Design And Implementation Of Iraqi Electronic Identification Card Based On Modern Techniques Of Software Engineering

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Abstract

The rapid development in the information technology and computer systems had been an effect and a prominent role in the identifiable electronic systems in many countries of the world, that considered the application of modern information technology systems as an essential tool that contribute to community service. Our country is one of the Arab countries, that exercised the experience of hiring electronic applications since 2003 and so far, it is the most important of these newly adopted electronic applications is the system of the electronic format that belongs to central acceptance of high school students. It is important to mention that the identification text card of the civil status or citizenship certificate card is only the official identification card that recognized the identity for the Iraqi citizens. This induction text card has several disadvantages, the most important is presented to corruption or fraud by manipulating their data by some weak people, This scripts card not possess accurate and important details about the person, due to the lack of extra information fields that contain, so we must think about new identification card for the Iraqi citizen that has modern electronic code, We offer through this work these new modern scientific ideas, easy to implement and employs computer engineering techniques that are used in the preparation and establishment of an electronic induction card for every Iraqi citizen, whether inside or outside the country, by converting of textual information carried by the citizen in paper form that represent his private information to an encrypted digital information electronically stored in electronic storage chip placed in a special card to form an e-card induction card for every citizen.

Keywords: Information Technology, Coding, Data Compression, Visual Programming .

تصميم وتنفيذ بطاقة تعريفية الكترونية عراقية بأعتماد التقنيات الحديثة في هندسة البرمجيات

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الخلاصة :

لقد كان للتطور السريع والشامل في تكنولوجيا المعلومات والحاسوب أثر ودور بارز في تطور العديد من الأنظمة التعريفية الالكترونية في الكثير من بلدان العالم التي تعتبر تطبيق نظم تكنولوجيا المعلومات الحديثة كأداة أساسية ومرتكز نظامي متقدم يساهم في خدمة المجتمع . وبلدنا يعتبر من البلدان العربية التي مارست تجربة توظيف التطبيقات الألكترونية منذ عام 2003 ولحد الآن،   ومن أهم هذه التطبيقات الألكترونية المعتمدة حديثا هو نظام الأستمارة الألكترونية الخاص بالقبول المركزي لطلبة الدراسة الأعدادية . لابد من الذكر أن الهوية التعريفية النصية المتمثلة بهوية الأحوال المدنية أو شهادة الجنسية الورقية هي الهوية التعريفية أو المستمسك الرسمي الوحيد المعترف به كهوية تعريفية للمواطن العراقي، أن هذه الهوية التعريفية الورقية يشوبها العديد من المساوئ ، أهمها هي عرضتها للتلف أو التزوير من خلال التلاعب ببياناتها من قبل بعض ضعاف النفوس، كما أن هذه الهويات التعريفية النصية لاتمتلك تفاصيل دقيقة ومهمة عن المواطن بسبب قلة الحقول التي تحتويها،   لذا لابد لنا من التفكير بهوية تعريفية جديدة للمواطن العراقي تحتوي على شفرة ألكترونية حديثة . أننا نقدم من خلال بحثنا هذا أفكار علمية حديثة جديدة سهلة التنفيذ توظف وتستخدم تقنيات الهندسة المعلوماتية في إعداد وإنشاء بطاقة تعريفية ألكترونية لكل مواطن عراقي سواء كان في داخل القطر أو خارجه وذلك من خلال تحويل المعلومات النصية التي يقوم بإملائها المواطن في إستمارة ورقية خاصة بالمعلومات إلى معلومات رقمية مشفرة ألكترونيا مخزونة داخل شريحة خزن ألكترونية توضع في بطاقة خاصة لتشكل بطاقة ألكترونية تعريفية لكل مواطن.

1. Introduction

The United States and European countries are the first countries that used the computer and employing information technology in the development of its administrative systems and converted them from old traditional paper systems to new electronic systems that used the sophisticated computer techniques and other software applications. At the first, these countries developed their administrative systems through collecting of information and databases about their private citizens and converting these information from their own scripts to digital encrypted data stored in an electronic chip places on a special card to form electronic induction card which has become the bases in each electronic administrative system in these countries. Note that the adoption of this induction card in the definition of given personal information to every citizen in these countries enables it to be used in facilitating, allow him to enter into many of the institutions of the state government, and the high reliability and confidentiality of these cards facilitate the process of deposit and withdraw

money from banks, also facilitate the process of shopping from the market or when using the system of trains, air transportation.[1]

