SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Category - I Deemed to be University) Porur, Chennai
SRI RAMACHANDRA FACULTY OF ENGINEERING AND TECHNOLOGY

PATIENT DIGITAL IMAGE TRANSACTION SYSTEM

INT 200 – WEB DEVELOPMENT PROJECT REPORT

Submitted by

SUSHMITHA K – E0422002

In partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND MEDICAL ENGINEERING

(Artificial Intelligence and Data Analytics)

Sri Ramachandra Faculty of Engineering and Technology

Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai -600116

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ACKNOWLEDGEMENT

I express my sincere gratitude to our Programme Coordinator Dr. A.K. Jayanthy for their support and for providing the required facilities for carrying out this study.

I wish to thank my faculty supervisor(s), DR. A.K. JAYANTHY, Head of Department, and Sri Ramachandra faculty of Engineering and Technology for extending help and encouragement throughout the project. Without his/her continuous guidance and persistent help, this project would not have been a success for me.

I am grateful to all the members of Sri Ramachandra Faculty of Engineering and Technology, my beloved parents and friends for extending the support, who helped us to overcome obstacles in the study.

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ABSTRACT

The project was completed during the internship at Srisai Digital Dental X-Rays. This project focused on research and analysis within the technology field of dental x-rays. The primary objective was to develop a dynamic web application, specifically a Patient Digital Image Transaction System, utilizing web development and database management tools. The application created with HTML, CSS, PHP and Javascript serves as a centralized platform for storing, accessing and sharing patient records, thereby significantly enhancing data management capabilities.

LIST OF FIGURES:

CHAPTER 1
INTRODUCTION

1.1. PROBLEM STATEMENT

The process of manually entering patient information and maintaining records in MS Excel introduced inefficiencies and increased the likelihood of errors. Searching for and associating x-ray scans with the appropriate patient records consumed valuable time and often resulted in inaccuracies. The lack of a centralized system made it challenging to access patient information and generate comprehensive reports in a timely manner. Furthermore, the manual distribution of reports to doctors one by one not only prolonged the communication process but also increased the risk of misplacing or mishandling crucial patient information.

In summary, the existing reliance on MS Excel for patient information management and report generation, coupled with the laborious process of finding corresponding x-ray scans and distributing reports individually, posed significant challenges in terms of time, accuracy, and communication within the dental practice. The development of the Patient Digital Image Transaction system aimed to address these issues by introducing a web-based solution that allows for efficient storage of patient information, easy access to reports, and streamlined communication with doctors via email.

1.2. OBJECTIVES

1.2.1. STREAMLINE DATA MANAGEMENT

Develop a user-friendly interface that allows for easy and secure storage of patient information in a centralized database. Enable efficient data entry, retrieval, and management to eliminate the challenges associated with manual record-keeping.

1.2.2. IMPROVE REPORT GENERATION

Create a robust reporting system that generates comprehensive reports based on patient data stored in the database. Enable customization, editing, and deletion of patient information to ensure accurate and up-to-date reports.

1.2.3. ENHANCE COMMUNICATION

Implement features that enable seamless communication between dental professionals. Enable email communication with the corresponding dentist for efficient information sharing and collaboration.

1.2.4. OPTIMIZE WORKFLOW

Automate repetitive tasks, such as auto-populating text fields and calculating payment amounts, to minimize errors, save time, and increase productivity. Provide a user-friendly interface that simplifies data entry, retrieval, and report generation, improving overall workflow efficiency.

1.2.5. IMPROVE PATIENT CARE

Enable easy access to patient information and reports, ensuring that dental professionals have the necessary data for accurate diagnosis and treatment planning. Facilitate effective communication and collaboration among dental professionals to enhance patient care and treatment outcomes.

CHAPTER 2

LITERATURE REVIEW

S.No.	Paper & Book Title	Author	Year	Methodology
1.	Dental Radiographs	JADA	2011	It explains that dental radiographs offer valuable insights into the hard and soft tissues of the mouth, allowing dentists to detect conditions such as tooth decay, bone diseases, gum disease, infections, and tumors. The safety of dental radiographs is addressed, emphasizing the low radiation dose involved and the implementation of safety practices. The ALARA principle is followed, ensuring radiation exposure is minimized. The use of leaded aprons and collars further protects patients. The decision to take radiographs is based on

				oral examination findings, symptoms, health history, and risk factors for oral disease. The article also highlights the importance of providing existing radiographs to avoid unnecessary exposure.
2.	Retrospective Study: Evaluating the Positioning Errors in Digital Panoramic Radiographs	Sanjeet Singh, Inderpreet Singh, Farooq Ahmed and	2022	This study on dental panoramic radiographs aimed to evaluate the errors and positioning techniques associated with the imaging procedure. A total of 300

		Arshid Baba		panoramic radiographs were evaluated to identify common errors in patient positioning. The OHP sheet was used to standardize the technique and ensure that no errors were overlooked. The study examined errors such as chin tipped too high, patient's head rotated/twisted, patient positioned backwards, tongue not resting on the palate, and chin tipped too low. The methodology involved analyzing radiographs, identifying errors, and providing recommendations for improved positioning techniques. The study highlights the importance of proper patient positioning to enhance the quality and accuracy of dental panoramic radiographs.

