Design & Implementation of Dental Crown Provider System

by

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Supervised by
Sabrina Tasnim

Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SONARGAON UNIVERSITY (SU)
January 2025

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APPROVAL

The project titled "**Design & Implementation of Dental Crown Provider System**" submitted by Md. Golap Rabbani (CSE2002020059), Arif Ahmed (CSE2102023022), Md. Masud Rana (CSE2102023102), Md. Amanot Islam (CSE2102023108) to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

Board of Examiners

Supervisor

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Assistant Professor
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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Sabrina Tasnim,** Assistant Professor, Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this Project has been or is being submitted elsewhere for the award of any degree or diploma.

Countersigned

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ABSTRACT

The Dental Crown Manufacturer Website Project Report presents a comprehensive analysis of the design, development, and launch of a website for a dental crown manufacturer. This project aimed to create a user-friendly and informative online platform to enhance the provider's digital presence. In an increasingly digital world, a website is the primary point of contact between the provider and dentist. In this system, Dentists can place orders for dental crowns with precise specifications, including material, size, and patient information. Dental crown providers have access to order details submitted by doctors. Also, providers can efficiently manage their workforce through an integrated employee management system. It is not only a source of information but also a platform for communication and interaction. the design is written in PHP, JavaScript , jQuery, HTML Bootstrap, and CSS. Users will have the freedom to log in from any place with an internet connection. After that, they will be able to perform various tasks that are designed for them. Users are categorized into three groups: (Management, Doctor, and Patient).

ACKNOWLEDGEMENT

At the very beginning, we would like to express our deepest gratitude to the Almighty Allah for giving us the ability and the strength to finish the task successfully within the schedule time.

We would then like to thank our supervisor, **Sabrina Tasnim** for introducing us to the amazingly interesting world of provide expert guidance, and valuable insights. And she is the person who taught us how to perform project work efficiently. Without she and her continuous supervision, guidance and valuable advice, it would have been impossible for us to come at this point and have some output from the project. We are especially grateful to Ma'am for allowing us greater freedom in choosing the problems to work on, for his encouragement at times of disappointment.

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We would like to express our gratitude to all our teachers. Their motivation and encouragement in addition to the education they provided meant a lot to us.

Last but not the least, we would like to thank our family, our parents, for their encouragement, endless love and for supporting us spiritually throughout our lives.

LIST OF ABBREVIATIONS

CSS	Cascading Style Sheets
HTML	Hyper Text Markup Language
JS	JavaScript
MySQL	My Structured Query Language
PHP	Hypertext Preprocessor
XAMPP	XAMPP is a free, open-source software package that allows users to create a local web server environment for testing and developing web applications.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The field of dentistry has witnessed significant advancements in recent years, driven by technology and an ever-increasing demand for improved patient care. One crucial aspect of dental practice involves the collection of dental crowns (caps), which are essential in restoring oral health and aesthetics for patients. However, the traditional process of ordering and manufacturing dental crowns often has challenges, including inefficiencies and communication gaps between dental Doctors and dental crown providers. In response to these challenges, our project introduces a groundbreaking web-based solution designed to streamline and enhance the dental crown collection process. This platform serves as a digital bridge connecting Doctors and dental crown providers, with the latter assuming an administrative role within the system. The platform offers a range of features useful to meet the unique needs of both parties.

1.2 Problem Statement

In the field of dentistry, the collection of dental crowns (caps) suffers by a series of operational challenges that efficiency communication, and overall service quality. The traditional process of ordering dental crowns, which involves dental doctors and dental crown providers. Traditional methods of ordering dental crowns often involve paper-based forms or outdated electronic systems that may not be user-friendly for dental practitioners (Doctor). Doctors may find it time-consuming and in error to fill out detailed order forms manually, which can lead to delays in submitting orders. Difficulty in specifying specific requirements for dental crowns can result in incorrect or suboptimal orders, and further delays. Traditional processes lack efficient channels for real-time communication between Doctor's and dental crown providers. Misunderstandings and misinterpretations of order details can occur due to limited communication, leading to errors in crown specifications. The need for back-and-forth communication to clarify details and make revisions can extend the time it takes to fulfill an order and may lead to frustration for both parties. Dental crown providers often have limited. visibility into the complete order details submitted by Doctor's. Incomplete or unclear information can make it challenging for providers to produce dental crowns that precisely meet the Dr's requirements. Lack of transparency can result in suboptimal crown quality, potentially requiring rework or adjustments. Both Doctor's and dental crown providers must allocate significant time and resources to manage the administrative aspects of the procurement process. Administrative tasks, such as documentation, order tracking, and communication, can be resource-intensive and detract from core dental practice and crown manufacturing activities. This administrative overhead can hinder operational efficiency and reduce the overall capacity of dental practices and crown manufacturing facilities.

1.3 Problem Background

The dental profession is at the intersection of medical science and patient aesthetics, with an ever-increasing demand for high-quality dental crowns (caps) to restore dental health and enhance smiles. Dental crowns play an important role in dental procedures, From cavity restoration to cosmetic dentistry. However, the conventional process of procuring dental crowns has often been plagued by inefficiencies, miscommunication, and time-consuming administrative tasks.

Traditionally, dental Doctors would place orders for dental crowns through a Difficult process that involved multiple mediators and manual documentation. This process was not only time-consuming but also miscommunication. Dental crown providers, who are responsible for crafting these crowns, faced challenges in accurately explanation the Doctor's requirements due to the limited information available in the ordering process.

The need for a more efficient and transparent system became evident as the dental industry evolved, with dentists increasingly seeking streamlined solutions to enhance patient care and reduce overhead. In response to these challenges, our project aimed to bridge this gap by introducing an advanced web-based platform. This platform not only simplifies the order placement process for Doctors but also grants dental crown providers administrative access to order information, ensuring specific crown production.

1.4 Motivation

The dental field is dedicated to providing patients with the highest quality care. However, the traditional dental crown procurement process was fraught with inefficiencies, leading to extended treatment times and potential complications. Motivated by a desire to improve patient care and reduce treatment durations, we embarked on this project to streamline the process. Effective communication is fundamental in dentistry, as precision and accuracy are paramount. Recognizing the significant communication gaps in the conventional ordering process, our motivation was to bridge these gaps, allowing dental practitioners and crown providers to interact seamlessly. This would lead to fewer misunderstandings and ultimately improve the quality of dental crown restorations.

1.5 Conclusion

The field of dentistry has witnessed significant advancements in recent years, driven by technology and an ever-increasing demand for improved patient care. One crucial aspect of dental practice involves the collection of dental crowns (caps), which are essential in restoring oral health and aesthetics for patients. However, the traditional process of ordering and manufacturing dental crowns often has challenges, including inefficiencies and communication gaps between dental Doctors and dental crown providers. In response to these challenges, our project introduces a groundbreaking web-based solution designed to streamline and enhance the dental crown collection process.

CHAPTER 2

BACKGROUND STUDY

2.1 Introduction

The field of dentistry stands at the intersection of healthcare and aesthetics, where precision and patient satisfaction are paramount. Dental crowns, commonly known as "caps," serve as fundamental components in dental procedures, offering both functional and cosmetic benefits. However, the conventional process of procuring dental crowns has long been plagued by operational challenges, inefficiencies, and communication bottlenecks. Dental practitioners (referred to as "Dr") typically initiated the process by placing orders for dental crowns. This conventional approach relied on manual paperwork, often complex documentation, and a lack of user-friendly interfaces. These hurdles contributed to delayed order submissions and the potential for errors in specifying critical crown details. Central to the challenge was the limited communication between Drs and dental crown providers. These providers, tasked with crafting precision dental crowns, lacked real-time communication channels and comprehensive order information. This gap hindered their ability to accurately interpret the specific requirements of each order, introducing the possibility of suboptimal crown quality and patient dissatisfaction.The administrative overhead associated with order management and documentation further compounded the inefficiencies in the traditional process. This overhead consumed valuable time and resources that could have been redirected towards patient care and the efficient production of dental crowns.

