is not included in law) and take the imprint of both (owner, purchaser).
4. Sending owner and purchaser to tax office to pay the tax and check.
5. The real estate registrar checks the documents which includes real estate owner property, tax and leasehold estate .
6. Sending an application to the surveyor to make survey for the property so as to check the property of the area and current state to compare it with stored status.
7. Making final confession on land register officer.
8. Sending the complete transaction document to verifying employee.
9. If everything is ok then register the new real estate owner property for the purchaser.
10. Storing the new transaction document in the real estate dossier.

The system had been examined on the already exist system and find below problems:

1. Complications of the routine in that office (for checking and authentication).
2. Routing complication: due to the number of working employees per process which is more than required.
3. Due to the huge amount of dossiers and documents, the time needed in the process of searching for a specific document which takes about (1-3) days and sometimes more.
4. A complete transaction requiring from 7 to 20 days.
5. Losing some of the needed documents and letters, sometimes they are torn or damaged and wasting a lot of time to accomplish the letters making the process boring to citizen.
6. The limited space in the area of the real estate registry office that indicates congestion in space and increasing of the letters and documents create a serious problem in the storage of these letters.
7. Due to the delayed completion transaction, some citizens are obliged to ask a lawyer to carry out this process, which led to additional cost for the citizen.
8. Because of the problems previously mentioned, mess in the department led to fraud and embezzlement and bribery in the office.
9. Ignoring the names of the citizens that the real estate belong to because the real estate are registered according to UPRM's (Unique Property Reference Number) and not names so it becomes difficult to search for properties of anyone by names.
10. Infrastructure problems in the absence of (the Internet and Intranet).
11. The objective that leads to create such a system is to overcome these real problems and to introduce service to citizen with fewer efforts.

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4.2 The mechanism after reengineering

1. The process begins with the owner and purchaser who should come to office in personal and request a transaction.
2. The real estate registrar searches for the property and prints it easily.
3. The same employee checks the leasehold estate.
4. Sending request to surveyor to survey the property.
5. The purchaser brings the clearance certificate from tax office.
6. Making the confession after check their ID's and receiving registrants fee and tax clearance certified to upload them.
7. Taking imprint of owner and purchaser.
8. Final checking of the real estate owner property.
- 9.
10. Printing the new real estate owner property.

	TIME	EFFORT	COST	Total time
Currently	30 minute	Higher	About 200\$	7-20 day
After KLRIS	Five minute	Much less	Free	2 days

Table (1) Differences in time, cost and effort before and after KLRIS

Table (1) illustrates the difference in efforts cost and time between the current system and the proposed system.

5. Structure Diagram

The system consists of five acting users:-

1. **Level one the Manager:** - his responsibility to turn on the system, as any employee cannot access his department without turn on the system by manager.
2. **Level two the land registrar :-**he has three responsibilities in his department which are :starting a new land transaction process , finishing an exist land transaction process and adding a new LOP(land owner property).
3. **Level three the Surveyor employee:** - he is responsible for the survey department (his responsibility will be the surveying of the information which is received from the land transaction department).
4. **Level four the search employee:-** his responsibilities are: Search for an real estate, Search for owner, and Search for document.
5. **Level five the Leasehold real estate employee:** he is responsible for checking, canceling or adding Leasehold for the real estate.

This system supports each department with information that helps it in its work (see Figure. 2, and Figure 4).