3.	Cephalometric Analysis in Orthodontics Using Artificial Intelligence—A Comprehensive Review	Aravind Kumar, Yong Chen, Abdullah Almalki, Gautham and Dashrath Kafle	2022	This narrative review focuses on the utilization of artificial intelligence (AI), specifically machine learning, in cephalometric analysis for orthodontics. The review highlights the rapid development of algorithms and increasing computational resources, leading to enhanced efficiency, accuracy, and reliability. Automatic identification of cephalometric landmarks has significantly improved efficiency. The primary objectives of AI in orthodontics are to improve precision, accuracy, and time-saving in dentists' work. AI shows promise as a tool for cephalometric tracing in clinical practice and analyzing research databases.

CHAPTER 3

PROPOSED METHODOLOGY

3.1. DEFINE PROJECT REQUIREMENTS

When developing a web application, it is crucial to clearly define its purpose, goals, and scope, while also identifying the specific needs of the users. By doing so, the development team can determine the essential features and functionality required to meet those needs. This comprehensive approach ensures that the web application aligns with its intended purpose, addresses user requirements effectively, and provides the necessary features for a successful user experience.

3.2. PLAN AND DESIGN

This involves creating wireframes to visualize the structure and layout of the application, providing a visual representation of its components. Additionally, determining the database structure and entity relationships is necessary to ensure smooth data management and interaction within the application. These steps collectively contribute to the development process, enabling developers to establish a solid foundation for building the application.

3.3. SET UP DEVELOPMENT ENVIRONMENT

Installation of local web server such as XAMPP enables developers to create and test websites locally. This server environment provides the necessary tools for hosting and running web applications. Additionally, setting up a code editor like Visual Studio Code (VS Code) allows developers to efficiently write, edit, and manage their code, enhancing productivity and enabling seamless coding experience for web development projects.

3.4. DEVELOP THE FRONTEND

Writing HTML markup is essential for structuring the content and creating user input forms, enabling efficient data collection. Secondly, utilizing CSS plays a vital role in styling the web pages, ensuring a visually consistent and appealing design. By combining HTML for content and forms and CSS for styling, developers can create engaging and user-friendly web pages that provide an optimal experience for visitors.

3.5. ENHANCE FUNCTIONS WITH JAVASCRIPT

With JavaScript, developers can add interactivity and dynamic behaviour, such as auto-population of fields. This enables seamless and efficient data entry as relevant information is automatically filled in based on user input or predefined conditions. By implementing JavaScript for auto-population and similar features, websites become more user-friendly, reducing manual effort and streamlining the overall user interaction process. This enhances efficiency and provides a more intuitive browsing experience.

3.6. DEVELOP THE BACKEND WITH PHP

Firstly, PHP scripts are written to manage server-side logic and handle data processing. These scripts enable the server to perform complex calculations, data manipulation, and interact with various resources. Secondly, a database is set up using tools like MySQL, serving as a reliable storage system for storing and retrieving data efficiently. Lastly, PHP is utilized to establish connections with the database and execute queries, enabling seamless data integration and retrieval within the web application.

3.7. IMPLEMENT DATA MANIPULATION

PHP scripts are developed to handle CRUD operations (Create, Read, Update, Delete) on the database, allowing for efficient data management and manipulation. These scripts enable the application to interact with the database, ensuring seamless data storage and retrieval. Additionally, form submission and data validation are implemented on the server-side using PHP, ensuring that user input is validated and processed accurately, enhancing data integrity and application security.

3.8. TEST AND DEBUG

Thorough testing plays a crucial role in the development process to ensure both functionality and performance of the application. Comprehensive testing is performed to identify any potential issues or bugs that may impact the application's usability. In case any issues are detected during testing, developers carefully debug and fix them, ensuring that the application operates smoothly. This iterative process of testing, debugging, and fixing guarantees a high-quality product that meets the desired functionality and performance standards.

CHAPTER 4

IMPLEMENTATION

4.1. DEFINING THE REQUIREMENTS

The system was developed with a specific purpose in mind: to provide a centralized storage solution for data, ensuring convenient access and facilitating data sharing among users. The system's key features encompassed various functionalities, including the ability to save and update data, automate the population of fields for ease of use, and enable data transmission via email with a single click. These features collectively aimed to streamline data management, enhance user experience, and promote efficient communication within the system.

4.2. CREATING WIREFRAMES AND DATABASE SCHEMAS

Wireframes were developed as visual representations to provide a clear understanding of the expected output and layout of the system. These wireframes served as blueprints, depicting the arrangement and structure of various components, ensuring a comprehensive visualization of the final product. Additionally, database structures were designed specifically for patient information and doctor information. These structures defined the organization and relationships of data, ensuring efficient storage and retrieval of relevant information within the system.

4.3. INSTALLATION OF WEB-SERVER AND CODE EDITOR

In order to establish a conducive web development environment, XAMPP, a local web server solution, was installed. This installation provided the necessary tools and services for hosting and running web applications locally. Alongside XAMPP, libraries such as PHPMailer and Bootstrap were installed.

Additionally, specific extensions required for seamless integration with the Visual Studio Code (VS Code) code editor were added. These installations enhanced the functionality and capabilities of the development environment, enabling efficient coding and leveraging advanced features for web development projects.

4.4. FRONTEND DEVELOPMENT

Firstly, HTML markup was created to establish the structure and content of the web pages. This involved writing the necessary tags, elements, and organizing the information hierarchy. Secondly, CSS was utilized to style the HTML pages, ensuring visual consistency, appealing design, and a cohesive user experience. By combining HTML for structure and content and CSS for styling, the web pages were rendered visually appealing and aesthetically pleasing.