2.2 Literature Review

Dental crowns, and tooth-shaped caps are used by dentists to restore weakened, broken, or decayed teeth. Dental crowns serve various purposes, including strengthening weak teeth, protecting and supporting cracked or worn-down teeth, holding dental bridges in place, covering stained or discolored teeth, concealing root canal-treated teeth, and securing dental implants [1]. These crowns can be crafted from different materials, including metal, porcelain-fused-to-metal (PFM), pressed ceramic, all-ceramic or porcelain, and resin. Each type has its advantages and drawbacks, with considerations such as durability, aesthetics, and cost influencing the choice of crown material. Additionally, technological advancements, such as CAD/CAM technology, allow for the creation of same-day dental crowns, offering convenience but with suitability varying by individual patient needs. All-resin crowns, while cost-effective, are generally more fragile and suitable for temporary use. Overall, the selection of a dental crown type depends on the patient's unique oral health requirements and personal preferences[2]. It explores various types of dental crowns, highlighting their materials, suitability for different teeth, and aesthetic considerations. All-porcelain crowns, especially zirconia and glass ceramic variants, offer natural-looking results with improved durability, making them popular choices for both anterior and posterior teeth [3]. Hybrid ceramic crowns, combining ceramic and composite materials, provide aesthetic and functional benefits suitable for minimally invasive restorations. Resin crowns serve as temporary solutions, while PFM crowns, with a metal base, have limitations compared to

contemporary options like zirconia crowns. Full metal crowns, like Golden or Palladium crowns, offer durability and functionality without ceramic components, catering to individual preferences and needs [4].The dental specialist's recommendation plays a crucial role in achieving precise and effective treatment outcomes for patients seeking dental crown treatments [5]. Dental crowns as an effective solution for protecting and restoring damaged teeth, commonly recommended by cosmetic dentists in Brooklyn. Dental crowns are utilized for addressing issues such as substantial chips, extensive decay, post-root canal protection, implant coverage, and bridge support[6]. These crowns play a vital role in restoring proper dental function, enabling normal biting, chewing, and speech while preserving a healthy and attractive smile. They provide comprehensive protection to the underlying tooth structure by covering it completely below the gum line, preventing bacterial intrusion, and restoring its natural shape and size. Dental crown procedures typically involve two visits: preparation and fitting. The cost of dental crowns varies based on the type selected, including options like gold, porcelain, zirconia, porcelain-fused-to-metal, eMax, and BruxZir crowns. Gold crowns, while more expensive, offer exceptional durability, making them suitable for heavy biting forces. Porcelain and metal caps are more cost-effective alternatives[7]. Ultimately, the choice of dental crown type is tailored to individual needs and preferences, ensuring optimal treatment outcomes at Envy Smile Dental Spa in Brooklyn

2.3 Problem Analysis

The dental industry, at the nexus of healthcare and aesthetics, faces a critical issue: the procurement of dental crowns (commonly referred to as "caps") is beset by a series of operational challenges, inefficiencies, and communication bottlenecks. The conventional process of ordering dental crowns has long been a source of frustration for dental practitioners (referred to as "Dr") and dental crown providers alike. The background of this project is rooted in a thorough problem analysis, highlighting the operational challenges within the traditional dental crown procurement process, the communication gaps, the administrative overhead, and the pressing need for a transformative solution. This analysis sets the stage for understanding the context, significance, and goals of our project.

2.4 Summary

The dental industry faces significant challenges in the procurement of dental crowns. The conventional process involves manual paperwork and lacks user-friendly interfaces, leading to delays and potential errors in crown specifications. Communication gaps between dental practitioners (Drs) and crown providers hinder precise order interpretation, potentially compromising crown quality. Additionally, administrative overhead consumes valuable time and resources. Recognizing these issues, our project seeks to modernize this process. Leveraging digital technology, we aim to create a web-based platform that simplifies order placement, provides comprehensive order information to crown providers, and fosters efficient collaboration.

CHAPTER 3

PROPOSED MODEL

3.1 Introduction

The proposed system introduces a user-friendly web-based platform that serves dental practitioners and crown providers. It streamlines dental crown procurement, enables seamless communication, and enhances patient care. Additionally, it empowers dental practitioners to manage patient information and prescription generation while facilitating efficient administrative tasks for dental crown providers. This digital solution aligns with the broader trend of healthcare digitization, aiming to revolutionize dental operations for improved efficiency and patient satisfaction.

3.2 Methodology

Our methodology for implementing the proposed system, breaks down large tasks into smaller pieces and an iterative approach to ensure functionality, reliability, and user-friendliness. The goal of Agile is to maintain a working style that allows for quick pivots to strategy. Should your team need to shift gears for any reason, your team can shift towards a different strategy, hence the name "Agile [7].



Figure-3.1: Agile Model

3.3 Use case Diagram

Use-case diagrams describe the high-level functions and scope of a system. These diagrams also identify the interactions between the system and its actors. The use cases and actors in use-case diagrams describe what the system does and how the actors use it, but not how the system operates internally.

Use case diagrams are typically developed in the early stage of development and people often apply use case modeling for the following purposes:

- Specify the context of a system
- Capture the requirements of a system.

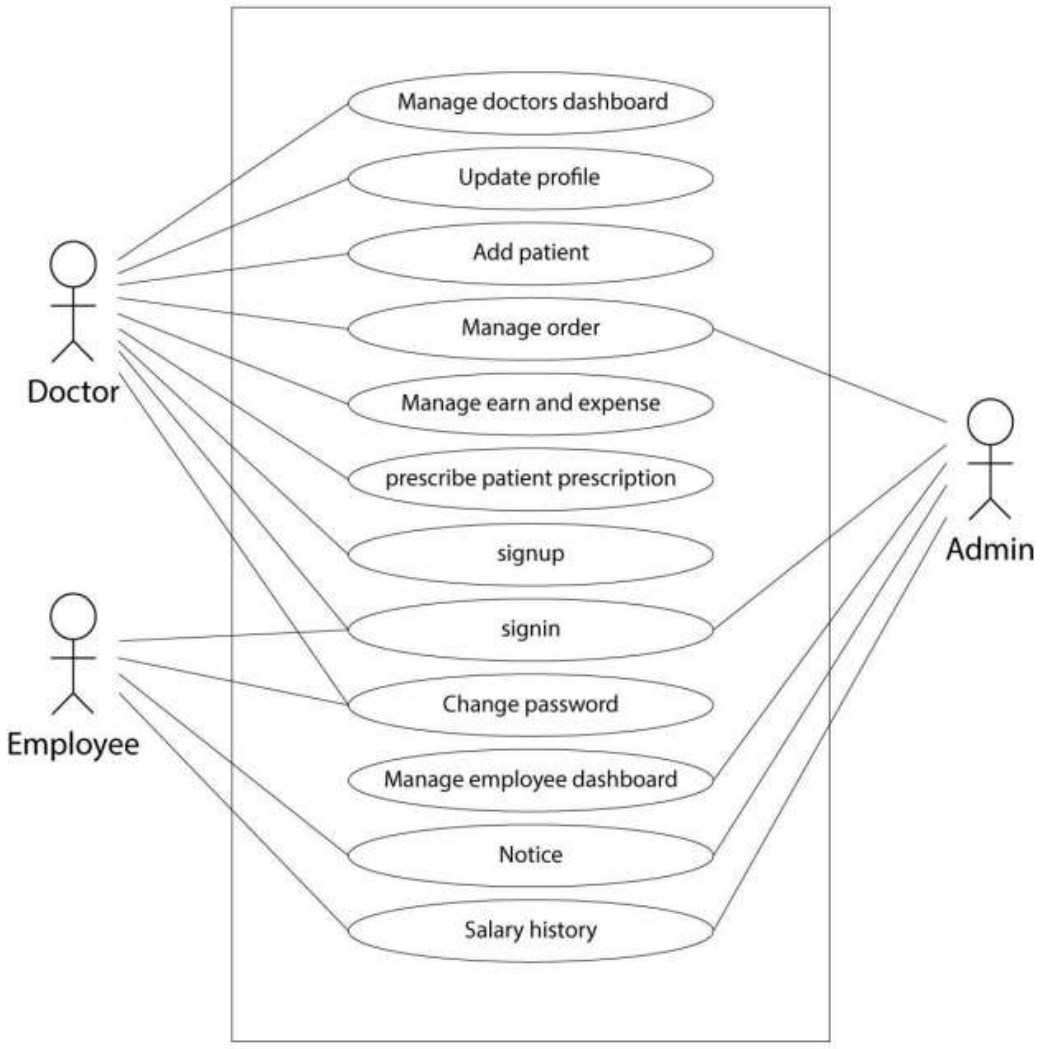


Figure-3.2: Use case Diagram

3.4 ER Diagram

An Entity-Relationship (ER) diagram is a visual representation of the entities (such as objects, people, and concepts) within a system or database and the relationships between them. It is a powerful tool used in database design and modeling to depict the structure and organization of data.

In an ER diagram, entities are represented as rectangles, and relationships between them are depicted as lines connecting these rectangles. The diagram typically includes attributes or properties associated with each entity, further defining their characteristics.

