Design and development of web application for elderly people using ASP.NET Core

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Abstract— **The Elder care web application is a platform designed to meet the non-financial needs of elderly individuals who may not have access to support from family or friends. The application acts as an intermediary between the elderly and service providers, facilitating the scheduling and payment of services such as transportation, medication pickup, and companionship. In addition, the application aims to reduce social isolation among elderly individuals by facilitating connections between like-minded individuals who wish to share their free time. The application will allow users to create profiles that highlight their interests and hobbies, and will provide features to ensure that connections are made in a safe and secure manner. Through its focus on both practical and social needs, the Elder care web application has the potential to enhance the quality of life for elderly individuals and provide them with a greater sense of community and support.**

Keywords—Elder care, Web Application, Service Provider Web App

I. INTRODUCTION

This application aims to connect elderly individuals with service providers who are willing to offer their time and assistance to help the elderly live a more comfortable and fulfilling life.

The application will offer a range of services that are specifically tailored to the needs of the elderly. For example, a senior citizen may require assistance with everyday activities such as grocery shopping, transportation to appointments, or help with housekeeping. The application will act as an intermediary between the Elder and the Service Provider, making it easy for both parties to connect and communicate.

The Service Provider can be anyone (adult) who wants to contribute to the well-being of the elderly in their community. This could include volunteers, students, or other members of the community who are willing to lend a helping hand. These individuals will register on the application as Service Providers and will provide their availability and services they can offer.

The Elder will be able to browse the profiles of Service Providers and select the one that best suits their needs. Once a Service Provider is selected, the Elder will be able to communicate with them directly through the application to arrange a meeting time and discuss the details of the service required.

One of the key features of the application is the ability for the Elder to rate and review the Service Provider. This feedback will be made available to other users of the application, helping them to make informed decisions when selecting a Service Provider. This rating system will also incentivize the Service Providers to offer high-quality services, ensuring that the elderly receive the care and assistance they require.

Some additional points that expand on the idea of the Elder care web application:

- The application will provide a platform for both one-time and recurring services, allowing the Elder to schedule services as needed or on a regular basis.
- Service Providers will be required to undergo a background check to ensure the safety and security of the Elderly users.
- The application will allow for secure payments and financial transactions between the Elder and Service Provider.
- The Elder will be able to view the availability of Service Providers in real-time, making it easier to find a provider who is available at a convenient time.
- The application will provide a messaging system that will allow the Elder and Service Provider to

communicate directly and discuss the details of the service required.

- The Elder will be able to specify their needs and preferences when selecting a Service Provider, such as language, gender, or specific skills.
- The Service Provider will have the option to accept or decline service requests based on their availability and preferences.
- The application will allow for the creation and management of care plans, making it easy for the Elder and Service Provider to stay organized and on top of the services required.
- The Elder will have access to a help desk or customer support service to address any issues or concerns related to the application or services provided.
- The application will provide a rating and review system to ensure accountability and incentivize high-quality services.

In addition to connecting the elderly with service providers who can assist with their everyday needs, the application can also help to connect elderly people who are looking for social interaction and companionship. This is especially important for those who may live alone or have limited opportunities to socialize with others.

The application will allow elderly users to create a profile where they can specify their interests and hobbies. Other elderly users will be able to browse these profiles and connect with those who share similar interests or hobbies. This can include activities such as playing board games, going for walks, or even just having a cup of tea and a chat. Once a connection is made, the application will facilitate the process of setting up an in-person meeting. This could include arranging transportation or providing recommendations for meeting places such as local parks, cafes, or community centers.

The application will also provide safety and security features to ensure that elderly users are protected when meeting with new people. This could include identity verification or background checks for users who wish to connect with others.

Overall, the idea of the Elder care web application serving as an intermediary between elderly people who want to share their free time is a valuable addition to the platform. It can help to reduce social isolation among the elderly and provide them with opportunities for social interaction and companionship. By connecting like-minded individuals in a safe and secure manner, the application can improve the quality of life for elderly users and enhance their sense of community and belonging.

