A Doctor Patient Portal for Effective Healthcare

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Abstract— **This paper presents a noble approach to develop a digital healthcare system for Bangladesh, a country which is soon going to become a developing country. We made an online application to help the masses to get access to healthcare easily and effectively. The application consists of two modules, doctor/hospital information system and emergency services. It has user-friendly features for doctor appointment making. Also, it has a blood donor search option, ambulance calling option, patient's report view option, doctors ranking options etc. The doctors ranking is a special feature which was calculated based on doctor's educational qualification, experience, average count of appointments made by patients and patient's feedback. Feedback form real users showed that this information system was very helpful for them. If implemented countrywide, this system of digital healthcare may pave the way for an effective healthcare service in Bangladesh.**

Keywords—healthcare online application, appointment, information system, doctor ranking

I. INTRODUCTION

Health care is an essential thing in life. Estimations suggest that health make a contribution numerous years to life expectancy. It additionally makes contributions possibly even greater to improving many human beings practical capability and fine of lifestyles. In Bangladesh, the health care machine is especially provided with the aid of the government with a very little price. However, this comes with many headaches. The huge number of sufferers makes it hard for the authorities hospitals to offer them with satisfactory fitness care. As an end result, lots of private hospitals are mounted so that you can meet the developing need of the loads for pleasant health care. But whilst one wish to take carrier from a clinic, he first attempts to collect a few statistics about that hospital. To reduce the health care problems in Bangladesh, we have developed a web-based application named doctor-patient portal for effective healthcare.

Lengthy waiting times for registration to look a health practitioner are problematic in Bangladesh, specifically in tertiary hospitals. To address this difficulty, a web-based appointment device turned into evolved l. the intention of this examine turned into to analyze the efficacy of the web-primarily

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based appointment gadget inside the registration provider for outpatients.

This application will provide: Online doctor appointment system, Information approximately the physician's chamber in a town a manner to make an appointment with the doctor

SMS notification for users booking confirmation, Find available blood donor, Information about the ambulance service provider.

II. LITERATURE REVIEW

Imteaj et al. authored a paper that described a smartphone based application for the health care system of Bangladesh. Though their system has hospital ranking based on quality and cost, they don't have a doctor ranking system which our system has [1]. Authors surveyed the views of the masses of the feasibility and suitability of smartphone use for healthcare purposes. They summarized their findings that smartphone use is extensive, frequent, and acceptable for healthcare purposes [2]. Digital non-public fitness document systems support [3] affected person-centered healthcare with the aid of making clinical records and different applicable statistics on hand to patients, as a result of assisting patients in health self-management.

Smart Doctors Appointment and Prescription System is an application that to give service to the doctor and patients. Doctors and patients connect with each other and ask for appointment [4]. Tia Gao, Dan Greenspan, Matt Welsh, Radford R.Juang, and Alex Alm showed their paper the affected person's crucial parameters along with ECG, heart rate, pulse charge and temperature are measured using a patient tracking machine [5].

In an application (app) called, "Doctorla", the developers designed a web application which can discover a doctor or a dentist easily and take an appointment with the physician immediately [6]. "Doctorsbd" is another doctor appointment system in Bangladesh [7]. "Doctor Apps Pulse" is an app wherein medical doctor can verify affected person appointment, write patients history and provides prescription and verbal exchange may be mounted via net [8]. Square hospital in Bangladesh has an online doctor booking system where anyone can take appointment but they don't have a doctor sign up option [9]. In a web app "Sebaghar.com", there

are three different registration system such as doctors, patients, hospital and representative. But there are no other medical-related facilities [10]. Another app-based healthcare provider in Bangladesh is "Healthprior21.com" [11]. The app has E-store, E-library and E-appointment, but this appointment system is not user-friendly. "Apollodhaka.com" is an online doctor appointment system [12]. Also, there is blood bank. "Labaidgroup.com" is Lab aid hospital website. Though it is a good healthcare information system, it has no online appointment system [13]. "Suvidhacare.com" is an Indian online doctor appointment system [14]. It has medical tourism facilities. After studying all these papers and works, we decided to develop an efficient healthcare portal to facilitate medical services to the masses.