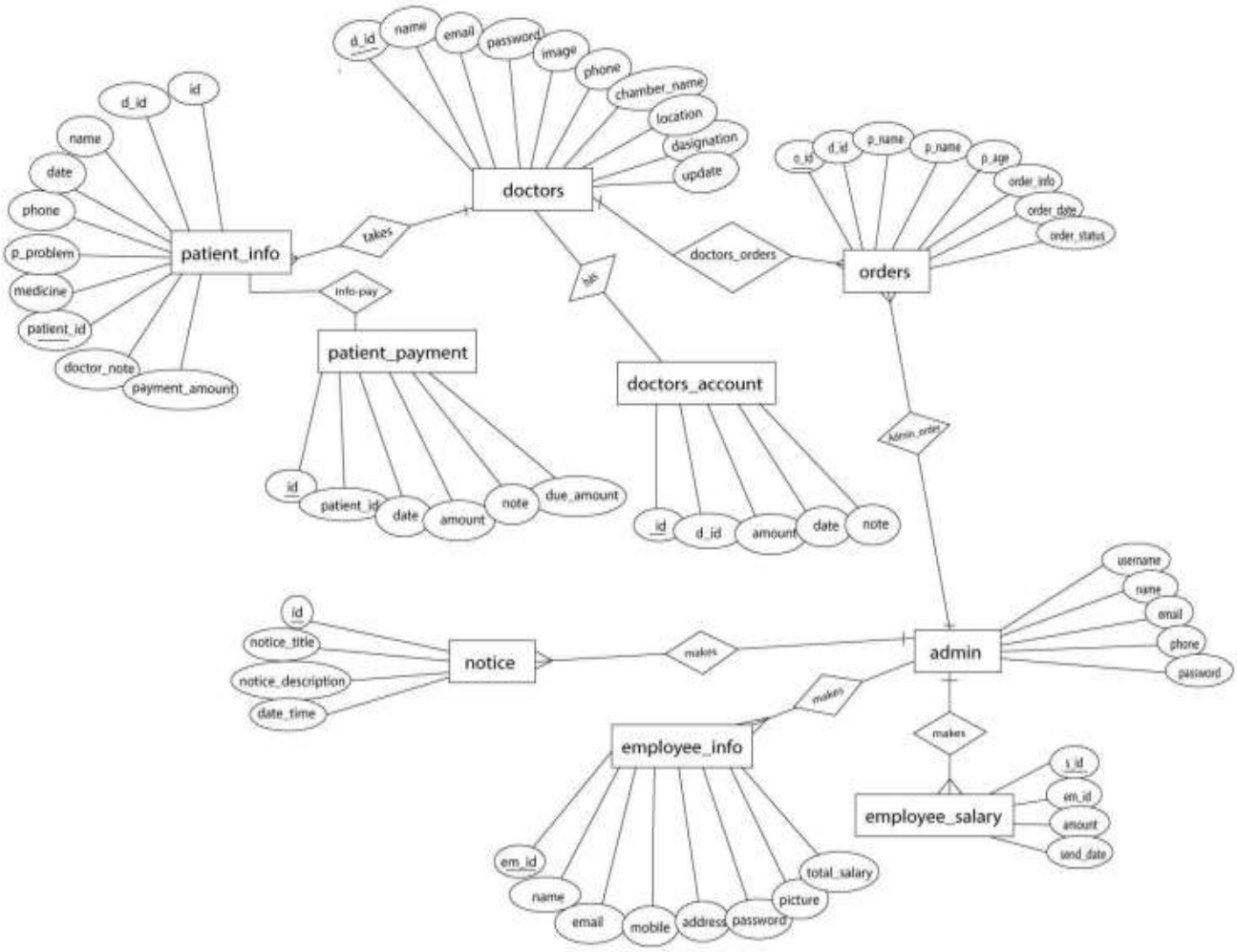


Figure 3.3: ER Diagram

3.5 Data Flow Diagram

A Data Flow Diagram (DFD) is a visual representation used to depict the flow of data within as sytem or process. It is a powerful tool in systems analysis and design, particularly in the context of software development and business process modeling.