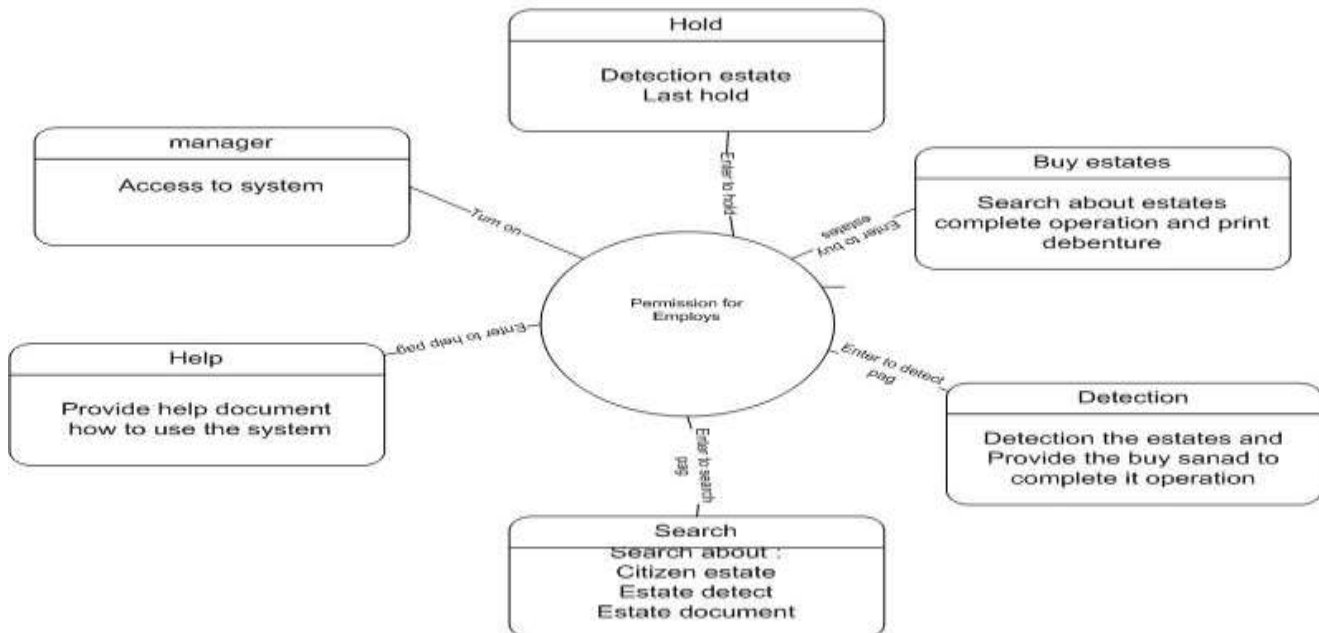


Figure (2) Description Structure diagram of the system

6. Communication Diagram

The workflow will be explained below to describe each part of the system.

6.1 *Transaction Process:*

This is the main activity or process that performed by the office

1. The citizen comes to office requesting land transaction accompanied by the current owner of the real estate (who will sell it).
2. Apply his request with verification IDs (National ID, ID Certificate, ration card).
3. The real estate registrar receives the request.
4. Checks if the land owner property information submitted by the citizen is verified and identical to info exist in the database.
5. If it is verified then open file document (dossier) of the real estate.
6. Send request for the survey employee to check the current status of the real estate like exact size, coordinate, building status.
7. The surveyor sends his report to the land transaction employee if there is a problem with the real estate then the process will be aborted, if there is no problem and the info is identical with the database information then the process is to be completed.
8. Open a new operation page in the real estate register.

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9. The info for this page is pulled from dossier of the real estate and the other info will be filled by the employee like owner, purchaser name, confession, and pricing.
10. Send the transaction operation to the checking department to verify the information whether it is correct or wrong if it is ok then insert tic in check box shows it is ok.
11. Then it is go back to land registrar to print the final version of the new land owner property and change the current owner name by the purchaser name.

6.2 Divided Process

This is the one of the activities or processes that performed by the office, the workflow is as follows:

1. The citizen comes to office requesting from divider registrar a division process on real estate accompanied by the current owner of the real estate (who will DIVIDE it).
2. Apply his request with verification IDs (National ID).
3. The divider registrar receives the request.
4. Check if the land owner property information submitted by the citizen is verified and identical to info exists in database.
5. If it is verified then open file document (dossier) of the real estate.
6. Send request for the survey employee to check the current status of the real estate like exist size, coordinate, building status.
7. The surveyor sends his report to the divider registrar employee if there is a problem with the real estate then the process will be aborted, if there is no problem and the info is identical with database info then the process is to be completed.
8. Open a new operation pages in the divider registrar depend on the numbers that had been specified.
9. The info for these pages is pulled from dossier of the real estate and the other info will be filled by the employee like owner, purchaser name, confession, and pricing.
10. Send the transaction operation to the checking department to verify the information whether it is correct or wrong if it is ok then insert tic in check box shows it is ok.
11. Then it is go back to divider registrar to print the final version of the new land owner prosperity to the same owner.

