

NURSE APPOINTMENT SYSTEM

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Abstract

Only a small number of wealthy individuals are still able to access patient registration and setting up appointments, which has led to a significant disparity in access to excellent health reproductive health services among urban and rural areas of Uganda. The use of electronic devices can help the health sector provide fair and equitable excellent amenities, and for this study, I employed a nurse appointment system that is compatible with several web browsers. In order to control their health state and to keep an eye on what's happening before it gets worse, this system allows every client, both men and women, to book consultations with a variety of clinicians from any hospital.

Key words: *health care, appointment system, clinical services and patient planning*

Background to the study

One of the clinical services that has been automated is the scheduling with the nurse for the patient. Medical facilities are driven to lower operating costs while raising service standards. In order to combat this, preventative medicine has emerged, which helps individuals stay healthy and reduces the need for urgent care facilities and hospital stays. In the context of health care shipment, the significance of patient planning cannot be overstated (Karen et al., 2015).

All sizes of businesses, from large multinationals to tiny service-based firms, rely heavily on the preparation of meetings and bookings as part of their daily operations.

A teaching hospital for the Makerere College of Health Sciences, Mulago Hospital was established in 1913 and serves as the primary national regional hospital for the entire nation of Uganda. The general hospital for the Kampala metropolitan region is

Mulago Hospital. According to the Ministry of Health's regulations, Mulago's mission is to deliver highly skilled medical care, undertake practical research, and give training. 2014-15 Inputs Mulago had 1,880 employees in 2014-15, which made up 67% of the staffing jobs, leaving 581 posts unfilled. In 2014-15, the yearly budget for Mulago Hospital was 38.14 billion (Mark & Jacob, 2023). The patient load at Mulago Hospital is still too high, which has an impact on the level of care provided. During FY 2014/15, the hospital attended to 829,817 outpatient visits; 761,573 inpatients; 61,568 emergencies; 28,759 total ANC visits; 39,081 deliveries; 11,120 postnatal visits; 1,738,652 lab tests; 33,949 X-rays; 27,142 ultrasound scans; 49,680 immunization contacts; 13,397 major surgeries; 9,701 FP contacts. The bed capacity rate for the hospital is 63%.

Problem statement

The majority of the nation's healthcare facilities currently use a time- and labor-intensive system for scheduling appointments that involves standing in line and filling out forms. Due to the lengthy wait times, scheduling a consultation with a health professional can take nearly half a day in a large hospital (like Mulago hospital), which treats a lot of people every day.

Meetings aren't even planned in some hospitals. Once a patient enters, he is given to any nurse who is on duty at that moment. However, if all the nurses are busy, as in a critical situation, this can be dangerous (Mark & Jacob, 2023). It may result in confusion over who should treat an urgent patient, which may cause medical facilities to halt. Patients can choose a previously known Nurse from the list of available nurses when making a reservation through the current appointment for patient's management system. The majority of the other nurses in the facility will be less busy during their assigned shifts if one Nurse is chosen by many patients based on their level of preference for that particular Nurse. Due to the unbalanced allocation of workload among nurses based on the daily volume of inquiries about appointments, this occurs. The problem this system addresses is to provide a big list

of different hospitals from different areas where patients can easily make choices of their Nurses which always occurs during appointment scheduling.

Specific objectives

The specific objectives of the study were:

- 1. To carry out a study on the literature of related and/or existing medical appointment scheduling systems to identify the necessary requirements for the system.*
- 2. To design the prototype that illustrates the main functionalities of the system.*
- 3. To implement the designed system prototype.*
- 4. Finally, to carry out testing and validation of the implemented system.*

Significance

- 1. The implementation of the system is entitled to providing complete, accurate and timely booking user information*
- 2. The project has enabled the researcher to fulfill the Appointment requirements in different Hospitals.*
- 3. The study has helped in further improvements of the current system and this has helped to pave a way for new and advanced technologies to be implemented for such systems in Hospitals.*

Methodology

Research Design

A research design is a strategy, framework, and plan of examination that is taken into account to find solutions to issues or problems in the field of study (Babikir, 2011). A case study research design was used in this investigation. This is due to the fact that a case study aided in providing a firsthand observation that painted a full image of the cases under consideration. Qualitative as well as quantitative approaches were used in the investigation. Investigators can gather precise data and thorough conclusions about Nurses Appointment App with the aid of the case investigation study design.