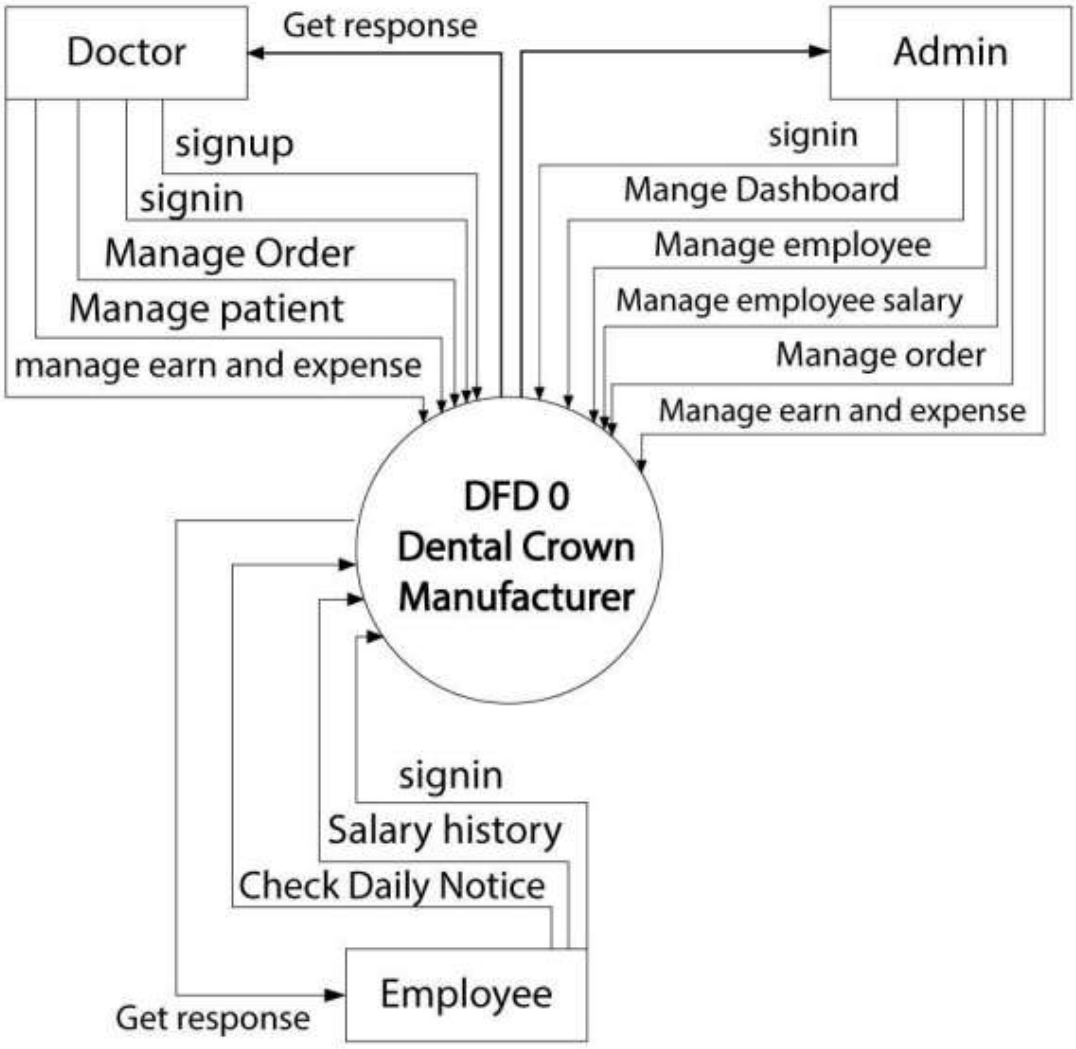


Figure-3.4: Data Flow Diagram Level 0

3.7 Login Activity

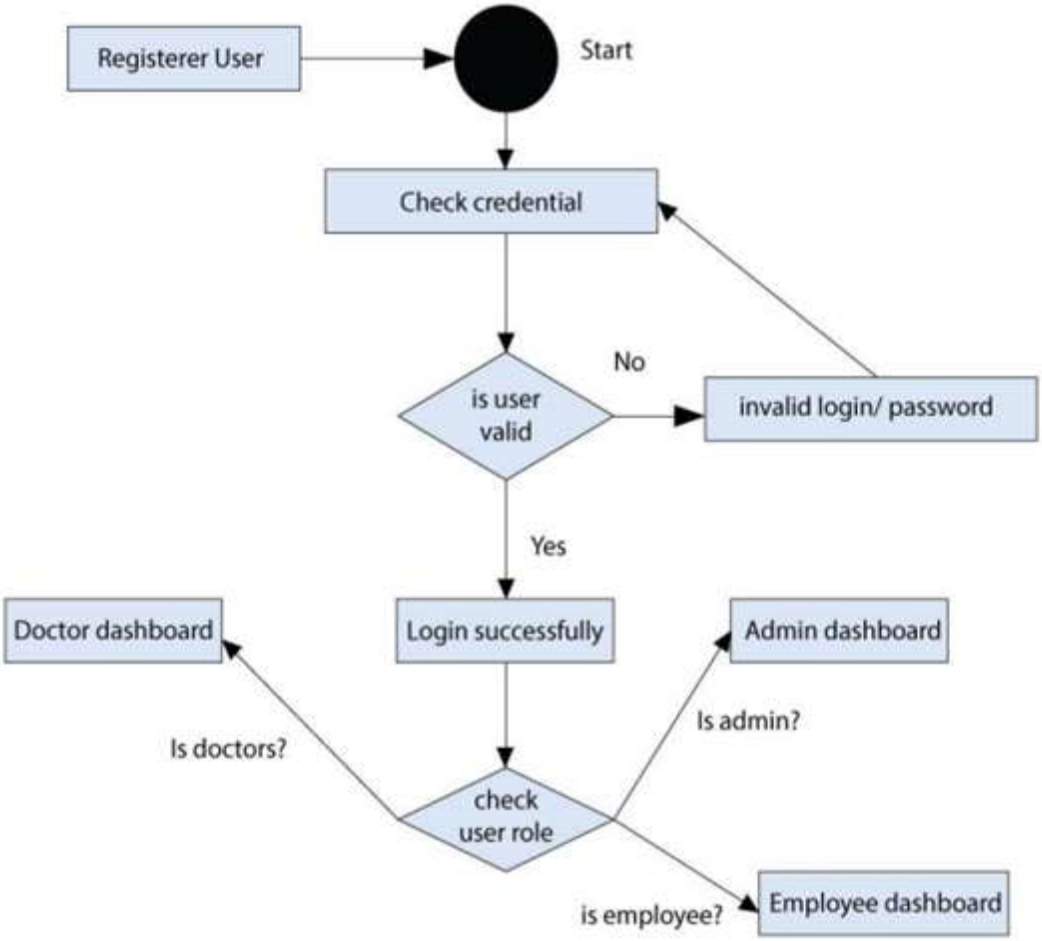


Figure 3.5: Login Activity

3.8 Requirement Analysis

To conduct the proposed architecture of the overall requirements, include,

✓ Sign In

✓ Manage Dashboard

✓ Registration

✓ Manage Employees

✓ Manage Orders

✓ Manage Earn & Spend

✓ Manage Patient

✓ Salary History

✓ Send Salary

✓ All Employee

✓ Add Employee

✓ Check Daily Notice

✓ Change Password

✓ Prescribe Patient Prescription

✓ Patient Bill Management

✓ Order History

✓ Logout

3.9 UI Design

User interface (UI) design is likely the first thing you encounter when you use an application or visit a website. User interface design is responsible for a product's appearance, interactivity, usability, behavior, and overall feel. Some examples of DCM UI design are below:

3.10 Home Page UI

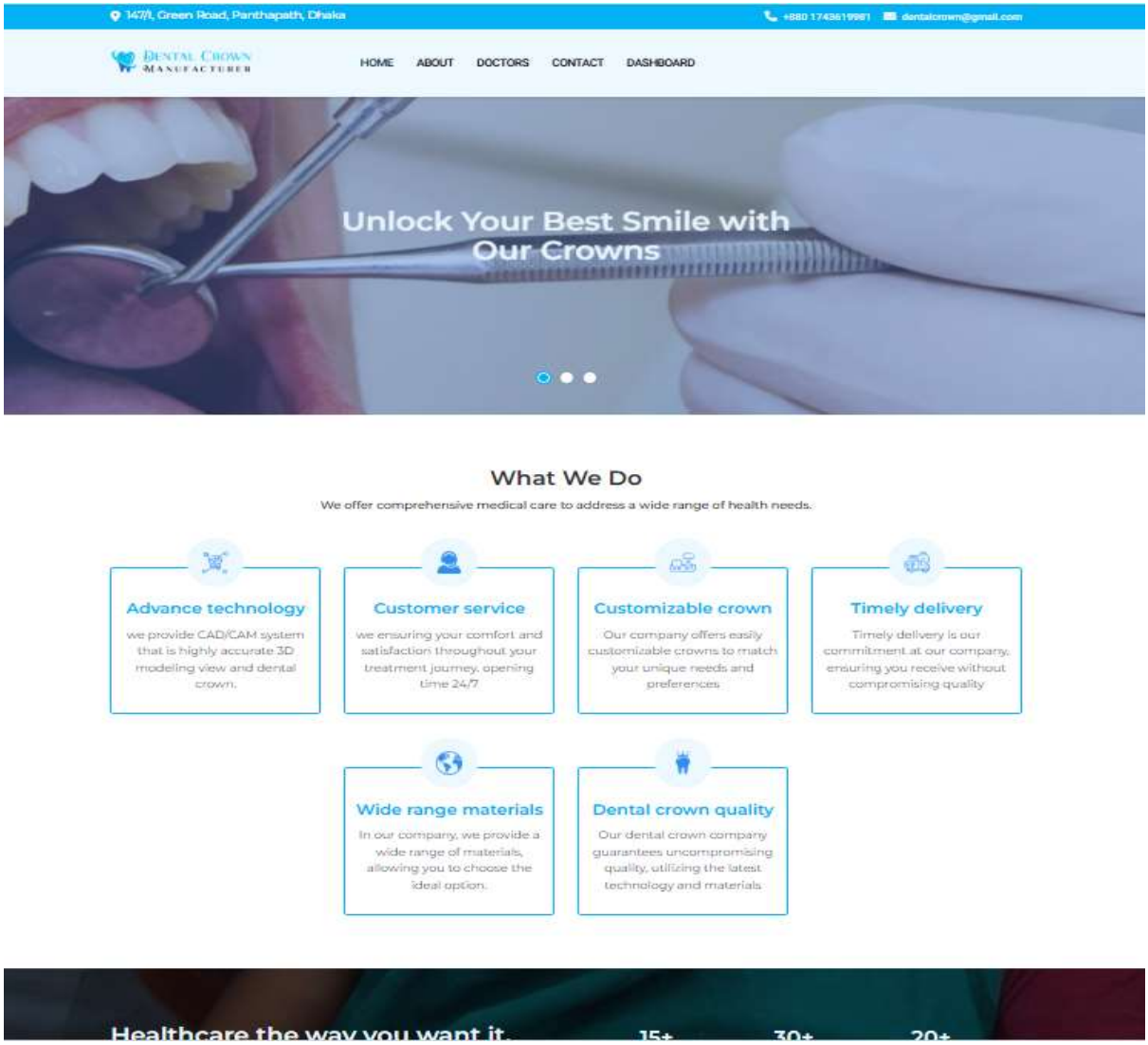


Figure-3.6: Home page

3.11 Dentist Dashboard

This is the dentist Dashboard page. On these pages dentist can update his profile, View notices from the admin, can order dental crowns, add new patients, manage all patients, manage patient payments, can estimate income and expense history.

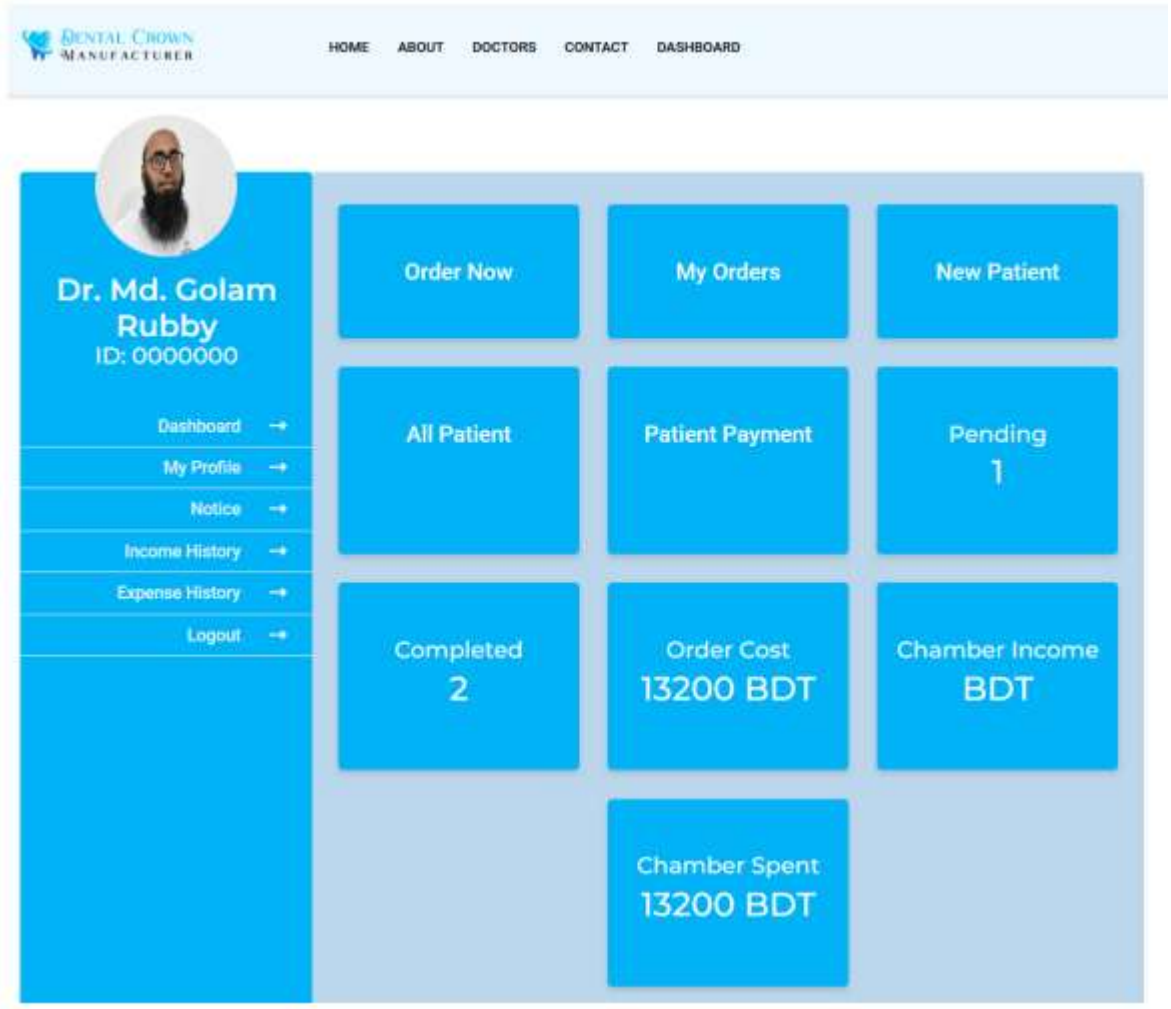


Figure-3.7: Doctor dashboard

3.12 Dentist Profile Edit Page

In these pages Dentist can update and edit his profile. They also set the chamber name and chamber location.

