

Application Design Document

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1.0 Introduction

The aim of this system is to help patients with regards to their dental needs by providing a smooth and hassle free, no que solution for appointments, at a single clinic to consult a particular dentist. It will also enable a dentist to manage their time effectively, while having the least number of staff for maintaining appointment schedules and patient dental history.

Application Scope

The application strives to provide a web-based patient appointment scheduler and management system designed particularly for a single clinic with due considerations to all the constraints involved. Emphasis is laid on the user interaction and user friendliness, database management and security of the web application keeping in my mind the primary users of this application, i.e. patient dentist.

The application is designed to, aid dentists in managing their time effectively while providing excellent care and attention to incoming patients dental needs and maintain a proper log of all the patients who visit, during their appointments itself enabling the dentist to maintain detailed patient dental history. To help and improve the experience of patients who wish to schedule an appointment with the dentist and provide them a repository for their dental health history and prescribed medication and aid the receptionist to better serve the dentist with their schedules and patients with their special needs.

2.0 System Level Architecture

A detailed system level architecture diagram for the web application is provided below. It consists of two main actors the patient(user/client) and the Dentist(administrator) who access the web page through the interface provided by their computer by connecting to web server, the application has within itself an authentication server, appointment and patient profile manager, and an application database, which interact with each other as shown bellow.

System level architecture

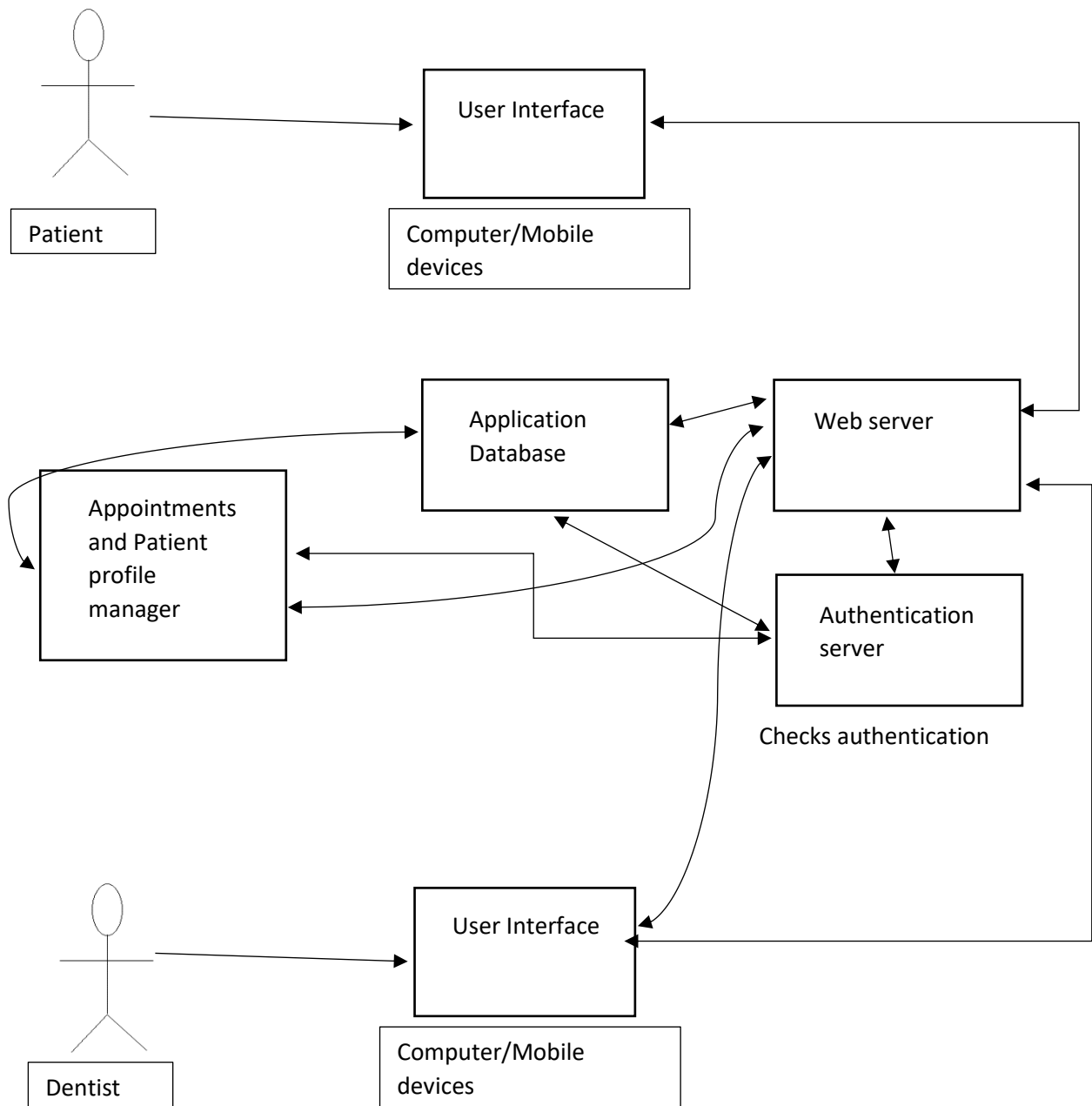


Fig 1: System Level architecture Diagram

Data architecture

Here a relational database is used to store all the patient oriented and appointment related information, each newly registered user is provided a unique 'User Id' which would be used to connect the user to all the data tables created and structure of the data tables are provided along with the use cases where they would be used.