Study Population

Bombo (2006) defines population as a group of persons or elements that have at least one thing in common. The population of the study included patients (20) and medical staff (10) from whom the sample size was obtained (Mulago Hospital)

Sampling

A sample, according to Omari (2011), is a portion of a population that has been chosen for observation and analysis. One might draw conclusions about the features of the population from which the sample had been carefully chosen by looking at the particulars of the sample. The sample included 20 patients, 1 the receptionist, and 10 members of the medical staff. These were established using the sample size calculation method described in the Kraijer and Morgan table (see Appendix II). Both deliberate and straightforward random methods were used to choose these.

Sample size and Composition

The study had a total sample number of 30 respondents, which included the medical staff receptionist, nurse and Nurse as shown in the table 1 below.

Table 1Sample Size

<i>Respondents</i>	<i>Sample Size</i>	<i>Sample Technique</i>
<i>Patients</i>	<i>20</i>	<i>Simple Random Sampling</i>
<i>Medical Staff</i>	<i>10</i>	<i>Purposive Sampling</i>
<i>Total</i>	<i>30</i>	

Source (Primary Data 2021)

Data collection methods

In the research, the following methods were used: Questionnaire, Interview method and Document Review

Questionnaire

*The study used a survey research methodology, with standardized questionnaires serving as the primary tool for data gathering. A questionnaire survey is a technique for gathering data in where respondents are asked directly how they feel about the research subject (Bird, 2009). The survey itself included open-ended as well as closed-ended inquiries to provide participants the right amount of freedom to clarify their answers while keeping their topics limited to pertinent ones. **Interview***

A qualitative data collecting technique called questioning allows investigators to get detailed information on how participants responded to questions about the study's variables as well as in-depth details about their opinions (Sutton and Austin, 2015). The interview method was chosen because, more than any other technique, it gave investigators access to precise information about the opinions of the participants and actual experiences. Since there is direct communication, the individual conducting the study is able to ask all of the inquiries and receive all the responses at that same moment.

System design and development

The system design identified system modules, elements, and connections and outlined how the system can be constructed from the conceptual blueprint to the physical model while also taking into account a problem that affects the database and the ways in which it is used. Entity relational models and other data models were used in the system's design.

A system's design

The architecture of the system was created using an object-oriented design methodology. The structure, behavior, and interactions of the many system components were all covered in this part, which also discussed the design.

