



Streamlining Dental Appointments: A Web-Based Reservation System with Automated Notifications

Yash Konde¹, Mrs. Sujata Patil², Yash Shevkar³, Priyanshu Kumar⁴

Department of E&TC, SKNCOE, SPPU, Pune

Abstract—A Web-Based Reservation System with Automated Notifications (AWRSAN) is a proposed system which aims to develop a computerized system to maintain all the information of hospital entities. It is being developed using technologies like HTML, CSS, PHP, Python, and Cloud Computing. The proposed system includes an admin login module through which the admin can monitor the entire system. The admin modules are designed to manage patients, doctors, services, and appointments. The proposed system includes patient modules to enable patients to find doctors and apply for appointments, view appointments and prescriptions. The system also includes doctor modules to enable doctors to view their appointments, write prescriptions, and view patient details. Overall, the proposed system aims to help hospital administration maintain hospital management in the best way possible and reduce human efforts. It is important to ensure that the proposed system is user-friendly, secure, and scalable. The system should be able to handle a large number of users and data efficiently. It is also important to ensure that the proposed system is compliant with relevant regulations and standards. In conclusion, the AWRSAN proposed system has the potential to improve the healthcare system by providing a computerized system to manage hospital entities, reducing human efforts, and enabling efficient access to healthcare services for patients.

Keywords – Web-Based Reservation System, Automated Notifications, Hospital Management, Patient Modules, Admin Login Module

I. INTRODUCTION

Information Technology is a great tool for the improvement and advancement of business. Automation is now widely used because of its efficiency and accuracy. It helps to perform task in an easy way with less time consumed. Business processes of some companies have become automated while others strive for the similar setting. This allows a business to be more competitive. A lot of business especially in the United States have made everything web based particularly for medical clinics. It speeds up every process for them. They wanted to reduce the use of papers and synchronized everything in the most effective way and this is what Information Technology could offer. By storing the data into the database, the communication between those involved parties can also be provided with ease. Everything will be organized and margin of errors will be lessened. Some dental clinics still use manual operations to run their business, like storing all their data in a secured drawer. Room for errors are very wide when it comes to keeping and updating records. Also, keeping track on dentist's performance and business is also hard. AWRSAN is a module which aims in developing a computerized system to maintain all the information of hospital entities. It has a facility of admin login through which the admin can monitor the whole system. Admin modules are managing patients, manage doctors, manage services and manage appointments. Patient modules are find doctors and applied for appointment, view appointment and view prescription. Doctor modules are view our appointments, write prescriptions, and view patient details. Overall this module of ours is being developed to help the hospital administration, maintain the hospital management in the best way possible and also reduce the human efforts.

II. LITERATURE SURVEY

The Internet age has dramatically altered communication patterns. Face-to-face interchanges continue to give way to digital message exchanges. Channels for these digital communications have rapidly morphed and expanded over the past years toward a faster, more interactive means of exchange. This is the reality that faces dental practices: Interaction with current and prospective patients will predominately take place online. In order to maintain a productive level of engagement, dental practices have to identify effective ways to leverage these new channels of communications. The study tracked no-show rate changes, both pre- and post-implementation, of automated appointment reminders. The study found that dental practice no-shows were reduced by 22.95 percent. Increased production is at the epicenter of a practice's financial performance, impacting cost structure, revenue flow, and ultimately, profitability. Appointment no-shows have a devastating impact on practice financial performance. In a 2012 national research study, 32 percent of dentists said their top need was to reduce no- shows in the practice. Automated reminders have the potential to cost-effectively and efficiently address this need. Research shows that today almost 60 percent of practices have some form of automated appointment reminder solution. However, until recently there has been very limited research to document the

impact these solutions have on no-show rates and practice production. With advanced systems costing \$300 per month on average, the return on investment justification for this investment has, to date, been a challenge. The data clearly demonstrates a positive productivity impact when integrating automated patient appointment reminders into the practice. First-year fees for this service should be recovered within the first six months post-activation. Additionally, time previously used by the administrative team on confirmations can now be leveraged to build relations with patients, market the practice and activate patients. Automated appointment reminders dramatically reduce practice no-shows and positively impact production. They are the method of communication that patients prefer. They improve efficiency and profitability. And, finally, 90 percent of dental professionals agree that automating reminders gives them peace of mind that all patients are being consistently contacted prior to appointments.