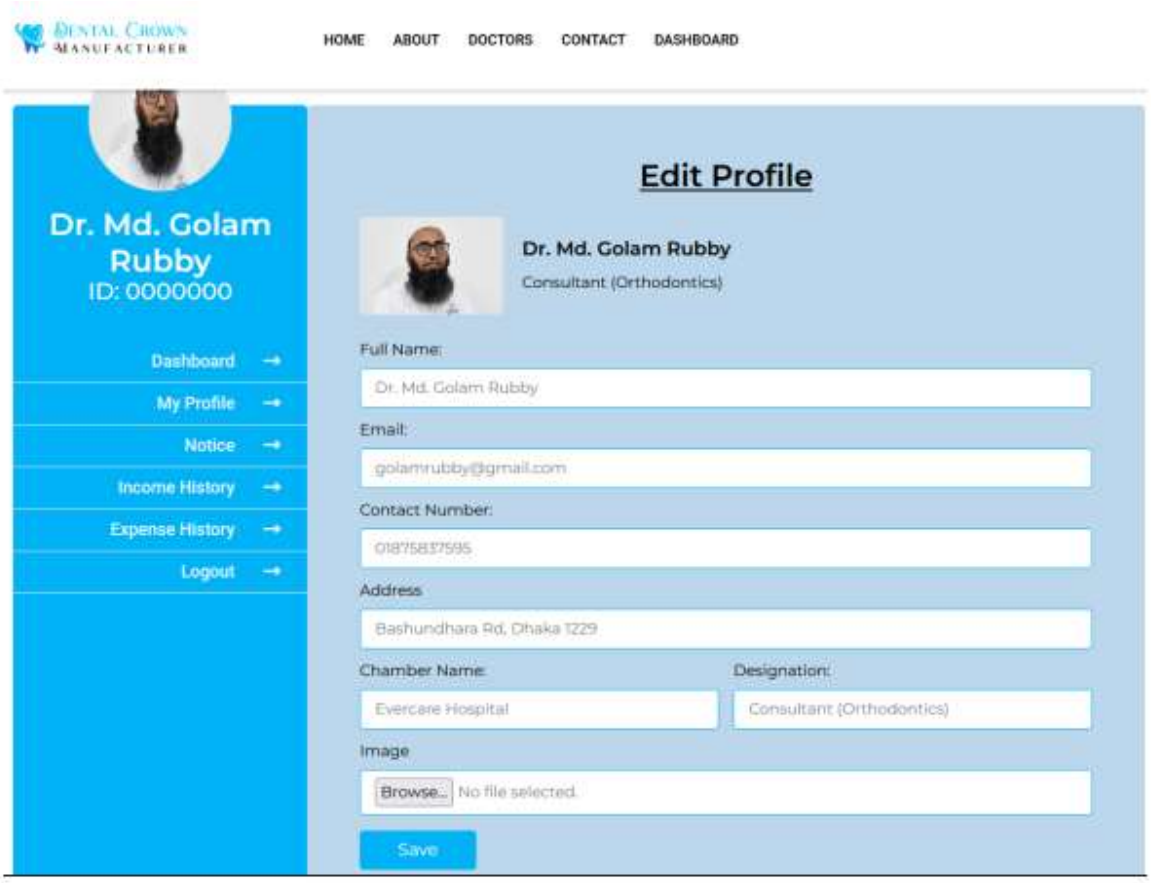


Figure-3.8: Doctors Profile Edit Page

3.13 Crown Order page

This is crown order page. From this page dentist can order crown from crown manufacturer. For order crown dentist must fill patient name, patient age, teeth color, expected date, teeth quality, teeth position.

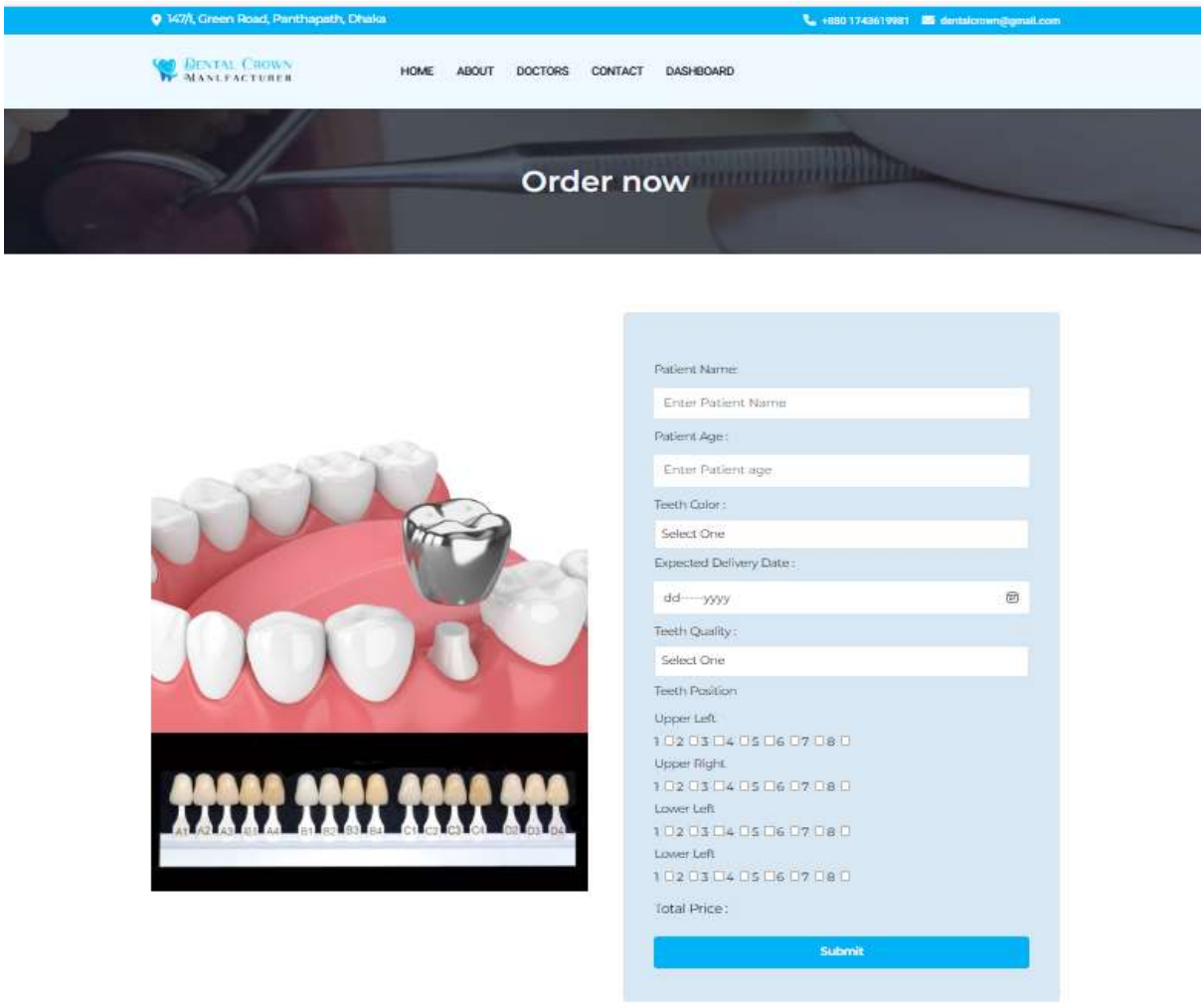


Figure-3.9: Crown Order Page

3.14 Patient Add page

This is new patient add page for dentist. Dentist can save patient information from using this page. Dentist can also save patient payment amount and manage patient amount from this page.

