

Comprehensive Web Application For Hospitals

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ABSTRACT:

A website is one of the most significant parts of any business or industry today. The design and upkeep of a website is crucial to the growth and success of any organization. This paper presents the design and development of comprehensive web application for hospitals. Angular was used for development of front-end and ASP.Net Core framework with C# implementation was used for back-end development.

Keywords: Web application development, Angular, C#, ASP .Net Core.

1. INTRODUCTION:

In today's world, a website is one of the most important aspects of any business or sector. The creation and maintenance of a website is critical to any organization's growth and success. Web application development is the process of creating software that is hosted on remote servers and delivered to a user's device via the Internet. Web development can range from creating a single static page of plain text to creating large and dynamic web apps. Front-end and back-end web development are the two types of web development. Angular, HTML, CSS, j Query, Bootstrap, are examples of front-end technologies. ASP.Net Core framework with C# implementation, SQL server, are examples of back-end technologies.

2. METHODOLOGY

There is a step-by-step approach followed for the design and development of website for the hospitals. Total application has been classified into five modules. They are

International patient treatment offerings module, International patient treatment module, Insurance claim module, Authorization service, International patients' treatment management portal.

2.1 International patient treatment offerings module:

This module does the following: Provides a list of treatment packages available at the hospital for international patients. Provides a list of specialists with their qualifications and contact information.

2.2 International patient treatment module

This module does the following tasks: For a new overseas patient, a timetable of specialist consultations will be supplied based on the condition.

2.3 Insurance claim module

This module performs the following tasks: Admin will select which patients are undergoing treatment and can designate as complete. Gets a list of insurance agencies, as well as their available limits and processing times for claims. All relevant information from the hospital will be provided to the insurer to file the claim, based on the administrator's choice of insurance.

2.4 Authorization service

This module is used with anonymous access to Generate JWT

2.5 International patients' treatment management portal

A web portal allows members to log in and perform the following tasks: Login. See a list of international patients' treatment options. By selecting the appropriate treatment package, you can register the patient's information and obtain treatment information. The status of treatment should be marked as 'in-progress.' Look through the list of registered patients to finish the treatment and file an insurance claim. Select the right insurer from the list of insurers. To begin the insurance claim, the required patient information is provided. The balance amount to be paid will be displayed on the web application UI when a successful insurance claim is initiated.

3. SYSTEM ARCHITECTURE

The system architecture and is shown in fig.1below:

