



Healthcare system

BRD

Submitted by :
GROUP 16

Introduction

Executive summary:

“Egy Healthcare System” provides medical services. It should help people identify their medical condition by typing their symptoms or searching for a doctor in the field. It can be used by patients, doctors, companies and schools. It can be linked to hospitals as well. “Egy Healthcare System” is a great place to get your medical treatment.

Document overview:

This document introduces “Egy Healthcare System” ‘s study plan. It gives a general and technical description, development and operational plan, cost analysis and market study.

Business objectives:

- Offering an easy and fast interface for patients
- Offering credible information about medical conditions and their symptoms
- Offering a huge database for doctors to suite every unique patient’s needs
- Offering a huge database for medical conditions and their symptoms
- Offering a service that is accessible by everyone
- Offering an effective way for self-evaluation, treatment, and follow-up
- Offering a partly self-growing business

Background

Introduction [1]

Nowadays, Patients lack a lot of information about their mental and physical health. Therefore, we decided to create a patient-doctor community system.

A lot of patients feel some symptoms but they don't know what to do!? If you feel pain in the eye all you have to do is just get an ophthalmologist appointment but, other symptoms we can't even decide which department we need to go to, how many times your son had a fever and you didn't know what to do? Don't worry we have your pediatrics right here all you need to do is just sign up and we will direct you to the suitable department according to your symptoms we will also give you the chance to choose your doctor according to the review and ratings of hundreds other patients. In addition to that we will give you the chance to review other doctors that you tried before.

Survey [1]

A lot of researches focus on Spreading the awareness of the patient to his symptoms.

In Egypt, The Ministry of Health started plenty of Awareness campaigns specially in epidemic diseases in order to make people know the symptoms of each disease and how to avoid it. In 2009, the swine flu spread all over Egypt, people didn't recognize these symptoms so the ministry of health decided to spread awareness by letting doctors do an on ground campaigns to let people know what this illness was.

This lack of information about any illness is a common case around Egypt, so we decided to help by combining the science of data analytics

with other technologies we will be able to create an online doctors' directory.

The patient need to put their symptoms online and by a simple data analysis we will direct him to the best doctor.

Patient's Data

When the patient signs up to our system we will need to collect some info from him so that we can follow his case and guide him to the best doctor according to patient's location to diagnose him also, reminding him with every consultation he has, he will let us know about the medicine he takes and the time of it so we can remind him by some pop ups Moreover, we will follow up with his doctor in the prognosis.

Doctor's Data

In addition to the patient's data we will need the doctors to sign up so that we could guide our patients to him according to their illness and location, we will give the doctors chance to follow up their patients' medical history to get the best diagnose to their case.

Feedback

Last but not least, in every successful organization the system of feedback is applied so in our system we will let the patients to review and rate the doctors who they tried before.

System Description

EGY Healthcare

To book an appointment with a doctor has never been easier! With our new service, which offers an "*Online doctors directory*.", users can now easily select a doctor according to their area and symptoms - or even search for a certain doctor by name - and read reviews about any doctor they choose. Our system allows them to easily track doctors' appointments and to have a full medical profile, which eases communication

between the users and the doctors.

Booking Appointments

After searching for a doctor by name or by area and symptoms or even by profession, select an appointment time from the available time slots. Users can pay either by cash at the appointment or online using master card.

Medical Profile

Users should create an account on our website. This allows them to add their medical history in detail and to be able to continuously update it, add their medications and the time of taking each medicine to check that they take them on time, and have a schedule containing their upcoming doctors' appointments.