III. SYSTEM DESCRIPTION

A. Doctor Ranking

In this system, we measured doctors ranking by considering doctors degree, number of doctor's appointment per week and patients rating. This ranking will be helpful for the user when they search doctor. The search result will be sorted according to that doctor's ranking:

We took three constant parameters for doctor ranking. We thought doctor's degree will get more priority than total appointment number and average rating. We have used the following approach to do doctors ranking:

Total appointment*.25 + Average rating *.25+ Number of degree*.50=Sum. We did this ranking as descending order of sum.

B. System Review

Our Doctor-patient Efficient Portal (DPP) deals with web-based. The project will be developed in PHP with back-end: PHP, HTML5, CSS3, Bootstrap (CSS-Framework), JavaScript as code, MYSQL as a database for giving a better service to the system and we hope that by this system they can handle their problem very easily. We have done doctor ranking to consider doctors degree, count doctor appointment schedule and patients rating. This site can be used in 5 panels: Patient panel, Admin panel, Doctor Panel, blood donor panel and ambulance service provider panel mode. Admin controls the whole system

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TABLE I. Doctor Ranking

Dr Id	Total Appoi ntment (T.A)	Average Rating (A.R)	Degree	Number Of Degree (N.D)	(T.A*.25+ A. R*.25+ .50*N.D) = Sum (Ranking)
71	15	4.5	MBBS, FCPS, FRCS	3	6.4
77	13	4.5	MBBS, D-CARD (NICBD)	2	5.375
75	11	4	MBBS, FCPS	2	4.75
80	11	3.5	MBBS,MS	2	4.625
74	10	3.5	MBBS, MD	2	4.375
76	9	4	MBBS, FCPS	2	4

a. Patient

The patient panel has the following features:

1. See doctor Schedule: A patient can see the doctor chamber and doctor time schedule find the available bus seat and book the seat.

2. Manage profile: Patient can update his/her information and upload a his\her file (report\previous prescription\image).

3. Online Payment: After Selected the time to the system, *the* user can make payment to get his/her appointment by online payment (Bkash). Nowadays Bkash is the most using mobile and online banking.

4. *Getting Confirmation SMS:* After payment, the system sends the same appointment information to the patient throw the bulk SMS.

5. Rating: After appointment confirmation, Patient can rating to the doctor. The patient can rate only that doctor from whom took the appointment.

b. Doctor

New doctor can send a request to the DPP. After verifying doctor, admin add doctor to the DPP. Admin sends email id and password to the doctor using bulk SMS. Then, Doctor can log in.
1. *Add Chamber:* Doctor can add a chamber to his\her Profile. The doctor can update and delete the chamber.
2. *Add time schedule:* Doctor can select chamber, day and time for an appointment.

The doctor can update and delete time schedule.
3. *Leave:* Doctor can leave to select specific chamber and date. That date will not be shown in a regular time schedule. The doctor can view selected leave chamber.
4. *View booking details:* Doctor can view booking details.
5. *View Patient Info:* Doctor can view patient info after confirming the appointment.

Create Report: Doctor can create report date to date in his/her profile to view what he\she income from the DPP.

c. Ambulance Service provider

Manage Profile: Ambulance service provider can manage his/her own profile. He/she can update their information.

Add Driver: One ambulance service provider has two or more ambulance. One ambulance for one driver. So, to mark each ambulance, ambulance service provider add the driver. The ambulance service provider manages driver from their profile when any ambulance is hired, then the ambulance service provider from his profile update from yes to no (when an ambulance is not available).

d. Blood Donor

Who willing to donate blood, can sign up. If he/she ready to donate blood then he/she select option YES otherwise it will be no

e. Admin

Admin has the control power of the system. They can manage all the section of the project such as manage new doctor request existing doctor, chamber, doctor schedule, doctor appointment schedule, patient, blood donor, ambulance service and create a report.