4.5. USING JAVASCRIPT FOR AUTO-POPULATION

To enhance user interaction and streamline data entry, JavaScript played a crucial role by implementing the auto-population functionality. This involved writing JavaScript code that dynamically populated fields based on user input. By using JavaScript, the web application was able to automatically fill in relevant information, saving time and effort for users. This feature improved the overall user experience, making the form-filling process more efficient and user-friendly.

4.6. BACKEND DEVELOPMENT WITH PHP

The development process involved the creation of PHP scripts using the Visual Studio Code (VS Code) code editor. These scripts were specifically written to implement various operations within the application. Additionally, the XAMPP control panel was utilized to run the Apache web server and

MySQL database management system, providing a local server environment for testing and hosting the application. Furthermore, PHP scripts were developed to establish connections with the database and execute queries, enabling seamless data integration and retrieval.

4.7. DATA MANIPULATION & VALIDATION

To enable efficient data management, PHP was used to create CRUD operations (Create, Read, Update, Delete) for the application. These operations allowed users to interact with the database, perform actions such as adding, retrieving, updating, and deleting data. Additionally, on the server-side, PHP was implemented to handle form submissions and validate the data received. This ensured that the data entered by users was validated and processed accurately, enhancing the integrity and security of the application's data.

4.8. TESTING AND DEBUGGING

In order to ensure the functionality of the program, comprehensive testing was conducted. This involved systematically checking each component and feature to identify any potential issues or bugs. Additionally, any errors or issues detected during testing were diligently debugged. The debugging process involved locating and resolving the root cause of the errors, ensuring that the program operated smoothly and without any glitches. By testing and debugging, the program was optimized for optimal performance and reliability.

CHAPTER 5

RESULTS AND DISCUSSIONS

Figure 1: Result of login form

The login form implements validation to ensure the accuracy of the entered username and its corresponding password. If the username field is left empty, the form prompts "username is required." Similarly, if the password field is empty, it displays "password is required." Upon submission, if the entered username and password do not match the stored credentials, the form prompts "password or username is incorrect." These validation prompts guide the user to provide the necessary information, identify missing fields, and notify them of any incorrect credentials for a secure login experience.

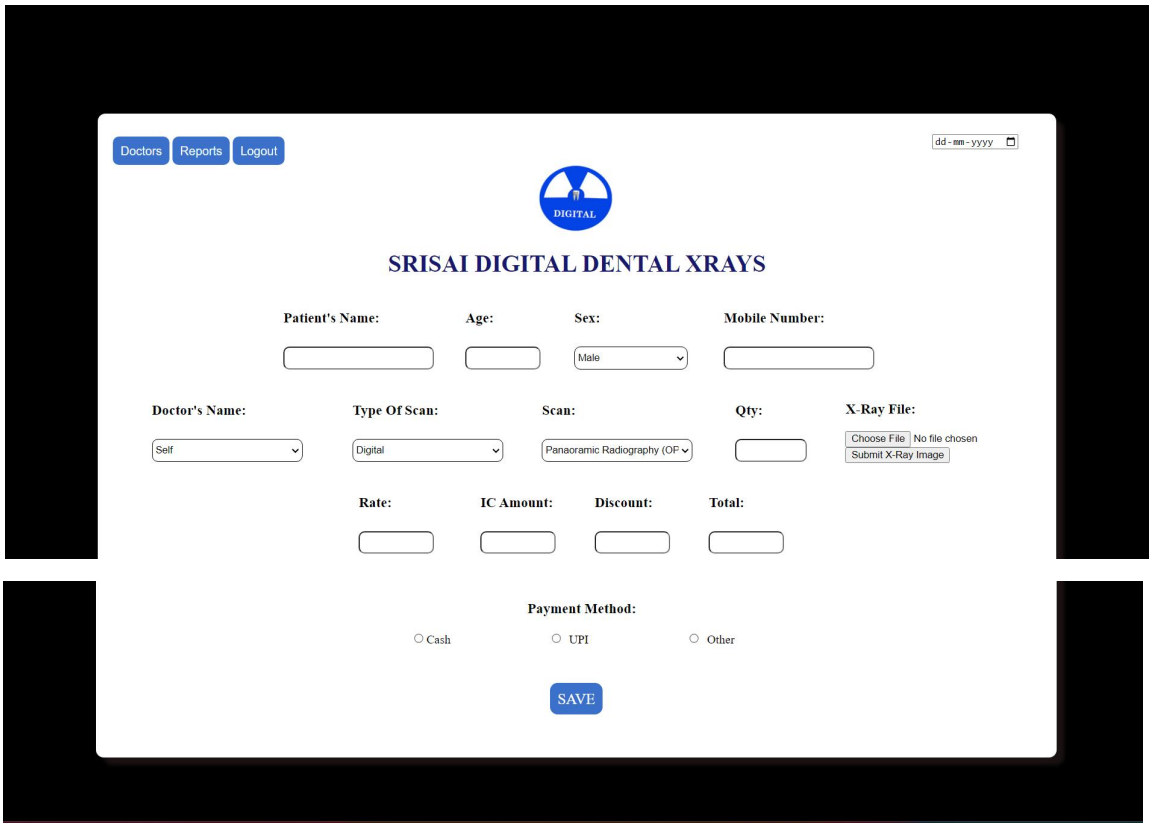
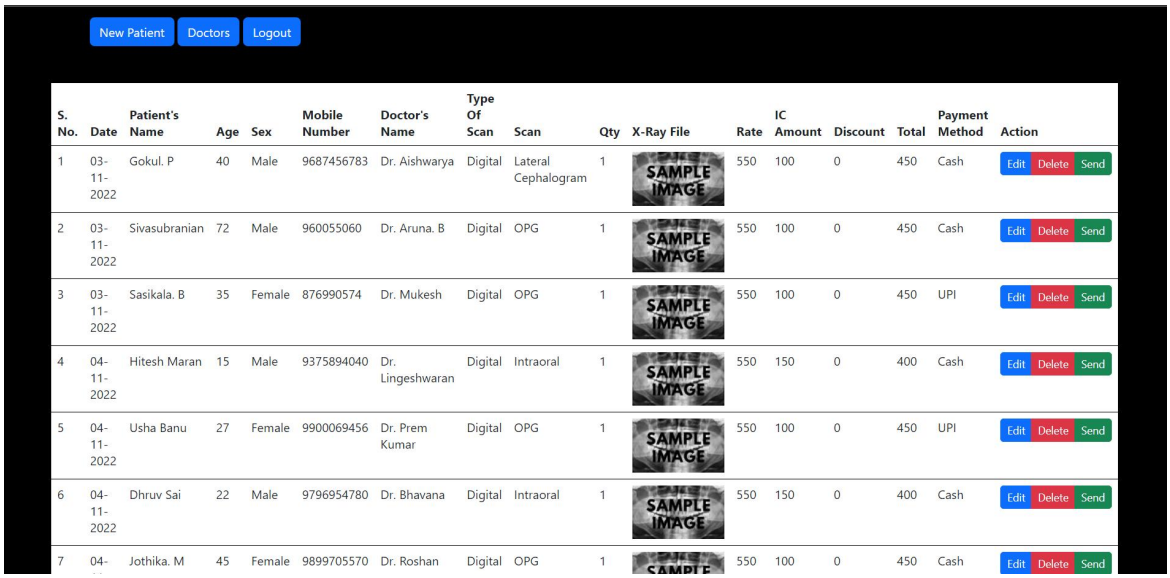