Acronyms	Definitions
Elder	A user who signed up as an elder, having age above 60 years.
Service Provider	A user who signed up as a service provider, who is legally allowed to work professionally.

A. Users Segmentation

There are three types of roles defined - Elder, Service Provider, and Admin. Let's take a closer look at each of these roles:.

- Elder: This role is assigned to elderly users who are registered in the application. An elderly user is typically a senior citizen who requires assistance with daily living activities.
- Service Provider: This role is assigned to organizations or individuals who provide care services to the elderly.
- Admin: This role is assigned to the administrator or superuser of the application. Whenever a new user sign-up as a Service Provider. Admin is the one who reviews the legal documents of a person and approves or rejects his/her application to be a Service Provider.

B. Login

There are three ways users can login in this application. First one, as an ‘Elder’ second one as a ‘Service Provider’ and third one as an ‘Admin’. After logging-in interface that will appear, will be different for each segments, with different set of options.

II. GAP ANALYSIS

Title	Authors	Technology	Gap
An Intelligent Elder Care	Tao Xu, Yun Zhou & Zhe Ma	Fall Detection Algorithm	Real time performance tracking can’t possible.
Stimulation in Elder Care Facilities	Luis Cobo, Pablo Francisco, Eduardo Zalama	Dialogflow	Model requires high powered monitoring system to establish customized therapy plans for each user.
Elder Care System – An	Abey wardhana D.	Raspberry cam, mobile	Application is color-

Android Application	S, Shahid M. A, Vithana V. N.	application	blind friendly. It uses blue-grey color combination.
Online Health care consultation	Castro, L. A., Favela, J., & García-Peña	Web dev And Cloud	Limited to phone call services only.
Elder Health care App and walking stick develoment	Nuanmeesri, S., & Poomhiran	Machine Learning and App dev	Unsatisfied results of the developed walking stick.
Covid helper for Elderly People	Abbaspur-Behbahani, S., Monaghesh, E. & Hajizadeh	Machine Learning and App dev	Only limited to the covid services.
Educational application for mobile devices in elderly health care area	Oliveira, A. E., França, R., Rendeiro, M. & Bernardes	Web development and Api	Limited to only providing educational services.

III. Design Methodology

A. Frontend

This application will have an elderly people friendly user interface, backed by React and Redux. As there are three different kind of users which will use web application each of them require different interface.

Public Interface - This interface is available for both registered and unregistered users. In this interface user will only able to read information on static web pages of application

Customer Interface- Only available for registered customers. This interface allow users to interact with database. Users update their information.

Service Provider Interface - This interface is only available for verified service providers and not for customers. Users of this interface will be able to read the information sent by customers.

Points to consider when designing the user interface of an Elder care web application:

- Adjustable Interface Size: Consider the needs of elderly users who may have vision impairments or other physical limitations. Ensure that the interface can be adjusted to accommodate larger font sizes, for example, to make it easier for users to read.
- Formatting of Textbox Size: Use a larger font size and adequate spacing between elements to ensure that the text is easily readable. Use a clear, easy-to-read font and make sure that the text boxes are not too small or crowded.
- Contrast: Ensure that there is sufficient contrast between text and background colors to make it easy for users to read the text. Use high contrast colors, such as black text on a white background, or vice versa.
- Color Coding: Use color coding to help elderly users navigate the application more easily. For example, use different colors for different sections of the application, such as red for emergency contacts, green for health information, and blue for social activities.
- Specify Interactivity: Make it clear to the user what they need to do next. Provide clear instructions and use simple language to describe the steps required to complete a task.
- Location Indicator: Use location indicators, such as arrows or breadcrumbs, to help users navigate the application and understand where they are in the process.
- Animation: Use simple animations to provide feedback to the user and make the application more engaging. For example, use a simple animation to show that a task has been completed successfully.
- High Error Tolerance: Make it easy for users to recover from errors by providing clear error messages and options for correcting mistakes. Ensure that the application is forgiving of mistakes, such as typing errors or accidental clicks.