Through the foregoing, we find that it has become necessary to think in a scientific manner about how to develop phases of the administrative system and try to move away from the use of traditional paper cards, and convert all the stages to electronic form by use of sophisticated electronic that based on advanced information systems for the definition of persons, therefore, the objective and the primary purpose of this paper is to give an idea of sophisticated scientific idea uses an algorithm of Arabic character orientation and data compression as a basis for the design and construction an electronic induction card for each citizen, that records all personal information about the citizen in terms of quartet name, surname, date of birth, gender, whether male or female, nationalism and the country prate…etc.[2]

2. Theoretical Background

It is obvious that any text, such as name or address or any other text can be written in a set of alphabetic characters, whether they can be Arabic or English characters. Many researchers create different ways for converting these texts from their scripts status to an encrypted electronic state, this new state can be represented in binary form (0) and (1) only. The researchers used many ways for converting the alphabetic characters and numbers to their electronic form, such these codes are the ASCII code, and the BCD code.

The ASCII code is considered one of the most important global code currently approved in the representation of English characters, numbers and symbols in their encrypted form, this code consists of eight bits for each character, number and symbol. [3]

The researchers also have keen on storing these encrypted form that representing the alphabetic characters, numbers and symbols in an electronic chip placed on certain card.

3. The Design Of Iraqi Induction Electronic Card

We can summarize the proposal algorithm which is called Iraqi Induction Electronic Card (IIEC) in four phases as mentioned below.

3.1. Initialization Phase:

This phase begins due to the fact that each Iraqi citizen must fill the form of private information, all custom fields of information are Arabic alphabetic characters and numbers fields, It is obvious that each key of the computer keyboard branded it two letters, one letter in English and one in Arabic, but this key has a single code (the ASCII code for its English character), For example, if we want to write the Arabic name (**Sami** سامي) this requires to write the word (**DLHS**) in English language (notice that the character **S** corresponds to character (س) in Arabic, the character (**H**) corresponds to character (أ) in Arabic, the

character (**L**) corresponds to character (م) in Arabic, and the character (**D)** corresponds to character (ي) in Arabic), Continue writing the Arabic words on the same pattern till fills all the fields with the required information.

3.2. Formatting Phase:

In this phase the written characters are formatted and arranged in a textual bar contains all the characters that were written in the fields as shown in the figure below:

Fig. (1) Fields of a textual bar

From **Figure** (**1**) we can notice that there several fields for this stream, field for name, field for father name, grandfather field, field of birth, mother name field, current address field,…etc. As mentioned before we notice that the name field had been filled with the characters (DLHS) that corresponds to the Arabic name (**SAMI سامي**), the other fields have also the same algorithm of arrangement of characters.

3.3.   Data Compression Phase:

In this phase, after completion of writing letters in integrated and sequential fields of textual bar, data compression process is made to this textual bar, this process will get rid of repetitions in the letters within a single tape script to enable increasing in storage space and increasing the detailed information and then increasing in speed of execution. Permeates the compression process another process called the encryption process, this process will produce codes using a special technology called Adaptive Huffman Code [4][5][6], this technique will rearrange the letters according to the probability of recurrence in the textual bar, we can also record the position of each character in this textual bar with its probability in a certain matrix, and then storing this matrix with compression results in a file, this file can be store in a computer or server, the benefit of this file is to check the authority of personal information that were mentioned in the text form. Do not forget that the probability of repetition of each character in the text bar is calculated by dividing the number of repetition of this character in the text bar to the total number of characters in the bar. The result of the use of this technology will lead to the production of special encrypted and compressed code for all characters exist in the text bar.

3.4. Electronic ID Production Phase:

This phase, will convert all the letters in the text bar from their literal form to their digital codes and then storing them in an electronic chip. As mentioned before in previous phase, the use of Adaptive Huffman Code for compression of data in the text bar will

