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Mobile healthcare SMS service

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ABSTRACT

Usage of mobile applications and wireless networks is growing rapidly in different sectors in the world. Mobile healthcare application is devotedly accepted by the healthcare organizations and also by patients. Providing healthcare and related services through the SMS, or e-healthcare is an emerging phenomenon. Wireless personal computing devices are finding a niche in the healthcare communities, promising point-of-care access to medical records and information ranging from patients to drug libraries. In this paper, we have presented a software-based application for healthcare centers entitled "Mobile Healthcare SMS Service'. This project is a prototype of a wireless health monitoring system capable of sending SMS related to the health status of the patient. The projects work at two different levels as System provides the medical information used for the desktop on wired networks. The system has a mobile context server that re-configures mobile contents according to the mobile device. The mobile context sever applies context to the contents by using styles, a property override, and templates according to the resources of a given mobile device. In this way, the system serves reconfigured web contents to the mobile device.

Keywords— *Mobile healthcare, Context server, Encryption, Decryption*

1. INTRODUCTION

The use of information technology in the healthcare domain is increasing day by day all over the world. Previously, mainly devolved countries were using computers and their devices within the healthcare domain. But nowadays developing countries are also moving towards it. Coverage of mobile networks in most of all areas in a country makes everyone interested to use mobile phones. And within the last few years, the uses of smartphones drastically increased. Due to this change, the user community is pushing for the development of mobile applications. Now user can use most of all desktop applications in their smartphones. Even healthcare service providers and patients are feeling comfortable to use mobile devices for patient records and/or patient diagnostic process. The use of mobile phone within the Healthcare domain is called mobile healthcare. An m-healthcare application can be used by patients as well as by doctors.

The main goal of this project is to develop an m-healthcare application that will provide secure, trustful and reliable communication for different communities in the healthcare area. We have planned to develop an application that will provide an interface to both doctors and patients. The GUI of this project is designed very user-friendly, any person with minimum knowledge of mobile or computer can easily use this application. In this project we also ensure the security to the user because this project will secure from three important types of threats, the major threats are:

1. Threats that attack from network communication.
2. Unauthorized access to data.
3. Third persons access to the device storing data if the device is lost or using some malicious software.

In our project, we eliminate the threats by encrypting and Decrypt data transfer between mobile devices and data servers. Using authentication and role-based access control. All the user needs to register into the system to get the SMS service from the healthcare center. Now the registered user can put up any query related to their health and immediately the will receive the prescription or health tips from experts.

2. PROBLEM DEFINITION

2.1 Existing System

As per the need of different applications the developer develops a project on the mobile healthcare system. As per our analysis, many application uses the internet connection to avail the facility of Mobile Healthcare application. At present we are in the practice of browsing the web and get details of a particular first-aid or any health tips from experts. But in the emergency spot, we can't find a computer and internet connection. Thus this is the main drawback of many mobile healthcare services.

Major Drawbacks

a) The need for Internet Connection and computer.
b) Need for mobile healthcare app installed on the mobile.
c) The reappearance of various widgets.

2.2 Proposed System

In this paper, we designed a software entitled ***"Mobile Healthcare SMS service***". This software provides better medical service to the patient anytime and anywhere.

In this paper, we suggested the cooperative mobile healthcare information support system and design system that can achieve the advanced inquiring manner of medical information for collaborating diagnosis at both desktop and mobile machines, and also afford to support wider accessibility of users over wireless network environments. This mobile healthcare service doesn't require an internet connection. The user has to send SMS to the healthcare center and immediately he received the valuable suggestion from the expert team.

Another important feature of this software is the security, which is ensured to the user by using the concept of encryption and decryption technique. Crystal Report is used for quick generation of a report.

3. SYSTEM DESIGN

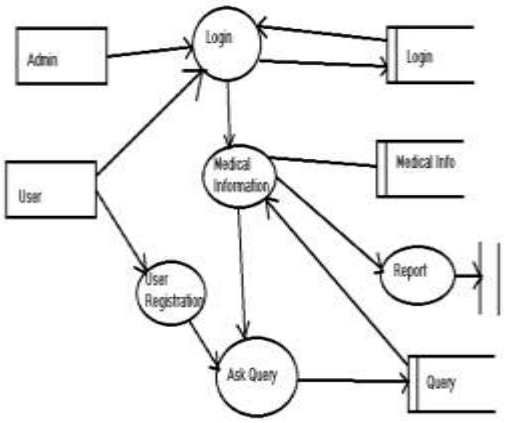

Fig. 1: Technology used in this system

3.1 Modules Description

After the careful analysis, this software is divided into following modules. The system is developed as 5 modules to handle the following parts:

a) User Registration Module

This module helps the healthcare center to keep the record of all the users, who have registered into the system.

b) Admin Module

This module is designed for the admin who is having the authority to use this software. The admin can view the details of all the users and can generate the reports as and when needed.

c) Query Module

This is the important module of this software. With this module, the user can ask any query related to health and send to the healthcare center.

d) Medical Information Module.

