E-COMMERCE PORTAL WITH RECOMMENDATION SYSTEM FOR SURGICAL EQUIPMENT

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ABSTRACT

Mobile and e-commerce applications are tools for accessing the Internet and for buying products and services. These applications are constantly evolving due to the high rate of technological advances being made. The purpose of E-commerce Mobile Application for Sutures business is to automate the existing system by the help of computerized equipment and full-fledged Mobile Application, fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. The required software and hardware are easily available and easy to work with. Online E-commerce Application, as described above, can lead to error free, secure, reliable and fast management Application. It can assist the user to concentrate on their other activities rather to concentrate on the record keeping. Thus it will help Admin in better utilization of resources. The Admin can maintain computerized records without redundant entries. The technical capabilities of modern smart mobile devices more and more enable to run desktop-like applications with demanding resource requirements in mobile environments. Along the trend, numerous concepts, techniques, and prototypes have been introduced, focusing on basic implementation issues of mobile applications. However, only little work exists that deals with the design and implementation (i.e., the engineering) of advanced smart mobile applications and reports on the lessons learned in the context.

Keywords: *Healthcare, surgical equipment's, online payments.*

1. INTRODUCTION

Healthcare has become one of India's largest sectors, both in terms of revenue and employment. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment. The Indian healthcare sector is growing at a brisk pace due to its strengthening coverage, services and increasing expenditure by public as well private players. In medical and surgery equipment industries, there are huge different types of products. Year by year, equipment production industry is rapidly growing and ultimately doctors surgeons cannot discover or find quality products, as well if found they are so costly, then patient also can't afford the treatment cost. These are complexities that we are trying reduce by developing E-Commerce application.

A. Background

As time passed, more technological advances appeared in healthcare. Additional new technologies have added laser technology and surgical glue to the tools available to the physicians for wound healing. These new materials help the process go quicker and also make the scars less visible. However, even with all the new modern techniques for suturing a wound, the reach of these products is uneasy and sometimes costly for the surgeons. E-commerce application for suture products will provide sutures and surgery-related things at the lowest possible prices to the surgeons to reduce their heavy inventory expenses and to make a surgical process in lesser expenditure. So that surgeons could pass on these benefits to patients with minimal surgery charges. Surgeons can find and discover various types of sutures, suture needles, suture length combinations of sutures and surgery-related things they might want to buy online in the most innovative, hassle-free and simple way. The application will also provide recommendation system which recommends products to buyers based on their profile and previously bought products.

B. Motivation

Now a day Healthcare Industry is growing and rapidly spread in India and also in the world. This industry increasing its productivity, specially includes sutures. Our application focuses more on sutures production, because most of the doctors and surgeons want a good quality and reasonable products. These lots of things effect on common people and patients as they can't afford their treatment cost. The idea is simple; sutures production industry will come on digital platform. This platform is provided as Android Application, which is E-commerce application for Sutures. Doctors and surgeons can easily buy a suture product by just few clicks on their mobile phones. Also recommendation system helps them to get recommended by the products they might need. In short, the proposed application is just like the other e-commerce applications that provides online shopping of different materials. The success of these e-commerce application is the most important motivation to start with this project. This project is

sponsored by KCIIL (KBCNMU Centre for Innovation, Incubation and Linkages). This project is developed for KCIIL's incubating startup company named Suture House. We are working as interns on this project as a role of Android Developer Intern.

C. Problem Definition

The following gives an insight onto the problem statement: Problem Statement Title: E-commerce Portal with Recommendation system for Surgical Equipment. Organization: Healthcare Description: Existing system of Suture House is completely offline i.e. the company sells product just by phone calls or physical meet only. Because of this, the procedure becomes lengthy. It is time consuming and more expensive. So there is a need to resolve these issues to increase business and save time and money. The proposed system will convert the offline business to online business. The suture products will be ordered online by doctors and surgeons and the company and/or distributors will process the orders. Complexity: Complicated

D. Scope

The main intention of this project is to develop a system which will automate the buying process for the doctors and surgeons by just few clicks on their mobile phones. This will encounter the issues in the existing system like time consumption, high costs and difficulties to discover quality products offline. In this project, an application will be developed which will allow users to view and discover the best suitable products they need. They can even compare between products from different distributors in correspondence to the quality, cost etc. This will make them easier to find and get the best products in reasonable price which will ultimately give benefit to the patients. The recommendation system will add a plus point which will recommend the suitable products to the surgeons according to their working profile and based on previously bought products. • The target users of the application are doctors and surgeons from different sub-fields of medical. • The Suture House company is the Admin of the project which will handle the orders and related data. • The database of the application can handle up to 100 users for the very first deployment of project.