III. PROPOSED SYSTEM

System Architecture Framework

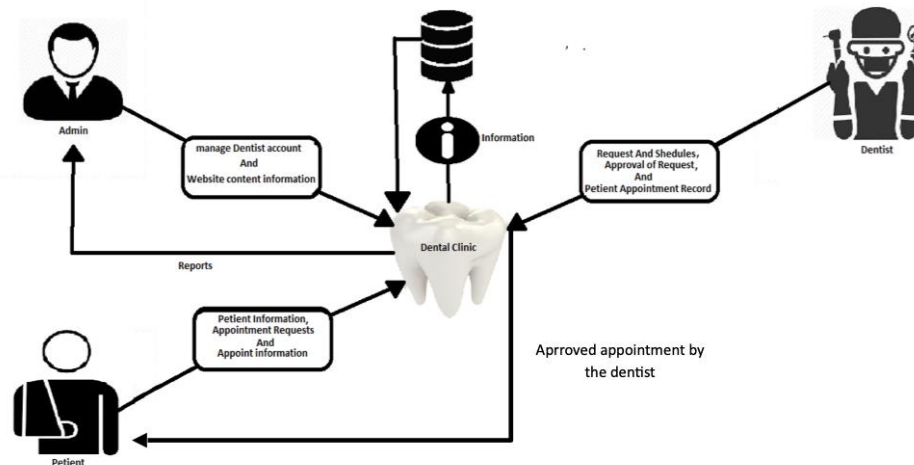


Fig 1. Block Diagram of the proposed system

The proposed system for AWRSAN is a web-based reservation system with automated notifications that aims to develop a computerized system to maintain all the information of hospital entities. The system is being developed using technologies like HTML, CSS, PHP, Python, and Cloud Computing. It includes an admin login module that enables the admin to monitor the entire system and manage patients, doctors, services, and appointments. The proposed system also includes patient modules that allow patients to find doctors, apply for appointments, view appointments and prescriptions, and doctor modules that allow doctors to view their appointments, write prescriptions, and view patient details. The system is designed to help hospital administration maintain hospital management in the best way possible and reduce human efforts. It is important to ensure that the proposed system is user-friendly, secure, scalable, and compliant with relevant regulations and standards. Overall, the AWRSAN proposed system has the potential to improve the healthcare system by providing a computerized system to manage hospital entities, reducing human efforts, and enabling efficient access to healthcare services for patients.

This chapter discusses the methods of the study, tools, and design used by the proponents.

1 Software

The proponent uses the following software base in windows Operating System. Mysql is used as the storage of all the data, browser such as Chrome, Mozilla and Internet Explorer is a tool used to see the output of the program, and for the Wamp Server, the Apache is more appropriate for the PHP coding.

2 Hardware

To develop the system, some hardware requirements are HTML needed. A desktop or laptop with the at least i3 processor is required with 2Gigabytes of RAM.

3 Data

The researchers gathered the business details and details from the people behind it like the dentist details, different programming language to create the system like CSS, PHP, Javascript, mySQL, wampserver. Methods of the Study

In the proposed module, the proponents used the Software Development Life Cycle or SDLC. SDLC is a process used by software industry to design, develop and test high quality software. The SDLC aims to produce high quality software that meets or exceeds customer expectations, reaches completion within times and cost estimates.

SDLC is a process followed for a software module, within a software organisation. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software. The life cycle defines a methodology for improving the quality of software and the overall development process.

