DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON

SYSTEM REQUIREMENTS SPECIFICATION
CSE 4316: SENIOR DESIGN I
FALL 2020

TEAM 10
MEDTECH

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Revision History

Revision	Date	Author(s)	Description
0.1	10.08.2020	MP	document creation
0.2	10.17.2020	MP	Added Product Concept
0.2.1	10.18.2020	MP	Added Safety Requirements
0.2.3	10.23.2020	MP	Added Future Requirements, updated Safety Req.
0.3	10.24.2020	MP, NM, HG, NS	release candidate 1
1.0	10.28.2020	NM	Official Release

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1 Product Concept

This section describes the purpose, use, and intended user audience for the product "Medtech". Medtech is a system that enables medical professionals to manage patient's medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory and test results. The intended user audience are nurses.

1.1 Purpose and Use

Medtech's purpose is to cut down time spent usage. How it should be used in a nurse's normal setting works as follows: Upon logging in with a username and password, the user should see a list of patients. Files to these patients are accessible, and each file includes all medical details and history. To cut down time usage, the user is expected to use the tab search engine if he/she does not know where to navigate.

1.2 Intended Audience

Medtech will be publicly available through open source. Since the system scale is small, small clinics would be using this. This product is designed for the sponsor of the project, Dr. Shawn Gieser. Medtech is intended for the nursing component of patient care.

