

Online Inventory and Order Management System for Pharmacy

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Approval Certificate

This project titled "**Online Inventory and Order Management System for Pharmacy**" submitted by **Narayan Chandra Sarker**, Student ID: **012162032**, has been accepted as Satisfactory in fulfillment of the requirement for the degree of Master of Science in Computer Science and Engineering on September 22, 2018.

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Abstract

The medicine stores are looking for opportunities to improve their daily operations efficiencies, increase sales and profit as well as reduce loss. An Inventory management system is a system that automates all the processes involved in inventory management. These system are a vital part of any successful business and is basically used to efficiently track inventory using both hardware and software tools. The objective of this work is to design, model as well as implement an Online Inventory and Order Management System (OIOMS) for pharmacy that would have the capability to automate all the processes of the medicine stores.

Most of the pharmacies in our country do not have an inventory management system. They are doing manual paper works for inventory management. A very few of them are using a basic inventory management system. In our research, we have found that the previous system has many desirable and undesirable attributes. We have explored valuable experience regarding inventory system of a pharmacy which has been applied to develop our system.

Inventory management is a very challenging problem for a pharmacy. With this challenge the objective of this project is to develop a responsive web application which will provides a platform like Software as a Service (SaaS) for pharmacy operations. The aim of this web application is to provide the basic tool for tracking as well as monitoring sales and inventory to individuals and small businesses who cannot afford the investment of a complete dedicated IMS. A client application called web browser, gives the ability to the customer to access our web application securely over the Internet through the available networks. Thus, our application will be accessible from all devices like PC, Laptop, Tab and Mobile etc. PHP, Bootstrap, JQuery, AJAX and MySQL are used to develop our system to make it responsive as well as very user friendly and effective inventory management system. The result and expected output of this work is to provide basic functions like a secure registration and login system, inventory, users, orders, suppliers, customers, history-logs and company configuration modules. In addition to that, there will be more advanced functions such as automatic email notification, order generation, export reports to PDF file and a lot more. Finally, our web application (OIOMS) replaces existing systems as well as reduces loss and increases profit of any pharmacy store.

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Chapter 1

Introduction

Age of Digitalization and Automation, Information and Communication Technology (ICT) plays a tremendous role in each and every field in our life. Blessing of ICT gives businesses a better competitive edge, reduces loss and increases profit. Medicine store is a store where medicinal drugs are dispensed and sold as well as manufacturer which produces these medicines and provides it to the store.

Inventory management is a vital part of a successful business operation. IMS can provide simple functions such as sales, stock control and monitoring as well as advanced functions such as barcode tracking. The most commonly used functions for an inventory management system enable the user for example to add, remove and modify inventory items, manage customers, suppliers and users, place and track orders etc. Customers, who provide products and services, must use an inventory management system in order to have direct access to the status of the stock as well as profit and loss.

Most of the pharmacies in our country are doing traditional paper based manual system and some have no tracking system for their inventory as well as purchase order. Keeping track expire date, availability of stocks as well as reorder level of medicines are not realistic using this paper based system. A very few pharmacies use a basic inventory management system which is a desktop version.

In this report, we have explored how ICT helps to manage inventory and purchase orders as well as automates all the processes involved in a pharmacy business operation. We have developed an Online Inventory and Order Management System (OIOMS) for pharmacy with the benefits of ICT. Our system is very user-friendly, effective and efficient which is very useful for our customers to track expire date, level of current stocks as well as reorder level of medicines. Suppliers can process the purchase information and supply medicine within a very short time.

Object Oriented Programming (OOP) concept has been incorporated in this project and models have been designed using UML. Users of OIOMS have their own panel based on their roles which allows them to perform their tasks. Admin can register a pharmacy as well as perform administrative roles. Manager manages all operations like set reorder level of medicine and generate purchase order. Seller page allows him to sale products. Our shelf management module helps the sellers to reduce the finding time of medicines. A notification feature which notifies the users for out of stock as well as near expire date of medicines.

There is no need for our customers to purchase any expensive licensed applications because price of our system (OIOMS) is based on an affordable monthly or annual fee. In addition, the customers do not need to invest in additional or expensive hardware because the application is hosted remotely. Moreover, like Software as a Service (SaaS) [3], our system removes the need for organizations to handle the installation, configuration and daily maintenance of the software application and hardware resources.

In the following chapters, we have explored background and motivation, problem of the present system, methodology used in the new system, as well as benefits of our system for pharmacy and a very brief conclusion.

Chapter 2

Background and Motivation

Medicine is a live giving object in the world and taking medicine is increasing day by day. Based on the need of medicines, there are a number of pharmacy (a store where medicinal drugs are hold for sale) are established here and there in our country.

Inventory is the goods and materials that a business holds for sale and inventory management is the management of these goods. It is a vital part of any successful business operation. Inventory management is directly related to the profit and loss of a pharmacy.

Entire businesses and employees run their critical applications through centralized computing platforms over the Internet. There is no need for customers to purchase any expensive licensed applications because OIOMS prices are based on an affordable monthly or annual fee.

2.1 Underlying Mechanism

Use of ICT in a pharmacy store is not up to date in our country, till now we are in the age of traditional manual system. In our survey, we found three methods have been used to manage inventory and purchase orders in most of the pharmacies. Most of the pharmacies are doing a lot of paper works to track availability of stocks as well as reorder level of medicines which are very erroneous and also a very tedious task. Tracking expire date of each medicine is not possible using manual paper works. Besides, maintenance of these papers is also very important and crucial. A very few pharmacies use a basic inventory management system which is also a desktop version. The rest do not use any system that means they have no tracking system, they just buy and sale.

In our survey, we found there are a very few pharmacies like Lazz Pharma use a basic inventory management software which is a desktop based application. It provides only basic functionalities.

We have found some application for only searching medicine and dosage details. In our findings, our system has some unique features which are not integrated with the similar systems.

With the existing desktop version system, a pharmacy has to invest a lot to use that system which is a big challenge for all type of pharmacies in our country. In our survey, we have explored that the previous systems have many desirable and undesirable attributes. We have gained valuable experience with the previous systems.

2.2 Proposed System

We have designed a system that automates all the processes involved in inventory management system for a pharmacy. Our system is a dynamic and responsive web application. Project title is Online Inventory and Order Management System (OIOMS) for Pharmacy. OIOMS is very user friendly where user can easily create Pharmacy, Manage Inventory and Reorder Medicines. It is very effective as well as efficient. Supplier can also process purchase orders using our OIOMS. It works as a platform like Software as a Service (SaaS).

2.3 Objectives and Possible Outcomes

Our intention is to solve all issues with current inventory management system that have been found in our requirement elicitation phase. OIOMS gives businesses a better competitive edge, reduce loss and increase profit. Customer will never go back due to out of stocks which increases sales using our availability of stock as well as reorder level management features. It reduces customer waiting time by our shelf management module. Automatic notification such as OIOMS inbox mechanism, mobile alert as well as email notification systems are the features which will help to know the expire date and reorder level of medicines.

Our user friendly, effective as well as efficient inventory management system for pharmacy allows them to manage their inventory efficiently as well as increases the customer's positive reviews.

Chapter 3

System Analysis and Methodology

The specific objective of the proposed system is to develop a Web-based Inventory Management System for Pharmacy. Our dynamic web-based IMS provides more functionalities besides the basic features as well as user friendly access. Our proposed system is available online as well as offline. Anyone can create a medical store just like a web registration, free or very few of charges as well as they maintain the store from their desktop, laptop, tab or mobile phones with internet connection.

