**SOFTWARE ENGINEERING PROJECT MANAGEMENT**

**PROFESSOR:** *ALI ABBAS*

**PROJECT TITLE: ‘***HomeDoc***’**

**PROJECT TEAM:** 10

|  |  |  |  |
| --- | --- | --- | --- |
| **FIRST NAME** | **LAST NAME** | **STUDENT ID** | **E-MAIL ID** |
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## SECTION 1. CHARTER INTRODUCTION

### 1.1 DOCUMENT CHANGE CONTROL

**Document Title:** HomeDoc Project Charter

**Project Name -** HomeDoc

**Authors:** Yadunanda Mukundhan, Project Manager, EPIC Solutions Ltd.

Abhishek Mysore Prakash, Project Manager, EPIC Solutions Ltd.

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| --- | --- | --- | --- |
| **Revision Number** | **Date of Issue** | **Author(s)** | **Brief Description of Change** |
| 1.0 | 01-30-2020 | Project Manager(s) | Initial Project Charter Draft |

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### 1.2 EXECUTIVE SUMMARY

The HomeDoc Project is proposed to overcome the functional limitations of the Home HealthCare portion of the General Hospital. It will provide a highly accurate and scalable system to have high-level understanding and better control of the patient’s Electronic Health Record (EHR). This system will eliminate the time consuming and exhausting task of visiting the hospitals on a daily basis for health monitoring. The system will comprise of simple interface for easy use, secure access, e-billing, and reliable means of communication for both the end-users.

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### 1.3 AUTHORIZATION

The project charter provides deep understanding of the project and plan of the project named “HomeDoc”. Henceforth, product owner from “The General Hospital” and project manager from “EPIC Solutions Ltd.” are responsible for any or all modifications in this document, based on the changes proposed in basic scope and functionalities of the project.

Every modification should be recorded and needs prior approval from all the below signatories from both the firms.

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*Ali Abbas* Date

Executive Sponsor

*SVP Operations*, The General Hospital

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*Muhammad Omar Malik*  Date

Project Sponsor

*IT Manager*, The General Hospital

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*Harmanjeet Singh Gill*  Date

Project Sponsor

*IT Manager*, The General Hospital

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Project Sponsor  Date

EPIC Solutions LTD.

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## SECTION 2. PROJECT OVERVIEW

### 2.1 PROJECT SUMMARY

Critical health issues can be controlled and avoided by recognizing its symptoms in its early stages. Our aim is to provide a Medical informatic system which can be easily accessed by both the patients and the doctors. This results in early detection of any possible health ailments. The main motive behind our system is to effectively use EHR to correlate it with the real time monitored data acquired from the patients and predict complications using modern technologies like Artificial Intelligence, Machine Learning and Big data analytics which in turn. eliminates the excessive use of medical resources. Our system enhances the accessibility and provides a secure utilization of EHR by using encrypted cloud-based services.

### 2.2 PROJECT GOALS AND OBJECTIVES

**2.2.1 GOALS**

Successfully plan and implement a Medical Informatic System which will modernize the home health division of TGH and deliver quality user experience which is achieved by providing the user with control over their EHR thereby, reducing human efforts in health monitoring. In essence this system turns-out as a stepping stone for disease prediction and aids in e-health care.

**2.2.2 OBJECTIVES**

|  |  |
| --- | --- |
| **Sr. No** | **Objectives** |
| 1 | Building a simple user-friendly application which assists both end users in accessing medical records. |
| 2 | Provides in depth analysis of user data with the help of modern technologies like AI and ML |
| 3 | Provides an accurate healthcare system capable of predicting of future health ailments |
| 4 | Presents a highly scalable system with the help of Cloud servers |
| 5 | Provides a secure environment for sharing and accessing Health records |
| 6 | Providing a system which will act as reliable patient information source in Emergency situations. |

### 2.3 PROJECT SCOPE

|  |  |
| --- | --- |
| **Activities in Scope** | **Activities Out of Scope** |
| Implementation of automated AI and ML from available EHR for prediction and diagnosis of disease. | Prioritizing the level of emergency for multiple patients is not considered. |
| Supports different platforms like android and iOS. | Monitoring the Mental & Emotional Health of patients is not considered. |
| Accuracy in terms of predictions based on highly efficient AI algorithms. |  |
| Scalability considering storing and monitoring of data using cloud services. |  |
| Scan and Log of daily dosage notification for patient and dosage skip notification for doctor |  |

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### 2.4 MILESTONES

The following table represents the major achievements that we will accomplish forwarding into our project:

|  |  |  |
| --- | --- | --- |
| **Project Milestone** | **Description** | **Expected Date**  **(mm-dd-yyyy)** |
| 1. Prototype Application Implementation | A prototype of interactive application will be implemented at the user end for better view and control of EHR. | 03-04-2020 |
| 1. Data Acquisition and Processing | The data acquired and existing EHR is monitored and stored in the cloud for future processing. | 08-31-2020 |
| 1. AI Implementation and Future Diagnosis | Make use of AI and ML to predict future health issues and recommendations for possible treatment at early stages. | 02-28-2021 |
| 1. HomeDoc System Implementation | A whole easy-to-use system which will provide high-level control and knowledge of patient data at both ends. | 09-04-2021 |