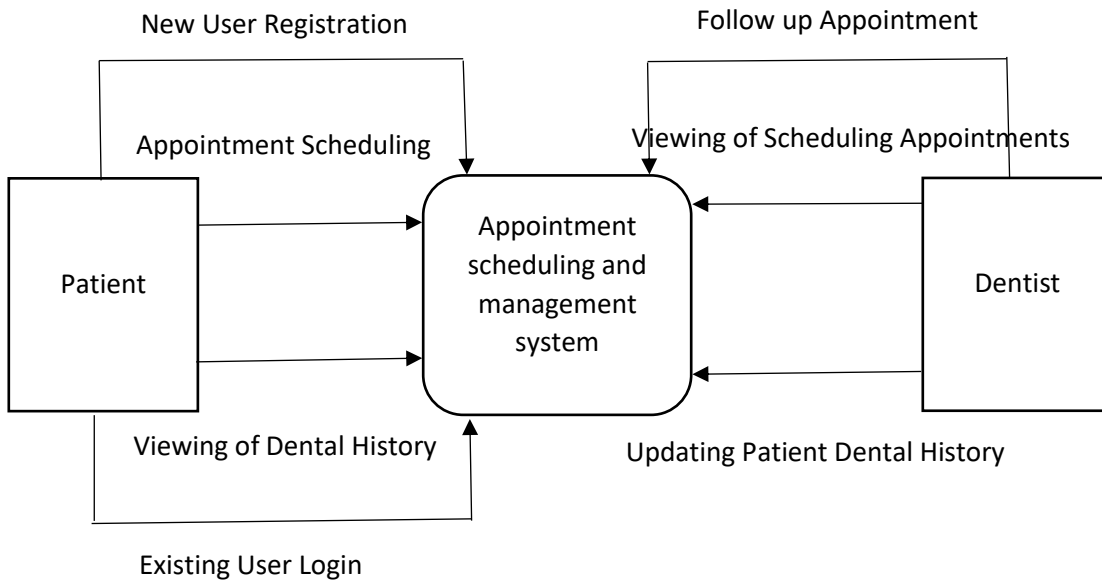


Fig 2: Data flow Diagram

Data flow diagram for patient

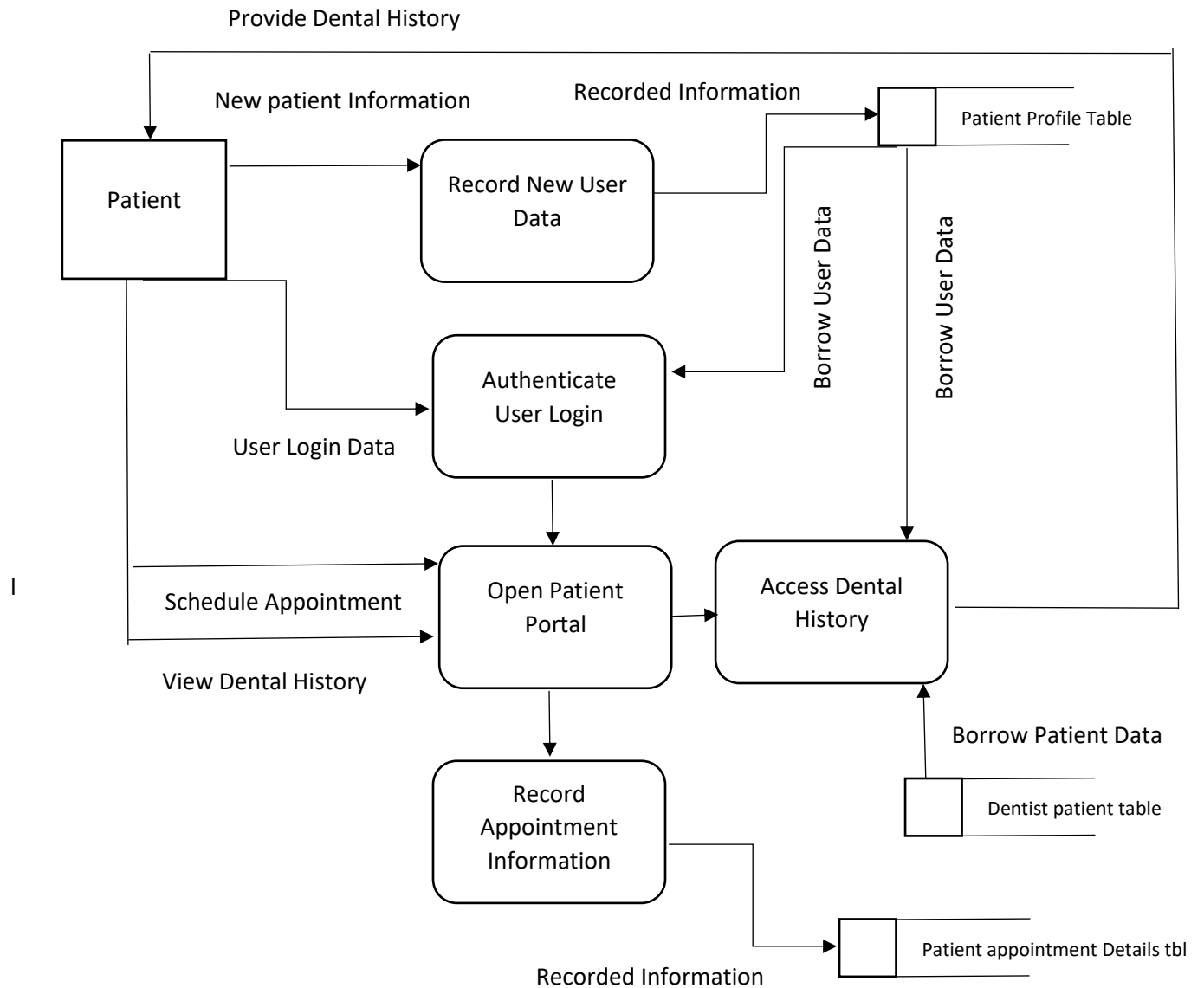


Fig 2: Data flow Diagram for Patient Use cases