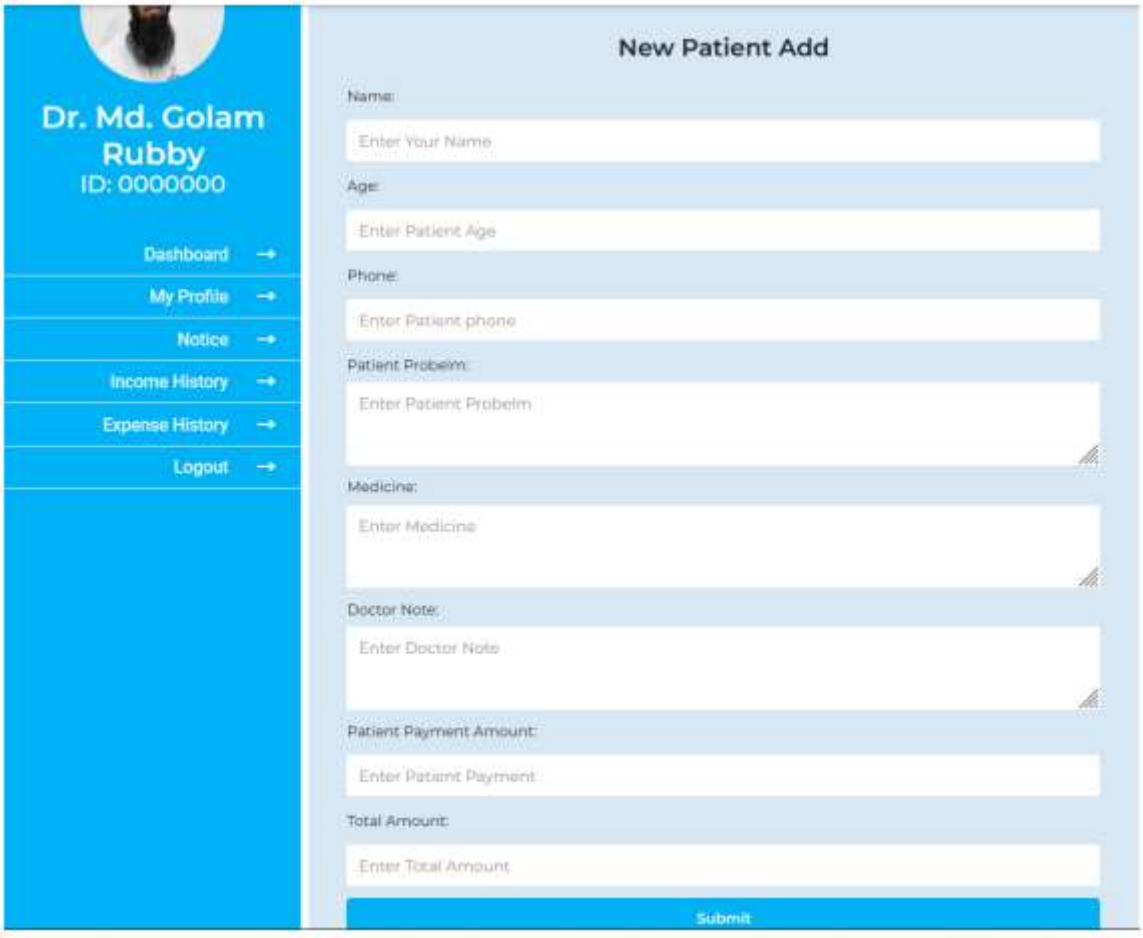


Figure-3.10: Patient add page

3.15 Patient Manage Page

Dentist can see patient information, and payment amount from this page. Dentist can also edit patient information using this page.

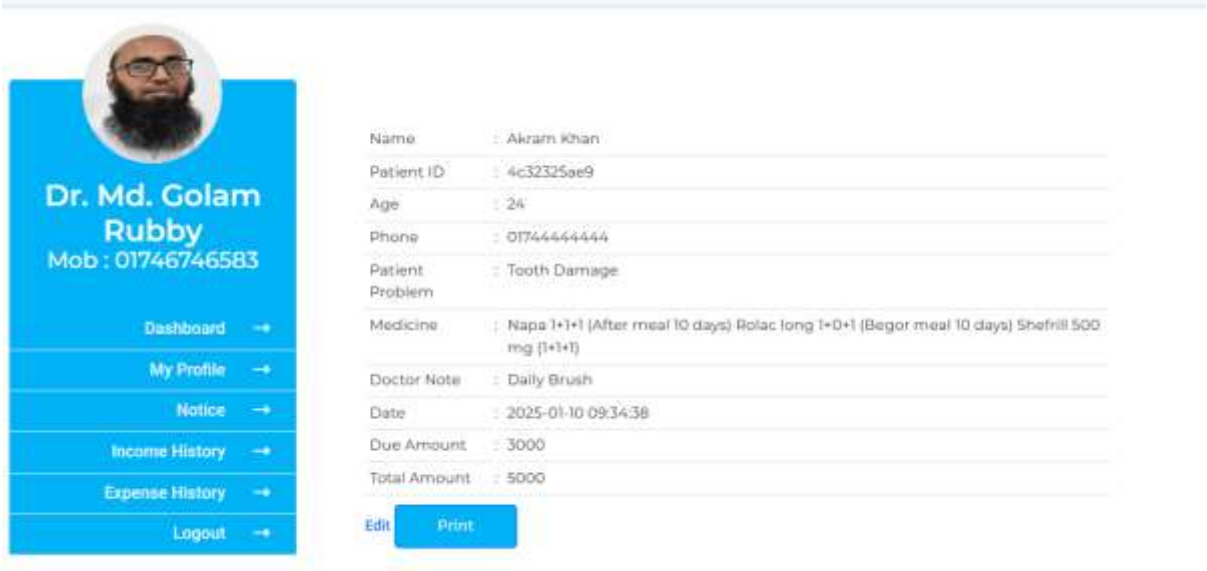


Figure-3.11: Patient Manage page

3.16 Patient Payment History page

Dentist can view patient payment history from this page, dentist also add patient due amount from this page.

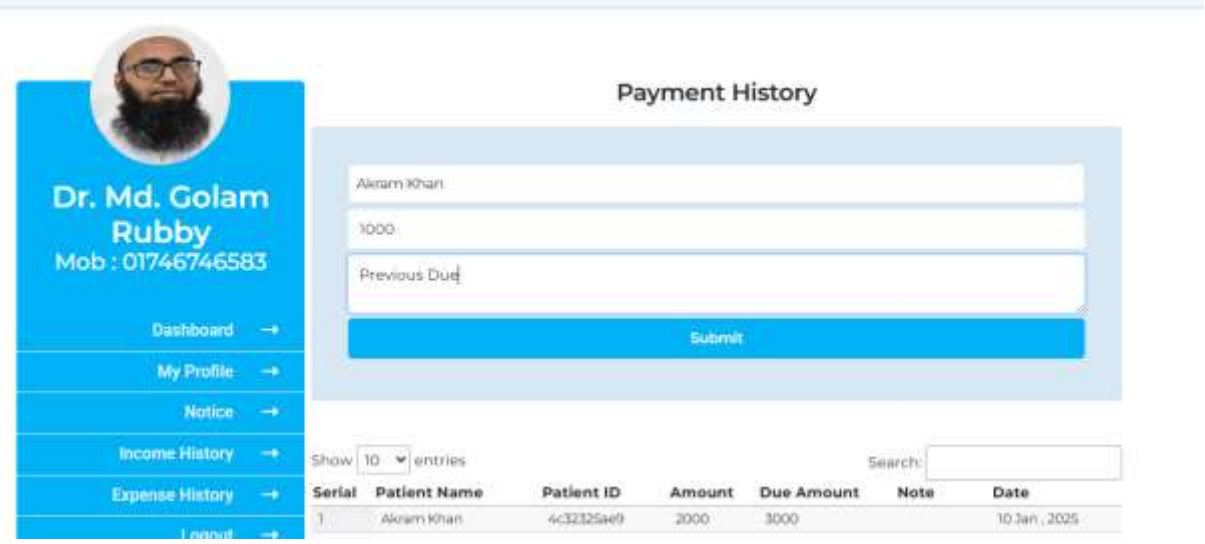


Figure-3.12: Patient Payment History

3.17 Print Prescription Page

This is patient prescription page. Dentist can prescribe digital prescription.