In this system we have implemented Object Oriented Programming Concept (OOP). UML (Unified Modeling Language) is used for the model design. The interface between the front-end and the back-end is through MySQL (in XAMPP) and through an application program interface (API) defined in PHP. PHP is used as back-end for managing access structures, query evaluation and optimization, concurrency control and recovery. NetBeans IDE was used as front-end to develop forms, report-trail, and graphical user interface.

3.1 System Design

In this work we have used UML to analyze, design and implement our Online Inventory and Order Management System (OIOMS) for pharmacy. The UML is now the most widely used graphical representation scheme for modeling the objects of any system [8]. An attractive feature of UML is the flexibility. UML modelers are free to use various processes in designing systems. In this paper, we have designed the following five UML diagrams to explain the behavior as well as relationship of the components of our inventory management system:

1. Data Flow Diagram (DFD)
2. Use Case Diagram
3. Class Diagram
4. Software Architectural Model
5. Relational Database Model

3.1.1 Data Flow Diagram (DFD)

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated. We have shown an overview of flow for our Online Inventory and Order Management System for Pharmacy in the following level-1 DFD diagram.

Customer who wants buy medicine, asks to seller and seller processes the order and receives payment and prints receipt. All these information are stored in the database. Manager can generate purchase order which will automatically sends to the suppliers or MPO by email or other systems. Pharmacist verifies all received medicines from suppliers and manager add these into inventory database.

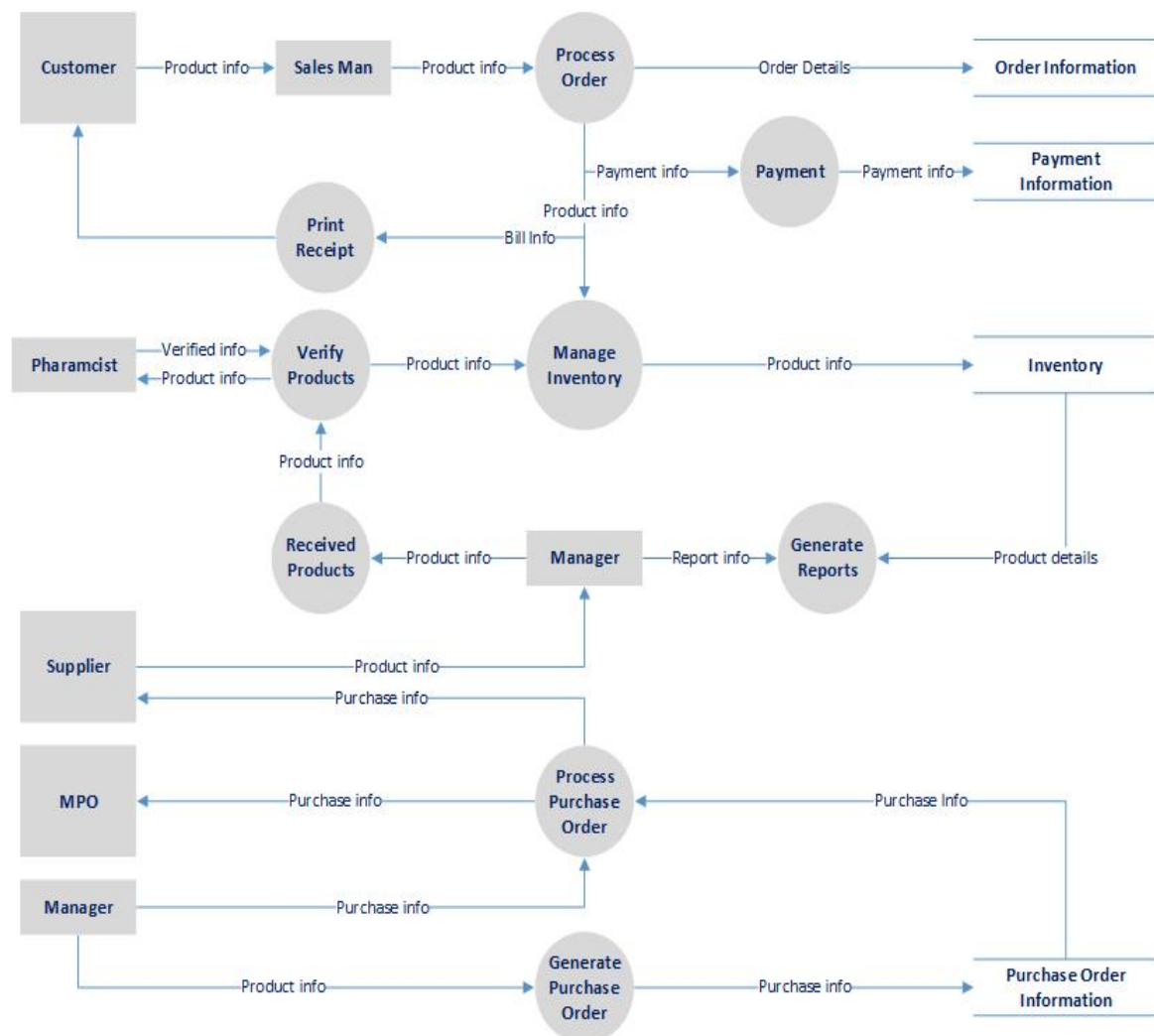


Figure 1: Level-1 Data Flow Diagram of the system

3.1.2 Use Case Diagram

Use case diagrams are usually referred to as behavior diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors). Each use case should provide some observable and valuable result to the actors or other stakeholders of the system.

We have identified actors such as Customer, Seller, Manager, Pharmacist, Admin, MPO and Supplier as well as their actions (use cases) in our IMS which have been depicted in the following diagram. It is a top level use case diagram.