Data flow diagram for Dentist

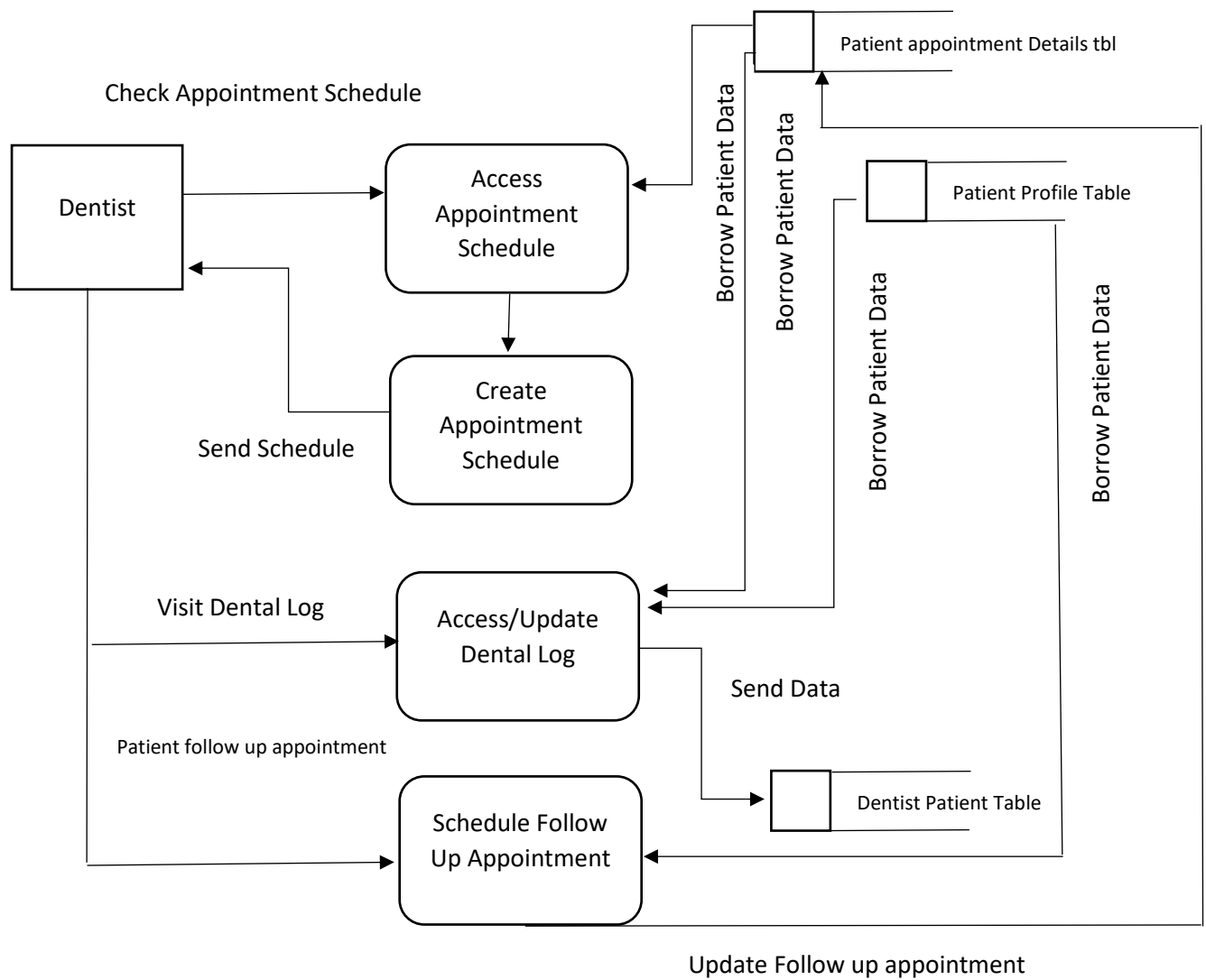
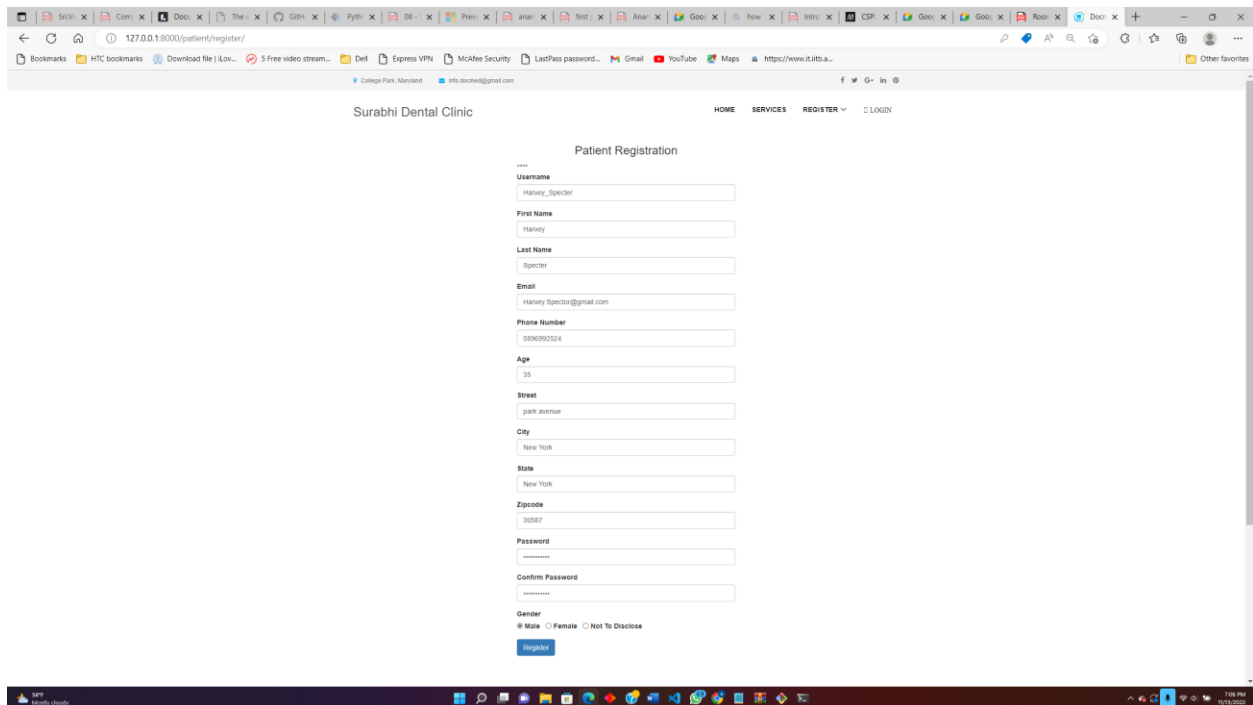
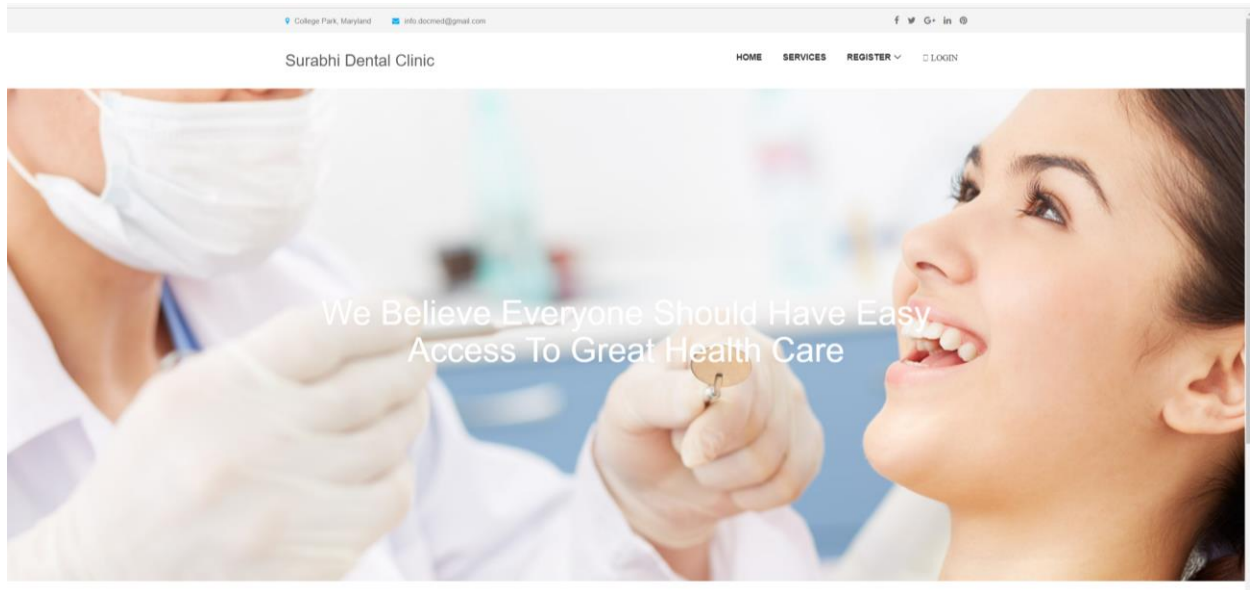


