Tele-Health Monitoring System (planning)

Team Members

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Section 1 (Project Overview)

1.1 Project Description

This document is a system for the site of Tele-health monitoring system. This site aims to addressing the challenges and providing remote health Care solution to the patient. That is done by entering the patient to the site instead of going to hospital, taking an appointment with the doctor, recording his complaint, then sending that data to the doctor to describe the appropriate treatment for him. If required the patient can have a live video session with doctor, and if a further follow up is needed the doctor can ask the patient to visit the hospital for additional tests and treatment. In some cases, if the patient's condition is very bad, then the doctor provides that patient with some medical devices which equipped with a sensor according to the patient's condition, such as a sensor to measure pressure, sugar, temperature and respiratory rate. Each of this sensor collects data from the patient and store it. And if one of the rates of that sensor is unstable, it sends an alarm to the doctor responsible for of that case and opens automatic a live video session with the patient and from it the doctor determines if it is required to be transferred to the hospital or not All this information of the patients will be stored in their medical records. This project is designed to reduce the crowding in the hospital by making online appointment instead of going to hospital, saving time, and effort and not to stand in a long queue.

1.2 Purpose & Objectives

The business goals and objectives for this project will focus on implementing web application that:

- Help patients connects to vital health care services through videoconferencing, remote monitoring, electronic consults.
- Help increasing access to physicians and specialists of doctors.
- Helps ensure patients receive the right care, at the right place, at the right time.
- Using sensors that measure health parameters and vital signs help bring healthcare to the homes of patients and make telemedicine and preventive care possible.

Sample project goals and objectives:

- It will reduce the crowding in Health care center
- It will save the time and effort.
- The data of patient will be centralized.
- Online appointment to save the time and don't need to stand in the queue.
- Increase the hospital management efficiency.

1.3 Project Scope

Project Includes
Tele-Consultation
Tele-Diagnosis
Tele-Treatment
Store and forward
Tele-Monitoring
Tele-Nursing
Interactive patient care
Tele-Pharmacy
Communication with the responsible authorities
Search for data by admins and show it
Selecting the department
Selecting the best doctor
Giving new ID to new patient
Medication reminder
Generating a monthly report about patient
Giving alert sound at serious cases
Collecting patient info at his medical record
Adding a sensors in some cases
Bringing patient to hospital if the matter require
Inquire about bills & pay bill
Submit complaints(About the system)
Submit complaints(Patient pain)

Project Excludes
Accessing private area of each patient
Accessing private area of each doctor profiles
Change medical staff through the treatment
Taking an appointment without matching the queue
Generating MR with serious reason
Using system devices with other system
Change of payment authorities

1.4 Assumptions

1) The user will have internet connection and know how to use the system.

2) Assume that all information will be available for specific people in the system.
3) The administrator has the right to view and modify the database.
4) Patient will get notification after confirming the examination reservation along with all the details about the name of the doctor who make examination.
5) Most of the people will use our system are have a health problems.
6) System must be easy to use by the patient.
7) The system must available at any time people need.

1.5 Constraints

There are some constrains for users who will use this system form clients (patient) or even from the employees(medical staff)

1) Database must be update regularly.
2) People under age of 18 couldn't register.
3) This system is only available for those who can afford it.
4) No one could access all data except key persons
5) Appointments timetable must be organized based on doctors availablity.
6) All required important data must be send to admin .
7) No one can access patient medical records without a strong permission .

1.6 Project dependences

Ambulance management system:

Emergency Service providers on road network are identified. In this thesis GIS/GPS/GSM based prototype system has been developed for routing of ambulance on road network of Hyderabad city (AMS). This prototype is designed such that it finds the patient location and locates the nearest ambulance to patient site using the real-time technologies (GPS/GSM). AMS creates the fastest route from nearest ambulance to patient site and from there to our hospital. Congestion on roads during peak hours is considered, and the fastest route on both major and minor roads is created.

Communication system:

A communications system is a collection of individual telecommunications networks, transmission systems. The components of a communications system serve a common purpose, are technically compatible, use common procedures, respond to controls, and operate in union.

A Voice Communication Control System (VCCS) is essentially an ACD with characteristics that make it more adapted to use in critical situations (no waiting for dialtone, or lengthy recorded announcements, radio and telephone lines equally easily connected to, individual lines immediately accessible etc...)