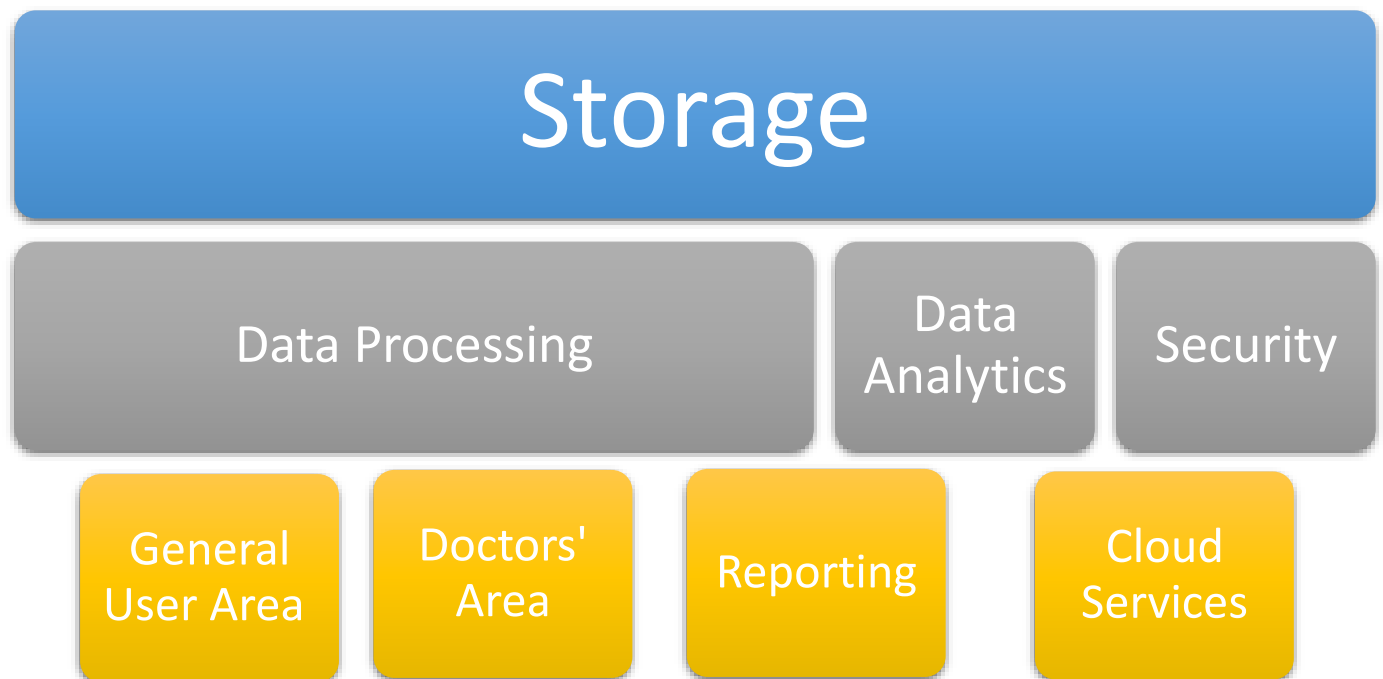
Other services

Other options include searching for certain medicines and buying them online. The search result offers the nearest pharmacies where the medicine is available and the price. The system offers reminders and notifications when a certain appointment or a medicine time is coming up. Useful health tips and insights are regularly sent to the user

System Architecture

Egy Healthcare system introduces an online doctors' directory and many medical services. The system offers the contents and services to desktop users via web-based software.

The system consists of the following modules:



Storage:

Egy Healthcare uses different types of storage:

- Core storage for material and user interaction
- Archive storage for historical changes, deleted contents and old logs
- System storage for system configuration, users' information and fresh logs
- Analytics storage(s) to store the outcomes of data analytics module

Core storage uses MYSQL unstructured database installed over



distributed infrastructure. Unstructured scheme allows flexible data definition. MYSQL database speed up the queries compared with raw data storage format.

Archive storage uses JSON data format stored directly over distributed storage. JSON allow flexible access of

data attributes. Distributed storage allow fast access of data items and offer expandable storage. Data replication is configured to minimum which full data availability and data recovery needs of archiving information.

System storage uses traditional structured database which provide better queries and data processing over structured contents.

Data Processing:

Data processing module is responsible on providing all data related services like data modeling and correction, data transformation, data classifier and multimedia processing.

Data modeling and correction is required to understand the textual material based on the related language model.

Data transformation is required to allow import and export of different data format. The system supports common data formats supported by common data processors applications.

Multimedia processing is required to enhance the quality of multimedia contents like images, audio and video. It converts multimedia contents to unified format. Also, this service is

required to detect some features required by data classifier service.

Data classifier is required to classify the contents which is important to avoid

non-appropriate material.

The classifier uses information

retrieved by data modeling and image and video processing services.



Data Analytics:

Egy Healthcare holds huge amount of contents which includes medical material, user interaction and logs. These modules are important to study the contents and produce very useful result. Basically this module support following data analytics.

Similarity analysis to determine similar medical contents. This analysis is important to avoid generating redundant information.

Quality analysis to study the correctness of medical contents based on user interaction.

Security analysis to study user behavior to avoid future attacks. Basically this analysis users logs to study user behavior.

Statistical analysis to produce a set of statistical studies regarding contents and users' interaction. For example, this

analysis can study the distribution of contents vs. time or region or language

Security:



Security module is responsible on user authentication and communications security. User can register/login using internal accounts. The portal access is made using https protocol in order to secure the communication.

Security module also, responsible on managing the permissions and roles. Users are either guests, or logged users.

Security module also, responsible on detecting the threats and preventing data theft. The system is tested against common attacks using known penetration testing tools. Data theft is prevented using various data protection techniques as described in “Examination Process Security” feature.