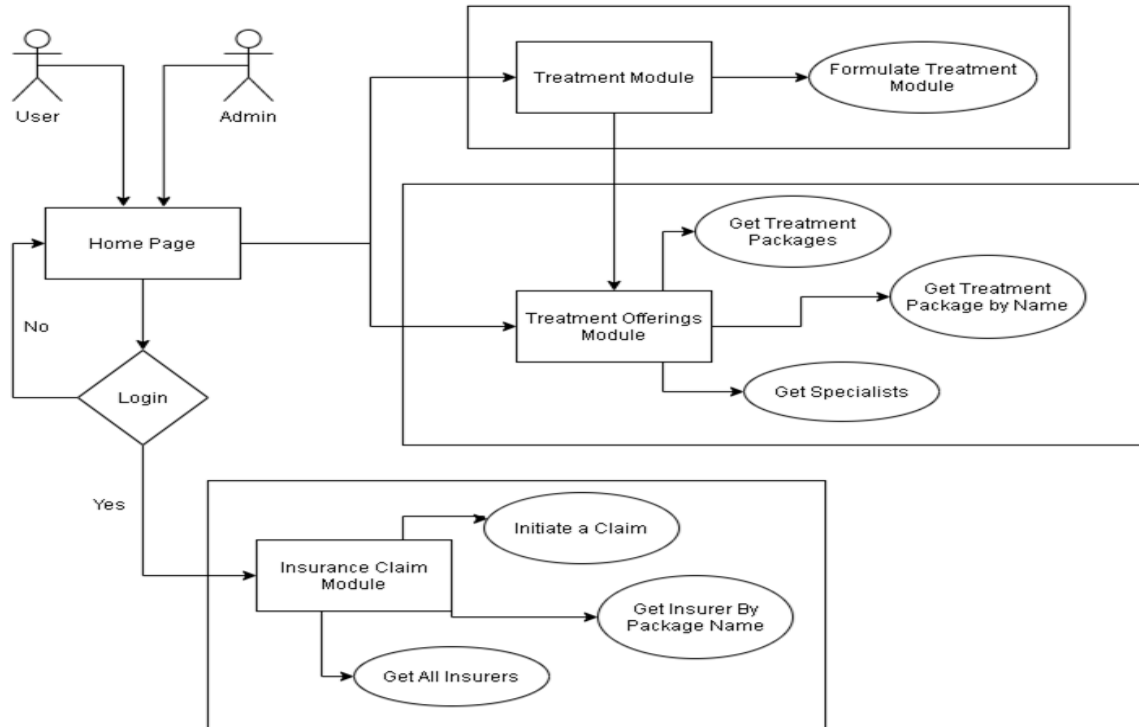


Fig.1. System architecture for web application

3.1 Functional Requirements– Treatment offerings Module

The goal of this module is to give a list of service packages for international patients as well as a list of specialists with their qualifications and contact information. IP Treatment Packages, Specialis Detail, REST End Points ,Inpatient Services Module, Trigger – will be invoked from the Inpatient service detail module

Steps and Actions are preparing the lists the In-patient services for it will be shown on the User interface and provides a list of specialists with their expertise and service charge detail. Has a pre-defined list of specialists, for each of the domain. Has a pre-defined data of two junior and senior specialists for each of the domains.

Non-Functional Requirement is, only Authorized requests can access these REST End Points

3.2 Functional Requirements – IP Treatment Module

This module should be invoked from the Web application. It allows the following operations:

The web application provides input to i) a new in-patient service request, get the (Patient detail – Name, Age ,Package name ,Date of treatment start)ii) With this information, the specialist to the package will be assigned with the logic that (Package 1 - junior specialist of the domain , Package 2 - senior specialist of the domain iii) A table with all these details will be returned to the Web application and the treatment status of the patient will be marked as in-progress. The Entities considered are Patient Detail (Name, Age, Ailment, Treatment Package

Name, Treatment Commencement Date) , Treatment Plan (Package Name, Test details, Cost, Specialist, Treatment Commencement Date, Treatment End Date), REST End Points, Inpatient Service Module

Trigger – will be invoked from patient treatment packages web portal. The steps and actions involved are: i) This module will be invoked from the web portal with the JWT obtained from the Authentication service. ii) The Formulate Timetable is used to generate a timetable for the admin user to explain to the patient. iii) Patient detail along with the package and specialist detail will be saved in database. The non-Functional Requirement is, only Authorized requests can access these REST End Points.

3.3 Functional Requirements – Insurance Claim Module

This module's goal is to provide a list of insurers, along with their details, for the admin, user to choose from, based on the patient's preferences. When the insurer is chosen, a claim initiation request is sent to the insurer, together with the balance due from the patient, which is displayed on the Web UI. The Entities are, (Insurer Name, Insurer Package Name, Insurance Amount Limit, Disbursement Duration,) Initiate Claim (Patient Name, Ailment, Treatment Package Name, Insurer Name ,REST End Points , Audit Severity Module).Trigger – will be invoked from Web portal .The steps and actions are i) To mark a service as complete, insurer detail will be chosen to make the payment ii)This Module will be invoked to get all the insurers with the details. The insurer details can be a set of pre-defined detail of Insurers. iii) From the list, the admin can choose one of the insurer initiate claim. iv)The module gets the chosen insurer, determines the balance amount to be paid, and returns the balance amount to be paid to be on the UI. This completes the claim initiation. The chosen insurer, Insurer Package Name will be mapped to the patient detail in the database. The Non-Functional Requirement is, only Authorized requests can access these REST End Points.