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### 2.5 DELIVERABLES

The following table represents the project’s work breakdown structure. All the manageable requirements are in accordance with the project objectives:

|  |  |  |
| --- | --- | --- |
| Phase Number | Deliverable Description | Due Date  mm-dd-yyyy |
| 1 | Medical data acquired in the form of patient’s vitals will be logged into our system. | 04-30-2020 |
| 2 | Making logged data available and visible in our system. | 05-31-2020 |
| 3 | Scanning Barcodes of medicines to keep a record of daily dosages and having notifications for missed medicines and vitals. | 06-30-2020 |
| 4 | Data Storage - Getting enough storage to store patient data on cloud so that it can be accessible from anywhere. | 08-31-2020 |
| 5 | AI - make a database of already known diseases with their symptoms and continuously compare the patient data with it to make sure of any upcoming health issues for the patient. | 02-28-2021 |
| 6 | Medical processing - processing of medical data , decision making and diagnosis of diseases is done in this phase. | 04-30-2021 |
| 7 | Security - make sure the communication channel is secure and end-to-end encrypted. | 05-31-2021 |
| 8 | Complete EHR availability and visibility | 06-30-2021 |
| 9 | Testing phase: Test and calibrate the algorithm to get more accurate in perceiving the dimensions. | 07-31-2021 |
| 10 | Trial Phase: Test and fixing issues period while creating a pleasant User Interface for application. | 08-31-2021 |
| 11 | App and Software releasing event | 09-04-2021 |

### 2.6 PROJECT COST ESTIMATE AND SOURCE OF FUNDING

#### 2.6.1 PROJECT COST ESTIMATE

The whole project cost is estimated in the table below:

|  |  |  |
| --- | --- | --- |
| **EXPENSE** | **DESCRIPTION** | **COST ($CAD)** |
| Labor | Human resources cost expended towards the project. | |
| 1 Development Manager (TGH) | | 150,000 |
| 3 Programming Analysts (TGH) | | 675,000 |
| 8 Programmers (5yr+ exp.) (TGH) | | 1,440,000 |
| 7 Software Programmers (>2yr & < 5yr exp) (TGH) | | 735,000 |
| 1 Project Manager (EPIC Solutions Ltd.) | | 200,000 |
| O&M | Operations and Maintenance costs | 100,000 |
| Software Licences | One-time software licence purchases. | 1,000,000 |
| Bell’s Cloud Storage | The cost of renting and using Bell’s cloud storage services for one year. | 15,000 |
| Miscellaneous Costs | Unexpected and different kind of unknown expenditures. | 100,000 |
| **Total** | 4,415,000 | |

#### 2.6.2 SOURCE OF FUNDING

The source of funding to support the whole project is The General Hospital.

### 2.7 DEPENDENCIES

The following table represents deliverables from other products and firms:

|  |  |
| --- | --- |
| **Dependency Description** | **Critical Date** |
| Home Equipment Data Acquisition Accuracy | 04-30-2020 |
| Bell’s Cloud Storage Availability | 05-31-2020 |
| Software licences | 06-30-2021 |

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### 2.8 PROJECT RISKS, ASSUMPTIONS, AND CONSTRAINTS

#### 2.8.1 RISKS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Risk Description** | **Probability**  **(H/M/L)** | **Impact**  **(H/M/L)** | **Planned Mitigation** |
| 1 | Privacy of end-user | M | H | Layered Authentication |
| 2 | Use of AI is not yet completely safe | L | L | Regular testing and training |
| 3 | Schedule risk will be there as the delay with any of the milestone will affect the scheduled time of the project | H | M | Proper use of skills on each task will decrease this risk factor or Using better management tools and techniques for instance agile methodology |
| 4 | Cost Incremental Risk | M | H | It can be compensated by the use of Iterative and Incremental approach |

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#### 2.8.2 ASSUMPTIONS

|  |  |
| --- | --- |
| **Sr. No** | **Assumptions** |
| 1 | The cost of the project falls under the initial estimate |
| 2 | Every deliverable will be completed on time |
| 3 | Equipment provided is up-to -date with modern technologies and is highly compatible with every element of the system. |
| 4 | No extra training cost and time is allotted as the application is simple and easy to use |
| 5 | Every computing element has high processing power for the implementation of AI algorithms |
| 6 | Human resources provided for this project are highly knowledgeable and efficient |
| 7 | The allotted human resources are available for the total duration of the project |
| 8 | A certain source of uncertainties are taken into account for meaningful and accurate monitoring of results. |
| 9 | Cloud Server performs with maximum efficiency |