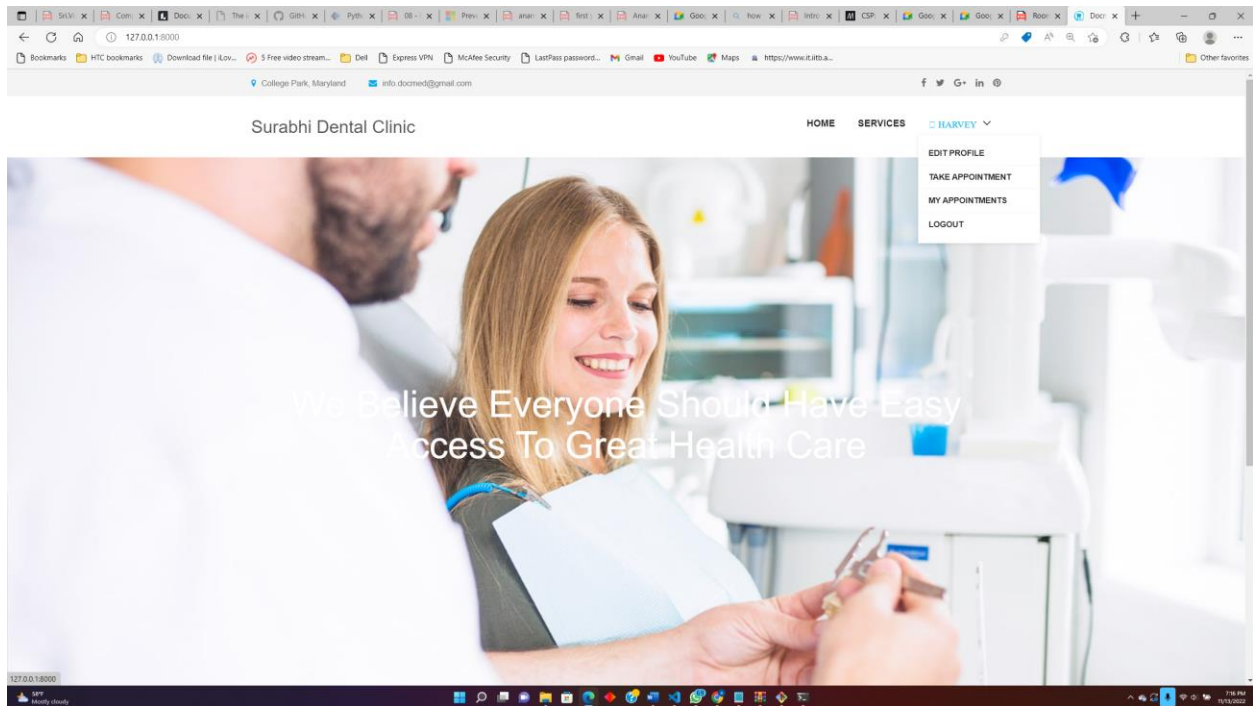
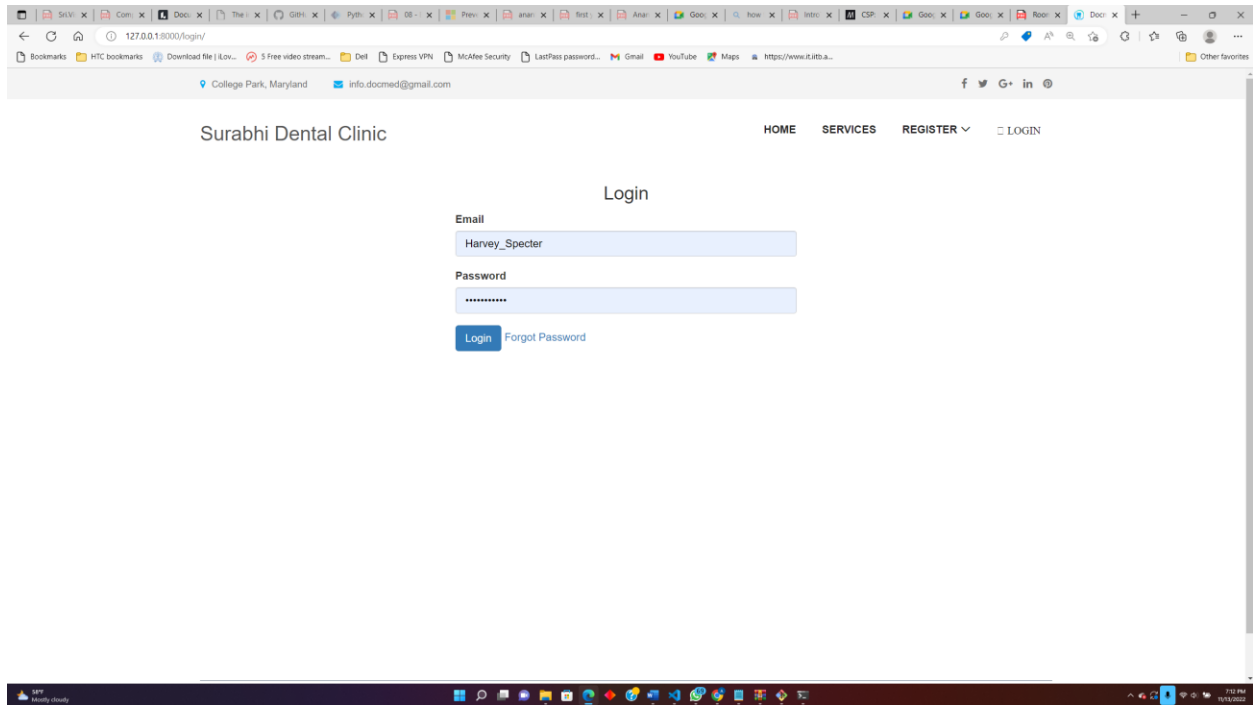
Fig 3: Data flow Diagram for Dentist Use Cases

Patient Use cases

Wireframes of the GUI of the web application are provided bellow, though not mentioned all the frames have back buttons that could accessed from web browser application.

Use case: patient registration

A screenshot of the Patient Registration form on the Surabhi Dental Clinic website. The form is titled "Patient Registration" and contains the following fields: Username (Harvey_Spector), First Name (Harvey), Last Name (Spector), Email (Harvey.Spector@gmail.com), Phone Number (5898992524), Age (35), Street (park avenue), City (New York), State (New York), Zipcode (30587), Password, and Confirm Password. At the bottom, there are radio buttons for Gender (Male, Female, Not To Disclose) and a Register button.



Data structure

Patient Profile Table

User Name	Absolute case	First name	Last name	Phone number	Email ID	age	Street	City,	state	Password	gender
Harvey-Specter	HARVEY-SPECTER	Harvey	Spector	58969 92524	Harvey.Spector@gmail.com	35	Park Avenue	New York	New York	(argon 2 hashed password)	male