E. Objective

The proposed system will reduce the paper work where the sell records will no longer involve any manual recordings. All the records will be kept automatically to the database server. The new system will also reduce the time needed to complete all these process and ultimately the cost of products will be reduced along with the benefit to company. Expected objectives of the project include the following points:

- Doctors and Surgeons should be able to find the best suitable products from the platform.

- The application should be user friendly and easy to use.

- The application should provide the online payment system as well as cash on delivery options.

- The users should be able to compare different products based on their quality, cost and other parameters.

- The users should be able to track their orders.

- The users should get recommendation of products based on their profile.

- The users should be able to apply filters for buying products.

F. Identification of software development Process Model

The four basic process activities of specification, development, validation and evolution are organized differently in different development processes. In the waterfall model, they are organized in sequence, while in incremental development they are interleaved. Software Development Life Cycle (SDLC) is a process used by the software industry to design, develop and test high quality software. The SDLC aims to produce a high quality software that meets or exceeds customer expectations, reaches completion within times and cost estimates.

2. WATERFALL MODEL – DESIGN

After assessing various Software Development Life Cycle Models, the one that best suited to our application is Iterative Waterfall Model. After considering the users of our app and their requirements, our team's technical capacity and ability, associated risks, etc. referring to the final evaluation we adopted Iterative Waterfall Model. Using this approach, various phases in Life Cycle can be conducted in several cycles. Following is the diagram for Iterative Waterfall model:
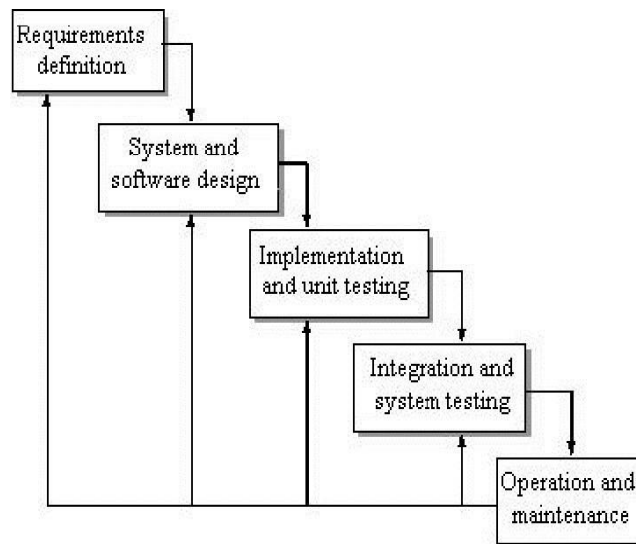
Fig 1. Waterfall model

3. ANALYSIS

System Analysis is the process of gathering and interpreting facts, diagnosing problems and using the facts to improve the system. System analysis chapter will show overall system analysis of the concept, description of the system, meaning of the system. System analysis is the study of sets of interacting entities, including computer system analysis. There are a number of different approaches to system analysis.

A. Requirement Collection and Identification

Requirement gathering is the main phase of the Analysis phase because this is when the project team begins to understand what the customer wants from the project. During the requirement gathering sessions, the project team meets with the customer to collect each requirement in detail. Suture House application model which explained the whole process of e-commerce application like selling suture products to the doctors and surgeons with specified place and time. It is necessary to know about actual requirement of doctors and surgeons to build any software for them. Development of e-commerce application is fully based on the social requirements of doctors. For collection of actual requirement, it is necessary to select the flow of action/phases. We have identified some requirements during the requirements collection phase;

- Doctors or surgeons can register themselves. and they add suture products to cart or wish list.

- Admin can be verifying the details of doctors.

- Admin can add more products to the app.

- Doctors can easily payment by using online or offline mode.0

1. Requirement Identification

It identifies different types of software requirements such as:

- Data Domain: Data collection for e-commerce application for surgical equipment to collect data in the system. (Database for storing data).

