Document Digitization using RFID & Fingerprint Scanner

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Abstract: The Omnipresent idea of the Web permits the majority of the present data innovation frameworks to give benefits that are of a worldwide degree. An understudy in the US may utilize Facebook to speak with her family in Brazil and to send them a blessing by utilizing Amazon. As online clients appreciate the accommodation of worldwide administrations, information transmission crosswise over fringes and Skill security turns into an essential thought. So, what we are realizing nowadays is digital life, in every day to day life we are dependent on digital way of doing that work. But there is still one case where we are using papers for doing that work which is government or any educational, medical documents etc. We have to drift file of documents while we are going for any government work such as for issuing driving license. So we are providing digital solution on this problem by replacing bunch of documents with single Radio Frequency Identification card.

1. Introduction

The project is to design and implement central repository for all documents by using software and hardware. The endmost goal is that the ideas and planning signified through this model system can then be easily enhanced to an actual document management in government sector. As the system is to be executed for government and such long organizations, there are a number of performance detailing that have to be met to safeguard the system operates correctly and efficiently. Most importantly, to emerge system interface must send and receive the expropriate information.

2. Problem Statement

For Public Services and Government firms, with tens or hundreds of thousands of documents, a document management system is becoming a instruction directive to organize, index and control their documents in a hassle-free manner. Public Services and Government firms deal with Documents which range from Public View documents, Tenders, to the most Confidential and undisclosed Documents which are deliberated only for view of certain designated personnel. Saving all these documents as physical records not just consumes a lot of space but also is a tedious uninspiring affair to file these documents and govern them safely with inadequate access. So we are providing one digital solution to this problem with RFID card and fingerprint scanner. User will get authenticated by unique id of RFID associated with each document.

3. Literature Survey

Ehun-wei Tseng presents our offered validation system subsidize with keystroke elements as a biometric for verification. In this inter-key postponement of the secret key and the record for client recognizable proof in the System conception. Feng-Jung Liu Mentioned with respect to keystroke dynamics. Keystroke dynamics is the way of analyzing client categories at a terminal by checking the keyboard inserts a huge number of times and tries to recognize them dependent on persistent rhythm samples in the manner in which they type. Keystroke elements or composing elements refers to the automated strategy for recognizing or confirming the personality of an individual dependent on the way and the rhythm of typing on a console. Keystroke dynamics is a social biometric, this implies the biometric factor is 'something you do'.[1]

Hyoungshick Kim present new tape insurance system for grid associated gadgets that have a place with a client's own unique network. To prevent unlawful reconstructed of the tape substance through web, a proper substance assurance automation is required. They implemented a model with famously utilized encryption algorithm (RSA-OAEP and AES). The trial after effects of our model show that the execution time elevated and it caused by the suggested framework appear to be sufficiently satisfactory. It solves the issue of Traditional account insurance frameworks that are commonly intended for a solitary gadget, for example, a Digital Video Recorder (DVR) or a Personal Video Recorder (PVR) that records that got substance in a computerized configuration to information stockpiling inside a device. [2]

Judi Diane F. Minon pivots on the requirement for the design and evolution of an intranet-based website that makes, transmits, tracks, and limits ISO document that go all through National University. Previous actual bodily records will be filtered to change into digital reprint and will be sync to the system and will go to its appropriate vault contingent upon its grouping dependent on the document name tradition. An advanced mark is additionally included for endorsers which can be followed and tracked. Moreover, it gives a structure where the development of a web-based document Management structure can be based. [3]

4. Proposed System

In this system we have several hardware like Fingerprint sensor, Smart RFID reader and tag, Arduino, ESP266, Raspberry pi. Using fingerprint, we use different fingerprints id to store in database to identify various peoples in the system. Each person has its own RFID number provided through which he or she can be identified. Data of fingerprints is stored in server using raspberry pi. RFID tag is provided to each user so two authentications is done. RFID tag is connected with fingerprint sensor. After Comparing RFID id and fingerprint the confirmation is given by Arduino, then data of that id can be accessed from raspberry pi which works as a server. All the scanned documents are uploaded to server by user.

Following are steps for working of the system:

1) Initially user need to upload the file of all the scanned copies of document to server. The id is created for every user.

2) RFID tags are provided to each user which connected to server with specific id.

3) It compares id' s and give authority to access the documents.