We use this system to communicate with our patient and make it easy for him to take all services from his home.

Medical device manufacturing system:

This class of software typically provides the ability to schedule activity, deliver instructions to operators, synchronize manual activities with automated processes, and integrate with manufacturing computer systems to enable quality control, deviation management and effective enterprise resource planning (ERP), equipment management, and the documenting of floor activities for monitoring and reporting purposes. MES technology enables the replacement of paper documentation with computerized records, known as electronic device history records (EDHRs), which can be accessed in real-time by all users. Put simply, MES is concerned with providing the right information, at the right time, to the right party, whether this is a human operator or an automated system, to achieve "right first time" production. While automation systems are responsible for controlling the manufacturing process and enterprise resource planning (ERP) systems focus on managing the entire supply chain, there is an information and/or time lag between these two automation layers, often addressed within the manufacturing department using spreadsheets or word documents.

Telemedicine system:

Telemedicine is the use of digital information and communication technologies, such as computers and mobile devices, to access health care services remotely and manage your health care. These may be technologies you use from home or that your doctor uses to improve or support health care services.

The goals of telehealth, also called e-health include the following:

- **Make health care accessible to people who live in rural or isolated communities.**
- **Make services more readily available or convenient for people with limited mobility, time or transportation options.**
- **Provide access to medical specialists.**
- **Improve communication and coordination of care among members of a health care team and a patient.**
- **Provide support for self-management of health care**

➢ **Telehealth services may be beneficial for your health care for example:**

Remote monitoring:

A variety of technologies enable your doctor or health care team to monitor your health remotely. These technologies include:

- **Web-based or mobile apps for uploading information, such as blood glucose readings, to your doctor or health care team**
- **Devices that measure and wirelessly transmit information, such as blood pressure, blood glucose or lung function**
- **Wearable devices that automatically record and transmit information, such as heart rate, blood glucose, gait, posture control, tremors, physical activity or sleep patterns**
- **Home monitoring devices for older people or people with dementia that detect changes in normal activities such as falls**

The potential of telehealth:

Technology has the potential to improve the quality of health care and to make it accessible to more people. Telehealth may provide opportunities to make health care more efficient, better coordinated and closer to home.

Research about telehealth is still relatively new, but it's growing. For example, studies have shown that both telephone-based support and telemonitoring of vital signs of people with heart failure reduced the risk of death and hospitalization for heart failure and improved quality of life.

PayPal system:

It's is an online financial service which allows the user /patient the payment

In our website after he finish his the services which tack in our website. He simply adds his bank account, credit card or debit card details and whenever he pays using PayPal, he can choose which of his cards or accounts it pays with. He can also set one to be the default payment method and that will be used unless he chooses otherwise.

1.7 Project deliverables

1) Evaluation resources and support structures for existing and new allied health tele-health-services.

2) Completion report outlining project performance, deliverables and outcomes, and recommendations for ongoing allied health telehealth capacity building requirements.

Section 2(Project Requirements)

1-Log in the system if the logined person is an existing patient.

2-Enter username.

3-Enter password.

4- Enter ID.

5-Registration in the system if the logined person is an new patient.

6-Assigning an new ID to the patient .

7-Filling a form with a personal data as(name,age,DOB,address,.....)

8-Sending patient information.

9-The system must give the chance to normal users to surf through the system and get information (FAQ, interest links, etc.) without logging into the system.

10-When a user log into the system, he must be able to see his/her personal information in the screen, but he wont be able to modify it. To do this kind of modifications, the patient must go to the hospital and communicate it to them.

11-If the patient is new the system ask him to upload his old medical record.

12-Once the patient is in his homepage, he must be able to send a form to the doctor with the medical information about his disease.

13-It must also be able to ask for an appointment with the doctor.

14-All the fields of these two features (form and appointment) must be filled or the information will not be added to the database.

15-Once the doctor has logged in, they must be able to see a list of all the patients and then, after selecting one of them, access to the information of that patient.

16-For each patient, the doctor must be able to see all the forms that the patient has sent as well as the appointment requests.

17-The doctor must be able to send an email to the patient to ask him to go to the hospital if any parameter in the forms is out of the normal range.

