careHUB

Health Care System

Business Requirement Document

Introduction

Executive Summary

CareHub Health Care System is a system that enables patients to accomplish three tasks easily:

1) Find the right health provider to get treatment.

2) Retrieve medical records, such as test results and other health information.

3) Book appointments and scans easily with a button click.

Imagine the amount of effort that'll be saved, all the hassle of looking for the right doctor, and having to book appointments on ground, all this will be available from home through this website.

All the needed information about the hospital will be available for the user.

Document Overview

This document introduce Health Care System product's study plan. It introduces general description, technical description, development plan, operation plan.

Business Objectives

- Offer easy and effective online Health Care Services.
- Offer online hospital system for medical institutions.
- Offer flexibility for patients to reserve their service.
- Offer an organized way to record the information
- Offer an upgraded online system.

Background

Introduction[0]

Healthcare is changing with a new emphasis on patient-centeredness. Fundamental to this transformation is the increasing recognition of patients' role in health care delivery and design. Medical appointment scheduling, as the starting point of most non-urgent health care services, is undergoing major developments to support active involvement of patients. By using the Internet as a medium, patients are given more freedom in decision making about their preferences for the appointments and have improved access.

Survey[1]

Many hospitals -even governments- turned to website-based appointment service WAS and these are some examples of them:

Chinese government: As a part of nationwide healthcare reforms, the Chinese government launched web-based appointment systems (WAS) to provide a solution to problems around outpatient appointments and services. These have been in place in all Chinese public tertiary hospitals since 2009.

Hospital Information[2]

A hospital information system (HIS) is an element of health informatics that focuses mainly on the administrational needs of hospitals. In many implementations, an HIS is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services.

Hospital information systems provide a common source of information about a patient's health history. The system has to keep data in a secure place and controls who can reach the data in certain circumstances. These systems enhance the ability of health care professionals to coordinate care by providing a patient's health information and visit history at the place and time that it is needed.

Patient's laboratory test information also includes visual results such as X-ray, which may be reachable by professionals.

HIS provide internal and external communication among health care providers. Portable devices such as smartphones and tablet computers may be used at the bedside.

Hospital information systems are often composed of one or several software components with specialty-specific extensions, as well as of a large variety of sub-systems in medical specialties from a multi-vendor market. Specialized implementations name for example laboratory information system (LIS), Policy and Procedure Management System, radiology information system (RIS) or picture archiving and communication system (PACS).

Potential benefits of hospital information systems include:

- Efficient and accurate administration of finance, diet of patient, engineering, and distribution of medical aid. It helps to view a broad picture of hospital growth
- Improved monitoring of drug usage, and study of effectiveness. This leads to the reduction of adverse drug interactions while promoting more appropriate pharmaceutical utilization.
- Enhances information integrity, reduces transcription errors, and reduces duplication of information entries.[2]
- Hospital software is easy to use and eliminates error caused by handwriting. New technology computer systems give perfect performance to pull up information from server or cloud servers.

Medical Appointment [3]

Traditionally, medical appointments have been made with schedulers over the telephone or in person. These methods are based on verbal communications with real people and allow for maximum flexibility in complicated situations. However, because these traditional methods require the intervention of schedulers, the ability to get a timely appointment is not only limited by the availability of appointment slots, but also by the schedulers and phone lines. Patients' satisfaction with appointment booking is influenced by their ability to book at the right time with the right health service providers.

The Internet has recently emerged as another means to make appointments. Web-based appointment scheduling has been a popular research topic. Several studies conducted satisfaction surveys and found that Web-based appointment scheduling is an extremely important feature, and most patients would use the service again.

There are two major types of Web-based medical appointment services, medical scheduling software as a service (SaaS) and proprietary Web-based scheduling systems. Medical scheduling has gained increasing prominence in recent years. These appointment systems are not built up by health care practices themselves, but are provided and maintained by health IT companies such as ZocDoc and InQuicker on a paid subscription basis. The appointment services are cloud-based and can be integrated into health care providers' own management systems. The other type of appointment service is proprietary appointment systems, which are integrated into patient portals on providers' websites. A patient portal is a secured Web-based service that allows patients to access their health information and communicate with their health care providers at any time.

There is one mode of Web-based appointment systems, asynchronous mode or electronic forms on providers' website. In the asynchronous mode, appointments are requested through emails and then manually processed by schedulers.Although the asynchronous Web-based appointment systems also use the Internet as a medium, they basically replicate the process of telephone-based appointment scheduling. Under the asynchronous mode, if an appointment is requested outside of a provider's business hours, it will not be processed until schedulers return to work. Normally, Web-based appointment requests are put in the same queue as phone-call appointments, and are thus limited by the backlog of phone calls in the queue.

