Preliminary Investigation

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In this process, we analyze the existing system and need for new system. These analyses are then documented and presented as report and discussed about this investigation. It is the first preparation for the proposed system.

1. System identification: -

This phase is used to recognize the need for a new system. Everything performed in future depends on this definition and identification.

1.1. Need for the system we are developing:

At the beginning of our study of the project, we found that the current manual medical system is difficult for the patient these days, so we decided to try to make it easier for patients and doctors as well by making an electronic system that would be an intermediary between them and also between them and the hospital. **We found the following:**

- There are many medical systems, but we did not find one of them that contains all the needs of the three categories patients, doctors and the hospital.
- The patient has to go to the hospital to book his doctor, and he finds it difficult because he sits and waits for a lot of time.
- The patient is forced to go to the hospital to book his doctor, and he finds it difficult because he sits and waits for a lot of time and also book the work of x-rays and medical tests and also receive them.
- We also found that the proportion of patients with pneumonia affects about 15% of children under the age of five around the world, according to the World Health Organization. https://www.who.int/ar/news-room/fact-sheets/detail/pneumonia.
- Under the spread of the Corona virus, the patient, if he suspects that he has the disease, tends to make Lung x-ray, where pneumonia appears.
- We found that these days, the state is working to reduce the circulation of currencies and dealing with them and towards electronic payment.
- We also found it difficult to organize between doctor's and patients' appointments.

- We also found that the doctor does not see the patient's medical history, so the doctor is forced to ask each patient about his medical history and his details, but the medical history is not recorded in order to be preserved if the same patient goes again in follow-up.
- We also found administrative and accounting problems in hospitals.

1.2. Affected Group of people:

- Now we can say that the most affected by the current system in hospitals are patients who find it difficult to seek medical advice, so they turn to search via the Internet. In a study conducted, it proved that websites and applications for examining symptoms are accurate about 34% of the time, while doctors, when given the same information, diagnosing the condition correctly 72% of the time.
- Doctors also, because their task is made difficult in the current system because there are no ways to facilitate the matter of meeting patients, for example, or knowing their medical history in asking each patient. Those related to the health system in Egypt, so by making it easier for them, they are more attracted to work in Egypt.

1.3. Objectives:

Develop a system that contains the following:

1- Pneumonia detection.
2- Doctor reservation.
3- X-rays and medical tests reservation and receive results.
4- Make Full accounting system.
5- Make an electronic payment system.
6- Make patient profile.
7- Make dashboard for doctors and hospital workers.

2. Define project scope and constraints: -

2.1. Characteristics of system:

1. Maintain the medical records of the patient.
2. Maintain the contact details of the patient.
3. Keep track of the appointment dates.
4. Save the insurance information for later reference.
5. Tracking the bill payments.
6. Time-saving Technology.
7. Improved Efficiency by avoiding human errors.
8. Reduces scope for Error.
9. Data security and correct data retrieval made possible.
10. Cost effective and easily manageable.
11. Easy access to patient data with correct patient history.
12. Improved patient care made possible.
13. Easy monitoring of supplies in inventory.
14. Reduces the work of documentation.
15. Better Audit controls and policy compliance.

2.2. Features of system:

1- Registration of new user

User could be one of the following
Doctor – Patient - Laboratory physician - Radiology doctor – Pharmacist.

2- Appointment Management

Patients visiting the hospital's website can book online appointments with ease.

3- Billing and Insurance Management

Integrated Billing with treatments, Lab and Radiology. Option to bill before and after consultation.

4- Prescription Management

Manage commonly and recently used medicines. Option to show medicines available in the pharmacy.

5- Lab Management

Comprehensive Lab Management handles complete order management, Custom Reports, Smart Notifications.

6- Artificial Intelligence Detection

Use AI in detection of Pneumonia disease by uploading X-Ray of patient.

7- Integrated interface and distinct user roles

MediBooki Information system offers people with privacy and data security. Implementing them will help to empower clear and smooth functionality. It means the patient data is safe and can be accessed only by limited people with authentication.

8- Support Multilingual

The system support two languages **Arabic** and **English**.

2.3. How are we unique ?

- Optimize, manage, and track personal and financial hospital resources.
- **No** chance for **duplicated** patient files and data.
- Optimize different allocation of resources, namely **beds**, **rooms**, and **doctors**.
- Manage **lab tests**, and **consultation** of different specialties like cardiology and more.
- Build actionable treatment plans with reminders and targets for patients, staff, and doctors to enhance adherence.
- Manage appointment time slots and timings by lab, clinic, and doctor.
- Access to your portal through our mobile apps.

- You will find support in how to use our website in **Chatbot**.
- Fast **detection** of pneumonia disease.
- **Discounts** on many services.

3. Alternate Solutions: -

The scope of the **MediBooki** project identifies MediBooki-approved service locations, services, providers, service areas, and target populations.