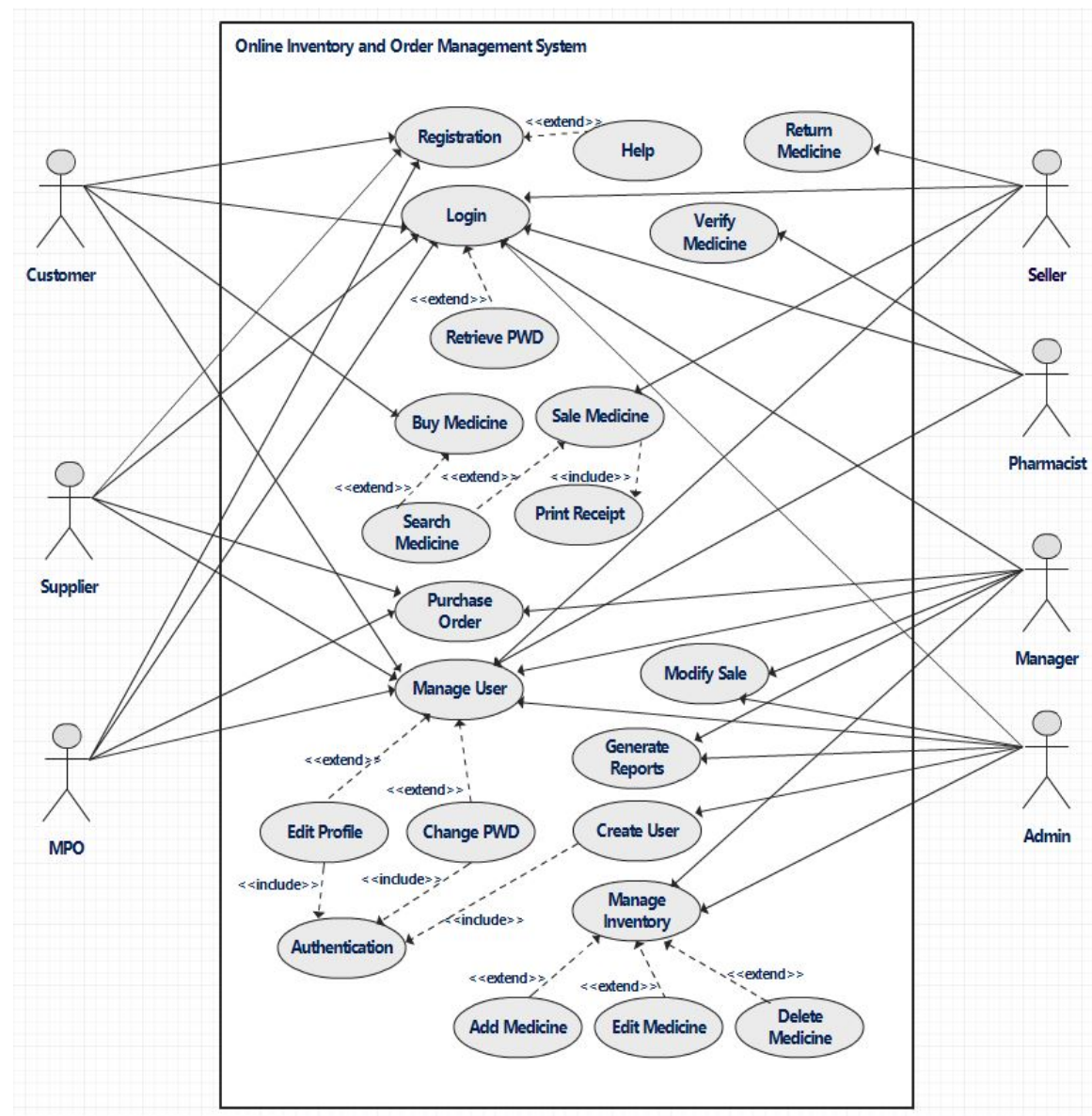


Figure 2: Top Level Use Case Diagram of OIOMS System

3.1.3 Class Diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects [8].

We have represented all the classes of our Online Inventory and Order Management System in the following class diagrams. In our IMS, Customer as well as Staff are specific classes of a generalized class Person. Supplier and MPO are subclasses of base class Staff. Pharmacy is an Organization which has an inventory which has an aggregation relationship with Medicines. Staff, Supplier, MPO as well as Web Customer are associated with Login Account class. All the classes as well as their relationships have been depicted in the below UML class diagram:

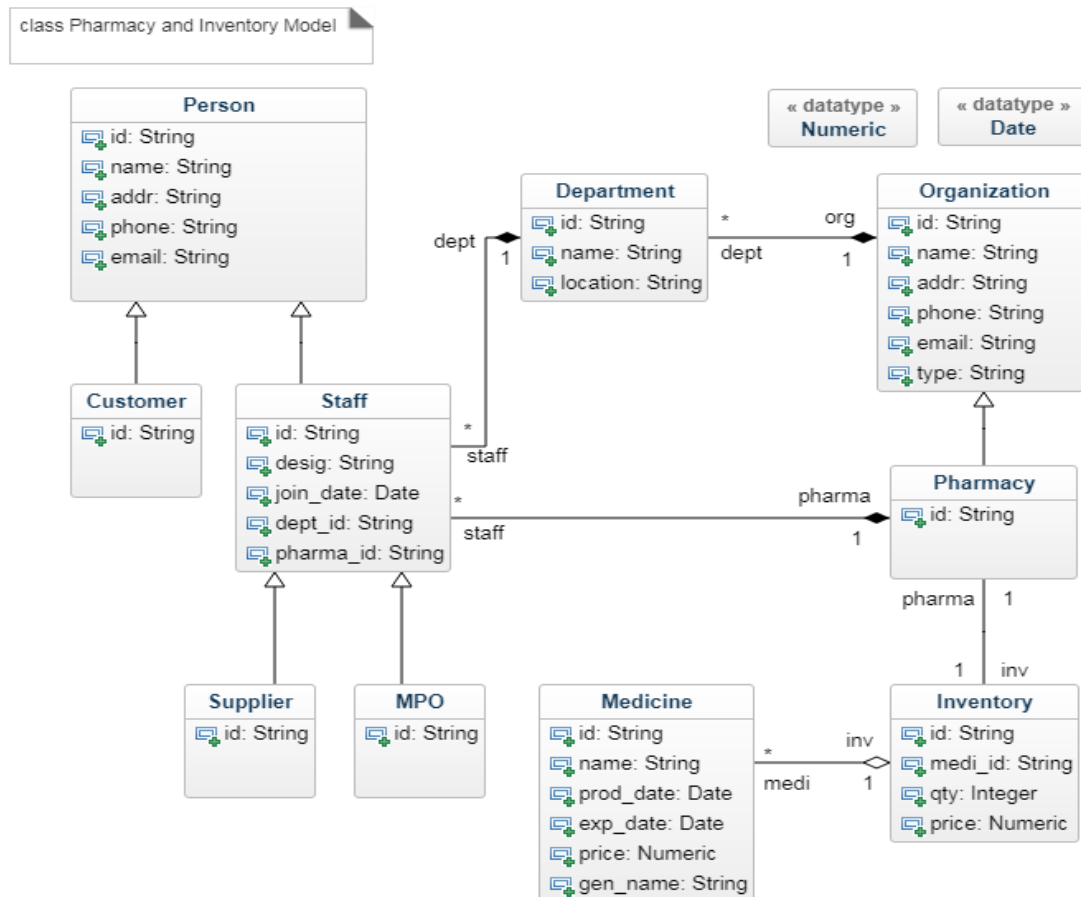


Figure 3: UML Class Diagram for Pharmacy and Inventory Model

The following diagram is the order model of our inventory management system. We have designed all models which are related to the purchase order. Here MPO, Supplier as well as other purchase related components are depicted in this model.