Use case 2 Existing user login to the web application

College Park, Marylandinfo.docmed@gmail.com

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Surabhi Dental Clinic

HOME SERVICES REGISTER LOGIN

Login

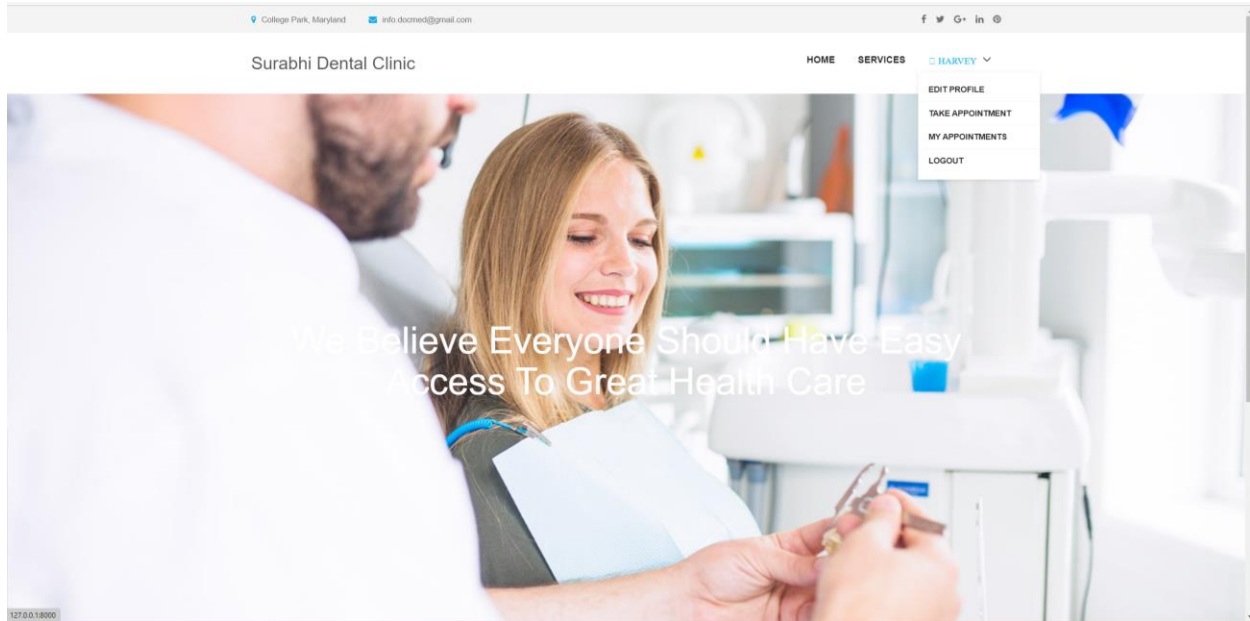
Email

Harvey.Spector@gmail.com

Password

LoginForgot Password

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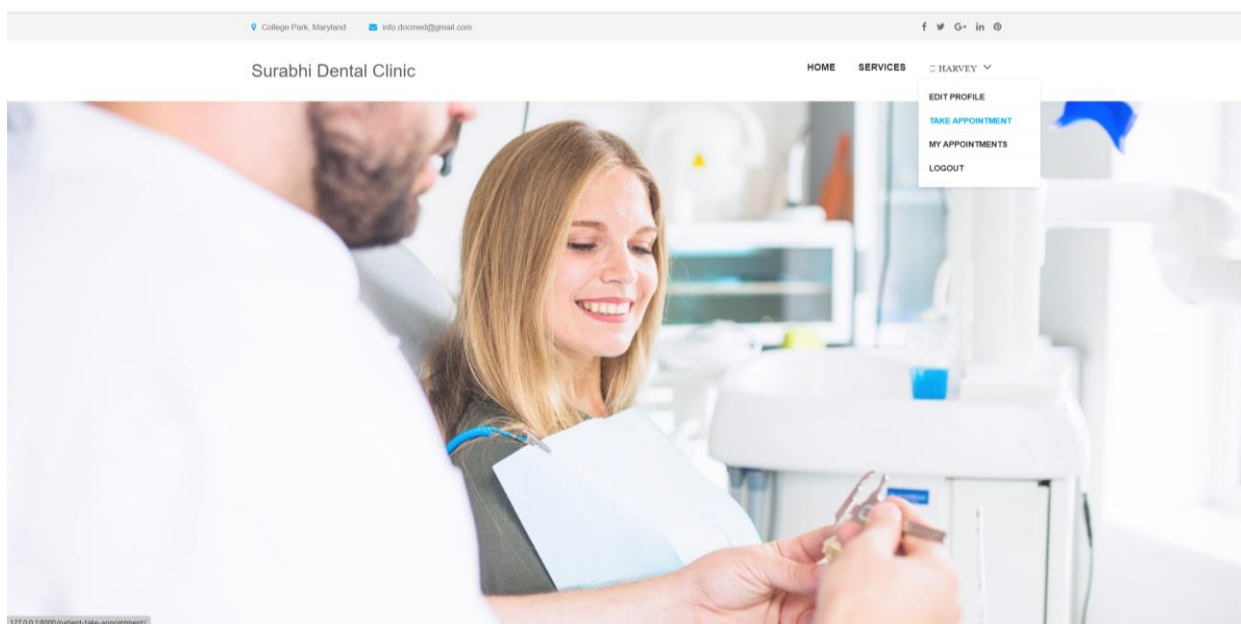


Data structure

Patient Profile Table

User Name	Absolute case	First name	Last name	Phone number	Email ID	age	Street	City,	state	Password	gender
Harvey-Specter	HARVEY-SPECTER	Harvey	Spector	58969 92524	Harvey.Spector@gmail.com	35	Park Avenue	New York	New York	(argon 2 hashed password)	male