Figure 2 & 3: Result of transaction page

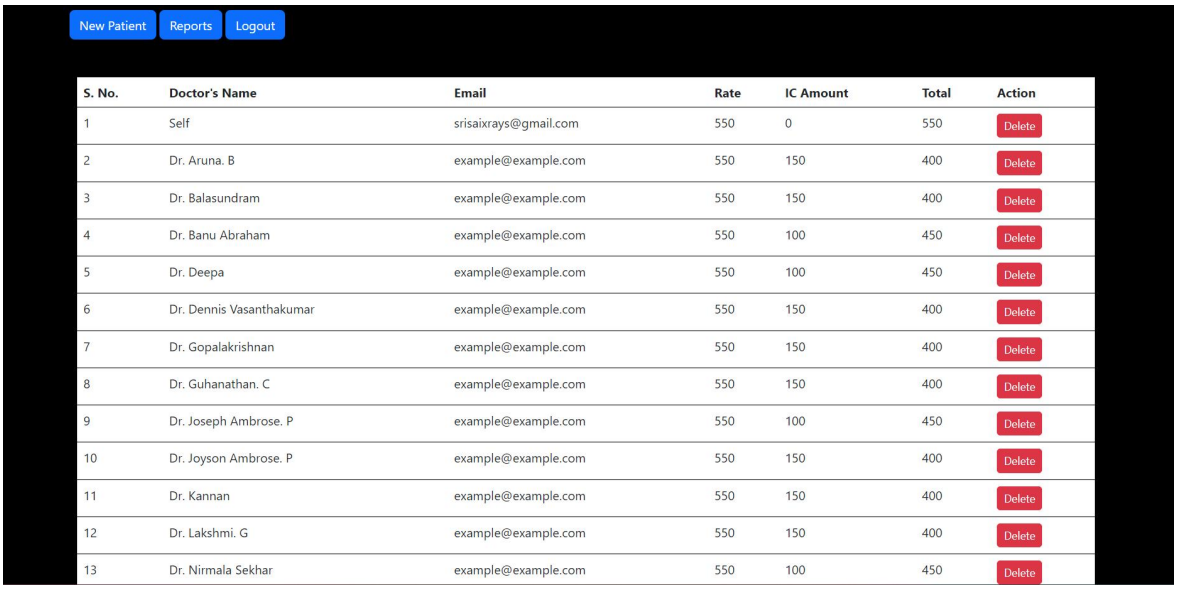
The transaction page is a crucial component of the web application, featuring text fields to input patient details such as name, age, sex, mobile number, doctor's name, type of scan, and scan. HTML and CSS are employed for structure and styling, while JavaScript dynamically generates auto-populated text fields for rate, IC amount, and total amount when a doctor's name is selected. This information is securely stored in the database and seamlessly displayed in the reports page, providing a comprehensive summary of patient transactions for easy access and reference.