18-The doctor must be able to access to the patients options like sending a form or requesting an appointment .

19-The system shall be able search the patients record on the bases of ID number, date and telephone number .

20-Patient queuing feature should be available.

21-The tele-health solution will provide video conferencing / video chat based on applications Function allowing live video session between physician and patient.

22-The doctor may ask for an in-person visit before video conferencing / video chat.

23-The patient may to need adding a sensors in some cases.

24-These sensors collect& store patient data.

25- These sensors send patient data to medical staff in system.

26- These sensors display alert message & alert sound if there is dangerous cases.

27- The doctor should be able to send aprescription to patient.

28-The user should be able to search for specific department.

29-The system should be able to recommend the best doctors in system to user.

30-The system should generate each day a list of patient who expected to attend appointments that day.

31- The system should enable the user to purchase products.

32- Medical record history for patients with multiple visits Functionality to view health/clinical records summary along with date timestamp in a chronological order from the very first visit till recent consultation.

33- The system should support report generation based on EMR data, downloadable in excel and pdf formats.

34-The system should access the field of medication reminder.

35- The patient must be able to remove his profile from the system.

36- The patient must be able to update his profile from the system.

37- The doctors must be able to remove his profile from the system.

38- Access to technical support staff : Technical support staff members can help answer questions about telehealth programs. To help with efficiency, technical support staff may be shared across collaborating organizations.

39- Accessing to the private area of the a system is forbidden unless the user has a valid username and password. There are some specific options (or services) that, for security reasons, must be only available for registered users.

40- After tacking a serve the user(patient) should go to screen which enable him to pay fees.

41- Finally, the patient log out from the system.

42-In the end , the system collect patients data and send them to database to store.

Section 3 (Project Start-Up)

3.1 Project Life Cycle

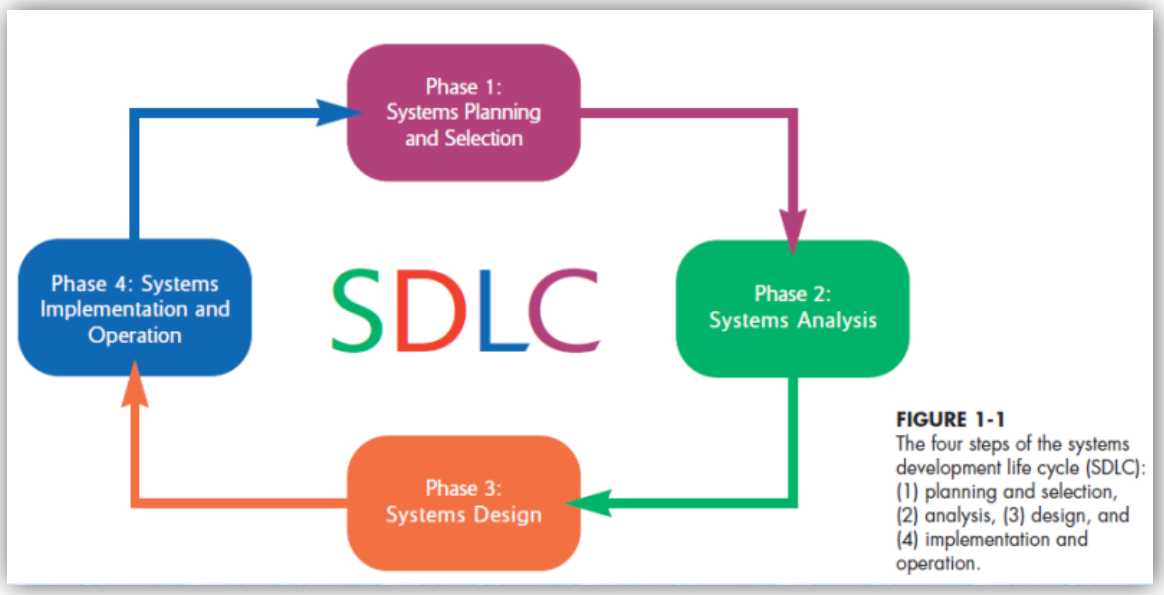


FIGURE 1-1
The four steps of the systems development life cycle (SDLC): (1) planning and selection, (2) analysis, (3) design, and (4) implementation and operation.