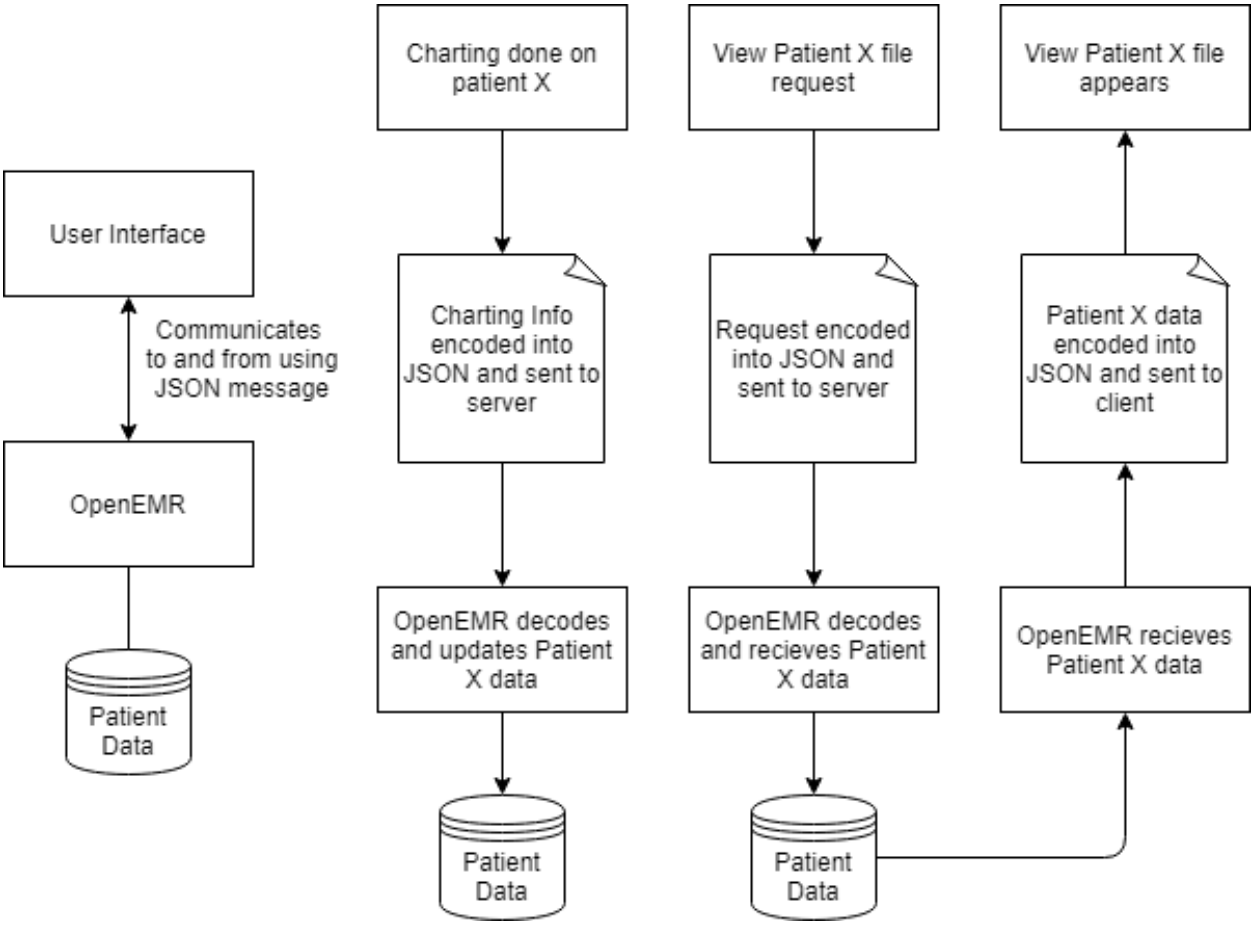

Figure 1: Medtech conceptual drawing

2 PRODUCT DESCRIPTION

This section provides a brief description of features of MedTech. The primary operational aspects is it to assist medical professionals with the health care of patients. MedTech aims to increase efficiency and usability of EMR systems. This section provides the reader with an overview of our EMR System, MedTech. Below we outline the key features and functions found in the products as well as critical user interactions and user interfaces from the perspective of end users, maintainers and administrators.

2.1 FEATURES & FUNCTIONS

The main features we hope to target are:

1) Hourly updates from patient to health care professionals
2) Voice recognition verification from doctors to patients for medications, prescriptions
3) Patient history details like previous ailments, medications, prescriptions, allergies and others.
4) Integration of machine learning and other deep learning models to help with early diagnosis
5) Updating lab results and other diagnostics in to the software
6) Conversion of notes from medical professionals to billing and other document management.

Since the medical field is a diverse industry and includes a variety of specializations, we will be focusing on a select department so as to narrow down our focus.

3 SPRINT BACKLOG

External inputs and outputs are outlined in the table below:

NAME	DESCRIPTION	USE
Login	A login page for medical professionals	To login with their credentials
Patient File Summary	Brief description of patient's file	This would display patient basic information, allergies, ID and blood type
Patient Updates	Updates by doctors,pharmacy and other health care professionals	This would include updates to treatment plan,pharmacy prescriptions and other orders from doctors
Settings	This would be to help with UI/basic web settings	Provide users with options to change password and other basic operations
Logout	A button to exit	This will logout out of professional's particular page.
Other elements	elements pertaining to individual patients	It would include patient for lab,flowsheet, patient history and updates all would appear on the same page

3.1 Product Interfaces

Below we have mock ups for our login page and patient file summary.