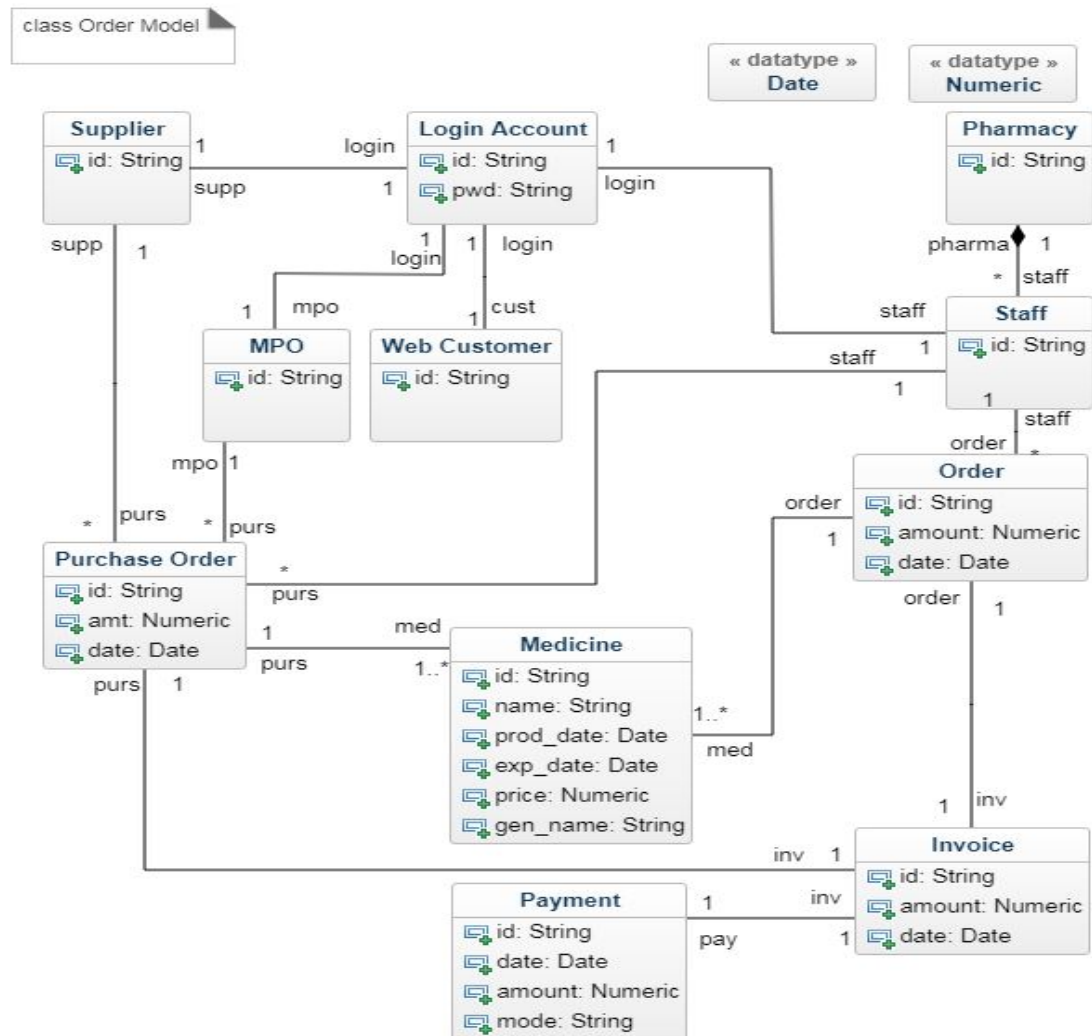


Figure 4: UML Class Diagram for Order Model

3.1.4 System Architecture

Software architecture refers to the high level structures of a software system. The architecture of a software or computing system is the structure or structures of the system, which comprise software elements, the externally visible properties of those elements, and the relationships among them.

Inventory management system software is implemented the following client-server architecture. MVC design pattern that divides an application into three interconnected parts, is implemented on the server side to separate the application's user interface from the business logic.

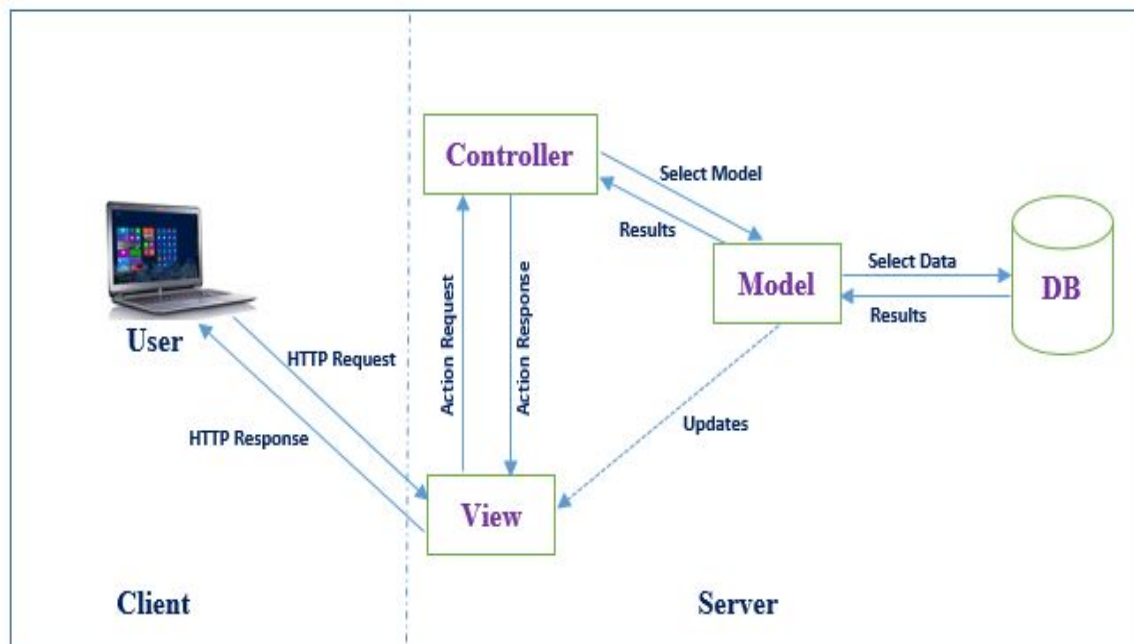


Figure 5: MVC Architecture of OIMOS

3.1.4.1 Hardware and Software Requirements

Hardware: PC / Laptop / Tab / Smart Phone / Printer

Software: XAMPP is the most popular PHP development environment and is completely free. It includes the following software: Apache Web Server, MySQL 5.5+ and PHP 5+

HTML5, CSS3, BOOTSTRAP 4, JQuery and AJAX are used to design responsive UI.

3.1.5 Relational Database Model

The Data Model Profile is a UML extension that supports the modeling of relational databases in UML. It includes custom extensions for such things as tables, data base schema, table keys, triggers, and constraints. While this is not a ratified extension, it still illustrates one possible technique for modeling a relational database in the UML. In the following diagram we have represented all tables, leys, constraints as well as relationships among them.