- Function Domain: Functions are the processes those transform the input flow to the output flow. Functions in e-commerce project are buying and selling produce like Absorbable suture, Non absorbable suture, Bone wax, etc. for selling or buying provide payment gateway.

- Behavioral Domain: It represents the behavior of the project application. The behavior of e-commerce application shows how the application makes transition from one states to another

B. Software Requirement Specification

It is a requirement documentation activity.

Product Features:

This is high level attribute of application. Product features are as follows:

- The application is fast and secure.

- User Friendly application.

- The application is easy to navigate for surgeons and doctors.

- Interface of application is most relevant.

C. Operating Environment

Operating environment of project contains software and hardware environment.

- Software Environment: Flutter/Dart, Android Studio, WooCommerce REST API, Windows 7 or higher, MySQL.

- Hardware Environment: Intel i3 or higher processor, 4 GB RAM, 1 TB HDD, Desktop.

D. Assumptions

This is external factor for which the intervention is not responsible, but that are very important for the realization of the results, the project purpose and the overall objective. They are outside direct intervention control, but vital for achieving a successful implementation.

E. Functional Requirement

Few of its functional requirements are as follows:

- The Functional Requirement of the e-commerce application is providing the platform to the doctors and surgeons on single place, where they can buy Surgical equipment through this application.

- Only verified doctor or surgeon must able to use the system.

- To provide user friendliness to the user, e-commerce application provides sort by option.

- Another Functional requirement of e-commerce application are Payment gateway for secure payment transaction for online sell or buy surgical products and equipment.

- Provide recommendation system with ML.

F. Non-Functional Requirement

Non-Functional Requirements are the characteristics or attributes of the system that are necessary for the smooth operation of the system. Those requirements are listed below.

- **Efficiency**: E-commerce application project required less amount of Hardware and software. This app is works faster and efficient in few amount of the resources.

- **Privacy**: In the e-commerce application for surgical equipment. It reduces the efforts of distributor to visit stores. In this application buyer and seller is login through e-mail verification, for maintain the privacy of the application.

- **Flexibility**: In this e-commerce application is provides the flexibility. In which application can be modified to adapt to different environments, configurations or user expectations.

- **Security**: Security plays major role in everywhere so, this application provides the security to doctors or surgeons for payment transaction.

G. External Interfaces

1. Hardware Interface

- System: Any.
- RAM: 4 GB or above.
- Hard Disk: 1 TB or above.
- Input Device: Keyboard or Mouse.

- Output Device: Monitor PC or Laptop.

2. **Software Interface**

- Operating System: Windows.
- IDE: Android Studio or Visual Studio Code.
- Front End: Flutter/Dart.
- Backend: WooCommerce REST API.
- Database: MySQL.
- Version Control: GitHub, Git.

4. DESIGN

System Design chapter provides graphical structure of the project by using various UML diagrams. System design provides the understanding and procedural details necessary for implementing the system recommended in the system study. Design is a meaningful engineering representation of something that is to be built. It can be traced to a customer's requirements and at the same time assessed for quality against a set of predefined criteria for good design. In the software engineering context, design focuses on four major areas of concern are data, architecture, interfaces and components.

A. System Architecture

A System Architecture is the conceptual model that defines the structure, behavior, and more views of a system and architecture description is a formal description and representation of a system. The system architecture of this project four main parts, users (client and

Enterprise), internal execution, database server and other services. Client and Enterprise access application through GUI. The application passes and sometimes executes the requests to the server and delivers results to users. Other services part includes Logistic and Bank Services.
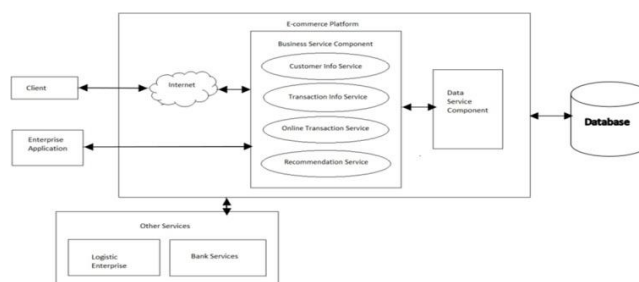

Fig 2. System Architecture

B. Data Flow Diagram

A data flow diagram is a flowchart can help to visualize the data pipeline of a system user can trace happens to the data as it moves between components. It is a great to find redundancies and optimize the speed and responsiveness of software.