MediBooki is defined as a location where providers are located:

- The patient can book any doctor through the website
- Conducting face-to-face visits with patients and documenting those encounters in the patient's medical records.
- Patients can be diagnosed and treated themselves.
- X-rays and analyzes can be uploaded to the site, and the patient's condition can be diagnosed through x-rays
- The provision of services through or on behalf of the MediBooki website, which means that the health center's board of directors must have control and authority over the services provided at the site.
- Providing services on a regular schedule.

3.1. Web Application

Several different approaches are now open to the developer. As we are developing Web applications, there are the following approaches from which best can be selected by the developing team:

1- Front-end developing

- ❖ Native:

  The default way of developing on the web (Front-end) is to write native code for each device – usually Html, CSS, Bootstrap, and JavaScript for Web Application.

- Angular:

  The release of Angular gave us the ability to write JavaScript code (with Typescript syntax) that use completely native UI elements. This improves design architecture, promotes code reuse, faster application development, and handles dependencies.

- Rest API in Angular:

  API (Application Programming Interface) in Angular is a set of global JavaScript functions used to carry out common tasks such as comparing objects, iterating objects, and converting data.

- React:

  React is a front-end JavaScript framework that runs on top of JavaScript. It was created by Facebook to develop apps faster. React helps developers by offering features such as client-side routing and declarative bindings, state management, and data flow.

- Rest API in ReactJS:

  ReactJS component is a top-level API. It makes the code completely individual and reusable in the application and You can consume REST APIs in a React application in a variety of ways, but in this guide, we will look at two of the most popular approaches: Axios (a promise-based HTTP client) and Fetch API (a browser in-built web API).

2- Back-end developing

- Native:

  The default way of developing on the web (Front-end) is to write native code for each device – usually PHP or C#, Database (MySQL), JSON for Web Application.

- Laravel:

  Laravel is a web application framework with expressive, elegant syntax. this offers superior start-up times and app performance. we've already laid the foundation.

- ASP.NET:

  ASP.NET is an open-source, server-side web-application framework designed for web development to produce dynamic web pages. It was developed by Microsoft to allow programmers to build dynamic websites, applications, and services.

- MySQL:

  MySQL is a relational database management system that uses SQL and allows you to handle, store, modify and delete data and store data in an organized way and offers support for multiple storage engines along with plug-in storage, making it more flexible.

3.2. Mobile Application

Several different approaches are now open to the developer. As we are developing mobile applications, there are the following approaches from which best can be selected by the developing team:

- Native:

  The default way of developing on mobile is to write native code for each device – usually Java for Android and Swift for iOS.

- React Native:

  The release of React Native gave us the ability to write JavaScript code (with React syntax) that used entirely native widgets. This takes away a major limitation of older hybrid apps but can still suffer performance issues due to reliance on the JavaScript 'bridge'.

- Hybrid App:

  Create hybrid apps that behave like native but use common APIs that run consistently across iOS and Android devices. The biggest advantage of developing the hybrid app is a consistent, cross-platform UI that is compatible with most devices.

- Flutter:

  Flutter is an open-source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase and transforms the app development process. Build, test, and deploy beautiful mobile, web, desktop, and embedded apps from a single codebase.

4. Feasibility Study: -

A feasibility study is conducted to find out whether the proposed system is possible, affordable, and acceptable for organization. The financial, political, social and time constraints must be considered during this study.

- Possible: to build it with the given technology and resources
- Affordable: given the time and cost constraints of the organization
- Acceptable: for use by the eventual users of the system

4.1. Technical Feasibility:

"A large part of determining resources has to do with assessing technical feasibility"

The primary technical requirement includes the availability of a good version of operating system installed in the network. To develop programs, any good Integrated Development Environment is needed, which can be easily acquired after deciding. Reliability, access, power and data security are also available.

★Hardware Requirements:

➔Computer Systems: 3 (Available)

➔Processor: Core i3 Processor (minimum)

➔RAM: Minimum 8 GB. (1 GB extra RAM is required to use android emulator)

➔Disk Space: Using an SSD would be a wise decision, but 256GB SSD can be a good choice.

★Software Requirements:

Android apps can be developed using a number of different alternative languages and IDEs.

➔Java Development Kit (JDK)

➔Java SDK

➔Eclipse Android Developer Tools (ADT) plugin,

➔the Native Development Kit (NDK) can be “kotlin or swift” and “React Native”.

➔Dart (flutter)

➔C#

4.2. Economic Feasibility:

“Economic analysis could be referred to as cost/benefit analysis. It is the most frequently used method for evaluating the effectiveness of a new system”

Whether the MediBooki is cost effective or not? The benefits in the form of reduced cost?

MediBooki is economically Feasible. As the hardware cost on the project is low. Similarly. it’s cost is also under the budget. Moreover, some of the technical requirements are already available and some can be obtained by using a reasonable amount and effort.

4.3. Operational Feasibility:

"Operational feasibility is a measure of how well a proposed system solves the problems"

MediBooki is operationally feasible. it provides the necessary information to the user as how to enter the information, how to register, selecting the interests, giving permissions to the apps. Some prior knowledge is required for the management to go through the various operations. But for the user basic knowledge of computers is enough.