Overall, designing a user-friendly interface for an Elder care web application requires careful consideration of the needs and limitations of elderly users. By incorporating these points into the design process, you can create an interface that is accessible, easy to use, and engaging for all users.

B. Backend

This application's back-end functionality will be handled by ASP.NET Core, which makes it simple to develop independent, high-quality C#-based applications.

ASP.NET Core have embed IIS server (means we don't need to deploy WAR files). It provide production- ready set of features.

Entity Framework core and ADO.net will be used to manage the database operations

C. Database

In this web application we will be using relational database 'MS SQL Server'. It will contain the following four tables.

1. Services

'Services' table contains the services provided by the web application. Each service contain its corresponding Id and Name. 'Id' will be used to uniquely identify each service.

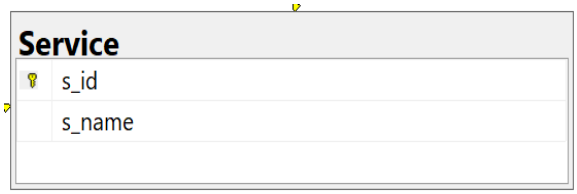


Fig.1 Service entity

2. User

'User' table is an essential component of the database schema. This table typically stores all the necessary information about a user who has registered to use the application. These fields can be used to personalize the user's experience within the application, as well as to provide more accurate and relevant information to the user. One of the most important fields in the User table is the role ID. The role ID is used to determine the role of the user within the application. Each of role may have different levels of access and permissions within the application.

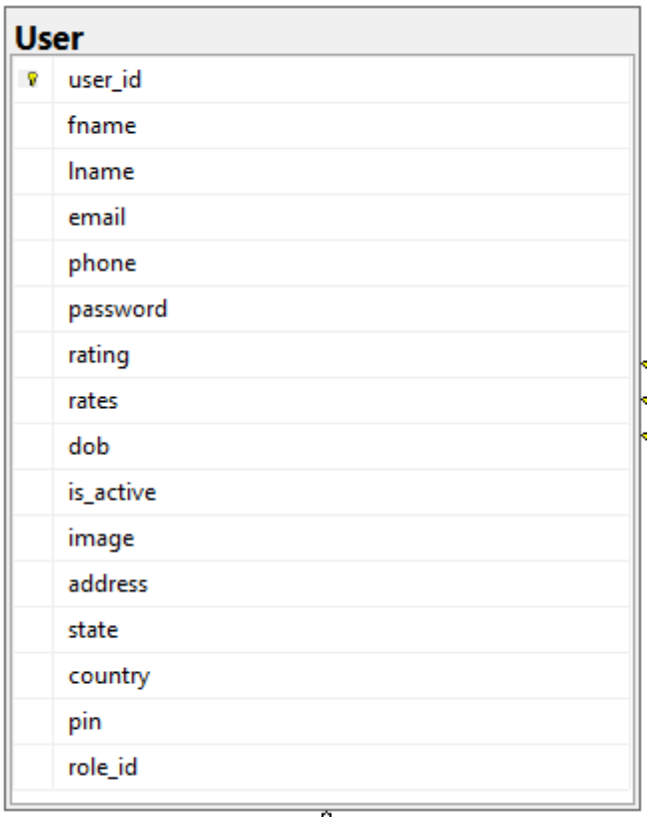


Fig.2 User entity

3. Role

'Role' table is another important component of the database schema. This table is used to define the different types of roles that are available within the application. Each role is associated with a set of permissions and access rights that define what actions and functionalities the user can perform within the application.

In this particular web application, there are three types of roles defined - Elder, Service Provider, and Admin. Let's take a closer look at each of these roles:.