Research Methodology

This research follows the proper System Development Life Cycle. It has seven different phases namely; Gathering information and analysis phase, planning, design, coding, testing, implementation and maintenance. Each phase plays a vital role in the success of the development of the system.

Operating Procedure

This is a set of step-by-step instructions compiled by the researchers to help users carry out complex routine operations. It identifies the sequence of steps, and specifies for each step what needs to be done, when, and by whom. It aims to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication and failure to comply with industry regulations.

IV. IMPLEMENTATION

The following technologies and libraries were used for the implementation:

A. **PYTHON:** Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code. Python is a programming language that lets you work quickly and integrate systems more efficiently. Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

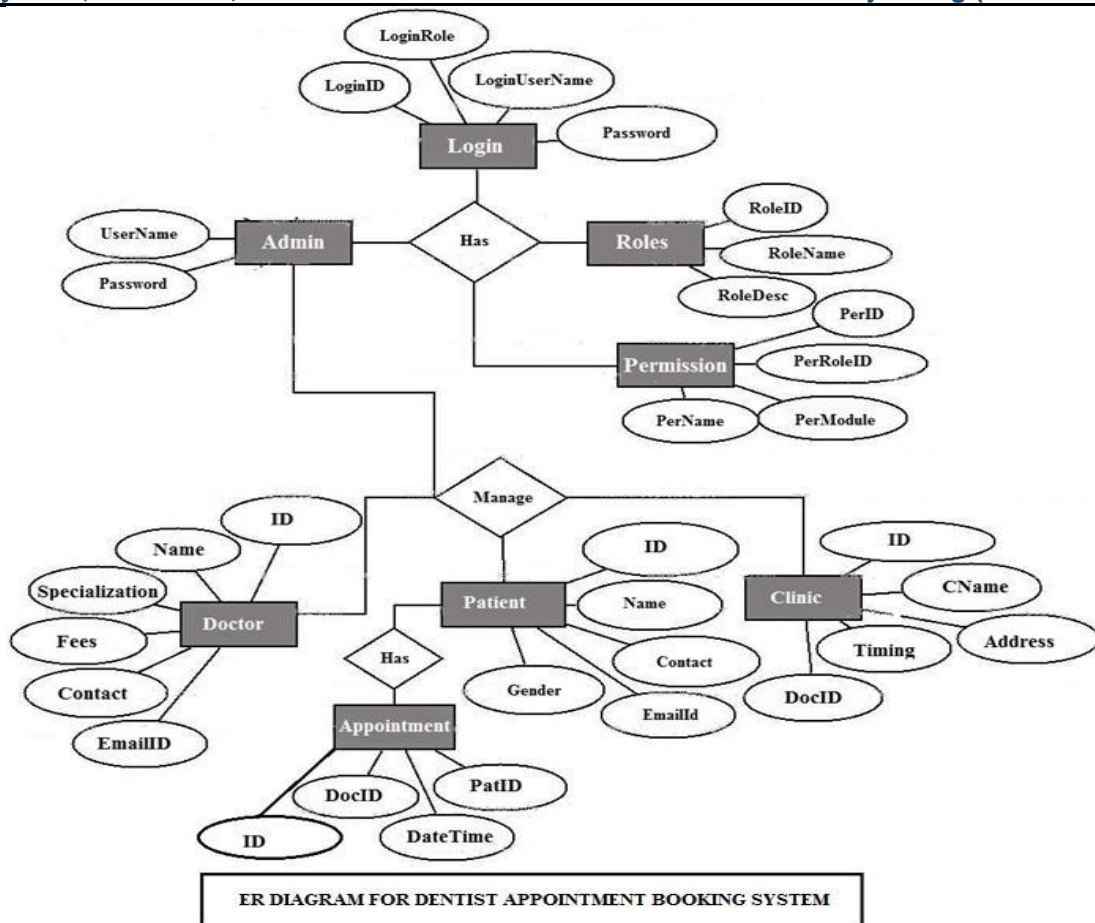
B. **HTML:** HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