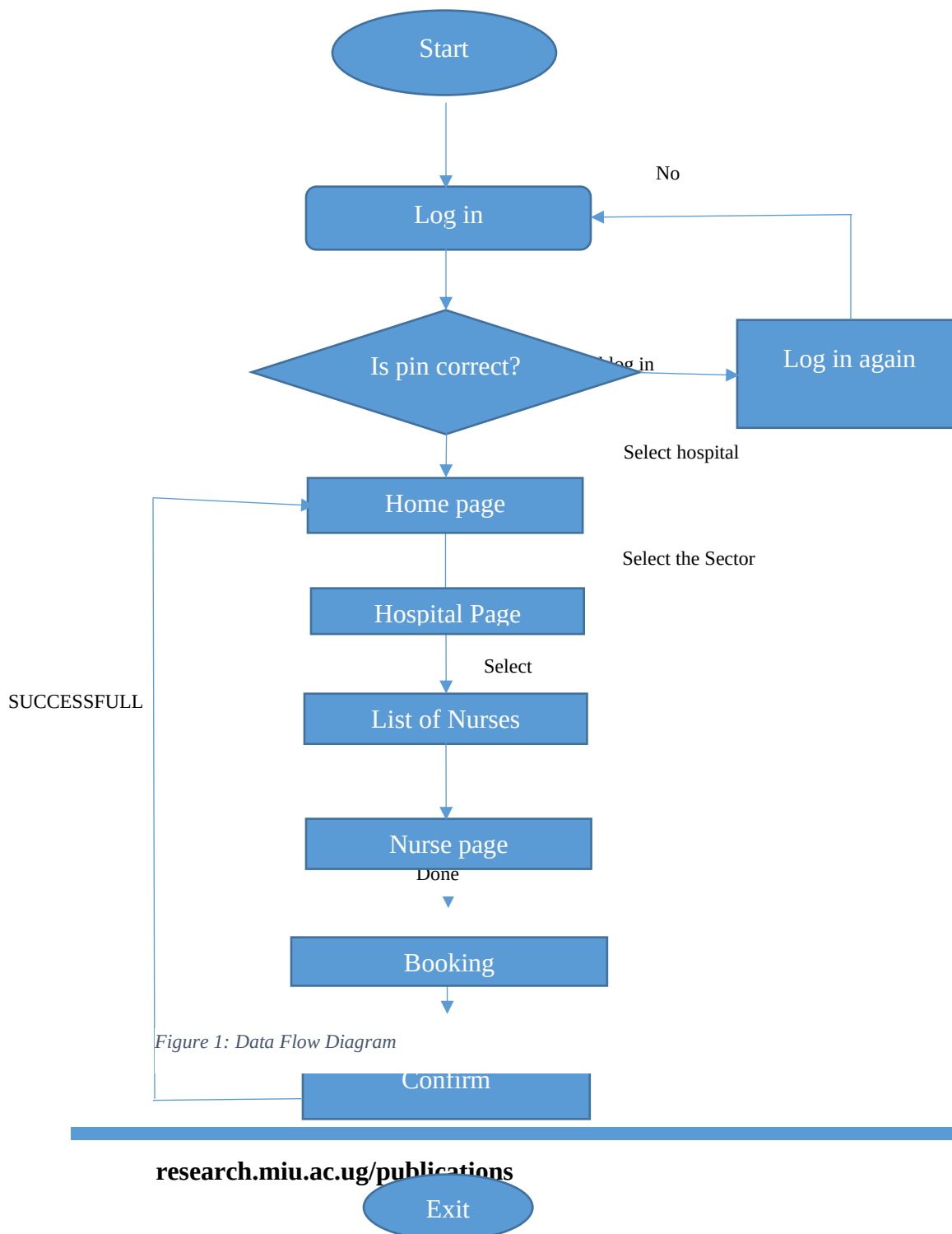
*The investigator created this system using Java. Every user of the computer system has access to a login page, which prevents anyone lacking a user name and password from accessing it. **Logical design***

The process of logical design constructed the model of information that can be used in the system based on a specific data model such as relational model.

Data flow diagram

In this process the researcher identifies, model and document how data can move around an information system. Data flow diagrams examine processes (activities that transform data from one form to another), data stores (the holding areas for data),

external entities (what sends data into a system or receives data from the system), and data flows (routes by which data can flow).



Entity relationship diagram

A fundamental ER model includes entities, which are objects with defined relationships. This graphic shows relationship and reliance between entities rather than defining any capability. The "rectangular boxes" in the ER diagram serve as the entities, while the "straight lines" depict the connections that connect the boxes. An entity is a thing or an object with an existence that is separate from other things and the ability to be easily distinguished from them. Each thing has certain characteristics, such as name, age, address, department, etc. The nurse, patient, appointment, admin, etc. are all distinct entities in the graphic that follows. A person, animal, plant, event, or business can all be considered entities.

Conceptual design

A conceptual data model was built for each identified view in the system. Conceptual data model comprises of entity types, relational types, attributes and their domains, primary and alternate keys and integrity constraints.