- Elder: This role is assigned to elderly users who are registered in the application. An elderly user is typically a senior citizen who requires assistance with daily living activities.
- Service Provider: This role is assigned to organizations or individuals who provide care services to the elderly.
- Admin: This role is assigned to the administrator or superuser of the application. Whenever a new user sign-up as a Service Provider. Admin is the one who reviews the legal documents of a person and approves or rejects his/her application to be a Service Provider.

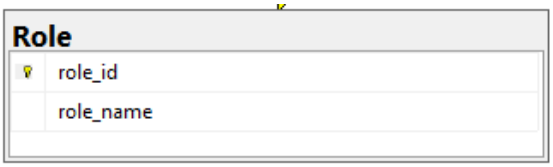


Fig.3 Role entity

4. ServiceProviderAndService

When a user sign-up as a service provider, he/she will be asked to check the services he/she will be able to provide as per his/her expertise. This information will be stored in this entity. It will contain service Provider ID and Service ID as foreign key.

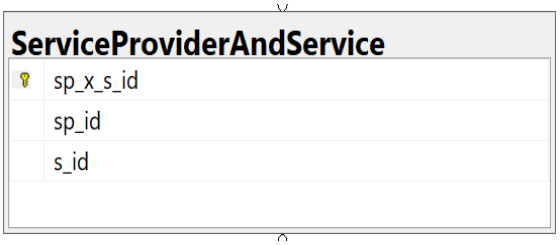


Fig.4 ServiceProviderAndEntity entity

5. Booking

'Booking' entity will contain the information of each booked appointment. It will contains fields such as booking ID (unique for each appointment), elder ID (who is booking the appointment), Service Provider's ID (who is chosen by the Elder for Appointment), Service ID, booking status, booking date, from-time, to-time. 'b_status' will contain three statuses ie, 'Pending', 'Accepted', and 'Completed'.

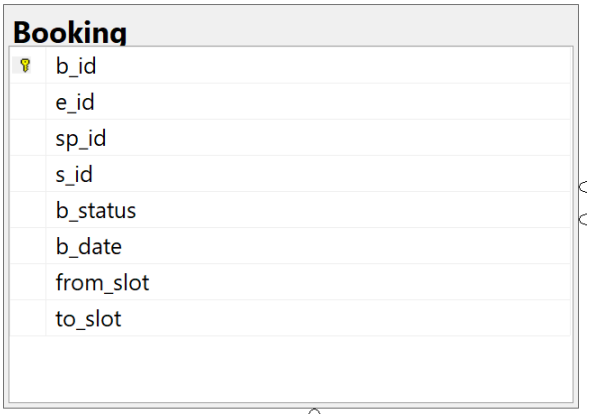
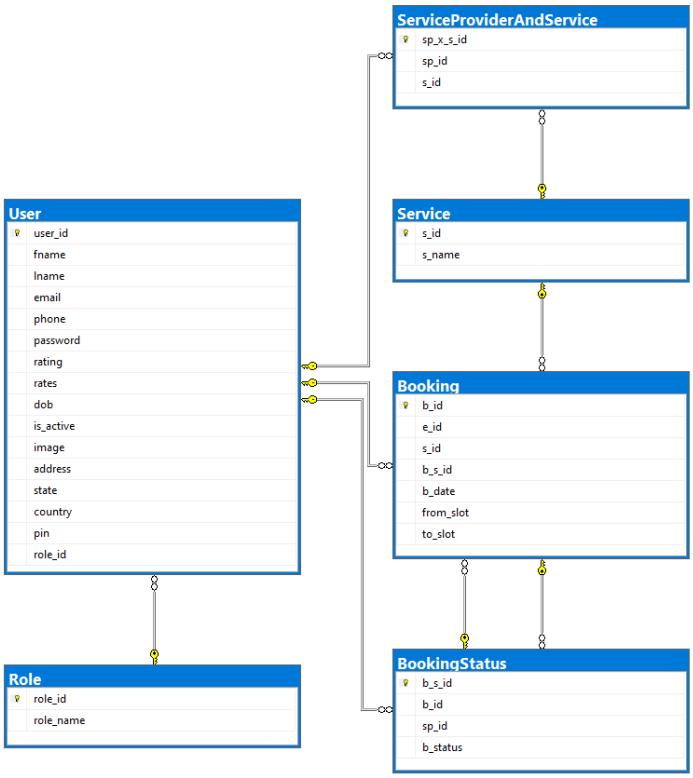


Fig.5 Booking entity

D. Interaction between the entities



To make any changes in the database a login session must be created. This login session is created by giving login credentials as input (at the sign-in page).