C. **CASCADING STYLE SHEET (CSS):** Cascading Style Sheets (CSS) are a collection of rules we use to define and modify web pages. CSS are similar to styles in Word. CSS allow Web designers to have much more control over their pages look and layout. For instance, you could create a style that defines the body text to be Verdana, 10 point. Later on, you may easily change the body text to Times New Roman, 12 point by just changing the rule in the CSS. Instead of having to change the font on each page of your website, all you need to do is redefine the style on the style sheet, and it will instantly change on all of the pages that the style sheet has been applied to. With HTML styles, the font change would be applied to each instance of that font and have to be changed in each spot. CSS can control the placement of text and objects on your pages as well as the look of those objects. HTML information creates the objects (or gives objects meaning), but styles describe how the objects should appear. The HTML gives your page structure, while the CSS creates the "presentation". An external CSS is really just a text file with a .css extension. These files can be created with Dreamweaver, a CSS editor, or even Notepad. The best practice is to design your web page on paper first so you know where you will want to use styles on your page. Then you can create the styles and apply them to your page.

D. **JAVASCRIPT:** JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. While JavaScript is influenced by Java, the syntax is more similar to C and is based on ECMAScript, a scripting language developed by Sun Microsystems. JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript functions can run after a webpage has loaded without COMMUNICATING with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required fields have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server. Like server-side scripting languages, such as PHP and ASP, JavaScript code can be inserted anywhere within the HTML of a webpage. However, only the output of server-side code is displayed in the HTML, while JavaScript code remains fully visible in the source of the webpage. It can also be referenced in a separate .JS file, which may also be viewed in a browser.

E. **DJANGO:** Django is a web application framework written in Python programming language. It is based on MVT (Model View Template) design pattern. The Django is very demanding due to its rapid development feature. It takes less time to build application after collecting client requirement. This framework uses a famous tag line: The web framework for perfectionists with deadlines.

F. **EXPLANATION & WORKING :** The above diagram explains about the working of the application with respect to the user point of view and administrator point of view. First user will request and create a login ID and then, will get credentials. Then after the login request is sent, application will cross check if the provided credentials is valid or not with its database. If the details provided is valid, it will execute and let the user access forward, else it will restrict the user by showing error/failed. It will request the user to enter valid credentials which is user ID and password and try again. Same process goes at the administrator end, only difference is that the administrator can access and control each and everything in the database.



An entity-relationship (ER) diagram is a specialized graphic that illustrates the interrelationships between entities in a database. ER diagrams often use symbols to represent three different types of information. Boxes are commonly used to represent entities. Diamonds are normally used to represent relationships and ovals are used to represent attributes an entity-relationship model (ERM) in software engineering is an abstract and conceptual representation of data. Entity-relationship modelling is a relational schema database modelling method, used to produce a type of conceptual schema or semantic data model of a system, often a relational database, and its requirements in a top-down fashion.