3.4 Functional Requirements – Authorization Module

The Security Requirements considered are to Create JWT, have the token expired after specific amount of time say 30 minutes, have anonymous access to get the token detail.

3.5 Functional Requirements – IP treatment management portal

Client Portal Requirements are i) IP Treatment management Portal will allow the admin to Login. Once successfully logged in, the member can do the operations such as -View the list of service offerings as package of treatments for International patients, Option to choose the package for a patient and view a timetable of treatment plan- View the list of registered patients - Choose any of the patients to mark the treatment completion - On doing that, admin will choose the insurer and package for claim-To proceed with that, the Insurance Claim Module will be invoked to initiate the claim. Upon getting back the balance amount to be paid, the insurer mapping to patient will be done and all the details will be saved in the database.

The development of application at various stages the techniques referred are as follows. Java 8 Parallel Programming [1], Feign client [2], Swagger (Optional) [3], ECL Emma Code Coverage [4], Lombok Logging [5], Spring Security [6], H2 In-memory Database [7-8], App Insights logging [9], Error response in Web Api [10], Read content from CSV [11], Access app settings key from app Settings. json in. Netcore application [12-13]

4. RESULTS

The proposed web application was developed using ASP .Net core for backend and Angular for frontend. Visual studio code was used for developing of code. Swagger was used to check the correctness of the code. The results obtained for User's Home Page, Registration Form, Login Page, Admin's Home Page, Check Status Page and Initiate Claim Page are shown in fig 2-7.