Use case 3: patient to take appointment



College Park, Marylandinfo.docmed@gmail.com

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Surabhi Dental Clinic

HOME SERVICES HARVEY

Take Appointment

Choose Your Dentist

Ganesh Vigneshwara

Reason for appointment

Tooth Pain

Date of Appointment

2022-11-13

Start Time

10:00 AM

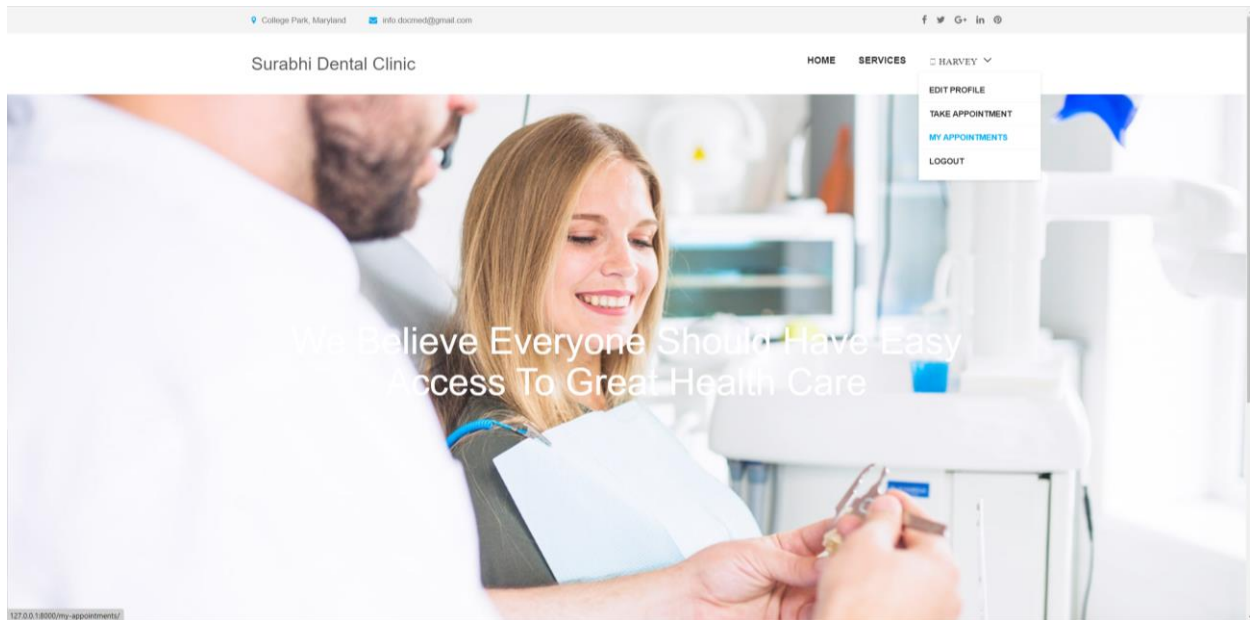
End Time

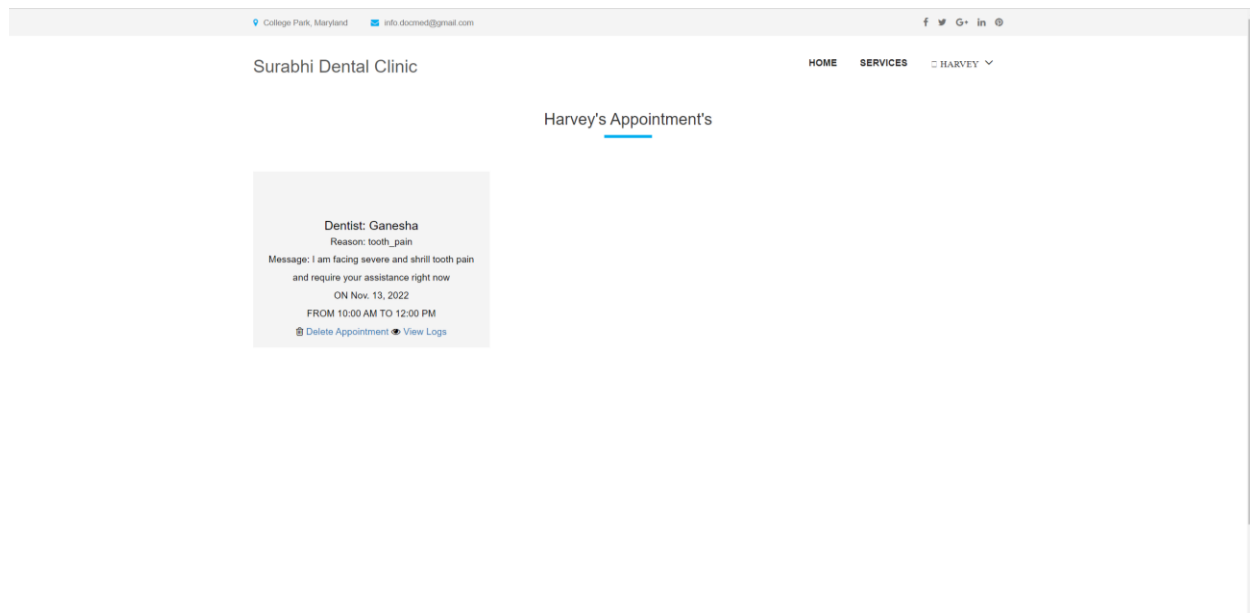
12:00 PM

Message

I am facing severe and shrill tooth pain and require your assistance right now

Submit





Data structure

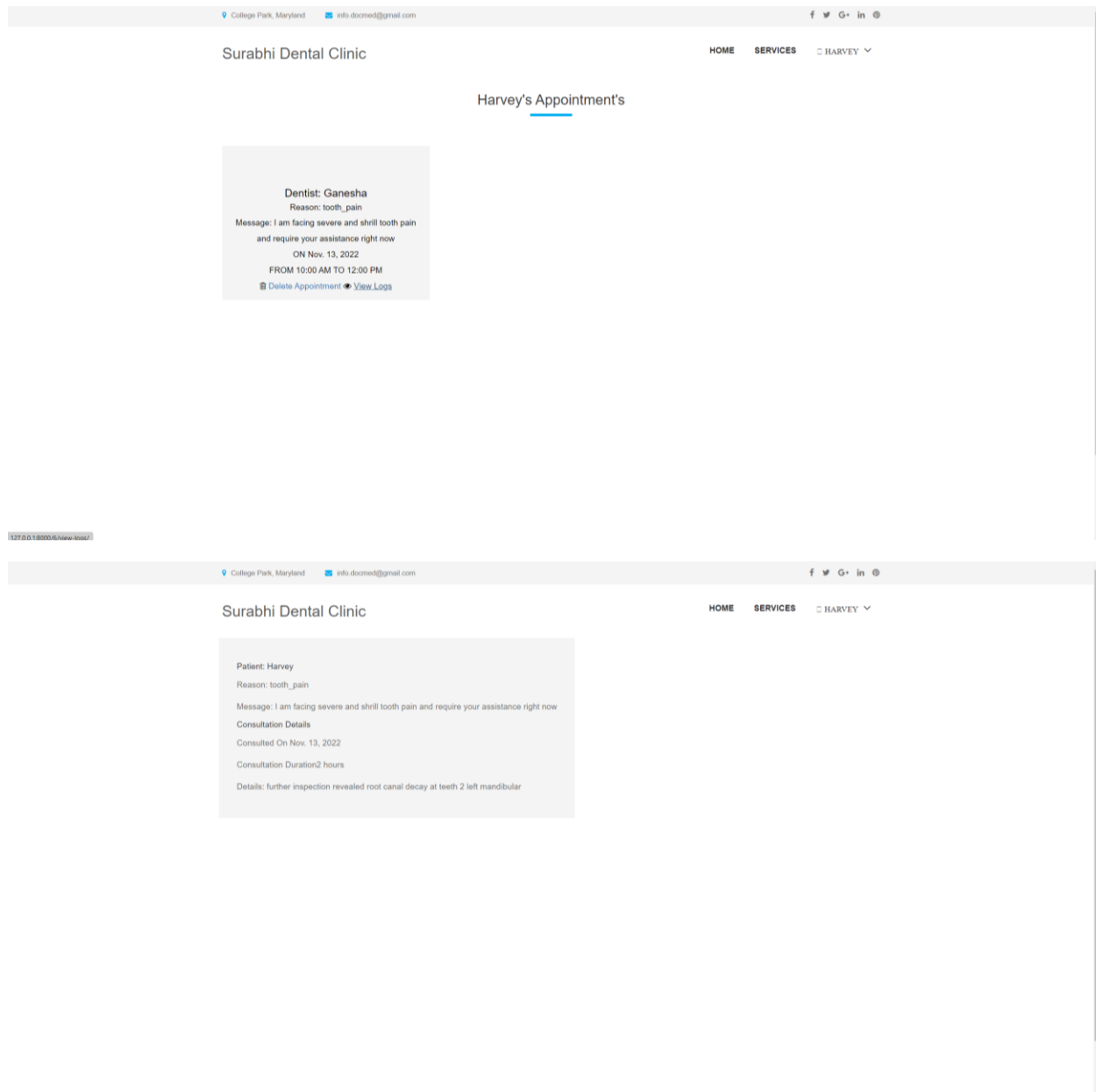
Patient Profile Table

User Name	Absolute case	First name	Last name	Phone number	Email ID	age	Street	City,	state	Password	gender
Harvey-Specter	HARVEY-SPECTER	Harvey	Spector	58969 92524	Harvey.Spector@gmail.com	35	Park Avenue	New York	New York	(argon 2 hashed password)	male

Patient appointment details

Sl number	Dentist name	Reason for Appointment	User Name	Appointment Date	Appointment Time	Messages
1	Ganesha	Tooth Pain	Harvey_Spector	2022-11-13	10:00 AM	I am facing severe and shrill tooth pain and urgent attention