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#### 2.8.3 CONSTRAINTS

|  |  |  |
| --- | --- | --- |
| **Sr. No** | **Category** | **Limitations** |
| 1 | Cost | This limitation comes into the picture when the cost of completion of the project is higher than the initial restricted budget. This affects the project outcome and reduces the overall scope of the project. This also puts a financial burden on the customer |
| 2 | Time | Delay in the project completion reduces the value of the project to the customer. |
| 3 | Human Resource | Limited number of human resources allotted can lead to reduction in scope, quality and project performance |

**SECTION 3. PROJECT ORGANIZATION**

**3.1 PROJECT GOVERNANCE**

* Project manager governs all the activities at the top level and makes sure that the team doesn’t deviate from their vision and missions.
* Whereas the development manager leads the team of programmers and supervise their work to make sure that they meet the weekly deadlines and reviews all the deliverables and make suggestions through his expertise.
* Two analysts monitor the performance of programmers and helps in technical aspects.
* The third analyst with expertise in a specific type of application monitors the work of programmers and makes sure that the team will not face any deadlock situations in the future.

**3.2 PROJECT TEAM STRUCTURE**

Project sponsor

Senior Review board

Project manager

Development manager

(1)

Programmers (8)

Exp >5

Analysts

Programmers (7)

Exp < 5

Team members

(3)

Executive steering committee

**3.3 ROLES AND RESPONSIBILITIES**

|  |  |
| --- | --- |
| **Roles** | **Responsibilities** |
| Project manager | * To guide the whole team in achieving project goals. * Should regularly interact with project sponsors and update them with the current status of project. |
| Development manager | * Needs to co-ordinate with team members and analysts. * Should be updated with status / progress of project. |
| Team members | * Create a project plan or a project outline which describes strategies used to achieve the goals. * Fix weekly milestones for programmers enabling them to meet the project deadlines. |
| Analysts | * Assess the programmers’ performance * And assist them in their work with his expertise. |
| Programmers | * Should be able to develop applications with simple interface. * Should develop a simpler program which aids in debugging the program. |
| Project sponsors | * Regularly have a meeting with project manager and his team and discuss the project progress. * Should set weekly milestones. |

**3.4 PROJECT FACILITIES AND RESOURCES**

Since project work is undertaken at client site, enough space should be made available in order to accommodate whole team working on project including human resources provided by stakeholders. Enough hardware should be made available so that all project peers can work parallelly. Conference rooms are required in order to conduct meetings with stakeholders.

Resources being utilized –

1. A development manager
2. Two analysts with extensive experience in developing applications.
3. One analyst with an extensive experience in developing specific type of application.
4. 8 programmers with an experience of more than five years.
5. 7 programmers with an experience less than five years.

**3.5 CONFLICT RESOLUTION**

* Project sponsor and project manager handle all the conflicts mainly concerning the goals and objectives of the project.
* All the problems or difficulties regarding project development will be managed by project analysts and the team of programmers.
* All the issues regarding employees are taken care by HR Team of The General Hospital.
* Financial matters are solely handled by project manager and stakeholders.

**SECTION 4. PROJECT REFERENCES**

Despite the fact that there is no directly available product in the market, for a clear thoughts and better understanding of project following technical papers and journals are referred.

|  |  |  |  |
| --- | --- | --- | --- |
| **Document Title** | **Date** | **Author and organization** | **Location (link or path)** |
| “eSmart: An IoT based Intelligent Health Monitoring  and Management System for Mankind” | 2nd  September 2019 | T. Jagannadha Swamy  Department of ECE, GRIET,  T. N. Murthy  Department of ECE, FST, ICFAI University | https://ieeexplore.ieee.org/document/8821845/authors#authors |
| “A Smart Healthcare Monitoring System Using Smartphone Interface” | 10th  January 2019 | Akshat ; Gaurav ; Zahid ; Bhupendra ; Aditi ; Sachin Kumar ; Maneesha ; Praveen Pandey | https://ieeexplore-ieee-org.proxy.bib.uottawa.ca/document/8605142 |
| “IOT based Patient Health Monitoring System with  Nested Cloud Security” | 29th  July 2019 | Ashvini Kamble ; Sonali Bhutad  Shah & Anchor Kutchhi Engineering College | https://ieeexplore.ieee.org/document/8777691/authors#authors |

## SECTION 5. GLOSSARY AND ACRONYMS

**5.1 GLOSSARY**

|  |  |  |
| --- | --- | --- |
| **S.NO** | **Word** | **Meaning** |
| 1. | Artificial Intelligence (AI) | It is simply the ability of a computer system to analyze and perform a task which requires human intelligence |
| 2. | Cloud computing | Delivery of different services through internet. Some of these services include cloud storage, cloud analytic tools etc. |
| 3. | Data refining | Converting abstract data into implementable data sets |
| 4. | Machine Learning (ML) | An application of Artificial Intelligence, which enables a system to learn and improve from experience without being programmed |

**5.2 ACRONYMS**

|  |  |  |
| --- | --- | --- |
| **Sr. No** | **Abbreviations** | **Explanation** |
| 1 | AI | Artificial Intelligence |
| 2 | EHR | Electronic Health Record |
| 3 | ML | Machine Learning |
| 4 | TGH | The General Hospital |