3.2 Methods, Tools, and Techniques

Uses some methods at:

- **Software management (data collection , agile development, risk analysis).**
- **Software requirements (requirements specification).**
- **Software design (database management system (DBMS)).**
- **Software construction (detailed design , code review).**

Programming language:

- **SQL**
- **HTML5**
- **CSS3**
- **PHP**
- **JS**

Using some programs like Tools:

- **Visual Studio Code**
- **Oracle SQL**
- **Microsoft EXCEl**

Using some diagrams:

- **EDR**
- **Dataflow diagram**

- Context diagram
- Gantt chart
- Network diagram

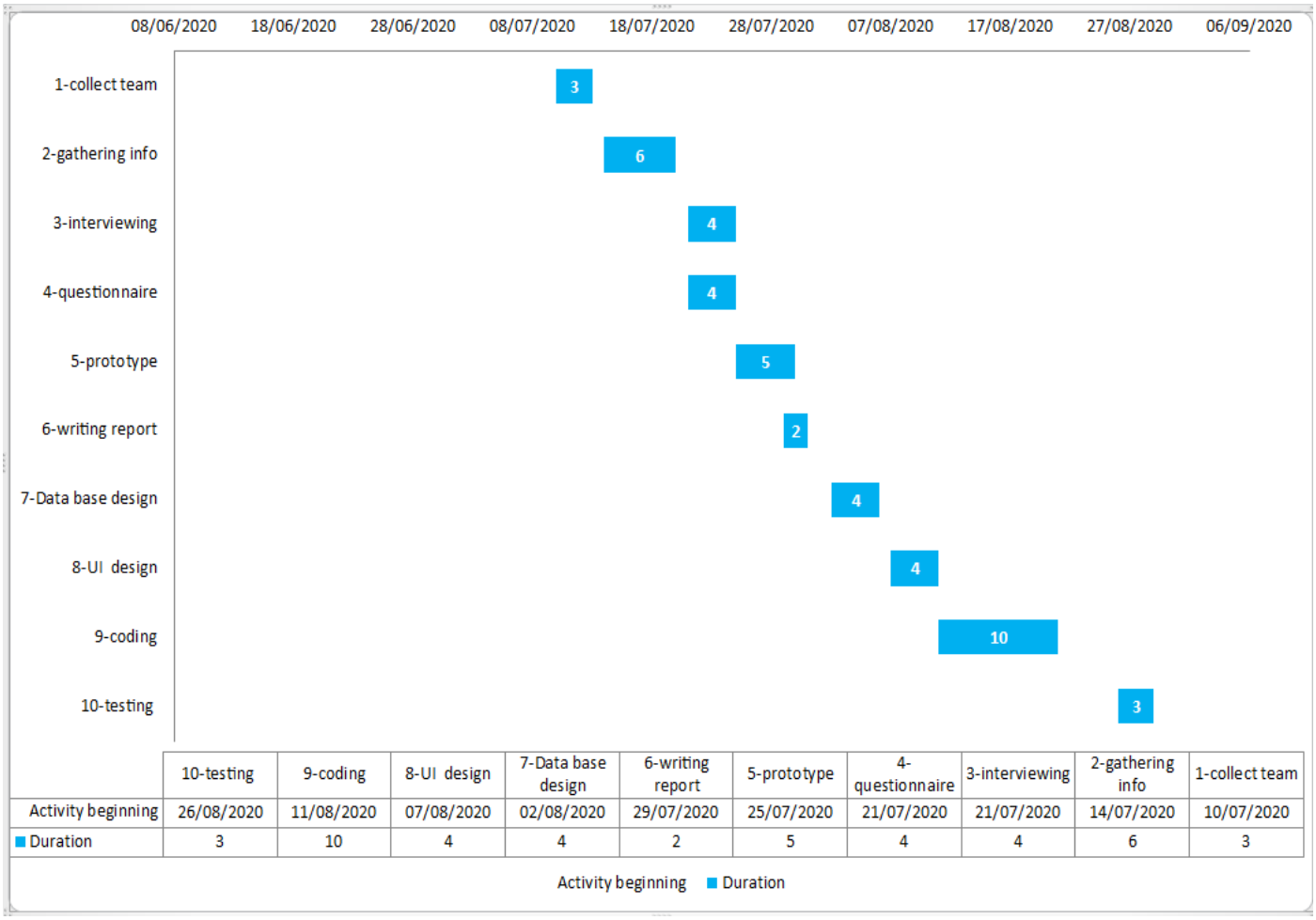
Techniques:

Waterfall project management:

This waterfall approach assumes that individual team member rely on each other to complete tasks in sequence as contributions to common goal build they enable more team members to take on larger tasks.