1. *Manage Doctor Chamber:* Admin can update, delete, view doctor chamber.
2. *Manage Doctor Schedule:* Admin can update, delete, view doctor schedule.
3. *Create Report for DPP:* Admin can create a report for DPP. Admin can see the total income of DPP by date.
4. *Create Report for DPP:* Admin can create a report for

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5. DPP. Admin can see the total income of DPP by date.
6. *Manage Blood Donor:* Admin can update, delete, view blood donor.
7. *Manage Doctor:* Admin can update, delete, view and trash (temporary delete) doctor.
8. *Manage Ambulance Service Provider:* Admin can update, delete, view and trash (temporary delete) ambulance service provider.
9. *Manage Blood Donor:* Admin can update, delete, view blood donor.

C. Software Design

Block diagram defines the summary of the whole system. a block diagram is a diagram of a system in which the most important components or features are represented by blocks connected via traces that show the relationships of the blocks. The block diagram of the system is shown in Figure 1.
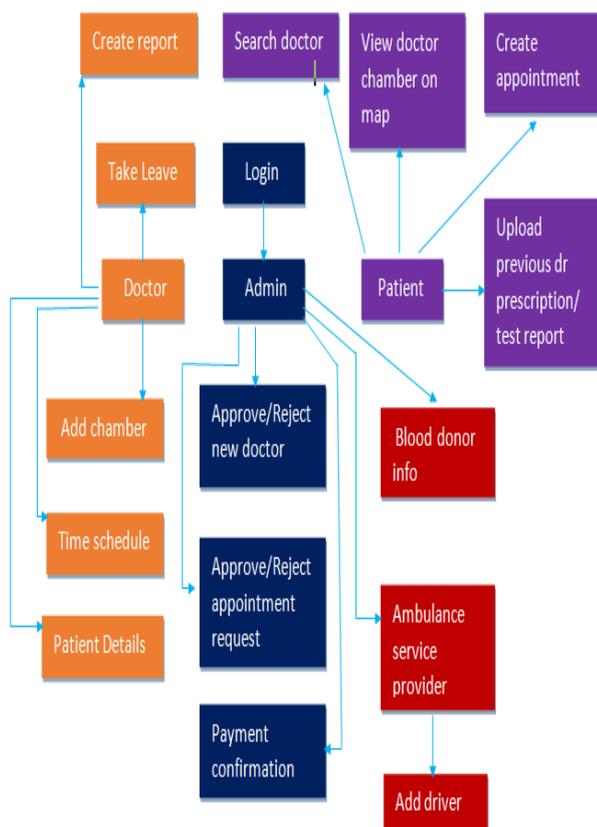
Figure 1. Block diagram of the system

The major module of the system is doctor appointment system. It plays a vital role in this application. There is also blood donor search option.

Those who need emergency blood, they can find available blood donor in the application.

There are also ambulance service provider's information. Anyone can call an ambulance when their need. This system has four login panels such as a doctor, patient, blood donor and ambulance service provider. They can manage their own entire panel.

Patient send request to the system and admin verify the request is valid or not. A doctor can send new doctor request and also admin can verify.