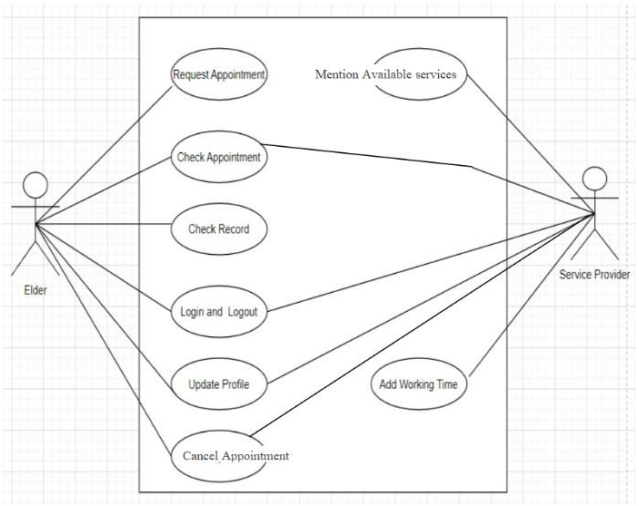


Fig.6 Use case diagram

Login credential of the customer is stored in the Customer_info entity. When the user inputs those login credentials, the controller picks those credentials and checks if the entered email is available in the database. If the email is found then the password is verified for that particular tuple. If matched, a session is created which holds the information of the customer.

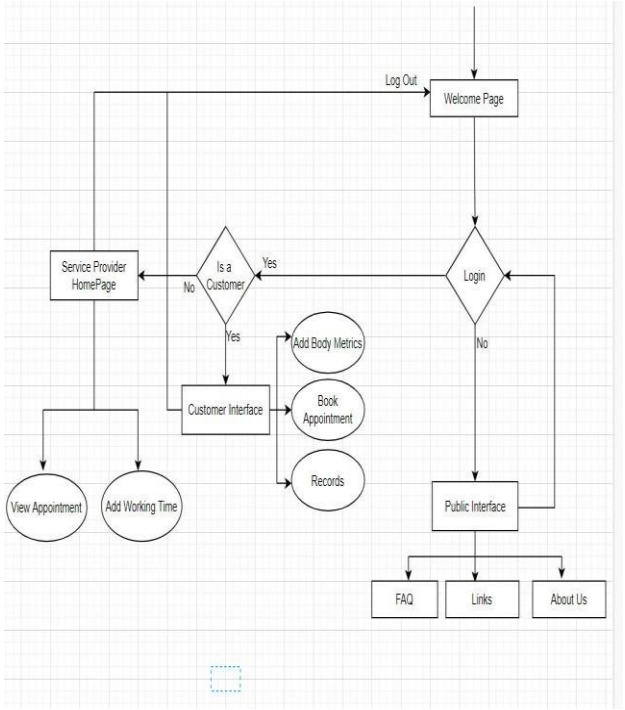


Fig.7 Data flow diagram

After the successful login customer will get to choose from the listed services. These services are listed in the services entity. Services included will aim at fulfilling the daily needs, which are under the scope of this application.

After selecting the services, the user will be displayed with a grid of slots.