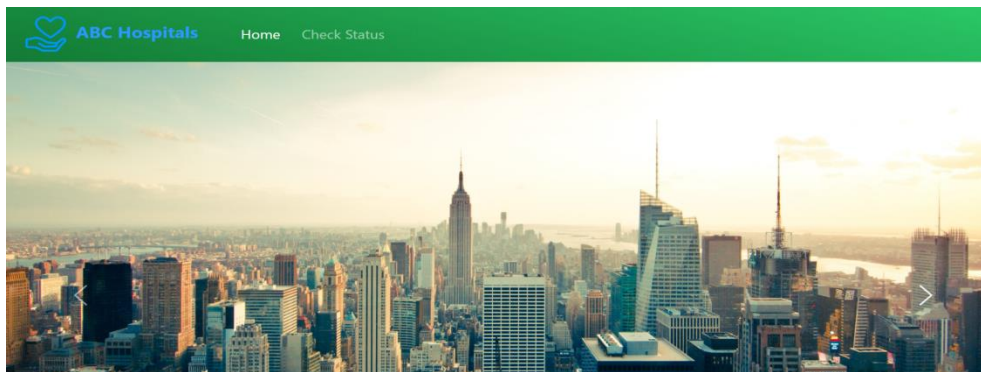


Fig.2 User's Home Page

Fig.3 Registration Form

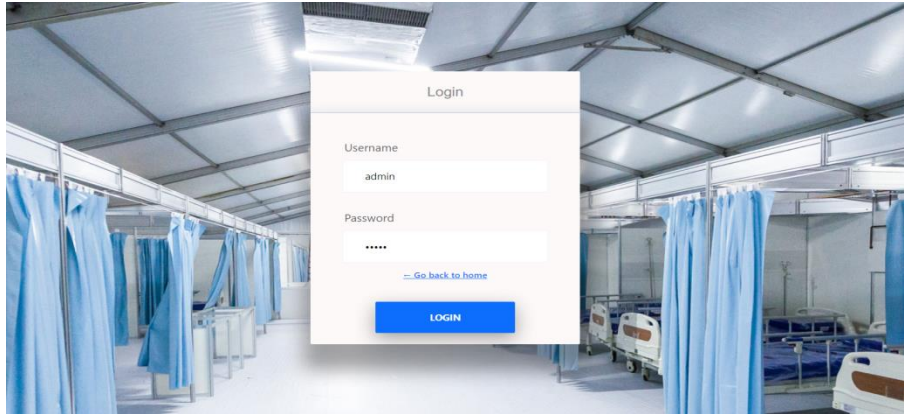


Fig.4 Login Page

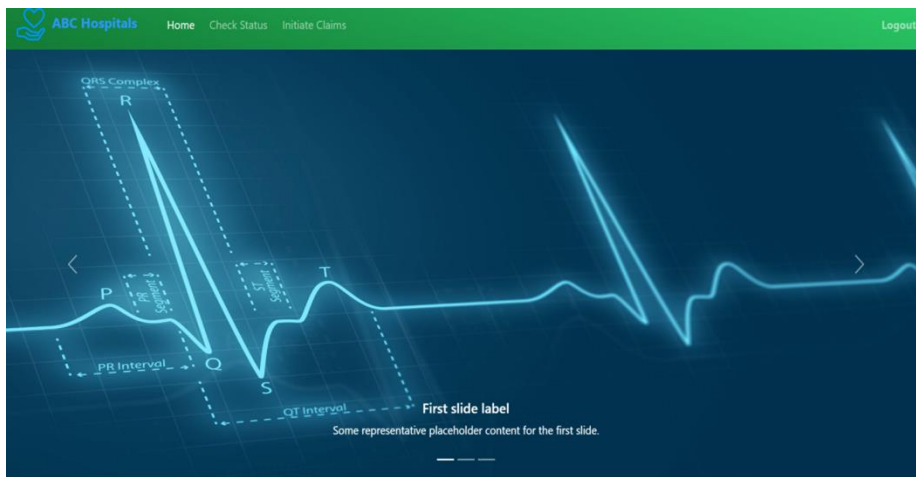


Fig.5 Admin's Home Page

| ID | Name | Specialist Name | Insurer | Status | Cost |
|----|-------|-----------------|------------------------|-------------|-------|
| 1 | Ram | Rachel | SBI | Completed | 10000 |
| 2 | Raj | Chandler | Insurer to be assigned | In-Progress | 17000 |
| 3 | Demo1 | Rachel | Insurer to be assigned | In-Progress | 35000 |

Fig.6 Check Status Page

The screenshot displays the 'ABC Hospitals' web application interface. At the top, there is a green navigation bar with the hospital logo, 'Home', 'Check Status', 'Initiate Claims', and 'Logout' links. Below the navigation bar, the title 'List of Insurers' is shown. A table lists four insurance packages: LIC (GOLD, 5000, 2 Years), HDFC (SILVER, 10000, 5 Years), Bajaj (PLATINUM, 15000, 10 Years), and SBI (PREMIUM, 50000, 15 Years). Below the table, there are two side-by-side claim initiation forms. The left form is for 'Raj' with Package 1, Specialist Chandler, and a cost of 17000. The right form is for 'Demo1' with Package 2, Specialist Rachel, and a cost of 35000. Both forms include a 'Choose Insurer' dropdown menu and 'Submit' and 'Remove' buttons.

| Insurer | Package | Insurance Amount | Disbursement Duration |
|---------|----------|------------------|-----------------------|
| LIC | GOLD | 5000 | 2 Years |
| HDFC | SILVER | 10000 | 5 Years |
| Bajaj | PLATINUM | 15000 | 10 Years |
| SBI | PREMIUM | 50000 | 15 Years |

Form 1 (Left):
Name: Raj
Package: Package 1
Specialist: Chandler
Cost: 17000
Choose Insurer:
Buttons: Submit, Remove

Form 2 (Right):
Name: Demo1
Package: Package 2
Specialist: Rachel
Cost: 35000
Choose Insurer:
Buttons: Submit, Remove

Fig.7 Initiate Claim Page

5. CONCLUSION

Comprehensive web application for hospitals developed successfully with all the necessary features such as User's Home Page, Registration Form, Login Page, Admin's Home Page, Check Status Page

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