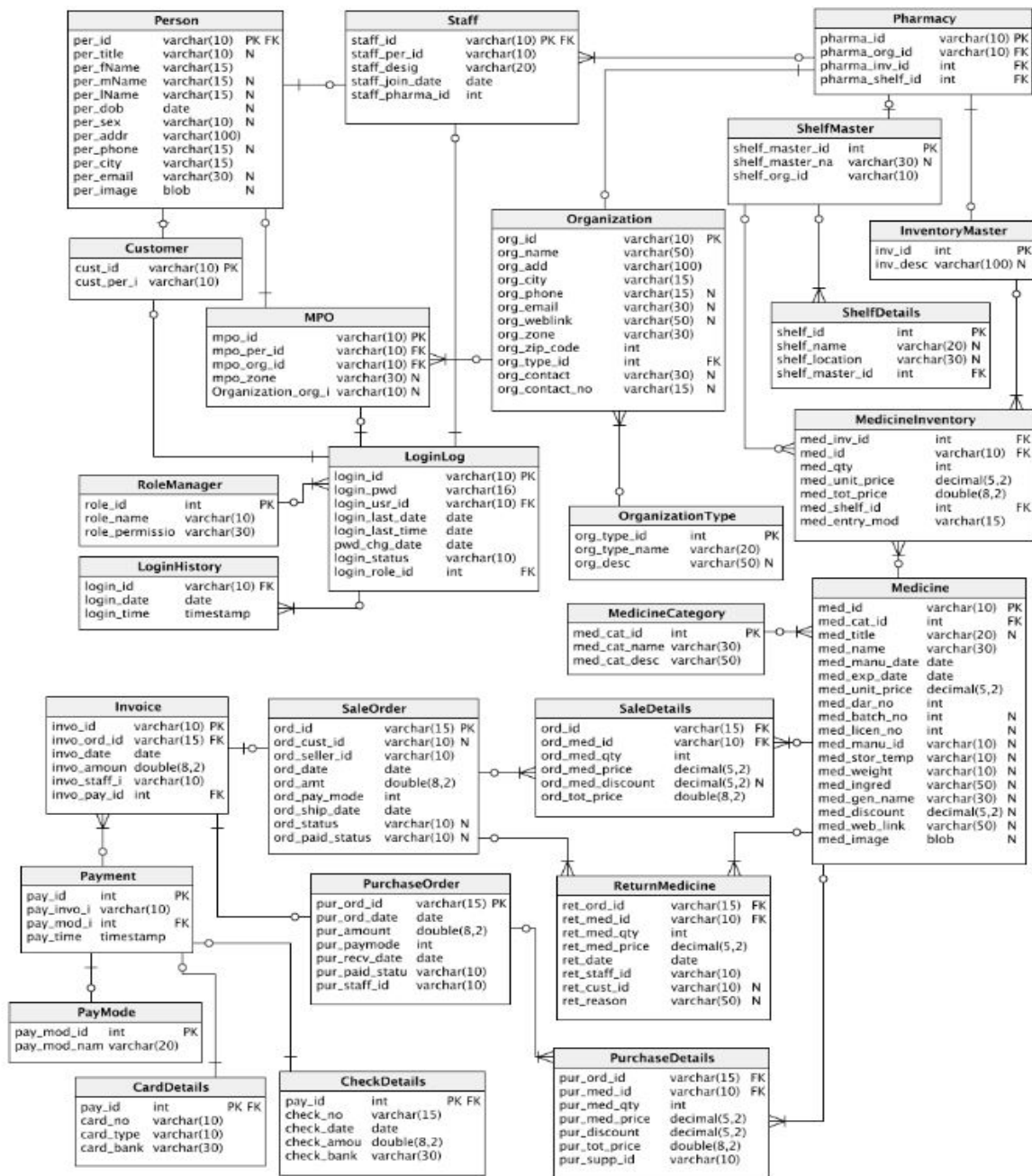


Figure 6: OIMOS Relational Database Model

3.2 Gantt Chart of the Project

A Gantt chart is a type of bar chart that illustrates a project schedule. Modern Gantt charts also show the dependency relationships between activities and current schedule status. Gantt Charts are a popular project management tool for planning and scheduling projects. The schedule of our work has been shown in the following Gantt chart where the phase of work of the development which has been started on January 20, 2018 and will be finished on September 30, 2018.

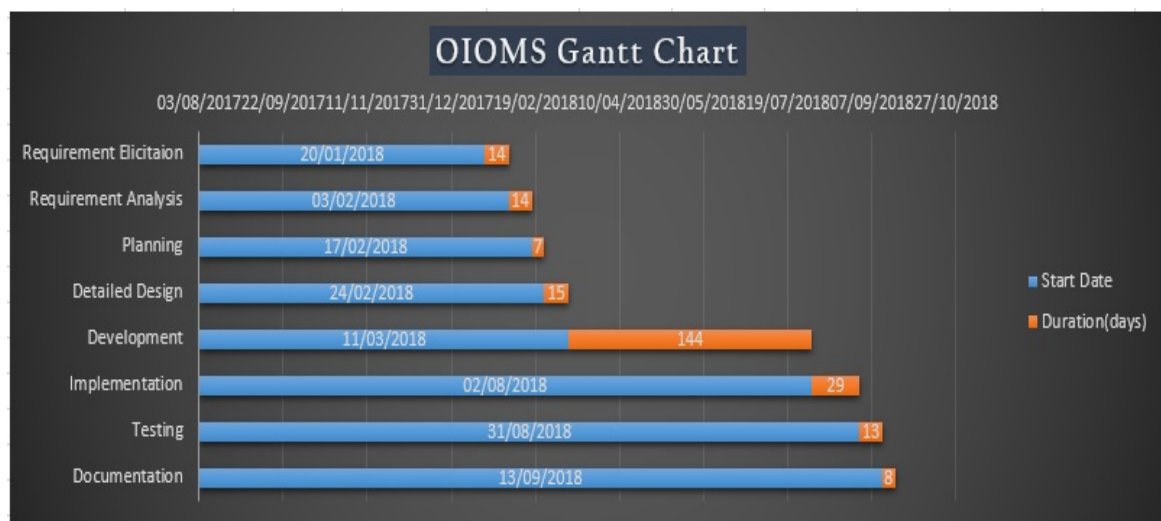


Figure 7: Project Gantt chart of the OIOMS

Chapter 4

Implementation and Output

In this chapter, we have explored the developed system as well as its functionalities in the following sections. User friendly design of OIOMS helps the pharmacy users to perform their tasks efficiently within a very short time. Notification and generation of reports make them transparent and alerts them about expire date as well as reorder medicines.

4.1 Development Tools

Vertabelo.com – is an online free tool to design relational database where we have designed OIOMS Database.

Microsoft Visio 2016 – is a very powerful tool for designing UML diagrams. Class diagrams as well as use case diagrams have been designed using this tool.

Microsoft Excel 2016 – Gantt chart of OIOMS has been made.

NetBeans IDE 8.0 – used to implement OIOMS. Graphical User Interface (GUI) as well as business models using Model View Controller (MVC) architecture have been implemented.

PHP – is a server scripting language, and a powerful tool for making dynamic and interactive web pages.

Bootstrap 4.0.1 – is a most popular framework for building responsive, mobile-first sites.

JQuery & AJAX – jQuery is the Write Less, Do More, JavaScript Library. AJAX is the art of exchanging data with a server, and update parts of a web page - without reloading the whole page.

CSS3 – is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

HTML5 – is a markup language used for structuring and presenting content on the World Wide Web.

MySQL5.5 – is an open-source relational database management system (RDBMS).

XAMMP 3.2.1 – the interface between the front-end and the back-end is through SQL and through an application program interface (API) defined in PHP.

Windows 10 – The system is developed in Windows 10 platform.

4.2 Benefit Using MVC Design Pattern

The MVC pattern is a great architecture no matter whatever the language we are using for the development. MVC is an architectural pattern commonly used for developing user interfaces that divides an application into three interconnected parts. This is done to separate internal representations of information from the ways information is presented to and accepted from the user. Using MVC design pattern, OIOMS is very powerful web application which eases the maintenance and allows us to integrate new modules.

4.3 Responsive User Interface and Outcomes

Using very latest technology as well as power of ICT, OIOMS is very user friendly and effective which helps users to perform their daily operations very efficiently. The following screen shots of our web application will give better outputs which will be errors free.

4.3.1 Home Page

Within home page of OIOMS, users can create organization, customer registration, sign in option and medicine searching option. All of operations of home page will be performed by providing very minimal information within a very short time.

