DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING (ECE)

SOFTWARE SPECIFICATIONS

SUMMER 2022

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DISABILITY CARE

Purpose:

Many people are born with disabilities and autism. They are flesh and blood humans just like us; Born with the same rights as ours. However, they always find themselves depending on others for assistance in doing even the most mundane tasks. This is especially the case when they are seeking medical assistance. A study suggests that people with such medical conditions have an urge to become self-dependent. There has been a surge of disability independence so much so that 26th July is celebrated as World Disability Independence day. To boost this noble mission of disability independence, we have come up with software that bridges the gap between people with disability and healthcare services. The current existing traditional healthcare portals present a huge language and structural barrier for these people. So we have made our portal guided, voice-controlled, and easily graspable for these people we truly care about.

The patients can get emergency medical care right from their homepage. They can request emergency ambulances and urgent video conferences with available doctors for emergency help. Patients can schedule regular doctor appointments with the assistance of the hospital help desk. They do not need to worry about medicine supplies as the pharmacies will receive direct notification about the prescribed medicines as soon as the doctor prescribes them. Patients also do not need to worry about the medical tests requested by doctors since diagnostic centers will be notified to collect the test samples from patients. The whole process will be automated making sure that none of the stakeholders have to worry about any communication barriers.

Scope:

The scope of this system lies in the healthcare sector. People with disabilities and autism are the prime users of this system given the fact that it is a guided software. Other users whose participation will make this system fully functional include doctors who provide medical guidance, pharmacies that supply medicines, and diagnostic centers which collect test samples. The intercommunication between these actors is made fluent and seamless by the automated features of the system.

Users and Their Roles:

1. **Patient:** Registered users aiming to get any form of medical service from the app will be considered patients. Patients will have unique PIDs as identifications to their profiles. The patient's medical history, diagnostic reports, and medicine supply data will be preserved in the profile along with their identification details such as name, DOB, location, contact information, and gender. Patients can book and attend doctor appointments.

2. **Doctor:** Registered users who are considered doctors will be providing medical services and consultancy hours. Doctors will have unique DIDs as identifications to their profiles. The doctor's schedule, availability, and appointment data will be in their profile. They will be able to prescribe medicine, look up medical history, and assign tests after connecting to a patient via video conference.
3. **Pharmacy:** Registered users aiming to supply medicines will be considered pharmacies. Each pharmacy will have a unique PHID as an identification to their profiles. The pharmacies will be notified of medicine requests whenever a doctor prescribes them to a patient. They will then deliver the requested medicines to the patient's location. The user will have an update of the patient's prescription every visit to the doctor.
4. **Diagnostic Center**: The registered users who aim to provide medical test facilities will be considered Diagnostic centers. They will each have unique DCIPs as identifications to each of their profiles. The diagnostic centers will be able to receive notification from prescribed doctors about what tests need to be done on the patients. They will be able to schedule the medical tests according to the patient's suitable time. They can also collect test samples from the patient's location. They can directly send the test results to the doctor who prescribed the test.
5. **Hospital:** The system will consider registered users who are aiming to provide all kinds of medical facilities as Hospitals. Hospitals will be able to provide emergency medical facilities such as instant video conferencing or sending help to a patient's location. Users of this kind can send transport facilities to the patient if requested and informed. Hospitals can also book doctor appointments for patients after checking availability of doctors.

Use Cases of the System:

The different use cases are grouped according to their actors below:

1. Patient:

a. **Sign up / Register:** Patients can sign up into the system upon providing relevant information like name, email, phone number, location, gender, and DOB. They will be assigned a unique patient ID (PID) which can be used later to access their profile and information. The patient can also sign up for the system using their Google or Facebook accounts, after which the system will prompt for other necessary information.
b. **Login:** A registered patient can log in to the system using their PID and OTP code sent to their contact number.
c. **Logout:** A registered user can log out of the system.
d. **Update Profile:** Patients can add a profile photo, change their current photo, and update medical history and reports. They can also update their email and phone number.