S. No.	Date	Patient's Name	Age	Sex	Mobile Number	Doctor's Name	Type Of Scan	Scan	Qty	X-Ray File	Rate	IC Amount	Discount	Total	Payment Method	Action
1	03-11-2022	Gokul. P	40	Male	9687456783	Dr. Aishwarya	Digital	Lateral Cephalogram	1	SAMPLE IMAGE	550	100	0	450	Cash	Edit Delete Send
2	03-11-2022	Sivasubranian	72	Male	960055060	Dr. Aruna. B	Digital	OPG	1	SAMPLE IMAGE	550	100	0	450	Cash	Edit Delete Send
3	03-11-2022	Sasikala. B	35	Female	876990574	Dr. Mukesh	Digital	OPG	1	SAMPLE IMAGE	550	100	0	450	UPI	Edit Delete Send
4	04-11-2022	Hitesh Maran	15	Male	9375894040	Dr. Lingeshwaran	Digital	Intraoral	1	SAMPLE IMAGE	550	150	0	400	Cash	Edit Delete Send
5	04-11-2022	Usha Banu	27	Female	9900069456	Dr. Prem Kumar	Digital	OPG	1	SAMPLE IMAGE	550	100	0	450	UPI	Edit Delete Send
6	04-11-2022	Dhruv Sai	22	Male	9796954780	Dr. Bhavana	Digital	Intraoral	1	SAMPLE IMAGE	550	150	0	400	Cash	Edit Delete Send
7	04-	Jothika. M	45	Female	9899705570	Dr. Roshan	Digital	OPG	1	SAMPLE	550	100	0	450	Cash	Edit Delete Send

Figure 4: Result of reports page

Upon submission of the transaction page, PHP scripts retrieve the entered information and securely store it in the database. The reports page, developed with HTML, CSS, and PHP, dynamically fetches the stored data and displays it in a structured format. The edit button allows users to modify saved patient information, while the delete button removes the data from the database. The send button, coded using the PHPMailer library, facilitates the secure transmission of patient information via email to the corresponding dentist.



S. No.	Doctor's Name	Email	Rate	IC Amount	Total	Action
1	Self	srisaixrays@gmail.com	550	0	550	Delete
2	Dr. Aruna. B	example@example.com	550	150	400	Delete
3	Dr. Balasundram	example@example.com	550	150	400	Delete
4	Dr. Banu Abraham	example@example.com	550	100	450	Delete
5	Dr. Deepa	example@example.com	550	100	450	Delete
6	Dr. Dennis Vasanthakumar	example@example.com	550	150	400	Delete
7	Dr. Gopalakrishnan	example@example.com	550	150	400	Delete
8	Dr. Guhanathan. C	example@example.com	550	150	400	Delete
9	Dr. Joseph Ambrose. P	example@example.com	550	100	450	Delete
10	Dr. Joyson Ambrose. P	example@example.com	550	150	400	Delete
11	Dr. Kannan	example@example.com	550	150	400	Delete
12	Dr. Lakshmi. G	example@example.com	550	150	400	Delete
13	Dr. Nirmala Sekhar	example@example.com	550	100	450	Delete

Figure 5: Result of doctor's masters input

The doctor's input page serves as a centralized repository for storing vital details about doctors, including their email addresses, referral amounts, and rates. This information is instrumental in auto-populating relevant fields and enabling streamlined email communication. The data is securely stored in a PHPMyAdmin database, ensuring efficient data entry and retrieval. Additionally, the page features a delete button to remove doctor information when needed, maintaining data accuracy and integrity. The PHPMailer library facilitates seamless email communication within the system.

The Patient Digital Image Transaction System delivers several significant outcomes that greatly enhance the functionality and efficiency of the web application. By incorporating a login page created with HTML, CSS, and PHP, the system ensures secure access for authorized users, establishing a robust authentication process and protecting patient information. It also enables the storage of patient records in a database, ensuring their safekeeping and easy retrieval.

The transaction page, built with HTML and CSS facilitates seamless data entry for patient details. It provides intuitive text fields where dentists can input essential information such as the patient's name, age, sex, mobile number, doctor's name, type of scan, and upload digital x-rays. The system further streamlines the process by automatically populating text fields for rate, IC amount, and total amount when a doctor's name is selected. This automation improves efficiency and accuracy in calculating payment amounts.

All the gathered patient information is securely stored in the database, allowing for easy access and retrieval whenever necessary. The organized database management ensures that patient records are efficiently managed, updated, and accessed by authorized users, contributing to streamlined workflows and improved data management.

The reports page, developed with HTML, CSS, and PHP, empowers users with the ability to edit and delete patient information stored in the database. This functionality allows for the customization and updating of patient records as needed, ensuring accurate and up-to-date information is available.
Moreover, the integration of the PHPMailer library enhances communication and collaboration between dental professionals. This feature enables the system to send specific patient information to the corresponding dentist via email with just a simple click of a button. By leveraging the stored doctor's email address, referral amount, and rate, the system automates the email composition and ensures timely and accurate communication, strengthening the connection between dental professionals.

Overall, the Patient Digital Image Transactional System offers several key outcomes. It allows for secure storage and easy access to patient information, streamlines data entry and transactional processes, improves data

management and organization, enables efficient report generation and editing, and enhances communication with dentists through automated email functionality. These features collectively contribute to a more efficient, streamlined, and effective web application, promoting optimal patient care and facilitating seamless communication within the dental practice.