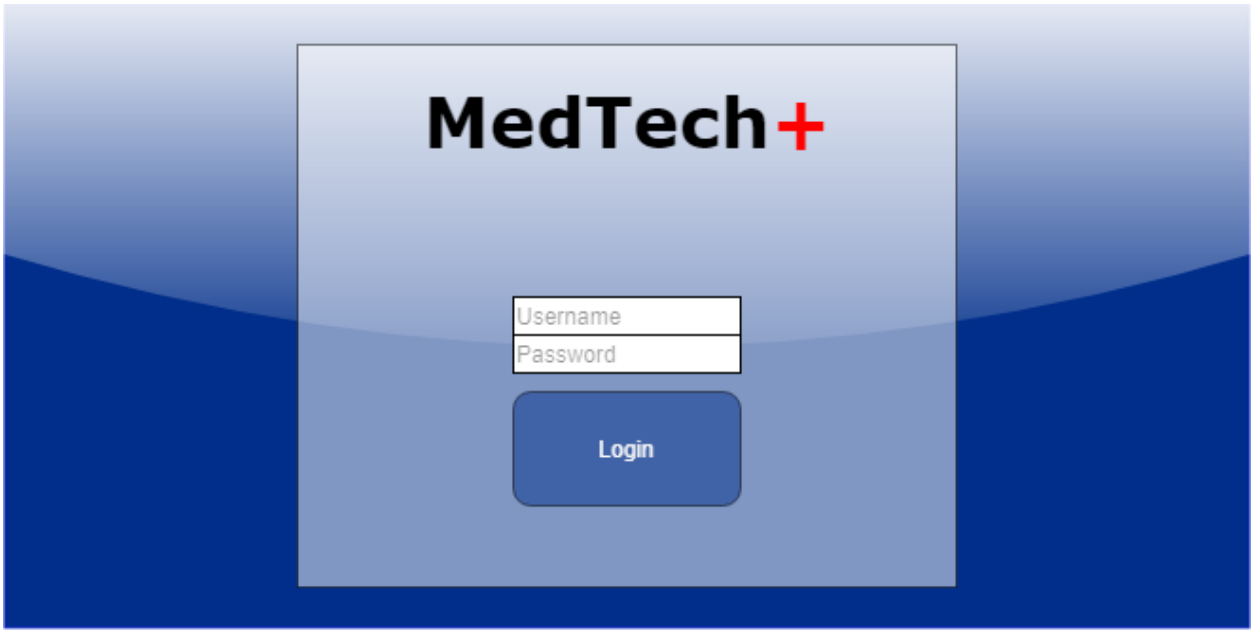

Figure 2: Login

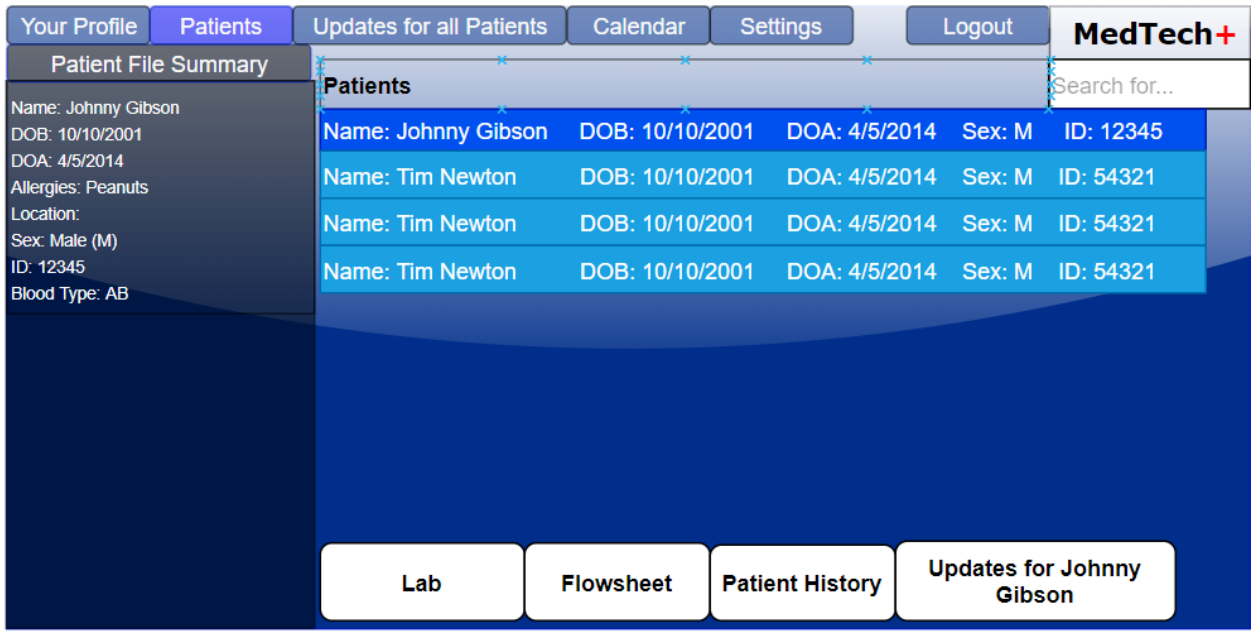

Figure 3: After Login

4 Customer Requirements

This project is meant to serve the medical community with helping them minimize the charting time. So this project will mainly be focused on improving the UI/UX and smarter layout for application with collective effort to make a seamless integration of state-of-the art technologies meant to help maximize the readability of the system as compared to the industry standard of software such as Epic.