7. Software Diagram

7.1 Database Design

The system consists of one database which contain eight tables which are:-

1. **Password table**:-contains the level of employees and their permissions
2. **Information –real estate**:-this table contains real estate description like (size, Dist., St, size, coordinate, neighbor ... etc.).
3. **Survey**:- this table contains final survey for all the real estate
4. **Name owner** :- this contain name of all owner that's have real estate
5. **Leasehold estate _real estate**: - this table contains information about each detainee real estate.
6. **History –information** this table contains the old data for the real estate which means any history for it.
7. **History –owner name**:- this table contains about previous owners of the real estate
8. **History –leasehold estate** : - this table contains information about previous leasehold estate real estate information for the real estate.

7.2 Class Diagram

The system has four main classes:

- 1-**InsertInfo**: This class main work is to insert data to the database it has nine function that insert data to the main nine tables of the database

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2- Update info: This class is used to update the data of the database it has six main function that update six function of the database(owners , real estate Info ,survey ,history owners , history real estate info ,history survey) .

3- Fetch info: This class used in many places for fetching the information of the real estate and the owners' then print it to the user .These information used in checking, searching and check land register officer. It had three main functions that fetch the (Real estate, owners, survey) tables.

4- Authentication class: This class is used to control the authentication. it has four main function:

- a. login function for land register officer
- b. login function for the other employees
- c. logout for land register officer
- d. Logout for the other employees.

7.3 System Interfaces

At the beginning the manger start activating the system “login the system” using its own the user name and the password, Figure (3) shows the manger login interface.



Figure (3) the Manager login page

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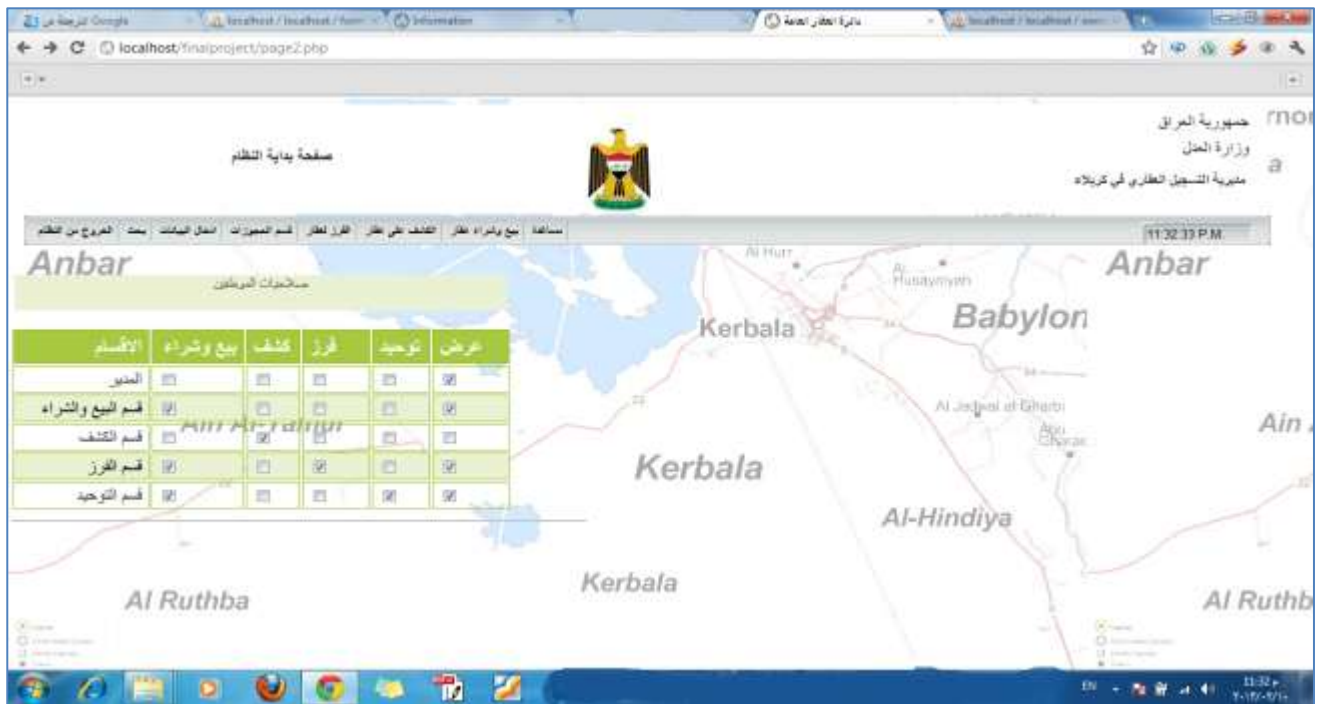