APPENDIX-2: SCREENSHOTS

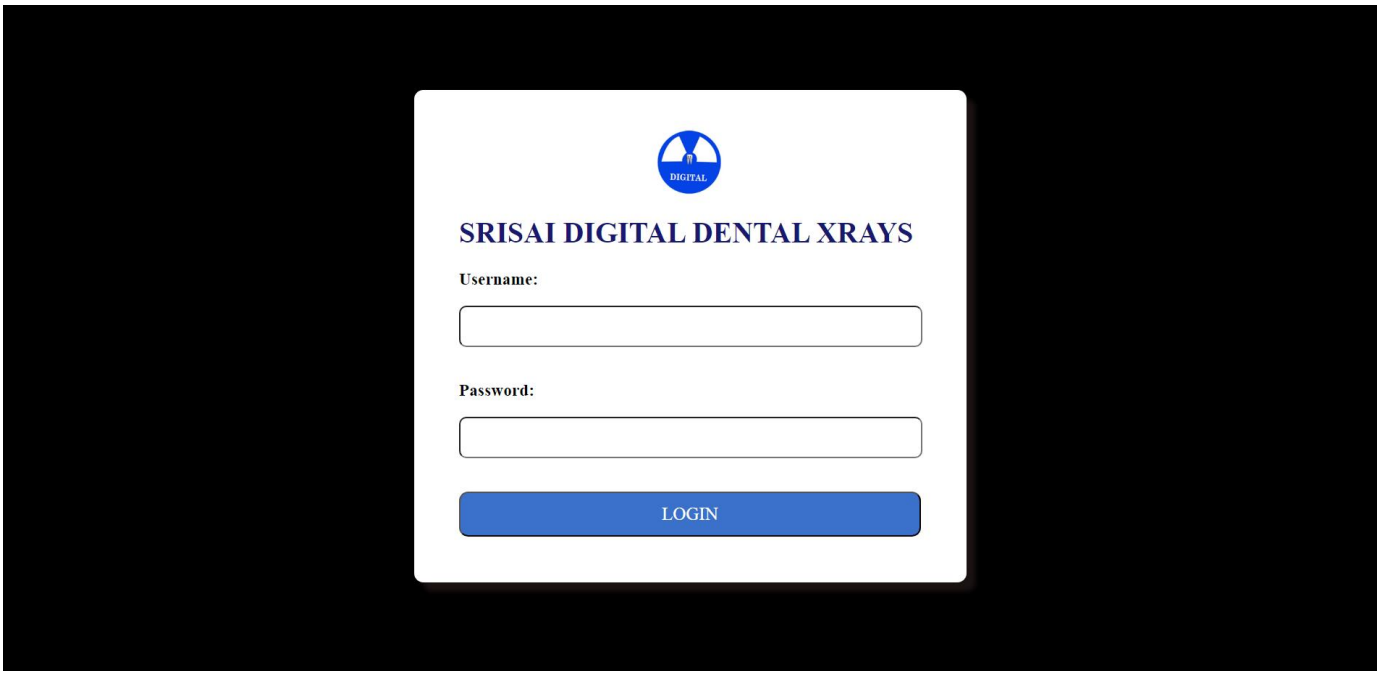


Figure 6: Login form

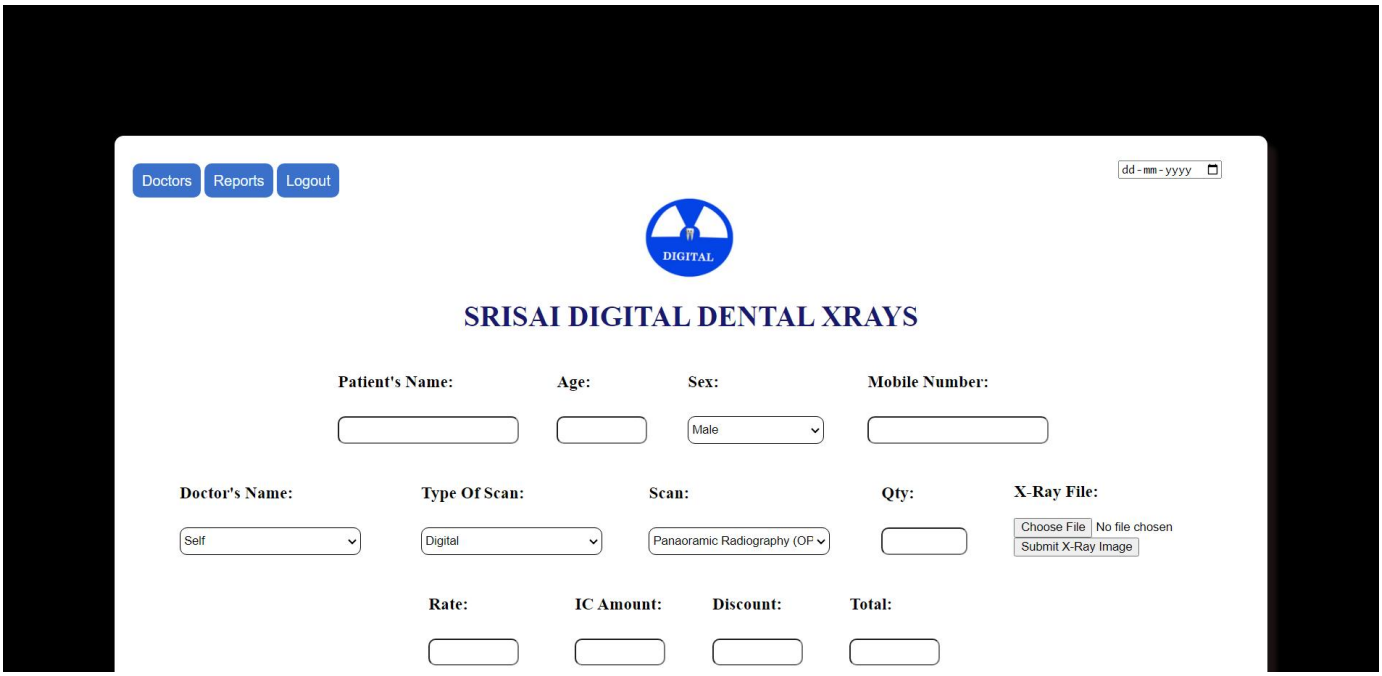