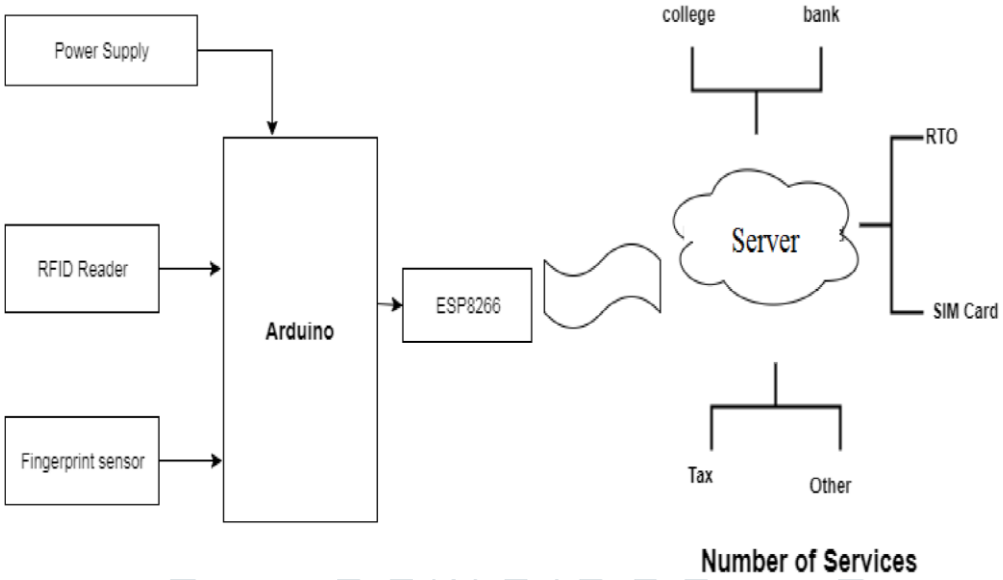

Figure 1. Overview of digitalization Using Raspberry Pi

5. Methodology & Implementation

In proposed system there are three modules

1. User registration module

2. User login module 3. Admin module

ALGORITHM

Step 1: User Registration

Step 2: User Login

Step 3: Document storage & task assignment

Step 4: Fingerprint scanner

Step 4: Task scheduling

Step 5: Logout

5.1. User Registration Module

User registration is done to generate the fingerprint pattern and RFID number for user login. Users have to fill the details to create an account. These fingerprint pattern and RFID number is used to authenticate the user. The user_id, fingerprint_id, and rfid_id is generated after the registration is done by the user. User scans the fingerprint and RFID which is stored in a database and further compared with the fingerprint pattern and RFID input given by user to login the system.

User is allowed to register for this system by enrolling the fingerprint pattern and the unique RFID number is generated for each document of the user which can be accessed with the RFID card in which these unique IDs are stored. These fingerprint patterns and unique RFID numbers are stored in the database and are used for the authentication purpose.

5.1.1. Authentication methods:

5.1.1.1 Fingerprint: People have utilized fingerprints for individual distinguishing proof and the checking accuracy utilizing fingerprints has been appeared to be high. Fingerprinting is likely the best-known biometric strategy for distinguishing proof utilized for a long time. The unique finger impression module is utilized for the expanding security of archives. There are a different picture catch innovation accessible for such industrially situated unique mark sensor, including optical, silicon, ultrasound, warm and half and half.

There are two steps in the fingerprint identification process.

1. Enrolling Fingerprint: At the time of registration of a user, user enters his fingerprint for security purpose. The fingerprint pattern gets the unique_id. After that this data is stored in the system database.

2. Matching Fingerprint: Once registration is done, then each time a user wants to login in the system he needs to go through the fingerprint authentication process. The fingerprint scanner captures the particular information and checks that it

matches with the information stored in the database or not. If that fingerprint matches with the data in the database then it gives access to that particular user.

5.1.1.2 RFID: Radio Frequency Identification (RFID) module exploits electromagnetic sector to accordingly distinguish and follow tags joined to items. By utilizing RFID appoint the one of a kind id to every client. The card contains electronically-put away data. It is Not like a systematize identification, the tags need not be inside the observable track of the user, so it might be fix in the accompanied item. RFID is scheme for programmed ID and information catch.

When user is going to register in system, system assigns the unique user_id to that user which is a special identification number used to identify the user. When admin uploads any document, each document will allocate a unique document_id along with document_name and user_id to which it belongs. Each document will be assigned the document_id and these RFID_ids are stored in RFID tag. Whenever RFID reader scans that tag and if authenticates successfully its displays all the related documents with that RFID tag.

Each RFID tag stores these unique_numbers or rfid_ids. Following are three categories of RFID tags which are 1. Active 2. Semi-passive 3. Passive. The active and semi passive RFID tags require inner battery is the main difference between them. It is adapted to connect to the Microcontroller. Now the PIC Microcontroller differentiates the two password strings. If they are identical then an authorization signal is sent to the computer else no authorization signal is sent to the computer. RFID reader can do two tasks one is reading and second is recover the information stored inside the RFID tags.

5.1.1.3 OTP: OTP which is nothing but the One-time Password is a password which is veritable only for one login period or proceeding in a PC. These passwords are amalgamation of 4 or it can be 6 numeric digits or it can be 6 digits which are alphanumeric. The Random function which is used to generate irregular or arbitrary one time passwords which is already explained or decided in math library. This password method is used for a authentication in case of the fingerprint identification failure. User can recover the access by this.

5.2. User Login Module

Once the registration is done the user can login to the system with the help of the fingerprint pattern and RFID card which is registered at the time of the user registration. The user has the sections visible which are created to store the documents according to its use and requirement. The documents uploaded on the system are stored as per the type of the document being uploaded. The documents can be uploaded in the section as per the use of the document.