3.4 Schedule Allocation

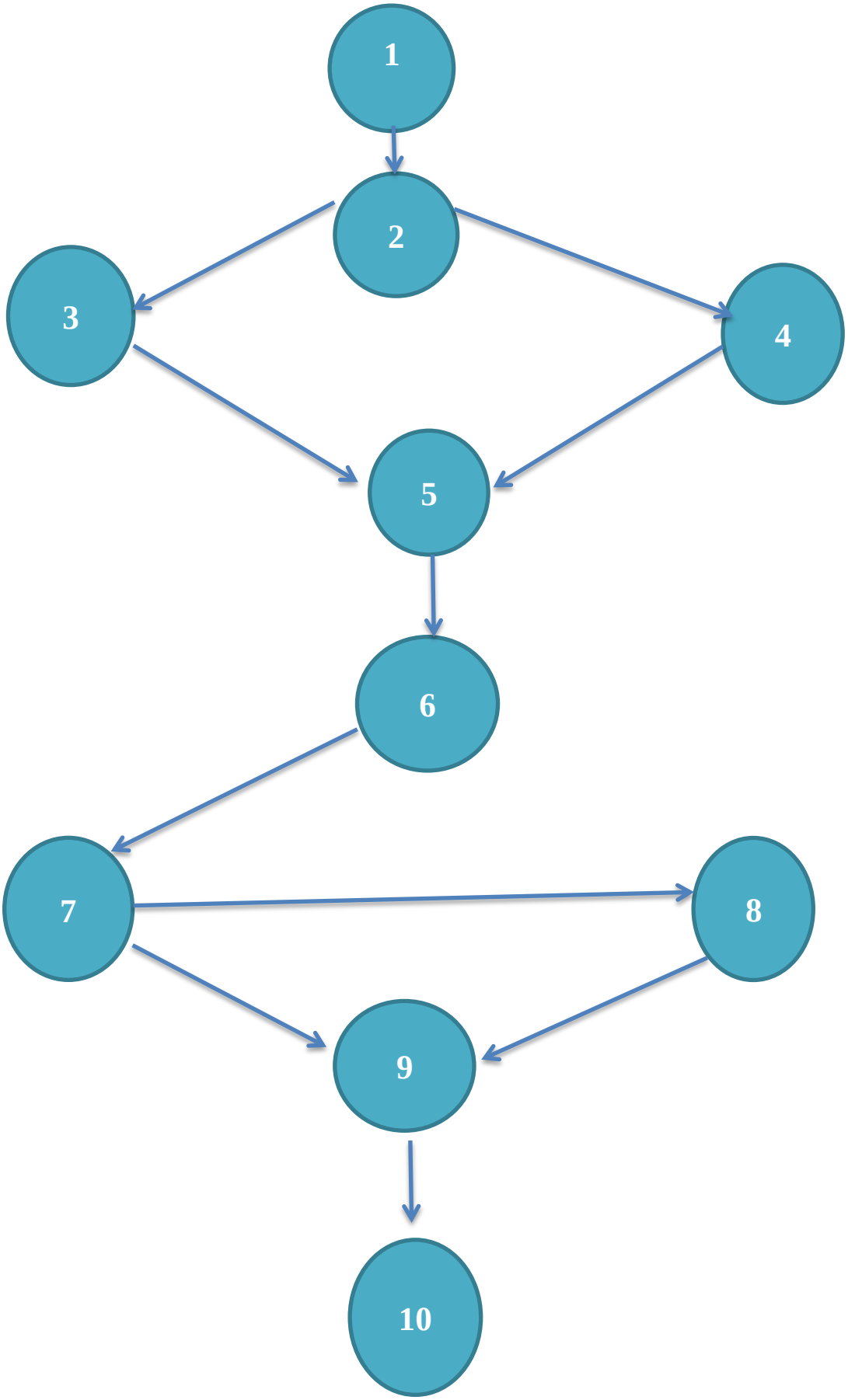
3.4.1 Gantt Chart



	10-testing	9-coding	8-UI design	7-Data base design	6-writing report	5-prototype	4-questionnaire	3-interviewing	2-gathering info	1-collect team
Activity beginning	26/08/2020	11/08/2020	07/08/2020	02/08/2020	29/07/2020	25/07/2020	21/07/2020	21/07/2020	14/07/2020	10/07/2020
Duration	3	10	4	4	2	5	4	4	6	3