4.1 Log-in for medical staff

4.1.1 Description

The medical staff like nurses and doctors should be able to create their unique account and then later log-in with that. Every employee should have one and only one account.

4.1.2 Source

Sponsors (Medical Professional/students)

4.1.3 Constraints

No sensitive information should be displayed on the screen without the staff member changing their temporary password.

4.1.4 Standards

NIST standard fir password management

4.1.5 Priority

High

4.2 Log tracking

4.2.1 Description

The system should be able to log each and every action taken to modify or view sensitive data for legal purposes and to satisfy one of the HIPPA rules

4.2.2 Source

Team

4.2.3 Constraints

Constraints include verifying the log status without increasing too much latency

4.2.4 Standards

HIPPA

4.2.5 Priority

High

4.3 Lab reports integration

4.3.1 Description

The system should allow integration of lab reports of medical patient for the nurses and doctors to view in the same patient profiles along with their other details as mentioned in the below requirement

4.3.2 Source

Team, sponsor

4.3.3 Constraints

The lab report integration should be in real time but that blocks off some computation power and might increase cost.

4.3.4 Standards

HIPPA

4.3.5 Priority

High

4.4 Patient History

4.4.1 Description

The system should be able to store and collect patient data from medical professional to help them with their analysis.

4.4.2 Source

Team

4.4.3 Constraints

More data to handle in out database, can increase the search-time

4.4.4 Standards

HIPPA

4.4.5 Priority

High

4.5 Charting

4.5.1 Description

The system should be able to provide an interface to staff members to chart their health including but not limited to daily vitals.

4.5.2 Source

Sponsors (Medical Professional/students)

4.5.3 Constraints

Need to keep many check statements, a bug might prevent them from charting properly.

4.5.4 Standards

HIPPA

4.5.5 Priority

High

5 Packaging Requirements

MedTech is a completely software driven project and a web application. Thus we will be hosting the web application on Google Cloud. We have no hardware requirements an will not require other packaging.

5.1 Google Cloud Hosting

5.1.1 Description

We would be using our student credits to host on Google Cloud.

5.1.2 Source

Each of our student accounts serve up to 600 credits so we could use that to our benefit.

5.1.3 Constraints

Constraints would include software updates to user systems to ensure that the current version is compatible.

5.1.4 Standards

None

5.1.5 Priority

Low

6 Performance Requirements

The main goal of this project will be to minimize the amount to time medical professionals spend charting and remove some of the unnecessary steps in between.

6.1 Always on service

6.1.1 Description

Since this project will be dealing with EMR(Electronic Medical Record) and EHR (electronic Health Record) system, this service should be available 24 hours a day and 365 days a year.

6.1.2 Source

Team

6.1.3 Constraints

Constraints include: 1) Assuming AWS or any other service provide are providing service with 100 percent performance time

6.1.4 Standards

None

6.1.5 Priority

Low

6.2 Reliability

6.2.1 Description

The client side service should never break or exit without explicit action taken by the user/customer

6.2.2 Source

Team

6.2.3 Constraints

Constraints may include hardware issues

6.2.4 Standards

None

6.2.5 Priority

High

7 Safety Requirements

Medtech is mainly a software project that will not require the use of laboratory equipment.

7.1 Laboratory equipment lockout/tagout (LOTO) procedures

7.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

7.1.2 Source

CSE Senior Design laboratory policy

7.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

7.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

7.1.5 Priority

Non-existent

7.2 No inaccuracies of charted data

7.2.1 Description

For legal reasons and patient safety, charted data must be absolutely accurate and must be double checked. Charted data includes medication orders for the correct drug and its prescription.