contribute for obtaining a new encrypted and compressed code for the data in the text bar, these codes can be stored in a small single electronic chip placed on certain position in the card to produce the electronic ID card for each citizen. The copy of this new encrypted and compressed code can be saved in a file in the computer or server device. The whole description of this new encrypted and compressed code can be illustrated in flowchart (1).
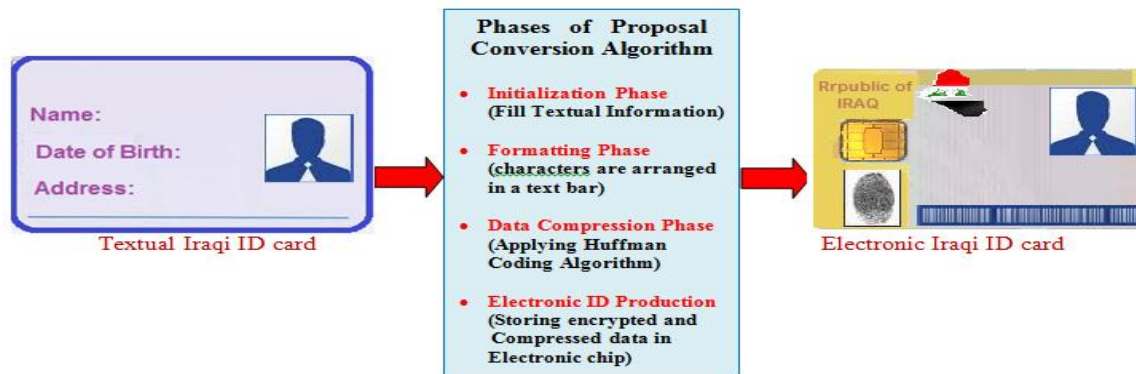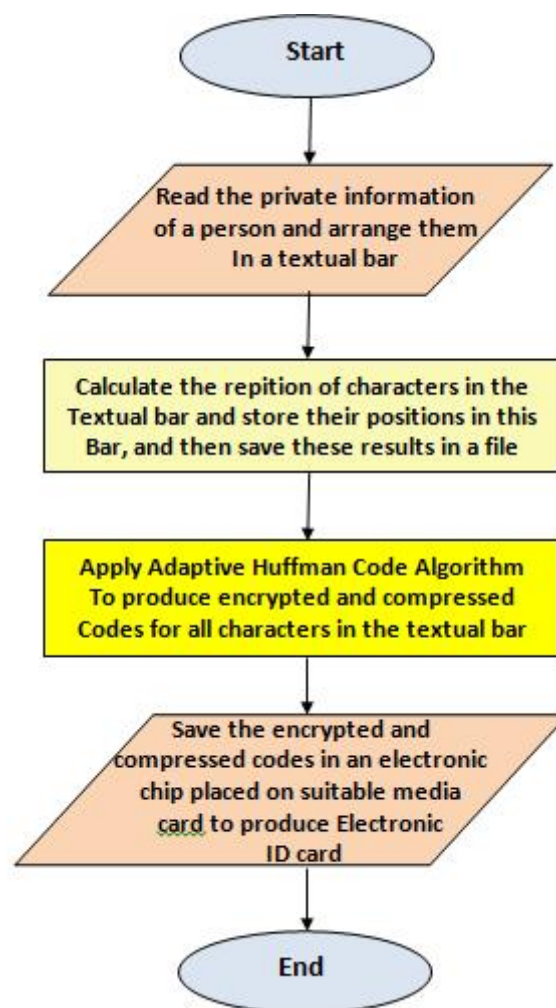

Fig. (2) Procedure of producing ID card

Fig. (3) Flowchart of Producing Electronic Codes

4. Implementation and Practical Results

To implement and test the proposal algorithm we built special program by using visual C++ [7], within this program many functions, classes, matrices, conditional loops, and linkers had been built to get the automatic computation for the encrypted and compressed electronic codes for all the characters that had been written in the textual bar.

4.1. Application Program Interface

When we execute the program of IIEC, the application program screen will appear as shown in **Figure (4).**
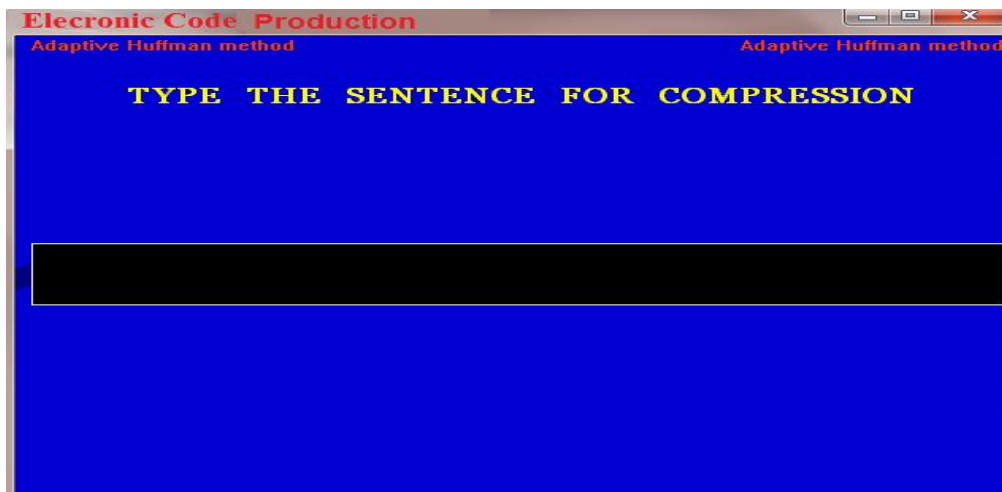