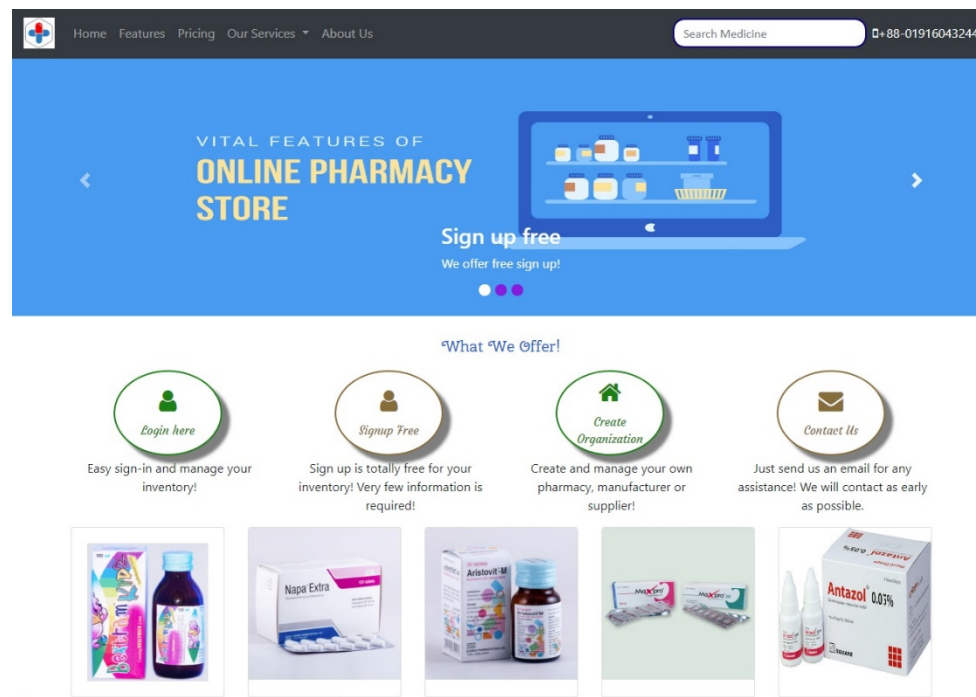


Figure 8: OIOMS Home Page

4.3.2 Organization Registration Screen

OIOMS allows users to create three types (pharmacy, manufacturer and supplier) of organization which will automate all the processes involved with the inventory management system as well as all stakeholders.

The screenshot displays a web application interface. At the top, there's a navigation bar with 'Home', 'Features', and 'Products'. A phone number '+88-01916043244' is visible on the right. A modal window titled 'Register your organization' is centered, featuring a 'Close' button in the top right corner. The form contains the following fields: 'Select Category' (a dropdown menu), 'Organization name', 'Address', 'Email', 'Admin login id', 'Admin password', 'Retype password', and 'Admin Mobile'. A blue 'Create Now' button is positioned below the form. The background is a blurred image of a computer keyboard and several boxes of medicines, including 'Napa Extra', 'Aristovit-M', and 'Antazol 0.03%'.

Figure 9: Organization Registration Screen within home Page

At the registration time, Admin login ID and password are required to register the organization as well as minimal information. After successful registration, admin can configure a pharmacy.

4.3.3 Admin Workstation

Admin of a pharmacy is a user of OIOMS web application who has the admin role (like web application configuration for their pharmacy) along with his business activities which have been specified in the use case diagram.

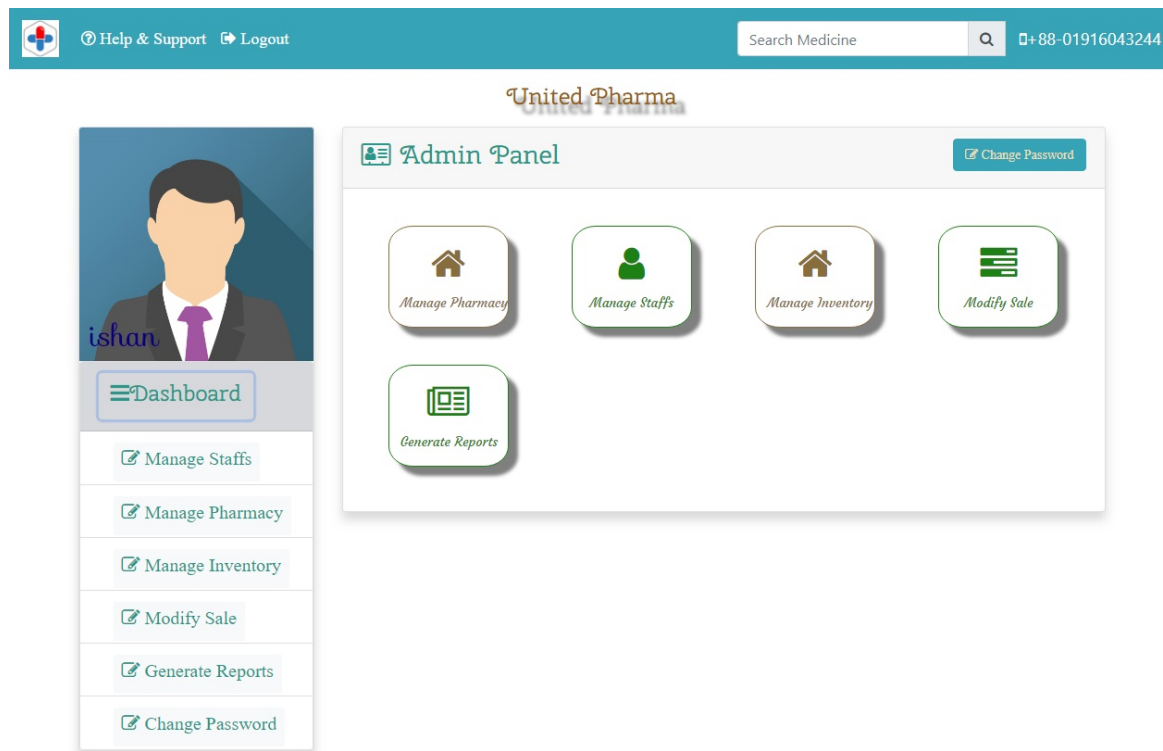
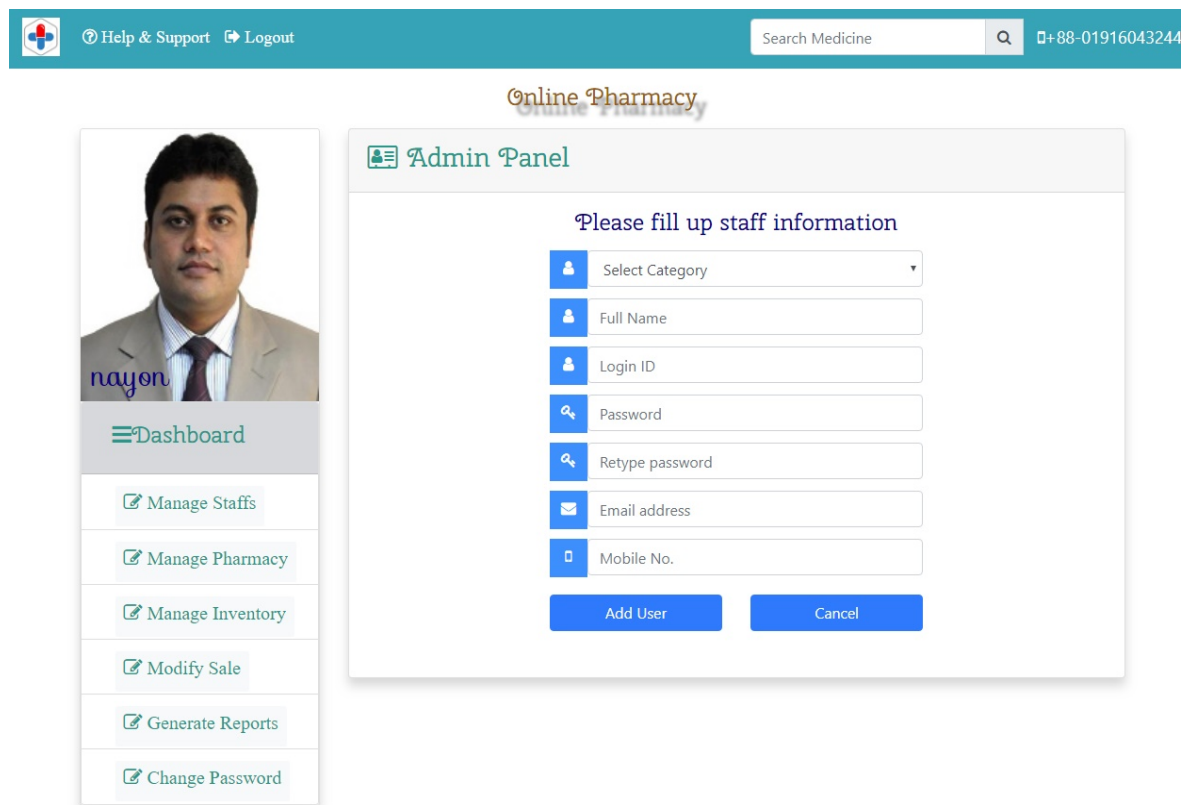


Figure 10: Admin workstation of a pharmacy

Admin actions of a pharmacy have been organized in the admin panel which is very user friendly. We hope that without any training or a very simple user manual help our users to perform their tasks with the user friendly UI and make them very much efficient within a very short time. OIOMS icon like UI is very easy to access for the operation of users.