We showed a flow chart of the system in Fig. 2. This flow chart shows the graphical representation of the system.
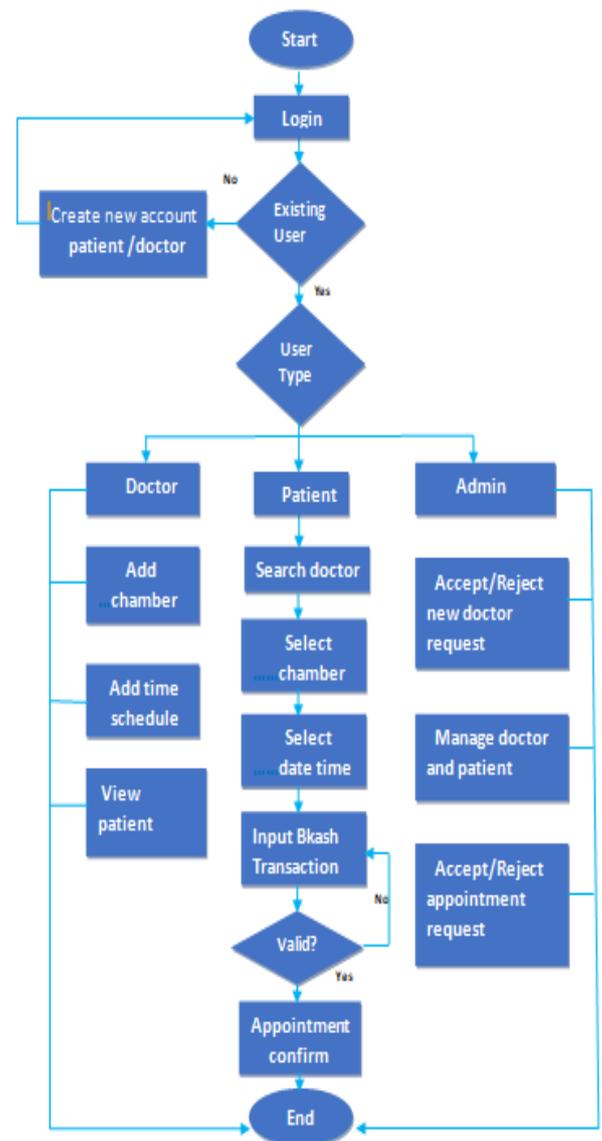
Figure 2. Flow chart of the doctor appointment system

Using this flow symbols, the user can log in into the system. System check user has an account or not, if

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the user has no account then the user has to create an account. Rests of thefunctionalities are shown in the flow chart.

IV. IMPLEMENTATION

After sign up, user search for a doctor and doctor list will be shown in the website (Figure 3). Then they can select the desired doctor. The search result will be automated doctor raking which included with a number of total appointments, doctor degree and user rating.

After that, there are doctors time schedule with doctor chambers google map they can see the exact location of doctor chamber and then they can select their intended time (Figure 4). Users also see average ratings of a doctor.
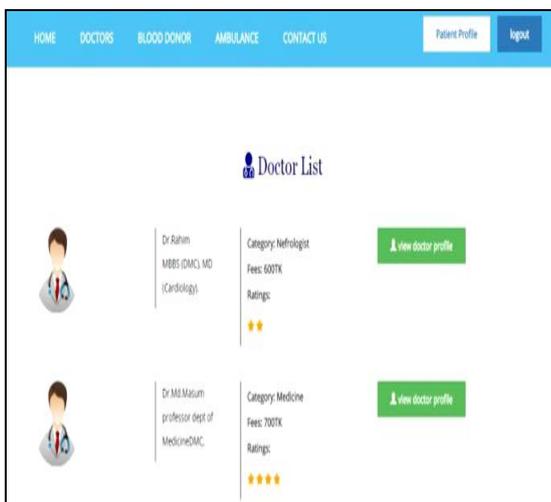
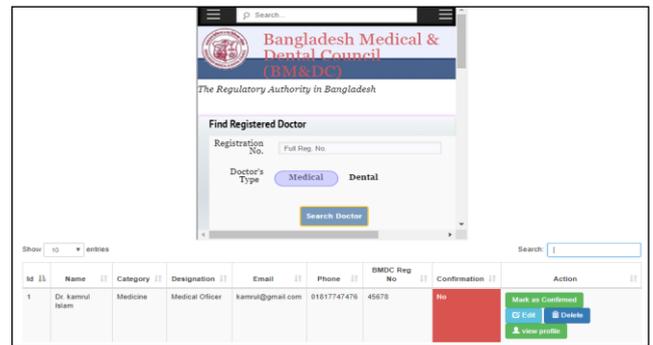**Figure 3. Doctors list**
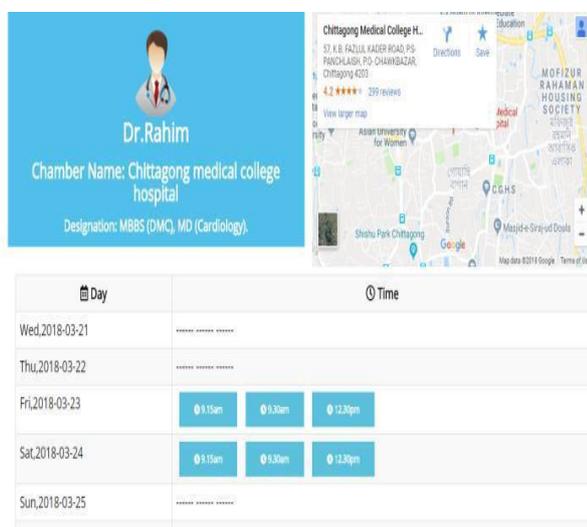
Figure 4. Time slot with google map