General User Area:

This module provides user with main system activities like viewing many symptoms or choosing a specific department and/or even a specific doctor.

For symptoms part, user can view a great amount of symptoms and choose what they have from them, according to these information user is directed to a specific medical department that best meets their symptoms. In the department and doctors section users can view full information about the nearest doctor in their area. Users can view the ranking of each doctor to choose the best for them, they can also view when a certain doctor has a free slot.

After choosing a specific doctor, it is possible for user to select an appointment time from the available time slots, they can also cancel their appointment or choose a different time from the available time slots. Users can pay either by cash at the appointment or online using master card.

After the appointment, the user can say their opinion according to their experience, they can rate any doctor, write a comment, and give a rate to the website.

Users can add their medical history in details on their profile and continuously update it, they can also add any medicine they have to take to be reminded of it and they can have a schedule containing their upcoming appointments. General system support martial are published to help users. However, users can communication with system operators to report issues or to get a direct support.

Doctors' Area:

This module provides the doctors with a lot of features, the doctors can follow their patients' case as they will have the access of their patient's medical history which eases the prognosis process. They will also provide their clinic's appointments and location so the patient can book the best appointment to him.



Reporting:

This module is responsible on providing many businesses like following:

- Available hospital/clinic information and supported languages.
- Number of doctors assigned in the system.
- Statistical report on user contribution per region, age segment and more.
- Contents quality report studying published contents vs. available contents.

System Features

User Profile

Users can create personal profiles on our website. They can write their medical record on it and continuously update it. This eases the communication between the doctor and the patient. Creating a profile is essential if the user wishes to reserve an appointment with a doctor through our website, and to have access to other system features other than searching for a doctor. The profile also contains the user's age, height and weight, which are also updateable to give a better image for the user's current conditions.

Creating Schedules

Users can create medications schedules and/or appointments schedules, and reminders and notifications remind them that it's time for a medicine or that an appointment is coming up. This helps them to easily keep up with taking their medicines on time and to not forget about their appointments.

Find a doctor

Our website makes it very easy for users to find the right doctor. Users can search for a doctor by choosing location and department and the result will be all the doctors from this department and near his location, ordered by their ratings. Users can also enter the doctor's name if they are looking for a certain doctor. Each doctor in the results will have the following information about him: name, degree, clinic/hospital address, contact info, medical examination price and reviews.

Choosing Symptoms

Users sometimes lack the knowledge that can help them classify their symptoms in order for them to know which doctors' department they should choose. To help these users search for doctors, the website offers them the option to choose their symptoms and their location and it suggests for them the department they should choose from.

Ask the doctor

This feature helps the users communicate with their doctors from the comfort of their own homes. Users can ask any doctor the question they want for the doctor to reply. Users can also view other users' questions and the doctor's replies to them which can be useful for the users to collect more information and may lessen repeated questions.

Ratings and reviews

Users can rate the doctors and view the average rating for all doctors which help them find the right doctor more easily. They can also read/write reviews about any doctor.

Reserving appointments

Users can reserve appointments with any doctor they choose. After deciding on the doctor, the user can select the suitable time for him from the available time slots for the appointments.

Health tips and insights

Health tips and insights about general health are sent to users regularly in order to help spread health awareness among users and to provide them with useful information and help them stay healthy. Suggestions of certain exercises can also be sent according to the user's general health conditions provided by his profile information.

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 sixteen weeks. After release, the system will enter an initial operation phase for six weeks. During that phase the whole development team will check for users' approval and feedback. 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

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Study Requirements																
Management Planning																
Preparation																
TEST PLANNING																
Implementation																
Research																
Testing																
System testing																
Final Release																

Operation Plan

	1	2	3	4	5	6	20 weeks later
Marketing							
Operation							
Maintenance							



Full time allocation of whole team members



Small team or part time allocation

TEAM Members:

Name	Role	Role Description
Reham Essam ELDin	Team leader	Backend development
Mariam Ayman	Team member	Frontend development
Mariam Khaled	Team member	Backend development
Mariam Safwat	Team member	Frontend development
Nada Mohamed	Team member	Frontend development
Israa ElSayed	Team member	Backend development

Tools

EGY healthcare will be developed using open source tools, languages and servers.

While development, online tools will be used for management, tracking, testing and source control. This will increase the collaboration between team members even if they are not located at the same place.

Operation	Tools
SOURCE CONTROL & VERSIONING	GitHub
TASKS & ISSUE TRACKING	GitHub, JIRA//Trello
STRUCTURED DATABASE	MySQL
PROGRAMMING LANGUAGES	Html,CSS,JavaScript,PHP,//python
DOCUMENTS	MS WORD ONLINE
OPERATING SYSTEM	//MS Windows
HOST MANAGEMENT	Digital Ocean
PLANNING	MS Project
//SOFTWARE SRS/SDA/SDD	Visio

Assumptions

- The system completely depends on free open source tools and languages.
- Users show up at the exact time of the appointments.