3.4.2 Network Diagram

Activity(task)	Per-task	duration	TE	TL	slack	Critical path
1-collect team	-	3	3	3	0	YES
2-gathering info	1	6	12	12	0	YES
3-interviewing	2	4	22	22	0	YES
4-questionnaire	2	4	22	22	0	YES
5-prototype	3,4	5	31	31	0	YES
6-writing report	5	2	38	38	0	YES
7-Data base design	6	4	44	44	0	YES
8-UI design	7	4	52	52	0	YES
9-coding	7,8	10	66	66	0	YES
10-testing	9	3	79	79	0	YES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Section 4 (Project acceptance criteria)

Task No.	Task name	Finish date	acceptance criteria Rate	Successfully finished
1	Collect Team	13/7/2020	95%	✔
2	Gathering Information	20/7/2020	80%	✔
3	Interviewing	24/7/2020	88%	✔
4	Questionnaire	24/7/2020	85%	✔
5	Prototype	29/7/2020	88%	✔
6	Writing Report	1/8/2020	88%	✔
7	Database Design	6/8/2020	85%	✔
8	UI Design	10/8/2020	90%	✔
9	Coding	25/8/2020	90%	✔
10	Testing	28/8/2020	90%	✔

Section 5 (Risk Management)

Risk Description	Probability	Impact	Strategy
Cost Estimates Unrealistic	Low	High	The cost is the important role in the project that mustn't change by the time Estimates Unrealistic high The project.(good study to cost and benefits)
Time Estimates Unrealistic	Low	High	The project must delivered in the specified time and delaying to deliver the project may effect on the the importance of the project.
Team Size	High	Medium	If the one of the team leave working of the project this will delay the delivered time of the project.

Project Scope Creep	**Low**	**High**	**The scope of the project must review by the project manager to determine the scope of the project requested.**
Team Members Unknowledgeable of	**Medium**	**High**	**This effect of the project that not achieve the requested.**
Available documentation	**Medium**	**Medium**	**The documentation help to make new project or to reengineering the project and it's very imported.**
Available Security	**Low**	**High**	**Security requirements related to processing and managing large amounts of wirelessly transmitted data are essential, and cyber security is increasingly important in the development of medical devices. Availability of ambulance to move the patient to the hospital**
Available requirements	**Medium**	**High**	**The hospital should provide the essential equipment for patient to be treated remotely and the availability of ambulance to move the patient to the hospital.**
Available medical record	**Medium**	**Medium**	**The interaction between patient and doctor using the telehealth monitoring technology should be recorded in the medical record of the patient.**
Available 24 Hours of medical care	**Medium**	**High**	**The system should be available 24 hours and provide alternative care in case of technology malfunction**

Section 6 (Budget)

Key Budget Category	Budget Amount	Periods of Time
Team members	8,000$	10/07/2020 : 28/08/2020
Maintenance	5,000$	Monthly
database license	6,000$	yearly
Improvements	3,000$	yearly
Announcements	2.000$	Monthly

Section 8(Communcation)

In our introduced system its better for the patient to have his first visit for our system offline which meens to make his medical records with the technician according to his medical history and his requierd tests before recording it; the admin is the responsible one for the client's data entry and giving the patient his unique ID related to the system. In case of the patient can't visit the hospital to make his own medical record he can make it online and some oe our technicians will contact him to fill full the information; For reserving an appointment the patient can do it him self through our website with the patient ID and all the services too even the payment.

Clinician to Clinician	Clinicians often communicate through e-mail ,video, or both
Clinician to Patient	Video , phone , email ,remote wireless monitoring internet
Patient to system	Wearable monitors , smart method , mobile app , video , email ,web portal