This module acts like a dictionary where the detailed information about any disease, treatment, and medical related keywords are stored by the experts.

e) Reports

This module is used by the administrator to generate the various reports.

4. SYSTEM REQUIREMENTS

4.1 Hardware Requirements

a) Dual Core 1.6 GHz Processor and Above
b) RAM 1GB and Above
c) HDD 80 GB Hard Disk Space and Above
d) Data card

4.2 Software Requirements

e) Operating System: Windows OS (XP3/07)
f) Coding Language: C#
g) IDE: Visual Studio 2010
h) Back End: SQL Server2008

5. TECHNOLOGY USED

5.1 Cryptography Mechanisms

Cryptography is a mechanism that has the ability to prevent the message from being read by others when the message transfers from a sender to a receiver. Cryptography uses the mechanism to encryption and decrypts data. Integrity checking and authentication are also provided by cryptography Substitution and Transposition are general principles of all encryption algorithms. In the Substitution, every element of plain text is mapped into other element and transposition reorganizes the elements of the plain text. But, the main requirement is that original information is not lost or changed. There are three types of cryptography functions: asymmetric key or public key cryptography functions, a symmetric key or secret key cryptography functions and hash functions.

i. Symmetric Key Cryptographic Functions

In symmetric cryptography sender and receiver both use the same key for encryption and decryption process. This key is known as a secret key. This secret key is shared between the sender and the receiver. Stream ciphers and block cipher are two types of symmetric key algorithms. Stream ciphers produce one output element for several input elements at a time. Block ciphers produce a block of elements at a time. There are several symmetric algorithms, such as Blowfish, DES, AES etc.
An example of the symmetric cryptographic mechanism is the following:

Encrypting message: Ek (M) = C
Decrypting message: Dk (C) = M

Here plain text message (unencrypted) is defined as M. The plaintext message M is encrypted by Ek (E is the symmetric encryption and k is the secret key of the encrypted message) and C is defined as an encrypted message (ciphertext). Then the ciphertext message C is decrypted by the receiver using the same secret key k and the receiver receives the original message C.
A serious problem of symmetric key cryptography system is key management over insecure communication channels. In symmetric systems, it is necessary to send the key through a secure channel or key must be encrypted. The key management problem is fully solved by public key cryptographic systems.

ii. Asymmetric Key Cryptographic Functions

Message sender and receiver use different keys for message encryption and decryption process in an asymmetric key cryptography system. Here one key is used as a private key and it is kept private which is only known to the owner of the key. Another key is used as public key and it is stored in a register or other accessible file. Public key cryptography is also applied for key management and signature applications: keys exchange for symmetric cryptography and digital signature.
Mailbox analogy is an example of public key cryptography. Mailbox is used as a public key where anyone can throw the letter into the mailbox. Only the mailbox owner is the only person who has the mailbox key (private key) and only he/ she can open the mailbox and get the letter with this key.
Encrypting message:

E_{PuK} (M) = C
Decrypting message:
D_{PrK} (C) = D_{PrK} (E_{PuK}(M))=M

The sender uses the receiver public key($_{PuK}$) to encrypt the message as E_{PuK} (M) and then sends the encrypted message to the receiver. When the receiver receives the message, she/he uses her private key($_{PrK}$) to decrypt it as D_{PrK} (E_{PuK}(M)). Since the only receiver knows her private key, no other receiver can decrypt the message.

6. CONCLUSION

Mobile Healthcare SMS Service is a software developed using visual 2010 as front end and SQL Server 2008 as the back end. This is an innovative approach to health checking and it should be widely accepted by different cities in addition to existing means like the website, email etc. A few years ago m-healthcare didn't exist and the people need to go physically to a medical service center for getting each service and physician also provided paper base service. After introducing m-healthcare application, it makes people life easier and comfortable. The patient can retrieve his/her medical information at any time and anywhere by using his/her mobile phone. The mobile healthcare communication between patient and healthcare professionals will increase efficiency and reliability significantly.

The fact that fixed wireless phones all have the capability to send and receive SMS also makes it a viable option. Finally, most peoples, guardians or sponsors who are not computer literate and not familiar with the use of the internet, will be probably comfortable with sending and receiving SMS. A mobile web service on Mobile networks is the foundation for ubiquitous healthcare that gives patients better medical services anytime and anywhere.

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