Risks

- Security of system's data.
- Effectively promoting the project, where the market of the healthcare industry is crowded.
- Encouraging doctors and medical facilities to use our system despite the fees.

Implementation

System implementation is the most important steps in case of finalizing the approved web system. We need to justify some basic requirement (software & hardware) so that the system will work without having obligation and customers' dissatisfactions.

Software Requirement:

- Operating System: Windows (XP, 7, 8, 8.1) or Mac OSX (Tiger, Leopard, Snow Leopard, Lion, Yosemite)
- Web Browser: Google Chrome, Internet Explorer (ver. 8 or later), Mozilla Firefox, Safari (Mac).
- Database Management System: MySQL, SQL Server
- Web Development System: Visual Studio 2010 or later, Sublime text editor.
- Others: .NET FRAMEWORK.

Hardware Requirement

- RAM: Minimum 1GB or higher.
- HDD: Minimum 50 GB.
- Processor: Intel Pentium 4 or AMD.
- LAN: Version 1.6.6.406(For fixing up client disconnection

Appendices

Appendix I

Patients' Appointment System

A patient appointment system or appointment schedule for health care center started long time ago (Harper, 2003). Management of patients' appointments has earlier works and has developed simplified queuing models and fairly static scheduling conditions. Another attempt was made to calculate the waiting time between patient and doctor using the mathematical queuing models to minimize waiting time (Gamlin, 2003). However; traditionally the appointment system has considered that the doctor time is more important than patient time (Wijewickrama, 2005). So, an appointment system was designed to minimize the doctor idle time, but current designing of an appointment system is based on decisive factors with respect to both the patient and doctor (Takakuwa, 2005). The patient appointment system has complex structures because it represents the patient appointment time in the healthcare center and controls the patient waiting time based on the type and the period of patient appointment (Gamlin, 2003). Moreover, a patient appointment system is International Journal of Computer Science & Information Technology (IJCSIT) Vol 6, No 4, August 2014 62 meant for: managing doctor's time, reducing patient's waiting time, reducing doctor's idle time, reducing nurse's idle time, and improving the quality of service in the health care (Harper, 2003).

Appointment Delay

Past research shows that the longer the appointment delay which is defined as the time between the day a patient requests an appointment and her actual appointment date, the higher the chances that he/she will cancel or not show up (Gallucci et al. 2005). This suggests an obvious way of minimizing no-shows and cancellations: this is done by asking the patients to come right away or make appointment requests on the day they want to be seen (Murray, 2000). This is called an open access (OA) or advanced access policy (Tantau, 2000), and of late it has become a

popular paradigm in practice and the subject of active research. Several authors report on their experiences in implementing OA, both positive and negative (Dixon et al. 2006). Some practitioners strongly advocate OA (Murray and Tantau 2000), and there are some who are strongly against it (Lamb, 2002).

Appendix II

Managing Patients' Appointment system

According to Dexter (1999), managing patient appointment system is a computer application used to manage and reduce the patient waiting time in the health care center. Some health care centers do not use any appointment system. So, it has a longer average patients' waiting time than the health care center that adopts the patients' appointment system. While patients can wait for more than one hour to be attended to by a physician in a health care center, they also can feel that they are being disregarded and treated unfairly. So, when patients are given the time of appointment in a health care center, they can evaluate the quality of service in the center (Dexter, 1999). Hence, developing patients' appointment process for health care centers necessitates the use of a sophisticated queuing model that captures much of the real system's features (saving time, reducing idle time etc.). Therefore, the appointment schedule represents the real situation in the health care center faced by patient appointment schedulers (Rohleder, 2002). On the other hand, the standard practice for scheduling and processing patient appointments are based on the nature of treatments of the patients and that better approaches more sensitive to patient needs are desirable (Klassen, 2002).

References

- 1- Url: https://apiko.com/blog/doctor-booking-app/?fbclid=IwAR3WldW33qE9sn-Wifk50Md_9_60iZp7n8JuNuAqm7OoFg2o0qMtdG41S2k
- 2- Url: [https://www.academia.edu/26066176/Design and Development of Online Doctor Appointment System?fbclid=IwAR0hNJogBuoe7iyo_1LgPxQF_RC7X7krblq6HjlprLyLTZlJlIwGr8FjT-M](https://www.academia.edu/26066176/Design_and_Development_of_Online_Doctor_Appointment_System?fbclid=IwAR0hNJogBuoe7iyo_1LgPxQF_RC7X7krblq6HjlprLyLTZlJlIwGr8FjT-M)