Data Analysis

According to Mugenda and Mugenda (2003), data analysis and processing is defined to yield cleaned data, with proper codes and ability to be manipulated through a computer processing system. Data analysis and processing critically focused on both quantitative and qualitative techniques as explained below.

Quantitative Data Analysis

This investigation concentrated on numerically expressed data. Statistical Package for Social Scientists (SPSS) was used to modify, code, and conduct additional analysis on the data (Nelson et al., 2022). Data was entered, error-checked, coded, and then entered into the computer program SPSS for analysis. Quantitative data analysis also uses tables, graphs, and statistics as other ways to show data.

Analyzing qualitative data

The field notes from the conversations were edited and straightened up to produce structured information. Qualitative data was gathered through the interviews that

were to be done. The information that was transcribed was organized using codes, categorized, and then incorporated into the paragraphs of the study's many specialized goals.

RESULTS

Table 1 Response rate

Response rate

Respodents	Actual	Percentage
20	30	66.67

From the above table, the researcher foundout that out of the 30 key respodents he had initially targeted only 20 provided successful responses which indicate 66.67% of the respondents provided relevant data which renders the findings creadible and reliable for the study.

Table 2 Response on gender

Respondents personal variables

Gender	Frequency	Percentage
Male	8	40.0
Female	12	60.0
Total	20	100

Table 2 Respondents on gender

It was discovered that female respondents were ready to respond than males. Though they were all willing to give relevant information.

Nature of the current system

Regarding the type of system used in Mulago Hospital, respondents were asked to identify whether it was manual or automated.

Table 3 Nature of the current system

The nature of the current syteem	frequency	Percentage
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<i>used</i>		
<i>Manual</i>	<i>27</i>	<i>100</i>
<i>Automated</i>	<i>00</i>	<i>00</i>
<i>Total</i>	<i>27</i>	<i>100</i>

Finding from both patients and Nurses indicated that the manual system is highly used at the Hospital.

System analysis

The specifications for the new system were ascertained by analyzing the participant's feedback following the use of the various data collection tools. This made it evident what needed to be changed in the new systems and helped to determine how the project would affect the target organization. The knowledge that was examined served as a foundation for the creation of plans that directed the project timeline and assets appropriately.

Requirement Specification

The requirements of the proposed system are both functional and non-functional requirement.

Functional Requirements

This defines what the system should do. i.e.

- 1. Storing and retrieving information of the users'*
- 2. It should be able to allow a user login.*
- 3. It should be able to reflect appointments made.*

Non-Functional Requirements

These capture the required properties of the system and the following are the considered non-functional requirements

- 1. The system should be user friendly.*
- 2. It should be able to add more features in the future.*

3. *It should be error free in report generation to those who who need to make more research.*

Hardware and software requirements

1. *Browser*
2. *Android phone*

System Design

System design is the most component of the system development. Most of the projects are devoted to these phases. It involves a logical and physical design.

Conceptual design

The system has the following entities:

Nurse

Patient

Appoitnment

Database design

Patient

Table 4 Patient table

<i>Attributes</i>	<i>Data Type</i>	<i>Description</i>
<i>Username</i>	<i>Varchar (11)</i>	<i>Name used to create an account</i>
<i>Address</i>	<i>Varchar (40)</i>	<i>location</i>
<i>Password</i>	<i>Varchar (8)</i>	<i>Uniquely identifies User</i>

Nurse

Table 5 Patient table

<i>Attributes</i>	<i>Data Type</i>	<i>Description</i>
<i>Username</i>	<i>Varchar (12)</i>	<i>Name used to create an account</i>
<i>Password</i>	<i>Varchar (8)</i>	<i>Uniquely identifies User</i>
<i>Department</i>	<i>Varchar (30)</i>	<i>An area of special expertise</i>

<i>Address</i>	<i>Integer (20)</i>	<i>location</i>
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Admin