e. **Locate User:** Patients can update their current location by selecting the 'Locate Me' option.
f. **View Medical Reports:** Patients can go to their profile and view new medical reports under the medical reports section.
g. **View Medical History:** Patients will be able to view their previous prescriptions, and medical and test reports under medical history in their profile.
h. **Request Emergency Help:** Upon extreme emergencies, patients can request emergency service by clicking an easily accessible and visible "EMERGENCY HELP" button. Once clicked the system will notify the nearest hospital which will send their emergency healthcare professional and/or ambulance to the doorsteps of the patient immediately.
i. **Request Urgent Consultation:** Upon emergencies, patients can request urgent consultation by clicking an easily accessible and visible "URGENT CONSULTATION" button. Once clicked the system will immediately search for available healthcare professionals and connect them in an instant video call. Doctors from the "favorite doctors" list will have the highest priority during the search.
j. **Schedule Doctor's Appointment (via Hospital):** Patients can request a doctor's appointment from a hospital. This will be a guided process where a representative from the hospital will ask the patient about the medical problem and schedule an appointment with a doctor in that field. The appointment schedule will be automatically synced to the system calendar.
k. **Schedule Doctor's Appointment (Direct):** Patients can directly lookup for a doctor using their DID (Doctor ID) and view their available slots for appointments. They can request an appointment in a free slot and will receive a confirmation upon successful booking. The appointment schedule will be automatically synced to the system calendar.
l. **Attend Scheduled Appointment:** The system will remind the patient 30 minutes prior to their scheduled appointment time via notification. A video call link will be generated and available on the notification and appointment page. By clicking on it the patient will be taken to the video call page.
m. **Add favorite doctor:** At the end of a doctor consultation, through video call, a prompt will appear asking the patient if he/ she wants to add the doctor to their favorites list. A doctor on the favorite list can be easily reached for future appointments.
n. **View Digital Prescription:** Patients can view the digital prescription prescribed by the doctor.
o. **View Patient Progress (Requires Permission):** The doctor maintains a note to keep track of the patient's progress. If the doctor makes it visible to the patient then they can view it.

p. **Schedule preferable time for delivery:** Patients will be able to add a preferable time of the day in the system calendar to notify when they will be able to receive medicine deliveries from the pharmacy.
q. **Schedule preferable time for medical test:** Patients will be able to add a preferable time of the day in the system calendar to notify the diagnostic center when they will be free for medical tests.
r. **Voice Command:** Patients will be able to click on a voice command button and ask the system to login and navigate by commands.

2. Doctor:

a. **Sign up/ Register:** Doctors can sign up into the system upon providing relevant information like name, email, phone number, location, gender, and DOB. They will be assigned a unique Doctor ID (DID) which can be used later to access their profile and information. They can also sign up for the system using their Google or Facebook accounts, after which the system will prompt for other necessary information.
b. **Login:** A registered doctor can log in to the system using their Doctor ID and OTP code sent to their contact number.
c. **Logout:** A registered user can log out of the system.
d. **Update Profile:** Doctors can add a profile photo, degrees, and certificates. They can also update their email and phone number.
e. **Update Schedule on Calendar:** Doctors can update their schedules in the system calendar by integrating Google calendar. The system will extract the appointment slots available for patients from the available times set by the doctor. Once an appointment vacancy is booked by a patient, the system will update the calendar and attach a video conference link to it.
f. **Join Patient Call:** Upon the arrival of a scheduled appointment, doctors will receive notifications with a link to the video conference. By following that link the doctor will be able to join the conference and a digital prescription will be launched.
g. **View Patient Information:** Doctors can view the medical history and reports of patients during regular and emergency consultations.
h. **Add Digital Prescription:** During video consultation, a digital prescription will be available where the doctor can prescribe medicines and tests. They can also write about the progress of patients. This prescription will also contain links to recent prescriptions of the patient.
i. **Prescribe Medicines:** Doctors can prescribe medicines to patients in a digital prescription. Upon the completion of the prescription, the medicine requests are sent to the nearest pharmacy offering those medicines.

j. **Request Medical Tests:** Doctors can prescribe medical tests to patients in a digital prescription. Upon the completion of the prescription, the test requests are sent to the nearest diagnostic center offering those tests.
k. **Add and View Follow-up Patients:** At the end of a consultation, a doctor can choose if a patient needs to have a follow-up. The doctor will select a date for follow-up. Follow-up patients appear on the follow-up list. From this list, doctors can send emails to patients and view pending reports. They can also cancel follow-ups if deemed not necessary.
l. **View Pending Reports:** As soon as the diagnostic center has filed test reports, doctors will be notified and updated with the test reports of a patient they had requested. The follow-up patients list will have a column named 'Requested Tests' where the tests with pending reports will be labeled as pending until they are made available to the doctors. The status will be changed to available once they are viewable by the doctor. The doctor can filter the list on the availability of reports.