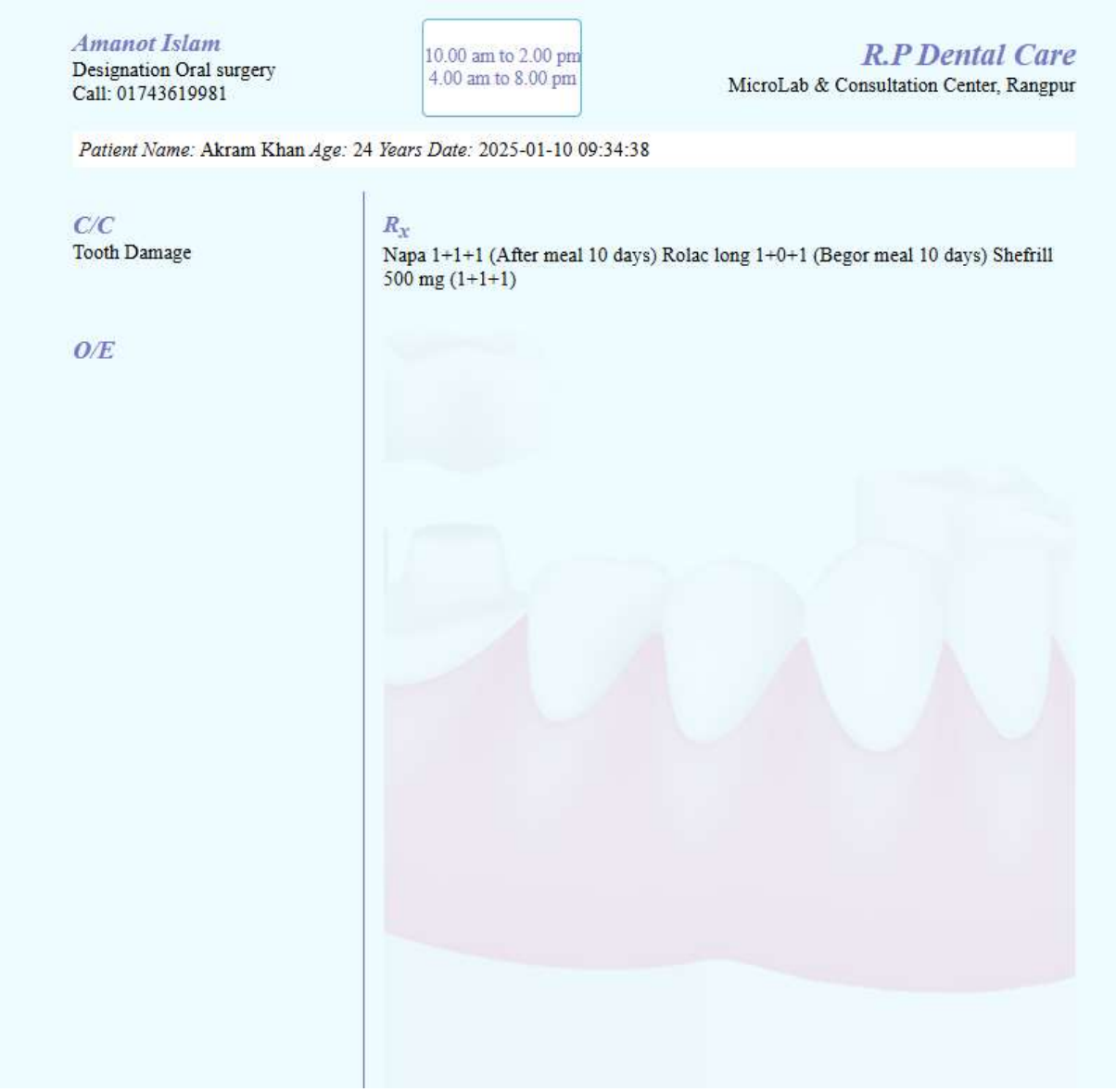


Figure-3.13: Print Prescription Page

3.18 Admin Dashboard

This is admin dashboard page. Admin can do all his related work from this page.



Figure-3.14: Admin Dashboard

3.19 Admins Order Manage Page

This is order manage page for admin.

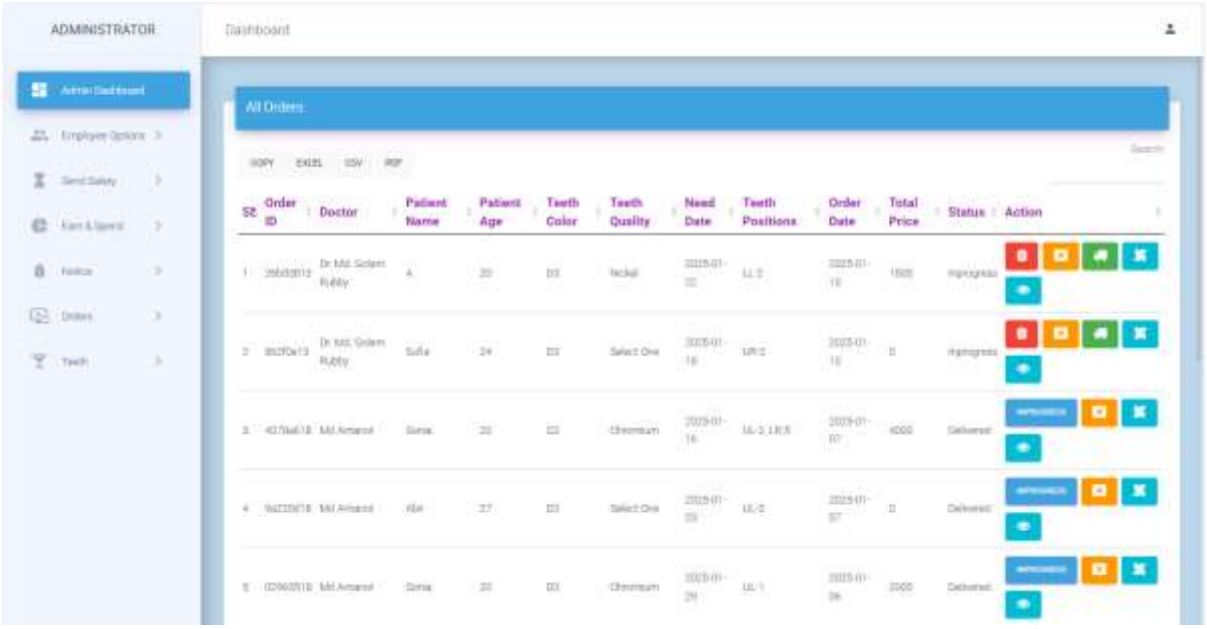


Figure-3.15: Admins Order manage Page

3.20 Admins Earn History

This is admins earn history page. Admin can view earning history. Also can print this page.

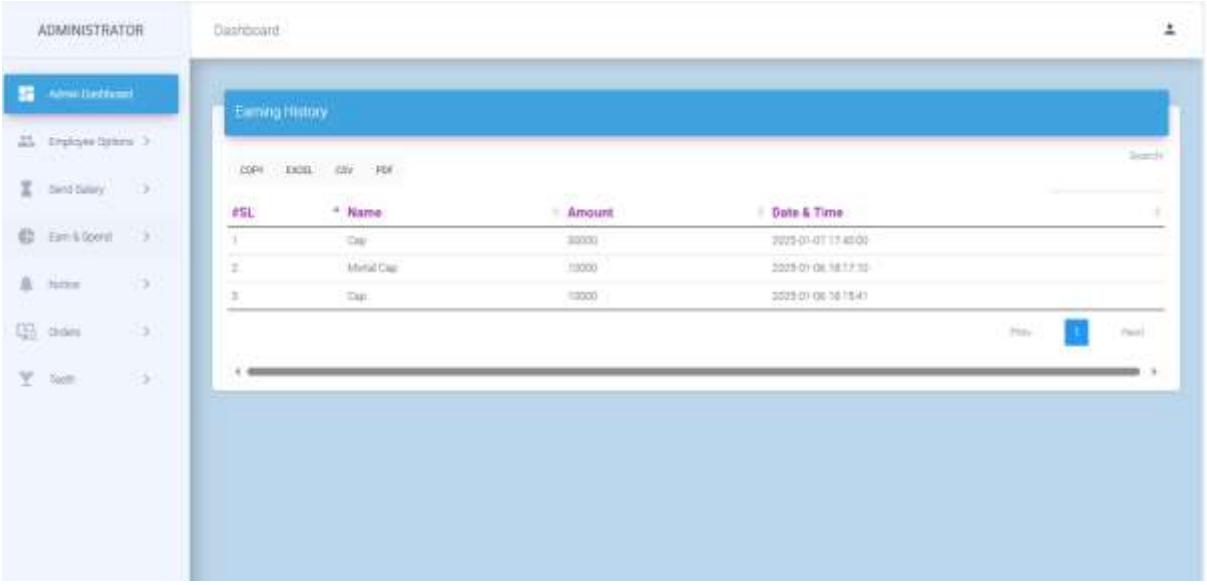


Figure-3.16: Admins Earn History

3.21 Admins Spend History

This is admins spend history page. Admin can view spend history. Also can print this page.