Table 6 Admin table

<i>Attributes</i>	<i>Data Type</i>	<i>Description</i>
<i>Username</i>	<i>Varchar (10)</i>	<i>Uniquely identifies the Admin</i>
<i>Password</i>	<i>Varchar (8)</i>	<i>Uniquely identifies the admin</i>

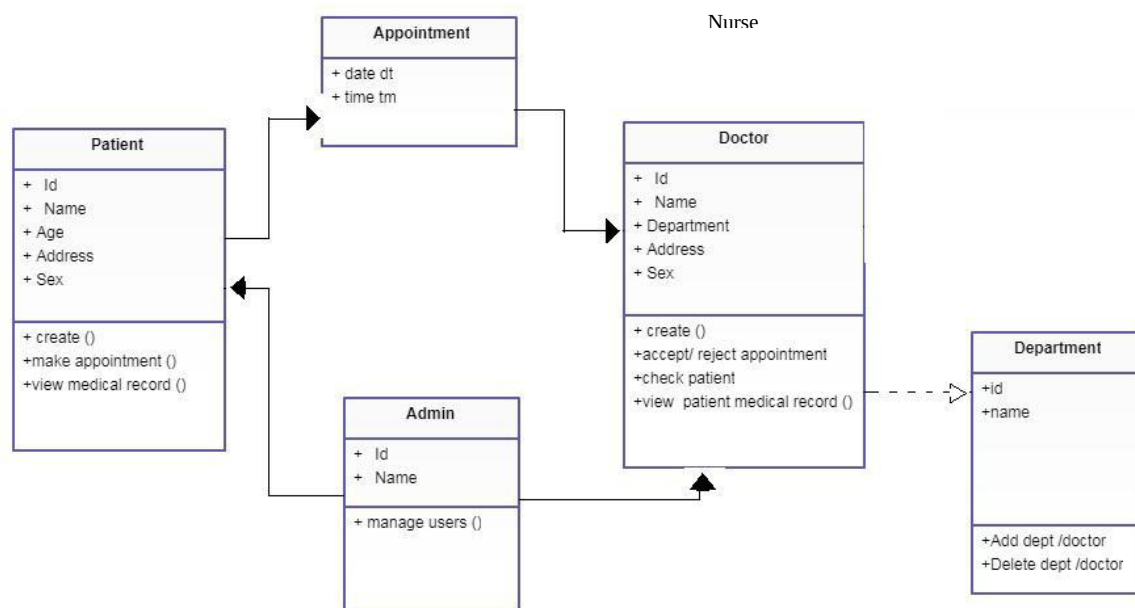
Appointment

Table 7 Appointment table

<i>Attributes</i>	<i>Data Type</i>	<i>Description</i>
<i>Nurse ID</i>	<i>Varchar</i>	<i>Uniquely identifies a particular user.</i>
<i>Patient ID</i>	<i>Varchar</i>	<i>Uniquely identifies a particular user</i>