Fig. (4) Screen of IIEC program with empty textual bar

4.2. Test for Writing Characters in the Textual Bar

In this step we wrote the english character corresponds to the name, father name, grandfather name as mentioned in the textual bar in **phase (2)** which is shown in **Figure (5).**
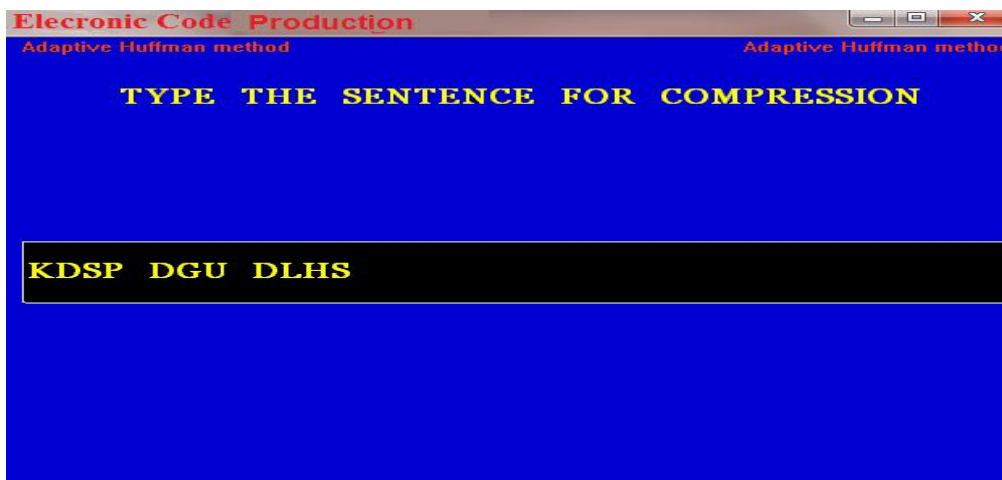

Fig. (5) Screen of IIEC program with proposal characters

4.3. Test for Writing Characters in the Textual Bar

When executing this program the results shown in **Figure (6)** will appear.

```
Elecronic Code  Production
Adaptive Huffman method        THE  RESULTS         Adaptive Huffman method
Char Frequency Propability Length  Binary        Code
  D       3       0.2307      1    01000100      0
  S       2       0.1538      2    01010011      10
  Space   2       0.1538      3    00100000      110
  P       1       0.0769      4    01010000      1110
  K       1       0.0769      5    01001011      11110
  G       1       0.0769      6    01000111      111110
  U       1       0.0769      7    01010101      1111110
  L       1       0.0769      8    01001100      11111111
  H       1       0.0769      8    01001000      11111110
```

Fig. (6) The resulting screen of IIEC program

From **Figure (6)** we can notice that the Arabic character (ي) that corresponding to English character (**D**) has the large frequency (3) among the other characters, while the Arabic character (س) that corresponding to English character (**S**) has the frequency of (2), the spaces between the words in textual bar has the frequency of (2), while the other characters have the same frequency of magnitude (1), this process can be illustrated in **Figure (7).** After that the arrangement of encrypted and compressed codes for sequenced characters will give us the electronic ID code, that can be either stored in electronic chip placed on card, or built encrypted bar code.

11110 0 10 1110 110 0 111110 1111110 110 0 11111111 11111110 10

Fig. (7) Illustrates the compressed code for sequenced characters

5. Conclusions

From the work that was presented in the previous sections of this paper, the following conclusions can be pointed out:

1- This algorithm gives suitable, encrypted, and compressed codes for Arabic characters in terms of corresponding English character.

2- This algorithm provides so strong code, because of the variation no of bits for each character, these bits can be combined together to get the electronic ID code.

3- This algorithm provides minimum number of bits as compared with the fixed coded algorithm that used ASCII codes as example; this give large amount of storage capacity of information.

4- This algorithm provides another way for checking the authority of textual information by comparing the data stored in the electronic chip with that saved in a file in a main database server.

5- This electronic card is more secure and reliable card than the conventional textual ID card.

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