System Description

The idea is to simply provide a service that facilitates patient care from home, The patient will be provided with hospital info to help him reach the suitable service for him, he'll have a profile with his full medical record and it'll be updateable with his blood test results, and any prescriptions he takes.
The website will enable patients to know the hospital's available services, doctors, and clinics. It'll also enable the patient to book appointments. The patient will be able to rate the hospital's doctors, to provide continuous feedback to the hospital's staff.

There will be a Receptionist user that can use the system in the hospital to book for patients on ground.

Staff

The main objective of this section is providing the patients with all the needed information concerning the hospital's staff. This includes that the patient will have access to the full schedule of all doctors, his specialization, feedbacks from other patients, and a brief description written by the doctor himself.

Profiles

The patient has a profile. The patient's profile includes his medical record which includes his blood type, whether he has allergy to certain drugs, a history of the treatments and prescriptions and everything that could help any other doctor to treat this patient.

Services

Clinics

Through the clinics section, the patient can check the available clinics in the hospital and their costs. The patient can also book appointments to the clinics he needs. And reserve his slot of time and day.

Scans

The patient can check the available scans in the hospital and their costs. The patient can also book appointment to the scan he needs. And reserve his slot of time and day.

Pharmacy

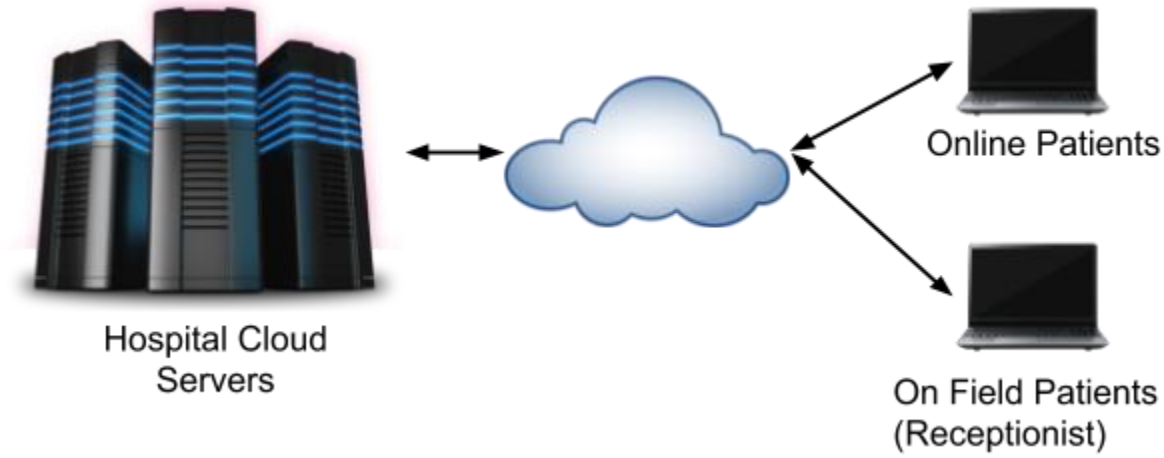
The patient can check if the pharmacy is available at the mean time and its days off, and working hours.

Surgeries

It provides the available surgeries in the hospital to the patient and the doctors performing them.