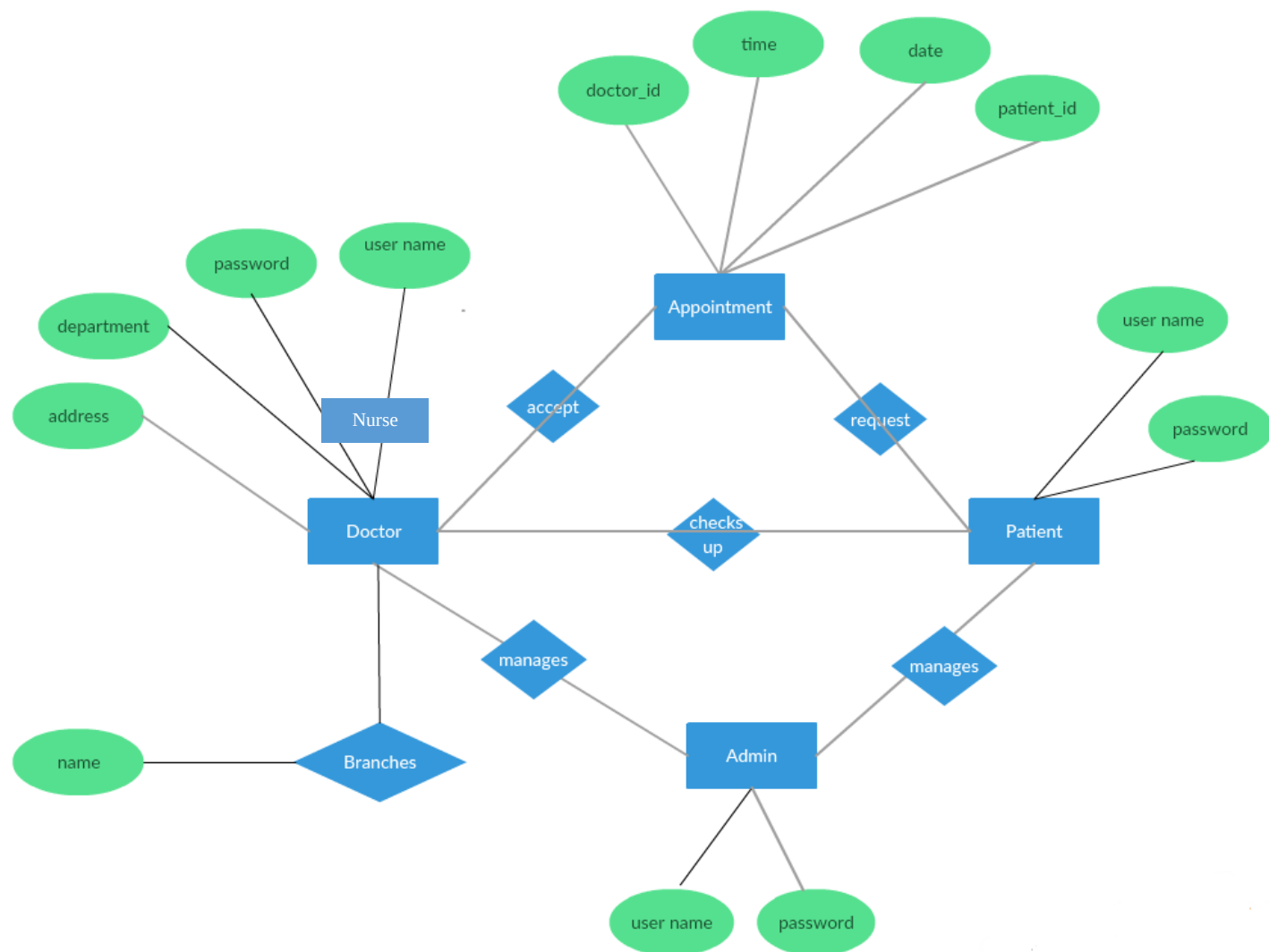
Context diagram of the Nurse's Appointment System.

Figure 2 Context diagram



Entity relationship diagram of the Nurses Appointment system.

Figure 3 Entity relationship diagram



Conclusion

In order to achieve sustainable development, Goal 3 of the Sustainable Development Goals of the United Nations focuses on guaranteeing healthy lives and encouraging wellbeing at all ages. Making Bookings is a problem that concerns people in all nations of the world. This prompted the creation of numerous efforts to educate individuals about it, particularly in hospitals.

Unfortunately, the use of sophisticated technology has decreased, especially in underdeveloped nations where some people do not have access to technology like time management systems. If an adequate scheduling system is in place and technology is used, some men and women encounter issues in their lives, which is the main cause of concern.

Recommendations

I recommend the future developers to take into consideration the following so as to increase the efficiency of the system:

- *Include Google Maps to offer precise locations of hospitals which give specialized services to patients.*
- *Include a section where a patient can directly interact with the Nurse booked.*
- *Include the DOs and DONTs when a patient is to make an appointment with the Nurse*

References

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