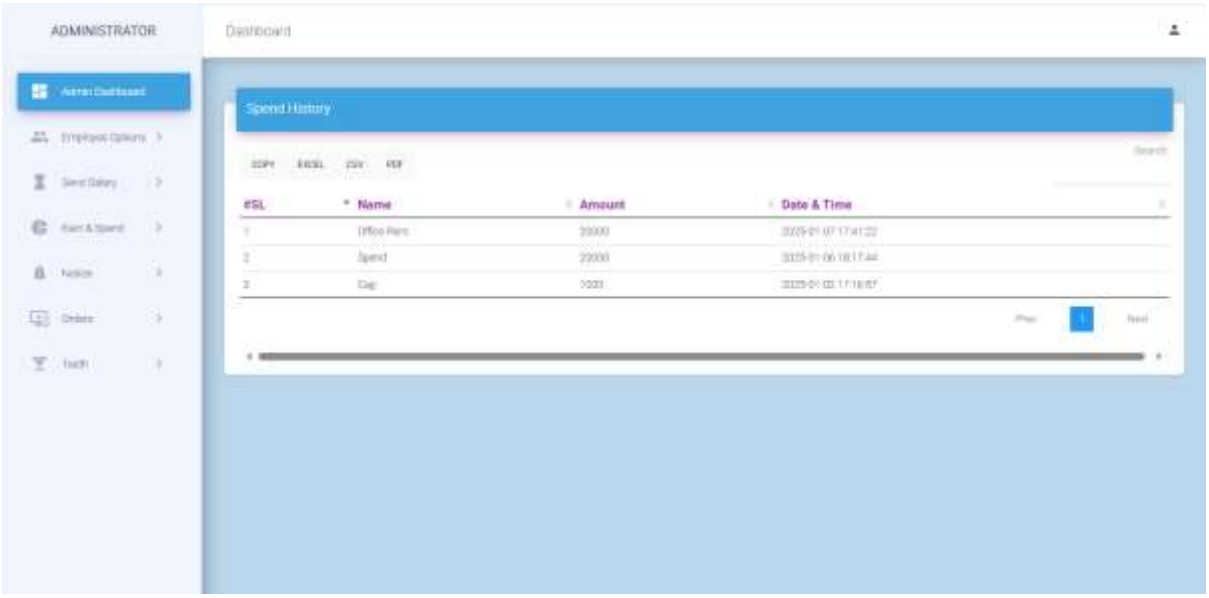


Figure-3.17: Admins Spend History

3.22 Employee Information Page

This is employee information page. Admin can add employee data using this page.

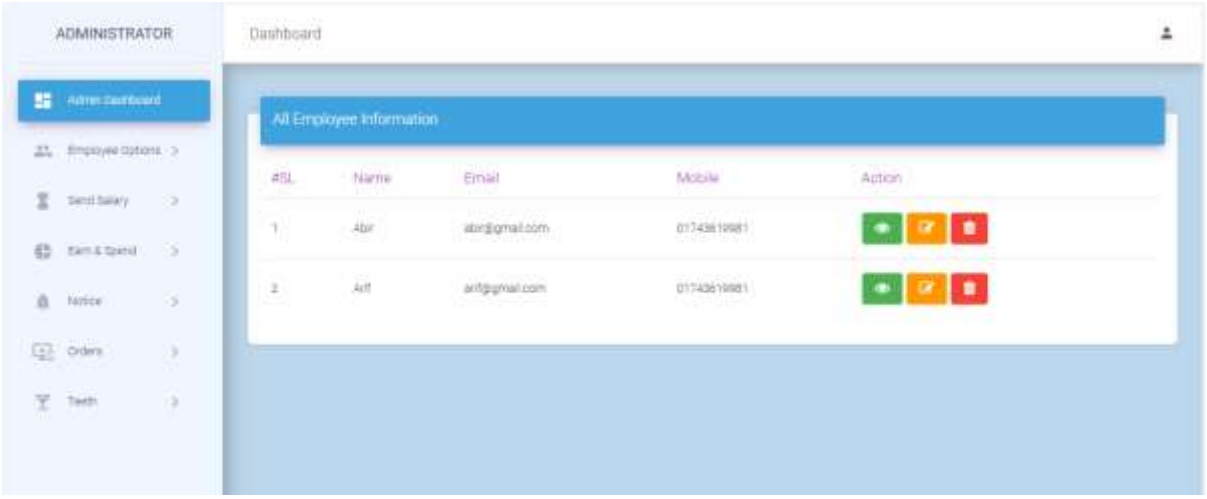


Figure-3.18: Employee Information Page

3.23 Employee Dashboard

This is employee dashboard. From this page employee can view his salary information.



Figure-3.19: Employee dashboard

3.24 Conclusion

Our proposed system represents a significant leap forward in streamlining dental operations, enhancing communication, and ultimately improving patient care within the dental industry. By harnessing the power of modern technology and a user-centric design approach, we have developed a comprehensive web-based platform that caters to the unique needs of both dental practitioners and crown providers.

CHAPTER 4

IMPLEMENTATION AND RESULT ANALYSIS

4.1 User Satisfaction

We are Gathering feedback from users (admins, employees, and doctors) to assess their satisfaction with the system's usability and features. Discussing any improvements made to address user concerns and enhance user experience

4.2 Testing

We are testing-

1.User Authentication and Authorization Testing:

Verifying that the login and signup processes for dental practitioners, employees, and administrators work correctly. Ensure that access is restricted based on user roles, with appropriate permissions granted.

2.Dashboard and Navigation Testing:

Test the navigation within the dashboard for admins, employees, and dental practitioners. Checking that menu items, links, and buttons are functional and lead to the correct sections.

3.Order Placement Testing (Dentist Perspective):

Creating an order from the end of doctors that is actually gone admin dashboard.

4.Order Tracking Testing (Dentist Perspective):

Test the ability of dental practitioners to track the status of their orders. Confirm that order statuses are updated correctly at each process stage.

5.Prescription Generation and Management Testing (Dentist Perspective):

Validate the prescription generation process, ensuring that it includes patient details and prescribed medication. Test the ability to manage and edit prescriptions as needed.

6.Employee Management Testing (Admin Perspective):

Create and manage employee accounts to verify that admin functions are working correctly. Test the addition, modification, and removal of employee information. Check that salary management functions, if present, are functional.

7. Notice Delivery Testing (Admin Perspective):

Test the admin's ability to send notices to employees and dental practitioners. Verify that notices are delivered to the intended recipients successfully.

8. Profile Management Testing (Dentist Perspective):

Check the ability of dental practitioners to update their profiles, including personal information and contact details.

9. Usability and Visual Testing:

Evaluate the overall user interface for consistency, alignment, and visual appeal. Verify that fonts, colors, and layout adhere to design standards. Ensure that elements are correctly positioned, and the system is responsive on different devices and browsers.

10. Data Validation Testing:

Validate that data entered by users, such as patient information and orders, is stored accurately and retrieved correctly.

11. Error Handling and Validation Testing:

Verify that appropriate error messages are displayed when users input incorrect or incomplete data. Check that validation rules for data entry are enforced.

12. Performance Testing:

Assess the system's response times, especially during order placement and prescription generation. Verify that the system remains responsive under normal usage conditions.

13. Final Verification:

Revise critical functionalities to ensure all identified issues have been resolved and the system is ready for production use.

4.3 Technology Used

Dental Crown management is based on HTML, CSS, PHP, and JavaScript, and for the database we used MySQL. HTML Bootstrap and CSS are used for design and for developing functionality. We used PHP and JavaScript.



Figure-4.1 : **Technology used**

4.4 Conclusion

In conclusion, the testing phase has been instrumental in shaping a robust, secure, and user-friendly dental crown procurement system. We are confident that the system is ready for production use, and its successful testing results position it to bring value, efficiency and enhanced patient care to dental practitioners and providers alike.

CHAPTER 5

CONCLUSION

5.1 Introduction

In conclusion, our dental crown provider project signifies a transformative step towards enhancing dental healthcare accessibility and quality. By streamlining the crown procurement process, upholding stringent data security, and promoting ethical healthcare practices, we have fostered trust among dental practitioners and patients. Our commitment to sustainability, both environmentally and economically, further solidifies our impact. As we forge ahead, we remain dedicated to evolving, innovating, and contributing to a healthcare ecosystem that prioritizes patient well-being, sustainability, and excellence in dental care.

5.2 Future Work and Limitations

Future work:

1. Web Application Enhancement:

Develop a user-friendly and responsive web application that offers cross-device compatibility. This will expand accessibility for dental practitioners, allowing them to manage orders, prescriptions, and patient data seamlessly from any location.

2. Mobile Application:

Consider creating a mobile application companion to the web platform, offering dental practitioners even greater convenience and flexibility in managing their orders, prescriptions, and patient profiles.

3. Telehealth Features:

Explore telehealth capabilities that enable remote patient consultations, enhancing accessibility and patient care, especially in areas with limited access to dental services.

Limitations:

Despite its strengths, our project does have some limitations. Data security and privacy compliance remain critical challenges, and ongoing efforts are needed to stay updated with evolving healthcare data regulations. The system's effectiveness relies on consistent internet connectivity, which may pose challenges in areas with limited access. Additionally, while we strive for comprehensive coverage, there may be unique dental practice requirements that our system does not fully accommodate. Continuous adaptation and collaboration with dental practitioners are essential to address these limitations effectively.

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