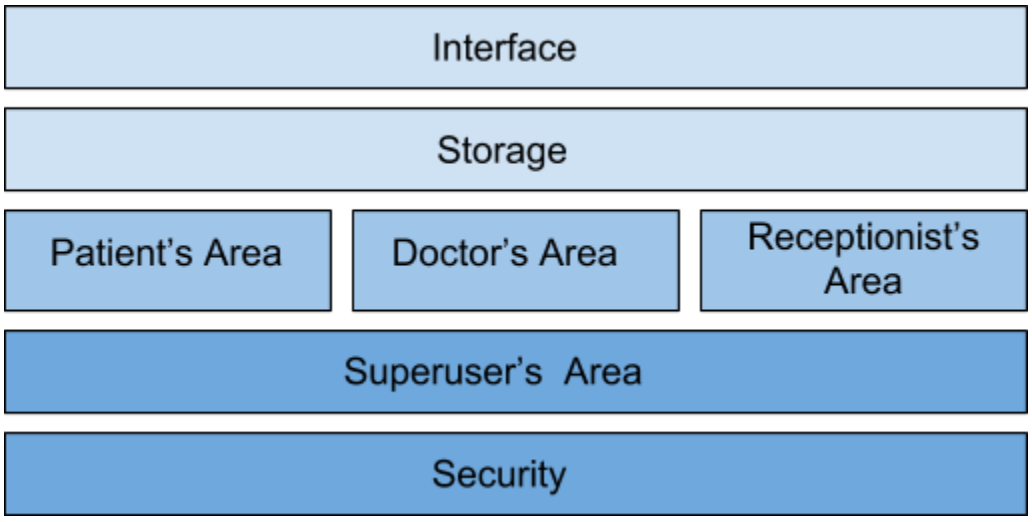
System Architecture

Health Care system introduces a product for medical institutions to help simplify the process between the patient and the institution. The system offers the contents and services to both mobile and desktop users via web-based.



The Site consists of:

- Receptionist's Area
- Patient's Area
- Superuser's(Admin) Area
- Doctor's Area
- Storage
- Security
- Interface



Receptionist’s Area:

- This module enables the Receptionist to book appointments for patients in the hospital (on ground, not online).
- The Receptionist will get access to each doctor’s time schedule. He will have limited ways to edit to them. He will get access also to every patient’s reservation whether it is scan or doctor examination.

Patient's Area:

- This module provides the patient with all the info he needs about the hospital.
- It allows the patient to view the available clinics in details including the clinic’s doctor, the available time slots, and the price of each examination with every doctor in the staff. After that, the patient will be able to book an appointment in the desired clinic.
- He will be provided with the price of each scan, the hospital can provide. He will be able to book the the desired scan or the desired blood test. He will be updated with the available time slots of the hospital’s scan rooms.
- As each doctor will write a small brief about himself and his specialization, The patient will be able to view the staff of the hospital, which includes the doctors. He’ll be able to see their info(mail, mobile number), their specialization, and their rank/rate.
- The patient can rate the doctors after appointments, the quality of the scans and the service provided by the hospital. He will be able to add his feedback to describe the treatment he had from the doctors, he dealt with and show the positives or negatives he noticed.
- The patient will be provided with the working hours of the hospital’s pharmacy and a way of communication between him and them -mail or phone number-.
- Each patient can create his own account on the site. He will get access to all the information and services, described before.

Superuser's Area (admin):

This module provides the admin to control the content of the website and has privilege over all users he can

- Edit The Pharmacy working hours
- The Staff of the hospital and their information
- The Doctors users and their Info
- Adding Doctors to the hospital staff
- Adding Receptionist Users for the receptionist to use
- Add or remove patient users
- Manage the flow of data in the site

Doctors' Area:

- As every patient, having access to this service, will have a private profile in the hospital's database, This module will enable the doctors to have access to the history of examinations he got in the hospital and each scan he got. He will get access also to the results of these examinations and scans from the patients' profiles.
- The doctors will be able to edit to the patients' profiles and update them with the required scans.
- Doctors will have a well-organized schedule in the system with all the examination slots booked in each day.
- Doctors will get access to all the patients' feedback and their declared pros and cons about their experience in the hospital which, will enable them to improve the performance of the hospital.

Storage:

Hospital Cloud uses different types of storage:

- Core storage for Hospital main information and Services and patients personal information and medical history.
- Log storage for Patient's Backlog of activities.
- System storage for system configuration, users information and Security data.

Core storage uses SQLlite/MySQL unstructured database installed over distributed infrastructure. Unstructured scheme allow flexible data definition and allow future extension of Patients personal information and medical history. SQLlite/MySQL database speed up the queries compared with raw data storage format. Cloud infrastructure offer high availability and instant recovery of data.

Log storage uses SQLlite/MySQL data format stored directly over distributed storage. SQLlite/MySQL allow flexible access of data attributes. Distributed storage allow fast access of data items and offer expandable storage.
System storage uses traditional structured database which provide better queries and data processing over structured contents.

Security:

- Security module is responsible on user authentication and communications security. User can register/login using internal accounts
- Security module also, responsible on managing the permissions and roles. Users are either guests, patients, doctors and receptionists.

Interface:

When the site is initially open it will introduce a welcome page and will require the username and the password. After that will get to the web page that provide you with available service according to you specification wich is determined by the superuser.
You will be in one of the previous areas:

1. Superuser: there will be one superuser initially, after that he can make multiple superusers.
2. Doctors: determined by the superusers.
3. Receptionist: determined by the superusers.
4. Patients: you will be in this area by default if there is no determination from the superuser.