Figure (4) the Authentication Page

Figure (4) represent the five employee's levels mentioned in section 5 and there Authentication's, example the manager has the authority to display the information that already stored at the database and the other employee's authority as shown above.

<p>نموذج رقم 25 تسجيل عقاري سند المعاملات الدائمة</p>				<p>وزارة العدل مديرية التسجيل العقاري العامة دائرة التسجيل العقاري</p>		
اسم الشقة	رقم الطابق	التأجير	القضاء	المحافظة	وصف السجل العقاري الدائم	
					رقم الجدة	التاريخ
اسم المقاطعة		رقم المقاطعة	رقم القطعة	رقم الباب	الشارع	المحلة
الحدود		الحدود		جنس العقار		نوع العقار
الحد العربي						الصف
الحد الجاوي						
الحد التركي						
المساحة				المالك او المتصرف تابعة		
يوم	اولئك	متر مربع				
نوع المعاملة						
اشارات التأسيسات و الحجز و مواقع التسجيل						
المبلغ التابع للرسم		البذل		القيمة		
دينار	فلس	دينار	فلس	دينار	فلس	فلس

Figure (5) the Prototpe No. 25 's Page

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The system, as mentioned before, was built upon Real estate Registration Act No.25 1971, Figure (5) shows prototype No.25 Land owner property from the real estate registration.

8. Security

Open distributed environments like the World Wide Web offer easy sharing of information, but provide few options for the protection of sensitive information and other sensitive resources. Typically, this protection is based on that a requester is already known by the server this way, the server is able to map the identity of the requester into a permissions table in order to grant or deny access to a resource. Databases are cardinal components of any web based application by enabling websites to provide varying dynamic content [7]. Since very sensitive or secret information can be stored in a database, we strongly consider protecting our databases. To retrieve or to store any information we need to connect to the database, send a legitimate query, fetch the result, and close the connection. we used the commonly used query language in this interaction is the Structured Query Language (SQL). Also the hashing algorithms was activated which encrypt the password in the database and on the web pages also the system must work when the land registrar officer login to the system and turn it on. After that each employee can log in to his department by his user/password but if the land registrar officer did not log in then no one can log in. And the system will turn off after LRO log out or at 15:00 clock.

9. Conclusion

1. The software is easy to use (user friendly) because the GUI is Arabic interface and web-based.
2. A lot of time and the efforts spend in data gathering by going or visiting the Karbala real estate office and see the work flow routines.
3. Clearly, the manual system is inadequate for this type of work, which led to many properties taken illegally.
4. The legislations need to be fully comprehensible and to be very careful in converting these legislations to digital system accurately.
5. The design of the interfaces will make the complicated routines easy to follow.
6. The security features is sufficient and more improved than manual system.

10. References

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