Use case 4 Accessing patient dental repository



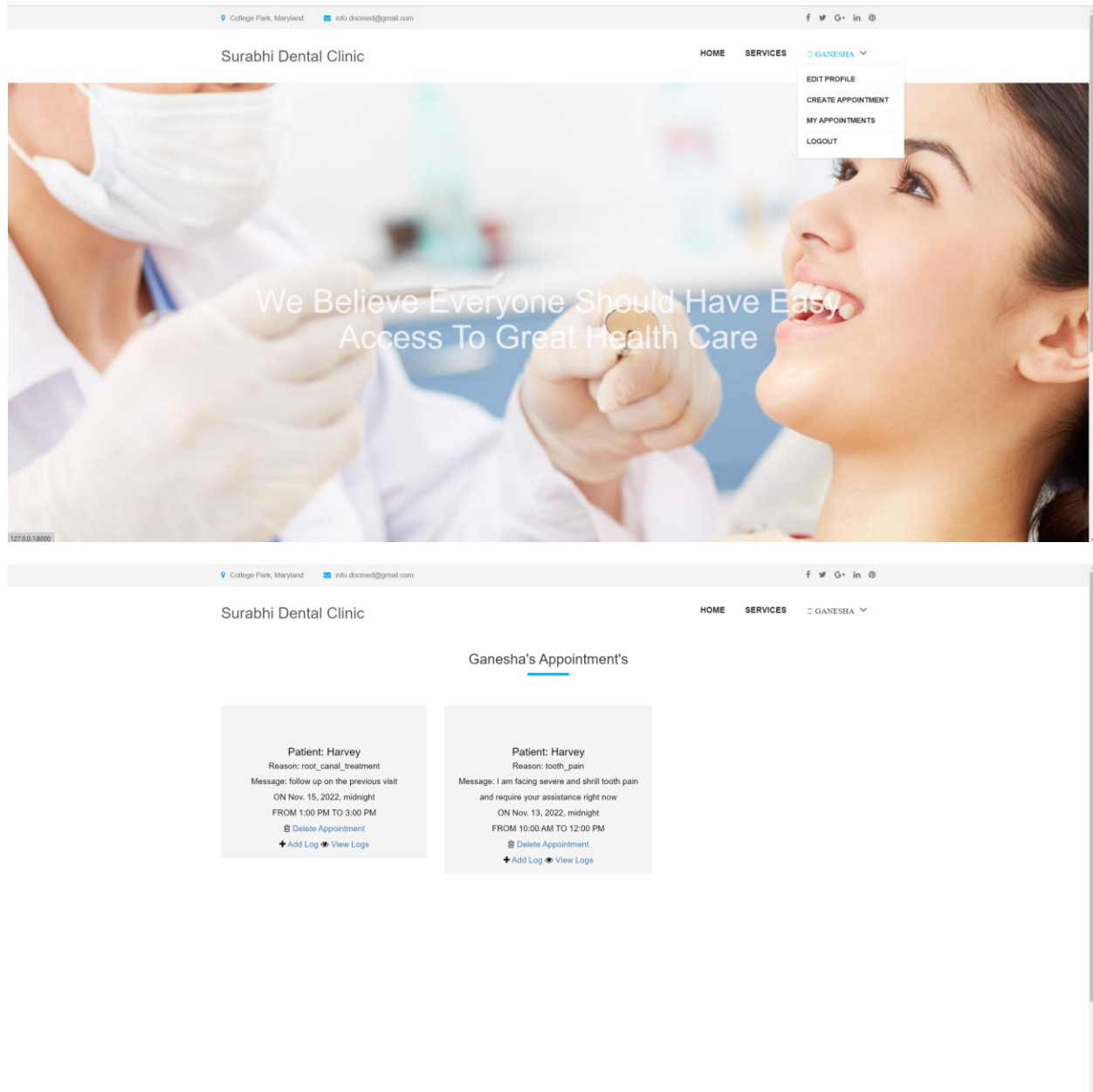
Data structure

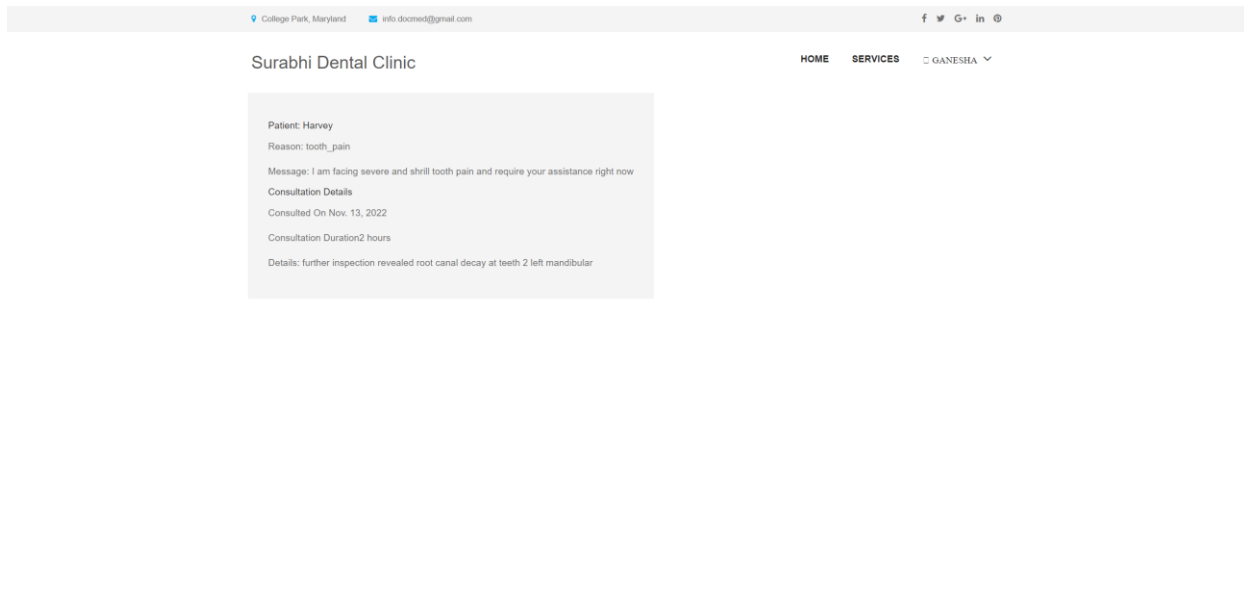
Patient Dental logs

Sl number	patient Name	Consultation Date	Consultation Duration	Details
1	Harvey-Spector	2022-11-13	2 Hours	Further inspection revealed root canal decay at teeth 2

User Dentist

Use Case: Checking of appointment schedule





Dentist Table

User Name	Absolute case	First name	Last name	Phone number	Email ID	age	Street	City,	state	Password	gender
Ganesh a-Vigneshwara	GANESH A-VIGNESH WARA	Ganesh a	Vigneshwara	845656215	Ganesha.vigneshwara@gmail.com	56	Manhattan road	New York	New York	(argon 2 hashed password)	male

Patient appointment details

Sl number	Dentist name	Reason for Appointment	User Name	Appointment Date	Appointment Time	Messages
1	Ganesha	Tooth Pain	Harvey_Spector	2022-11-13	10:00 AM	I am facing severe and shrill tooth pain and urgent attention

Use case: Documenting patients' Dental logs for the visit.

College Park, Maryland
info.docmed@gmail.com

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Surabhi Dental Clinic
HOME
SERVICES
GANESHA

Create Log

Consultation Date
2022-11-13

Duration
2 hours

Details
further inspection revealed root canal decay at teeth 2 left mandibular

Submit

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College Park, Maryland
info.docmed@gmail.com

f
G+
in

Surabhi Dental Clinic
HOME
SERVICES
GANESHA

Patient: Harvey
Reason: tooth_pain
Message: I am facing severe and shrill tooth pain and require your assistance right now
Consultation Details
Consulted On Nov. 13, 2022
Consultation Duration 2 hours
Details: further inspection revealed root canal decay at teeth 2 left mandibular

Sl number	patient Name	Consultation Date	Consultation Duration	Details
1	Harvey-Spector	2022-11-13	2 Hours	Further inspection revealed root canal decay at teeth 2

Use case : Dentist scheduling follow up appointment

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Surabhi Dental Clinic

HOME SERVICES GANESHA

EDIT PROFILE

CREATE APPOINTMENT

MY APPOINTMENTS

LOGOUT

Patient: Harvey

Reason: tooth_pain

Message: I am facing severe and shrill tooth pain and require your assistance right now