4.3.4 Staff Registration Output

Admin of a pharmacy who has the admin role to create login credentials for their staffs such as manager, pharmacist and seller.



The screenshot displays the 'Online Pharmacy' Admin Panel. On the left is a sidebar with a user profile (a man in a suit) and a menu including 'Dashboard', 'Manage Staffs', 'Manage Pharmacy', 'Manage Inventory', 'Modify Sale', 'Generate Reports', and 'Change Password'. The main area is titled 'Admin Panel' and contains a form titled 'Please fill up staff information'. The form fields are: 'Select Category' (a dropdown menu), 'Full Name', 'Login ID', 'Password', 'Retype password', 'Email address', and 'Mobile No.'. At the bottom of the form are two buttons: 'Add User' and 'Cancel'.

Figure 11: Staff credentials creation page

They can create users within a very short time because of minimal information is required to create at first. After successful creation, they are able to edit user's profile which has been explored in the next section.

4.3.5 Staff Management Output

A pharmacy admin has the edit profile role which has been depicted in the below screen. They will be able to upload their photograph along with editing other information.

The screenshot shows the 'Admin Panel' for 'Asim Bepari'. On the left is a sidebar with a user profile picture and a menu including 'Dashboard', 'Manage Staffs', 'Manage Pharmacy', 'Manage Inventory', 'Modify Sale', 'Generate Reports', and 'Change Password'. The main content area displays the user's profile information in a table, with an 'Upload Image' button and a 'Back' button at the bottom.

Profile of Asim Bepari		
Profile Image		Upload Image
Staff ID	2	Edit
Full Name	Asim Bepari	Edit
Position	Manager	Edit
Joining Date	2018-09-01	Edit
Release Date		Edit
Address		Edit
City		Edit
Mobile No	01714447617	Edit
Email	asim@yahoo.com	Edit
Date of Birth	01/01/1970	Edit
Sex		Edit
Staff Status	Active	Edit
Staff Login ID	asim	

[Back](#)

Figure 12: Admin workstation of a pharmacy

We have make it very user friendly as well as using AJAX technology, it will be performed within a very short time without reloading the page again and again for each field.

4.3.6 Medicine Entry Page

Entry of a medicine is a very easy where a very few information is required. The rest of the information are automatically collect from our system database. This will help to reduce entry time.

The screenshot displays the 'Medicine Entry' interface of the OIOMS system. At the top, a teal header bar contains navigation links for 'Help & Support' and 'Logout', a search bar for 'Search Medicine', and a contact number '+88-01916043244'. Below this, the 'Manager Panel' is visible, featuring a sidebar on the left with a user profile for 'asim' and a list of management options: 'Dashboard', 'Manage Staffs', 'Manage Pharmacy', 'Manage Inventory', 'Modify Sale', 'Generate Reports', and 'Change Password'. The main content area is titled 'Please fill up medicine information' and includes a form with the following fields: 'Medicine Name', 'Quantity', 'Unit Price', 'Mfg.' date (dd/mm/yyyy), 'Expire' date (dd/mm/yyyy), 'Batch No', and 'Shelf Name' (a dropdown menu). 'Save' and 'Cancel' buttons are positioned at the bottom of the form.

Figure 13: Medicine entry screen of OIOMS

In this work, we have stored updated medicine information from online database of the Directorate General of Drug Administration (DGDA), Bangladesh. They have to enter just medicine name, quantity, mfg. date and exp. date as well as batch no with the shelf name where it will be stored.

4.3.7 Manager Workstation

The manager workstation is depicted below which allows a pharmacy manager to perform his activities.

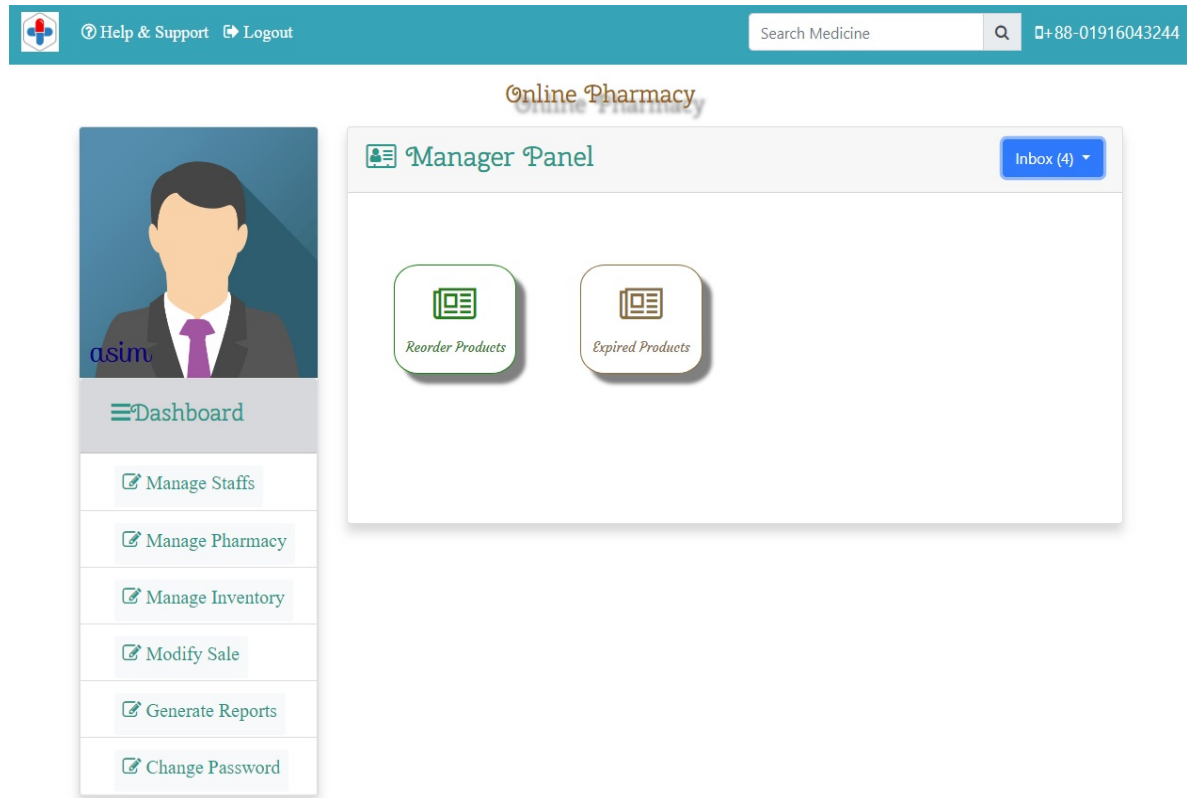


Figure 14: Manager Workstation of a pharmacy

In this work, we have implemented private notification module which notifies them regarding the expire date as well as reorder level of medicines. All the notifications are stored in the manager's inbox which is the very fruitful feature of our OIOMS. Manager can take urgent initiative to make purchase order and destroy the expired medicines which will increase the customer faith.