Figure 5. New doctor request

Figure 6. New appointment request

When new doctor request comes to the admin panel, admin verifies the doctor's BMDC (Bangladesh medical college) registration. After the admin confirmed the request an SMS will be sent to that doctor with login id and password. Users have to pay doctor fee through bkash. Admin checks the bkash transaction number and confirmed patient for a doctor appointment. After that confirmation SMS will be sent to the user with date and time.
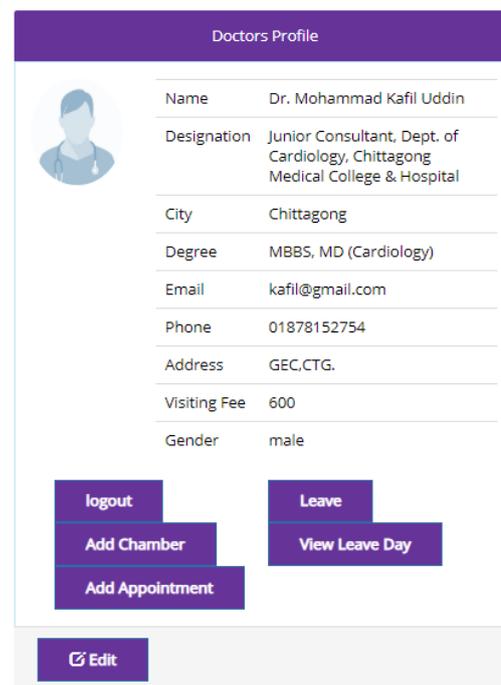

Figure 7. Doctor Profile

Doctor profile showed in fig. 5. Doctor can manage his own profile such as chamber, time schedule, view patient details.

We did a comparison between different similar applications with our proposed application as shown in Table 2. From the above comparison, we can say that our application is better to some degree that other existing application.

TABLE 2. Comparison of different applications with the Doctor-patient portal for effective healthcare.

System Facilities	Our Proposed Application	Doctorola [6]	Doctor Apps Pulse[8]	Doctorsbd [7]
Appointment	Yes	Yes	Yes	Yes
Rating	Yes	No	No	No
Ambulance Info	Yes	No	No	No
Doctors History	Yes	Yes	Yes	Yes
Patient History	Yes	Yes	Yes	Yes

V. CONCLUSION

The proposed doctor-patient portal will pave the way for easy and quick access to better healthcare. In a country like Bangladesh where mobile phone and internet has spread almost every corner, this type of application can help mitigate many hurdles in the path of good healthcare. This information system will arm the masses with up-to-date information through which they will be able to choose the right thing in day-to-day healthcare. Although we have some limitations in our software we still hope that the software will be helpful for the user. In future, we wish to include in this application several other features like area wise disease prevalence alarm, disease-stricken zone alarm, vaccination alert system, health condition monitoring with built-in phone sensors, remote healthcare service etc.

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