7.2.2 Source

The Office of the National Coordinator for Health Information Technology, Reducing Medication Errors: Simple Recommendations

7.2.3 Constraints

Software usage may be limited without training or reference to a nurse's inputs.

7.2.4 Standards

Tools: Reducing Pick List Errors in Medication Ordering for Providers [1]

7.2.5 Priority

High

8 Maintenance & Support Requirements

This will be an open source project to maximize its outreach and also be cost-efficient for the customer. Since this will be an open source project, the development team will not be able to help after the set project duration. This will be done by the open source source community, if possible. With that being said, it will be depend on any of our team-member if they voluntarily want to help with maintenance after the prescribed project-length.

8.1 Documentation

8.1.1 Description

The team will be writing the documentation for the code that is not clearly understood by a non-tech background individual. This will be help the customer significantly in understanding how the program works and can help them solve some of the post-delivery problems.

8.1.2 Source

Team

8.1.3 Constraints

We do not want to spend more time on writing documentation than on functional code

8.1.4 Standards

List of applicable standards

8.1.5 Priority

High

9 Other Requirements

The project should be capable of running in any computer environment including but not limited to any Operating System with set specifications.

9.1 Hardware

9.1.1 Description

The minimum hardware requirements to run this program without a set latency is required. A system computer should have an x86 architecture and at least 4 GB of RAM and 5 GB of free space on their storage drives.

9.1.2 Source

Team

9.1.3 Constraints

Some of the older systems might not be able to fully utilize this.

9.1.4 Standards

None

9.1.5 Priority

Low

9.2 Web Browser

9.2.1 Description

Since this will be a web app, to fully utilize all the features, this needs to run on a browser capable enough to handle all the actions, preferably google chrome (version 86.0.4240.111 for Windows, 86.0.4240.111 for Mac and Linux platforms or above)

9.2.2 Source

Team

9.2.3 Constraints

Some of the older systems might not be able to fully utilize this.

9.2.4 Standards

None

9.2.5 Priority

Low

10 Future Items

10.1 Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009

10.1.1 Description

Provides the HHS (US Dpt. of Health & Human Services) authority to establish programs to improve health care quality, safety, and efficiency through the promotion of health IT. This includes electronic health records and privately secured electronic health information exchange.

10.1.2 Source

Index for Excerpts from the American Recovery and Reinvestment Act of 2009 (ARRA)

10.1.3 Constraints

MedTech EHR must employ "(2) ENTERPRISE INTEGRATION" meaning the electronic linkage of health care providers, health plans, the government, and other interested parties, to enable the electronic exchange and use of health information among all components of the health care infrastructure.

10.1.4 Standards

SEC. 13101. ONCHIT; STANDARDS DEVELOPMENT AND ADOPTION. [3]

10.1.5 Priority

Moderate

10.2 Health Insurance Portability and Accountability Act (HIPAA) of 1996

10.2.1 Description

This protects health insurance coverage for workers and their families when they change or lose their jobs, requires the establishment of national standards for electronic health care transactions, and requires establishment of national identifiers for providers, health insurance plans, and employers.

10.2.2 Source

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT OF 1996 Public Law 104-191 104th Congress

10.2.3 Constraints

Patients must have insurance entries and will be viewed for money billing and transactions.

10.2.4 Standards

TITLE XXVII–ASSURING PORTABILITY, AVAILABILITY, AND RENEWABILITY OF HEALTH INSURANCE COVERAGE [2]

10.2.5 Priority

Low

REFERENCES

[1] Andrew Gettinger. Reducing Medication Errors : Simple Recommendations. 2016.

[2] Robin M. Caplan. HIPAA. Health Insurance Portability and Accountability Act of 1996. *Dental assistant (Chicago, Ill. : 1994)*, 72(2):6–8, 2003.

[3] United States Congress. Health Information Technology (HITECH Act). *Index for Excerpts from the American Recovery and Reinvestment Act of 2009 (ARRA)*, 2009:112–164, 2009.