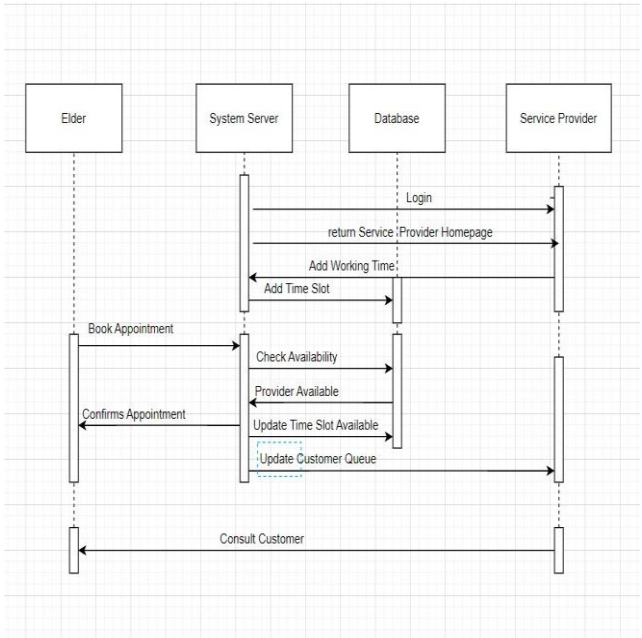


Fig.8 Sequence diagram

Slot Booking

First Elder will be asked to choose the date on which he/she wants the service then he will asked to choose the timing. Then he/she will have to select the service which he/she wants. After that interface will display the list of Service providers, those who provides that particular service and will be available in the given time frame (and don't have any clash with his/her's previously accepted appointments). Elder can select one or more service providers from the list.

Elder will select the service provider and appointment will be booked with status as 'Pending', until the service provider confirms the booking. Once confirmed status will be changed to 'Accepted'. It is totally up to the service provider whether to accept or reject the service. If service provider chooses to reject the service request then that particular request will be removed from that particular Service Provider's side. But 'Rejected' status will only be shown only when all the intended service Providers rejects the booking. When the Service provider successfully completes the task, status will be changed to 'Completed'.

IV. Conclusion

This application will act as an efficient and cost effective solution for matchmaking elderly people (i.e. Customer) with service provider. It removes the dependency on any particular service provider for receiving a service and rather distribute the work as per the availability of service providers and demands of customers. Gives the youths a chance to contribute to the well-being of elderly peoples.

References

[1] Ahmad Zhafri, Z. (2014). Elderly home care mobile application: interface design.

[2] Abbaspur-Behbahani, S., Monaghesh, E., Hajizadeh, A., & Fehresti, S. (2022). Application of mobile health to support the elderly during the COVID-19 outbreak: A systematic review.

[3] Sharifan, F., Farhoudi, F., Akbarzadeh, F., Sadeghi Bimorgh, M., & Emadzadeh, A. (2021). The effect of educating caregivers of the elderly with cognitive disorders using mobile application on the care burden.

[4] Maio, C., Tidó, E., Martins, N., Faria, N., Sousa, J., Silva, C., & Ferreira, J. (2022). NOS Personal Assistant to Engage Elderly People with Smart Home.

[5] Pires, I. M., Garcia, N. M., Pombo, N.&Flórez- Revuelta(2018, March). Limitations of the Use of Mobile Devices and Smart Environments for the Monitoring of Ageing People.

[6] Didyasarin, H., Vongurai, R., & Inthawadee, S. (2017). The factors impact attitude toward using and customer satisfaction with elderly health care mobile application services: a case study of people in Bangkok metropolitan, Thailand.

[7] Michailidis, E. T., Pikasis, P., & Kaltsas, G. (2021) Recent Advances in IoT-Based Wearable Systems for Biosignals Monitoring—Application to Elderly Care.

[8] McLeod, S., Mulder, C., McGregor, M., Katz, A., Singer, A., Liddy, C., ... & Nguan, A.

[9] Saraubon, K., Anurugsa, K., & Kongsakpaibul, A. (2018, December). A smart system for elderly care using iot and mobile technologies.

[10] Stutzel, M. C., Filippo, M. P., Sztajnberg, A., da Costa, & Caldas, C. P. (2019). Multi-part quality evaluation of a customized mobile application for monitoring elderly patients with functional loss and helping caregivers.