3. Hospital:

a. **Sign up/ Register:** A hospital admin can sign up in the system upon providing relevant information like hospital name, emails, contact numbers, hospital location, password, and so on.
b. **Login / Logout:** A hospital admin, after signing up for their account, can log in to the system and log out of the system using the provided email/ phone number and password.
c. **Receive Emergency Alert:** The hospital panel will be open to receive any kind of emergency alert from patients anytime. Such alerts are received with the location of the patient. The medical emergency alerts will be shown pending until an ambulance is assigned and sent off to the doorstep of the patient. When the vehicle will be assigned and sent off, the alert will become green and removed.
d. **Manage Appointments:** Hospitals will receive appointment requests from patients and then connect them to a suitable doctor. The status of such a request will show pending in the "appointment requests" list until a doctor's appointment has been assigned. Upon assigning an appointment, the calendars of both the patient and the doctor get updated and the patient receives a notification.
e. **Manage Help Desk:** Hospital admins will manage their help desk and respond to any queries sent by patients.

4. Pharmacy:

a. **Sign up/ Register:** A pharmacy admin can sign up in the system upon providing relevant information like pharmacy name, emails, contact numbers, pharmacy location, and password.

b. **Login / Logout:** A registered pharmacy can log in to the system and log out of the system using the provided email/ phone number and password.
c. **Receive New Medicine Requests:** Whenever a doctor prescribes medicines to a patient, the nearest pharmacy will be notified. If this pharmacy has the supplies then they will send a notification to the patient asking them to confirm delivery. If the nearest pharmacy does not have the supplies then they defer it to the next nearest pharmacy by selecting the 'defer' option.
d. **Receive Medicine Resupply Requests:** If the patient needs resupply of some medicine, the system calendar will notify the pharmacy 2 days prior to the ending of the patient's current supplies. The adjusted quantity of the medicines will be notified to the pharmacy and they will notify the patient to confirm the supply.
e. **Deliver Medicines:** Once confirmed by the patient, the medicines will be delivered to the doorsteps of the patient while prioritizing the 'available for delivery' time set by the patient.

5. Diagnostic Center:

a. **Sign up/ Register:** An admin of the diagnostic center can sign up in the system upon providing relevant information like the diagnostic center name, emails, contact numbers, location, and password.
b. **Login / Logout:** A DC admin, after signing up for their account, can log in to the system using the provided email/ phone number and password. They can also log out of the system
c. **Update Available Tests:** A DC admin will be able to update the available tests in the center. Upon the addition of new technology for tests, the admin can add a newly available test. Upon a test being temporarily unavailable, the admin will be able to remove the test from the available tests list.
d. **Receive Medical Test Request:** Whenever a doctor prescribes a patient with a test, the nearest diagnostic center providing such a test is notified. The test name and patient details (name & address) are listed in the pending tests list.
e. **Submit Report:** As soon as the test report is ready, the diagnostic center can submit the test report of a patient in the requested tests list. The status of the test changes from pending to submitted. The test report is sent to both the doctor and the patient.

Non-functional Requirements:

1. **Supported Environments:** Any device with a web browser (Google Chrome, Brave, Mozilla Firefox, Safari, Microsoft Edge)
2. **Limitations:**
    a. The operation of the software requires a stable internet connection.
    b. One stakeholder being unavailable can stop one functionality.
3. **Software Attributes:**

a. **Availability:** It should be ensured that the services provided by the software are available at all times especially in case of emergencies by the patient and when the patient runs out of medicines.
b. **Correctness:** It must be ensured that the location of the patient is tracked correctly in case of emergencies, medicine deliveries and sample collection by diagnostic centers. The medicines prescribed, the tests given, the appointments set, all should be ensured correct.
c. **Maintainability:** The hospital management, the doctors, the pharmacies and the diagnostic centers must maintain proper scheduling and services.
d. **Usability:** The services provided must satisfy the maximum number of medical needs by a disable patient.