The rfid_id and fingerprint_id are given as a input to the system for the login purpose. This input rfid_id and fingerprint_id is used to authenticate the valid user. The authorized user can view and download the stored documents from user's profile.

5.3. Admin Module

Verify Documents: The admin has the task of verification and validation of the documents user wants to upload on this system. Verification of the documents are done to avoid the misuse of the documents and it increases the integrity of the system. The authentication of the user is also done by the admin to upload the documents. The valid documents are then uploaded to the users profile by the admin. Admin has the access to upload, view and download the document in the system.

Scan Documents: The verified documents are scanned by the admin. Scanning is a function that digitizes printed documents and it converts paper documents into digital images. Admin has the access to upload the verified documents on the system and the documents need to be scanned for being uploaded on the system.

Upload Document: Documents are uploaded by the admin. Admin have the access rights to upload, view and download the documents. The verification and validation of the documents is done by the admin. The valid documents are then scanned to digitize them and these scanned documents are then uploaded on the system. The document when uploaded are assigned the unique document_id, document_name and the user_id of the user to which these documents belongs. Each document has its unique document_id which is stored in the RFID card through which user can access these documents. User can view and download these documents by login in the system with rfid_id and fingerprint_id.

6. Advance Encryption Standard Algorithm

AES is a symmetric encryption algorithm which has symmetric key symmetric block cipher. Below are some steps where we are encrypting a 128-bit block.

Step 1. Substitute byte: Substitute byte restore.
Step 2. Shift rows: Matrix or row column relocated.
Step 3. Mix column: Column should be blended. Step 4. Add round key: Key should be induced.

7. Mathematical Model

Problem Description and System:

Let S be the Closed structure which is explicated as,

S = { Ip, Op, Ss, Su, Fi,A}

Where, Ip={username, password}

Op= {finger print scanning, document storage, feedback}

A is Set of operations

A={Z1,Z2,Z3,Z4}

Where, Z1 =upload documents
Z2 = scan RFID & fingerprint

Z3 =display documents

Z4 = update documents

Ss- Set of User's states

Ss = {rest state, login state, Upload documents, Store fingerprint and RFID, Scan Fingerprint and RFID, Display Documents}

Su- success state is after authentication of fingerprint and RFID scanning all documents are getting displayed.

Fi- failed to authenticate user's fingerprint due to hardware problem or may be user is not registered

8. Result

The user accounts are created and is shown to the admin in the database along with the Fingerprint_id and rfid_id generated for the authentication. The documents along with their document_ids are stored in the database.

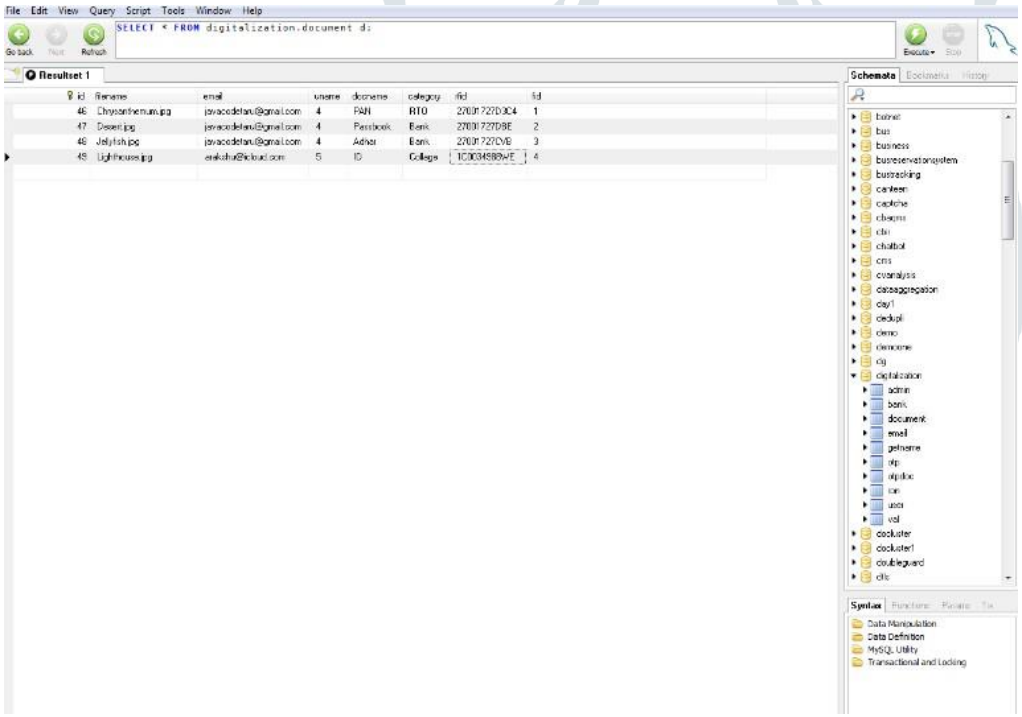

Figure 2. Result

9. Conclusion

We provide a hassle free and user-friendly way to manage documents by using them digitally. All the problems that arise due to current system i.e. carrying copies and original documents with us will be solved by new digital system. Every time it is easy to handle documents digitally.

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