Consultation Details

Consulted On Nov. 13, 2022

Consultation Duration 2 hours

Details: further inspection revealed root canal decay at teeth 2 left mandibular

127.0.0.1:8000/dentist-create-appointment/

College Park, Marylandinfo.docmed@gmail.com

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Surabhi Dental Clinic

HOME SERVICES GANESHA

Create Appointment

Choose Your Patient

Harvey Specter

Reason for appointment

Root Canal Treatment

Date of Appointment

2022-11-15

Start Time

1:00 PM

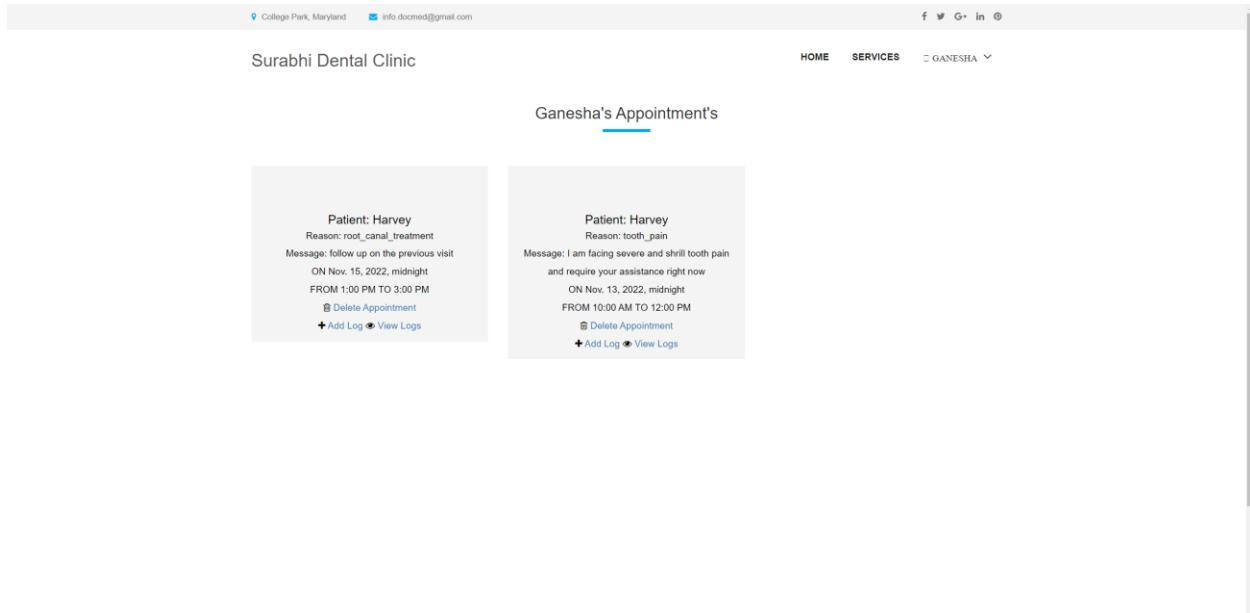
End Time

3:00 PM

Message

follow up on the previous visit

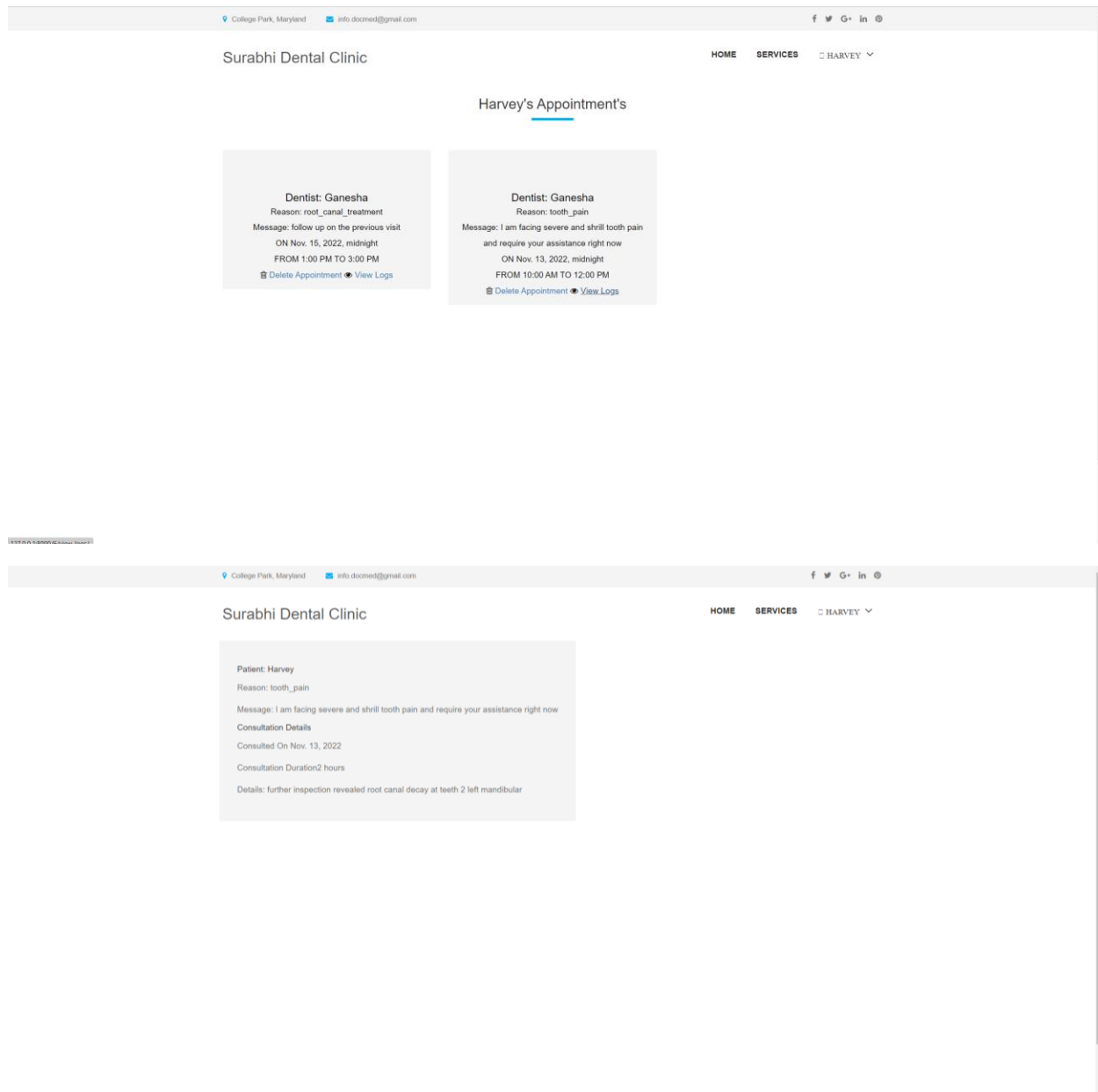
Submit



Patient appointment details

Sl number	Dentist name	Reason for Appointment	User Name	Appointment Date	Start Time	End time	Messages
1	Ganesha	Tooth Pain	Harvey_Spector	2022-11-13	10:00 AM	12.00 PM	I am facing severe and shrill tooth pain and urgent attention
2	Ganesha	Root canal treatment	Harvey_Spector	2022-11-15	1:00 PM	3.00PM	Follow up appointment on previous visit

Use case patient viewing appointment and dental log



Security Features implemented

1) User verification

During registration the user email is verified by sending the user an email, to prevent unscrupulous users from registering.

2) Forgot password

This feature is enabled only by providing the email address to which a link is sent with further instructions on password reset the reset password applied to the user to whom the email is associated.

The image shows two screenshots of the Surabhi Dental Clinic website. The top screenshot displays the 'Enter new password' form, which includes two input fields for 'New password' and 'New password confirmation'. Below the fields, a list of password requirements is provided: 'Your password can't be too similar to your other personal information.', 'Your password must contain at least 8 characters.', 'Your password can't be a commonly used password.', 'Your password can't be entirely numeric.', 'Your password must contain at least 1 number.', 'Your password must contain at least 1 uppercase character.', 'Your password must contain at least 1 lowercase character.', and 'Your password must contain at least 1 special character.' A blue 'Update Password' button is located at the bottom of the form. The bottom screenshot shows the 'Password reset complete' message, indicating that the password has been successfully reset and the user can now log in. The website header includes the clinic's name, location (College Park, Maryland), contact email (info.docmed@gmail.com), and social media links (Facebook, Twitter, Google+, LinkedIn, and Instagram). The footer contains a copyright notice: 'Copyright © All rights reserved | Made with "C" by "Surabhi Dental Clinic"'.

College Park, Maryland info.docmed@gmail.com f t G+ in @

Surabhi Dental Clinic HOME SERVICES REGISTER LOGIN

Enter new password

New password

.....

Your password can't be too similar to your other personal information.
Your password must contain at least 8 characters.
Your password can't be a commonly used password.
Your password can't be entirely numeric.
Your password must contain at least 1 number.
Your password must contain at least 1 uppercase character.
Your password must contain at least 1 lowercase character.
Your password must contain at least 1 special character.

New password confirmation

.....

Please enter your new password twice so we can verify you typed it in correctly.

Update Password

College Park, Maryland info.docmed@gmail.com f t G+ in @

Surabhi Dental Clinic HOME SERVICES REGISTER LOGIN

Password reset complete

Your password has been set. You may go ahead and log in now.

Log in

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3) User lockout is enabled to lockout users who hold multiple invalid attempts

- 4) Use of secure cookies are enabled to prevent attacker from mining cookies
- 5) Session management is secured through the use of token that refresh and CSRF protection is achieved by the use of CSRF token in each session and all tokens would be cleared at the end of each session.
- 6) Password security is improved through use of strict rules such as enforcement of minimum length, use of uppercase and lower case letters and special characters
- 7) Argon 2 password hasher is employed for storing password in database.
- 8) Protection against clickjacking and other accounts are taken care