C. UML Diagram

Unified Modeling language (UML) is a standardized modeling language enabling developers to specify, visualize, construct and document artifacts of a software system. Thus, UML makes these artifacts scalable, secure and robust in execution. UML is an important aspect involved in object-oriented software development. It uses graphic notation to create visual models of software systems.

5. USE CASE DIAGRAM

A Use Case diagram shows the interaction between the system and entities external to the system. There are two main actors, customer and admin. Customer has two types, new and registered. Admin has three types, authentication system, general admin and payment system. All the functionalities in the project are displayed in oval shapes with include and extend relationships.
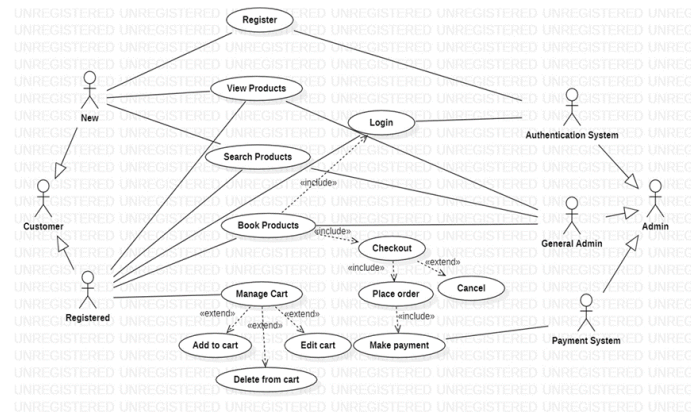
Fig. 2.   Use Case Diagram

6.   IMPLEMENTATION

Implementation phase is longest and most important phase in software development. When the designing of the software is completed, then a group of developers starts coding of the design using a programming language. The interface of the software and all its internal working according to design phase is implemented in implementation phase.

A.   Algorithm/Steps

An algorithm is a set of instructions designed to perform a specific task. This can be a simple process, such as multiplying two numbers, or a complex operation, such as playing a compressed video file. Search engines use proprietary algorithms to display the most relevant results from their search index for specific queries. In computer programming, algorithms are often created as functions. These functions serve as small programs that can be referenced by a larger program. Our application is fully android based mobile application which runs on the basis of internet and data collection.

1.   Every time app runs, firstly, the splash screen is displayed.

2.   If user runs the app for first time, the onboarding screens are displayed with skip button.

3.   Again for first time user registration page is displayed with skip button and login button. Registration uses email authentication and login uses search algorithm for database.

4.   Then for every user dashboard is displayed.

5.   Dashboard contains Home, wishlist and account tabs. Also it has side navigation which has about us, contact us, companies share etc. On appbar there are shop and notification icons.

6.   If user is logged in account tab is active with user information.

7.   Wishlist page displays the products that are saved by user.

8.   For buying product steps are as follows:

     •   Go to product.

     •   Click on add to cart.

     •   In the cart, click on checkout.

     •   After checkout, fill the form for address and user information.

     •   Click on confirm order.

     •   Finish with payment.

9.   For recommendation system steps are as follows:

     a.   First there is a" generate data" function to import data.

    b.   Then there is normalization of product parameters that are required for recommending products.

    c.   Using cosine similarity top n products are recommended to user.

7. RESULT AND ANALYSIS

The results section is a section containing a description about the main findings of a research, whereas the discussion section interprets the results for readers and provides the significance of the finding. Writing the results and discussion as separate sections allows you to focus first on what results you obtained and set out clearly what happened in your experiments and/or investigations without worrying about their implication.

8. CONCLUSIONS & FUTURE WORK

CONCLUSION

This project will help doctors and surgeons to book required healthcare material by just some clicks with their handy mobile phones. They will get the free delivery of the products to their place by specified. time. This will reduce the efforts of visiting the distributor store. Users can pay through online payment gateways to make clear transactions. In addition to all these, recommending the products to users using Machine Learning will improve the efficiency of application.

FUTURE WORK

There is also need to further enhance the system by extending the application to be used on different platform such as iOS The study can take up to look at effective ways on how to monitor and track progress Can make reports for evaluating the growth and make easy for monitoring

ACKNOWLEDGMENT

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