Figure 7: Transaction page

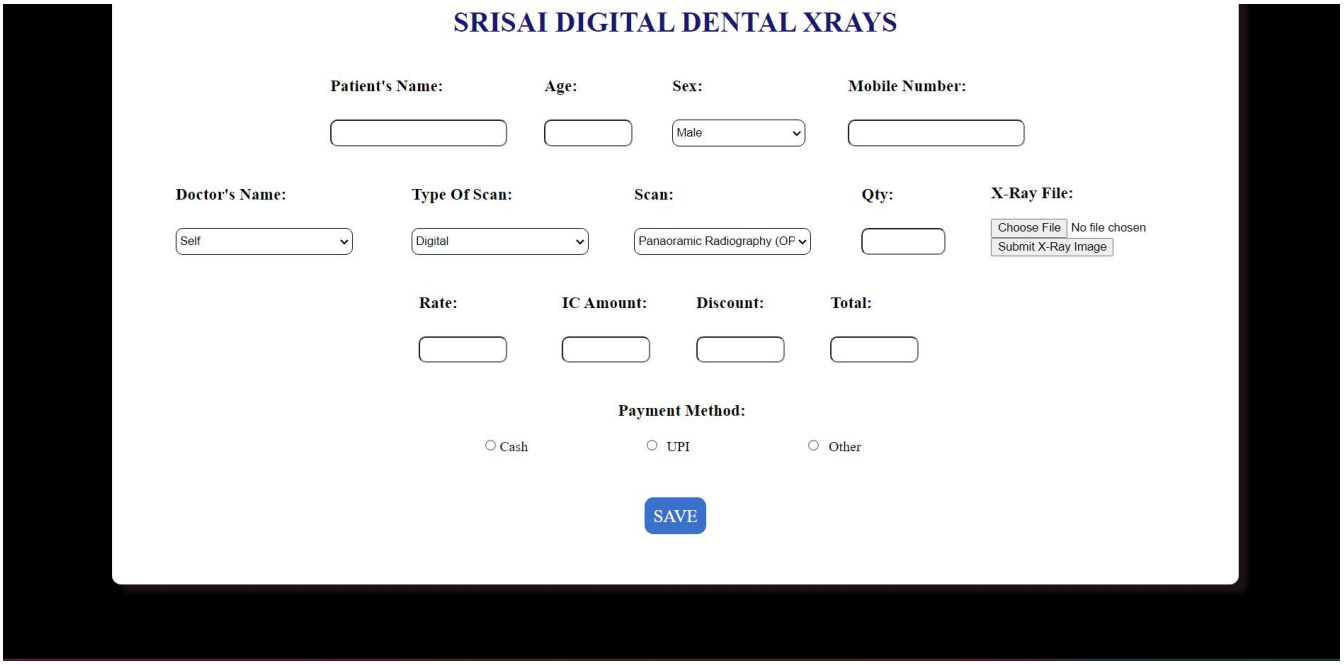
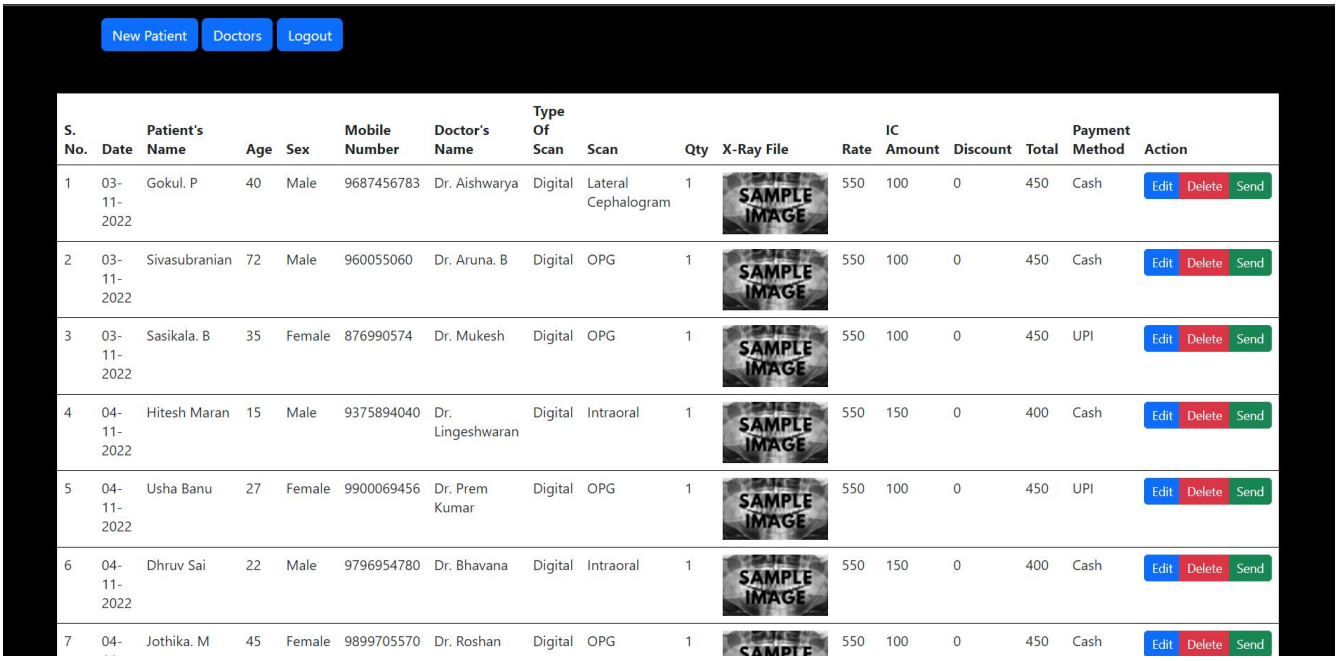