System Features:

User Management

- Users must register to the system before they can access the hospital's services including hospital info, staff, clinics, pharmacy availability, and surgery's availability.
- User management enables admins to control user access and on-board and off-board users to and from IT resources.

Registration

- The patient can sign up or sign in to the website to be able to access the hospital services and information and to be able to save his information to the database of the hospital and reuse it when its needed.

Observe Hospital information

- The user has the ability to observe the hospital's history and information like contact numbers, hospital's stay and environment, visiting hours and patient's rights.

Staff

This section of the site will contain all the staff, who are associated with this product. As we have mentioned before, each patient has access to the full schedule of the doctor, his free times, the location of the hospital (or clinic), he works in, the specialization and the cost of examination.

- This section will show all the doctors with their specialization from the data base of the site. The patient can also get more details about the doctor if he clicked on him.
- The patients can search for a specific doctor or a certain specialization. They can also see the staff of the hospital.
- The system will frequently upload the patients feedback about doctors.

Doctor’s rating

- It’s a feature by which the patient can rate their doctors and give them feedback about their satisfaction in the appointment. The hospital can observe the rating of the doctors so it can change the staff to improve the hospital’s performance.

Clinics

- We made a section called "Clinics" which contains a list of all the available clinics. Under every clinic there is a list of names of all the doctors in this clinic and their appointments. Through this section the patient can know whether the doctor is available in the clinic or not. The patient can also see the available slots on any day and if a slot is taken by patient (x) , it will not appear to any other patient. However, the doctor would still appear to be available on that day.
- This system would save the time and effort of the patient because they wouldn't have to call the clinic or to go themselves in order to make any arrangements. Everything can be done online at the touch of a button. This would also save the money of the doctors because they wouldn't have to hire any secretary to manage their appointments. Also secretaries are not always reliable and they can make mistakes and inconveniences.

Pharmacy

- It provides a feature to the user that he can know whether the pharmacy is open and available at this time or closed and provide the working hours and the off days

Scans

- The user has the ability to know the available scans (MRI, XRAYS, CT, and Ultrasound) in the hospital and the cost of each scan, also he has the ability to book an appointment for a certain scan.

Profile

- Patients Profile will display their personal information in addition to their medical Information, and medical condition.
- Patients Profiles will only be accessible by doctors or admins to provide privacy to the patient.
- Patient Profile will contain their contact info.
- There'll be a Medical chart for the patient that contains:
    1. Surgical History (operation dates, reports, and results)
    2. Medications and Allergies
    3. Blood type, weight, and height
    4. Family history (common family diseases)
    5. Habits (diet, smoking, exercise, ..etc)
    6. Demographics (race, age, religion, contact info)
    7. Test results (imaging scans, blood tests)
    8. Weather he's an organ donor or not
    9. Emergency Contact
    10. Body measurements
    11. Health insurance info

Reservation

The Patient has the ability to book all the hospital services online. This reservation is saved in the database which can be accessed by the admin (hospital receptionist) and he can reserve time slots for the patients who visit the hospital not only online.

Surgery:

The patient has the ability to know what surgeries are available in the hospital and the doctors who perform each surgery.

Patient's Backlog:

A Log that provides the patient with all previous prescription and interactions with either a doctor or a hospital, Will also save the reservations done.

System Development and Operation

Overview

The system development is performed using Agile methodology. Initial R&D activity should be applied to experiments tools and techniques. Later continuous R&D activity will run beside the
system development activities. The first version of the system should take two months. After release, the system will enter an initial operation phase for six months. During that phase the whole development team will communicate directly with the operation and business team.
Later the system will enter the final operation and maintenance phase. During that phase a minor development team will provide an indirect technical support.

Development Plan:

Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Study Requirements													
Preparation													
Implementation													
Testing													
System Testing													
Final Release													

Team:

Team	Role	Member
Development Team	**Team Leader**	Ahmad Abdelahelem Mohammad
	Backend Development	Mohammed Okasha Mohammed Hesham Khaled Mohammed Khaled Abdolgaliel Omar Ibrahim Ammar Yasser Salma Tarek Hassan Mariam Elsayed Omar Ahmad Abdelhalem Mohammad
	Frontend Development	
	QC Memeber	Salma Tarek Hassan Mohammed Hesham

Tools:

Operation	Recommended Tool
Source Control	Git, github
Tasks and Issues Tracking	Git, github
Database	Django (SQL lite)/MySQL
Programming languages	HTML, CSS, Javascript, Python/PHP
Frameworks	Angular, Django