V. RESULTS

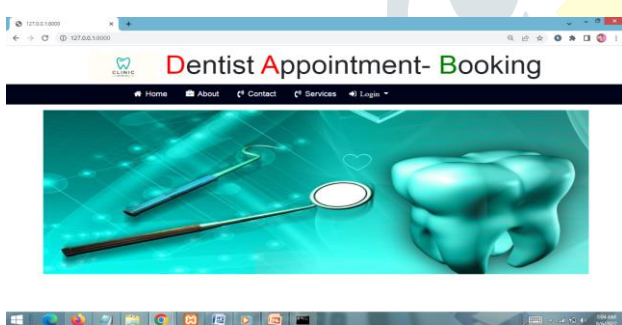


Fig 3. Homepage

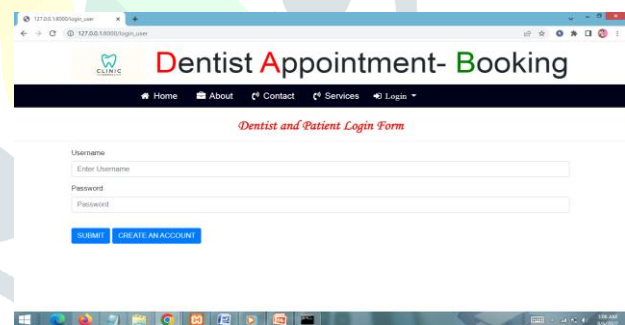


Fig 4. Login Page

The module entitled “A Web-Based Reservation System with Automated Notifications (AWRSAN)” is developed using HTML, CSS and Bootstrap as front end and Python with SQLite database in back end to computerize the process of online dentist searching and appointments management provides various features, which complement the information system and increase the productivity of the system. These features make the system easily usable and convenient. Some of the important features included are listed as follows: Intelligent User Forms Design, Data access and manipulation through same forms, Access to most required information, Data Security, Restrictive data access, as per login assigned only, Organised and structured storage of facts, Strategic Planning made easy, No decay of old Records, Exact financial position of the Business. This web application involves almost all the basic features of the online searching of dentist and appointment management. The future implementation will be online help for the users and chatting with website administrator.

VI. CONCLUSION

AWRSAN will be a big improvement over the manual system of the clinic. Patients will be able to access the page if there is an internet connection for reservation inquiries. The researchers conclude that AWRSAN (A Web-Based Reservation System with Automated Notifications) Notifications should be enough once it is fully completed over time. The system will be a great improvement to the patient and dentist and will take a lot of work off from the patient and to desired dentist. The researchers then conclude that the patients of dentist will have a great benefit from the system because of its authentication from the site this will help desired dentist identify the patient even if she/he set an appointment online.

ACKNOWLEDGMENT

We want to specially thank our respected internal guide Mrs. Sujata R. Patil for her guidance and encouragement which has helped us to achieve our goal. Her valuable advice helped us to complete our project successfully. Our Head of Department Dr.S.K. Jagtap has also been very helpful and we appreciate the support she provided us. We would like to convey our gratitude to Principal, Dr. A. V. Deshpande and all the teaching and non-teaching staff members of E&TC Engineering Department, our friends and families for their valuable suggestions and support.

REFERENCES

- [1] Dr. Erlinda D. Mendoza and Rosemarie San Luis.(2012). “Worktext in management Information System”. Manila: Mindshapers, Inc.
- [2] Robert Sebesta. (2012). “Programming Languages 10th edition”, San Francisco: Pearson Educ. Inc.
Philip Bernstein and Erick Newcomer. (2009). ‘Transaction Processing 2nd Edition”, Burlington: Elsevier Inc.
- [3] David et. al. (2012). “Automated School Records Management System.”
Dromaet. al. (2009). “Automated System for Patient Record Management.”
- [4] Pacio (2013).Online Student Information System of Benguet State University (OSIS_BSU), Philippines.Bugaoisan
- [5] Vangie Beal.(2015). Programming Language.Retrieved
form [http:// www.webopedia.com/TERM/P/programming_language.html](http://www.webopedia.com/TERM/P/programming_language.html)
- [6] Vangie Beal.(2015). Structured Query Language.Retrieved from [http:// www.webopedia.com/TERM/S/SQL.html](http://www.webopedia.com/TERM/S/SQL.html)
- [7] Electronic Dental Records: “A case study by Thorne (2010)” <http://www.dentistryiq.com/articles/2010/03/electronic-dental.html>
- [8] Mujamed Ahmed. (2010). Clinic database and software management system.
<http://www.slideshare.net/MujahedAhmed1/clinic-database-and-software-management-system>
- [9] Arceot. al. (2013).Dental Clinic Management System. http://www.dental-tribune.com/articles/specialities/practice_management/13603_study_reveals_how_automated_patient_appointment_reminders_affect_dental_practice_no-show_rates_and_production.html