Figure 7 & 8: Transaction page



S. No.	Date	Patient's Name	Age	Sex	Mobile Number	Doctor's Name	Type Of Scan	Scan	Qty	X-Ray File	Rate	IC Amount	Discount	Total	Payment Method	Action
1	03-11-2022	Gokul. P	40	Male	9687456783	Dr. Aishwarya	Digital	Lateral Cephalogram	1	SAMPLE IMAGE	550	100	0	450	Cash	Edit Delete Send
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7	04-	Jothika. M	45	Female	9899705570	Dr. Roshan	Digital	OPG	1	SAMPLE	550	100	0	450	Cash	Edit Delete Send

Figure 9: Reports page

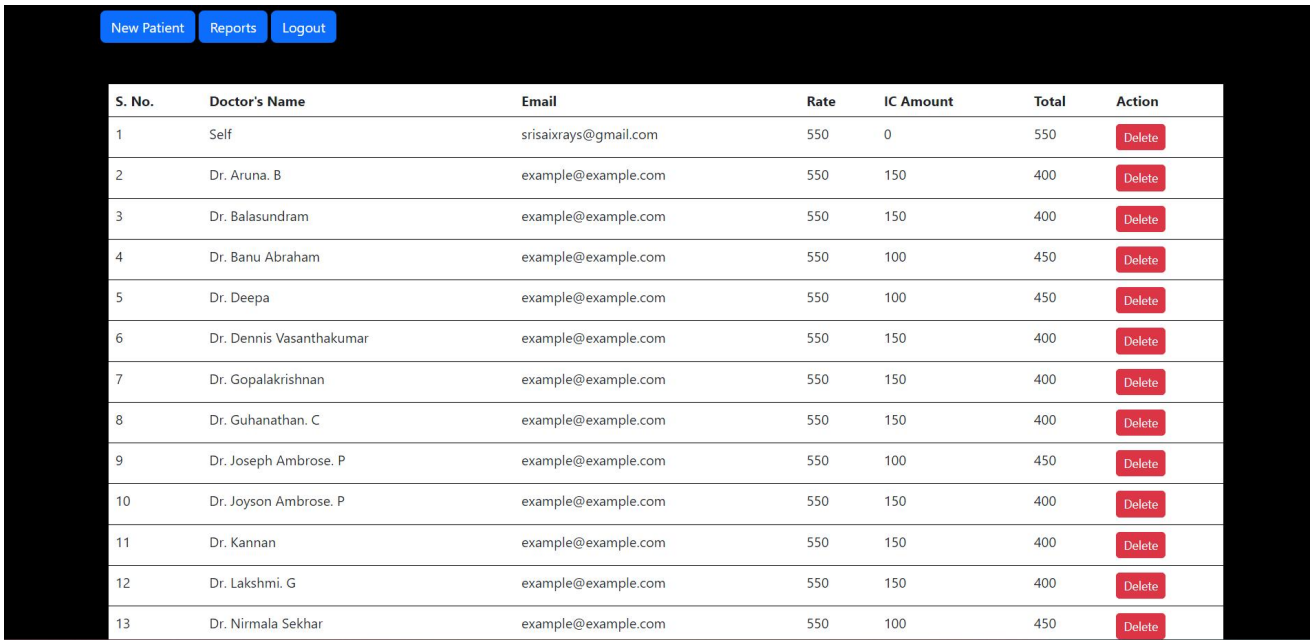

Figure 10: Doctor's masters input page

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OFFER LETTER

SRI SAI DIGITAL DENTAL X-RAYS

(ADVANCED DENTAL DIGITAL OPG AND CEPHALOMETRY)
314, 1st Floor, Aminjikarai, Poonamallee High Road
Chennai – 600029. Ph: 044-26640053, 9840710633
URL: www.srisaidigital.com ; Email : srisaidentalxrays@gmail.com

Daily - 10:00 a.m to 8:00 p.m SUNDAY – By Appointment

Ref : 1084

May 04, 2023

K. Sushmitha
Dear Sushmitha,

It was a great pleasure interacting with you regarding web development assignment for patient digital image transaction system. We refer to our discussions with you and are pleased to offer you to work with us as **Assistant developer as part of Student internship program in Sri Sai Digital Dental Xrays from 08th May 2023 to 15th Jul 2023.** Your place of posting will be at Chennai.

You will be paid compensation based on your performance at the end of your internship program. The compensation may vary, depending on management decision and your performance.

We request you to join us on or before **08th May, 2023**. At the time of joining, please submit the following documents:

- Original Bonafide Certificate from your Institution.
- Photocopy of your Aadhar Card.
- Two-passport size color photographs
- Permanent Account Number (PAN) along with the original card
- Duly signed acknowledged copy of the offer letter

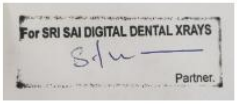
Please note:

• This appointment is subject to satisfactory professional reference checks with your institution.
• This offer from Sri Sai Digital Dental Xrays is valid for 15 days only from the date of offer.

We welcome you and look forward to a mutually rewarding association.

Thanking you.

Yours sincerely,



CERTIFICATE OF COMPLETION