4.3.8 Pharmacist Panel

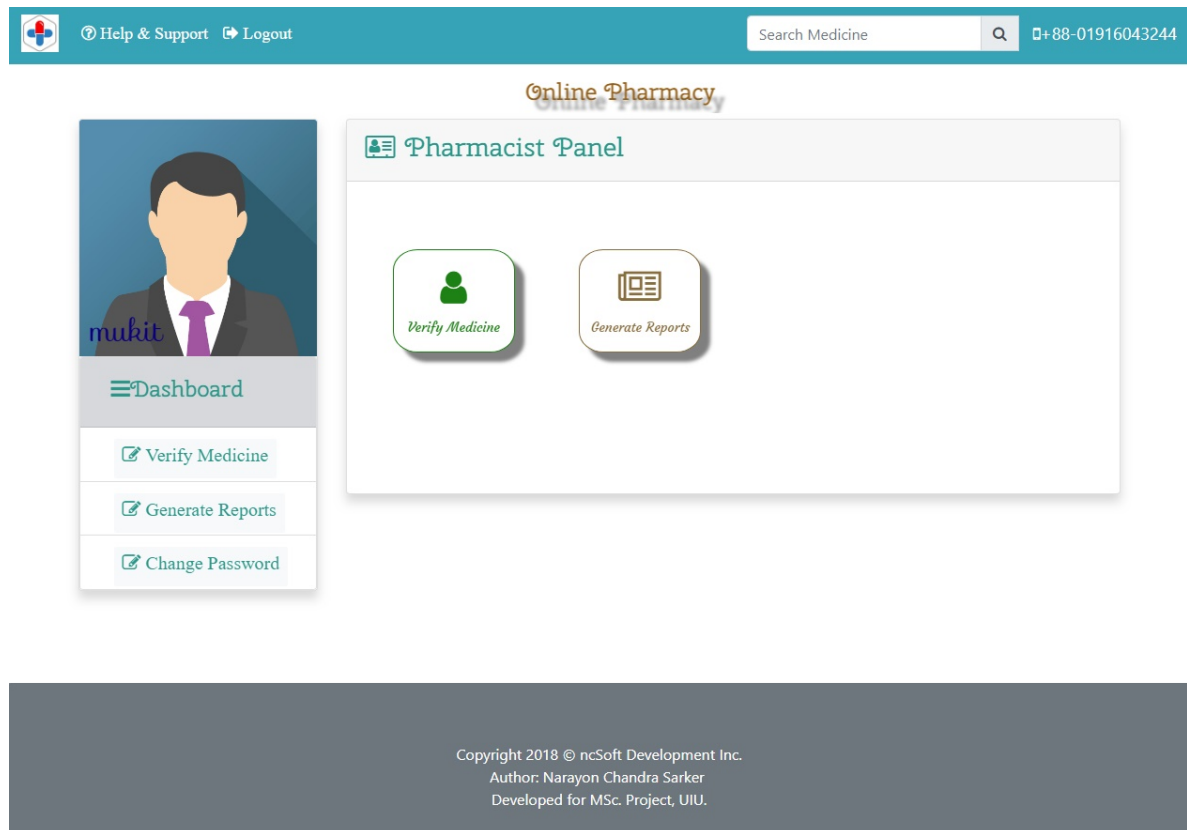


Figure 15: Pharmacist Workstation of a pharmacy

Pharmacist can easily mark verified with a click on the Verify Medicine iconic button for all verified medicines. This feature will prohibit to sale unregistered medicine by our application which will increase the ethical matter as well as customer's trust.

4.3.9 Seller Workstation

Considering the matter Seller Workstation should be very user friendly and effective, we have developed such type of UI for sellers which will help them to complete the sale process within a very short time. While typing a medicine name, AJAX call helps them to find a medicine from the search list along with level of stocks. It helps customers who are in hurry and have urgent needs.

Online Pharmacy

Seller Workstation

Medicine Name: Quantity: Add Sale

#	Name	Quantity	Stocks	MRP	Price	Discount	Shelf Name	Batch No	Delete
1	Napa 500	10	530	8.00	80.00	0.00	1-S, South-Middle	9999	<button>Remove</button>
2	Maxpro 20	10	400	7.00	70.00	0.00	2-S, South-Lower	2222	<button>Remove</button>

Total Price = 150 BDT Process to Sale Reset

Figure 16: OIOMS seller workstation of a pharmacy

Shelf management feature of OIOMS will help sellers to find out a medicine quickly. This feature's output has been depicted in the later section.

4.3.10 Shelf Management Output

Shelf management feature is very easy to configure by admin and manager of a pharmacy which will reduce the customer waiting time. It also allows to manage a most valuable information of each medicine which is currently ignored by most of the pharmacies in our country and that is the storing temperature of a medicine which is written inside the label of a medicine.

The screenshot displays the 'Online Pharmacy' Manager Panel. At the top, there is a teal header bar with a pharmacy icon, 'Help & Support', 'Logout', a 'Search Medicine' input field, and a phone number '+88-01916043244'. Below the header, the 'Manager Panel' is shown with a user profile for 'asim' and a sidebar menu with options: 'Dashboard', 'Manage Staffs', 'Manage Pharmacy', 'Manage Inventory', 'Modify Sale', 'Generate Reports', and 'Change Password'. The main content area features a green bar indicating 'Total Shelves = 4'. Below this is a table with the following data:

#	Shelf ID	Shelf Name	Shelf Location	Shelf Temperature	Details
1	1	1-S	South-Middle	25C	View Shelf
2	3	Fridge-1	South-Lower	15C	View Shelf
3	4	1-W	West-Top	25C	View Shelf
4	9	1-N	North-Top	22C	View Shelf

At the bottom right of the table area, there is an 'Add New Shelf' button.

Figure 17: Shelf management output of a pharmacy

There are the several condition which cause major impact on their quality of pharmaceuticals product such as temperature, humidity, air quality, and high temperature, light. The stability of product retained with in the specific limit, throughout its period of storage and use [6]. As a result, using our OIOMS a pharmacy store medicines on the shelf using shelf management feature according to temperature information.

4.3.11 Reorder Level Management Screen

The most desirable feature of OIOMS is to manage the reorder level of medicines which has been performed on the very user friendly UI. A pharmacy can set as well as modify the reorder level any time.

Online Pharmacy

Manager Panel

Total Medicines = 12

Show 10 entries Search:

#	Medicine Name	Current Stock	Reorder Level	Edit
1	Amodis 400	6	100	Edit
2	Amodis 500 IV	296	100	Edit
3	Cef-3	210	250	Edit
4	Don A 10	200	50	Edit
5	Ketonic 60	100	20	Edit
6	Napa 500	498	200	Edit
7	Nexum MUPS 20	320	150	Edit
8	Nopain 25	96	20	Edit
9	Pentosa 40	200	50	Edit
10	Polyvit B	100	40	Edit

Showing 1 to 10 of 12 entries

Previous 1 2 Next

Figure 18: Reorder level maintenance output of OIOMS

The maintenance of reorder level of a pharmacy is the innovative feature which will notify as well as help to generate purchase order. As a result, medicine will never be out of stocks and customer will never go back due to out of stock which will increase sales.

4.3.12 Reports Generation Output

Admin and Manager of a pharmacy can generate desired reports which has been explored in this work. A pharmacy will be benefited by with the help of these types of report such as sale details, reorder level, nearest expire date as well as already expired medicines.

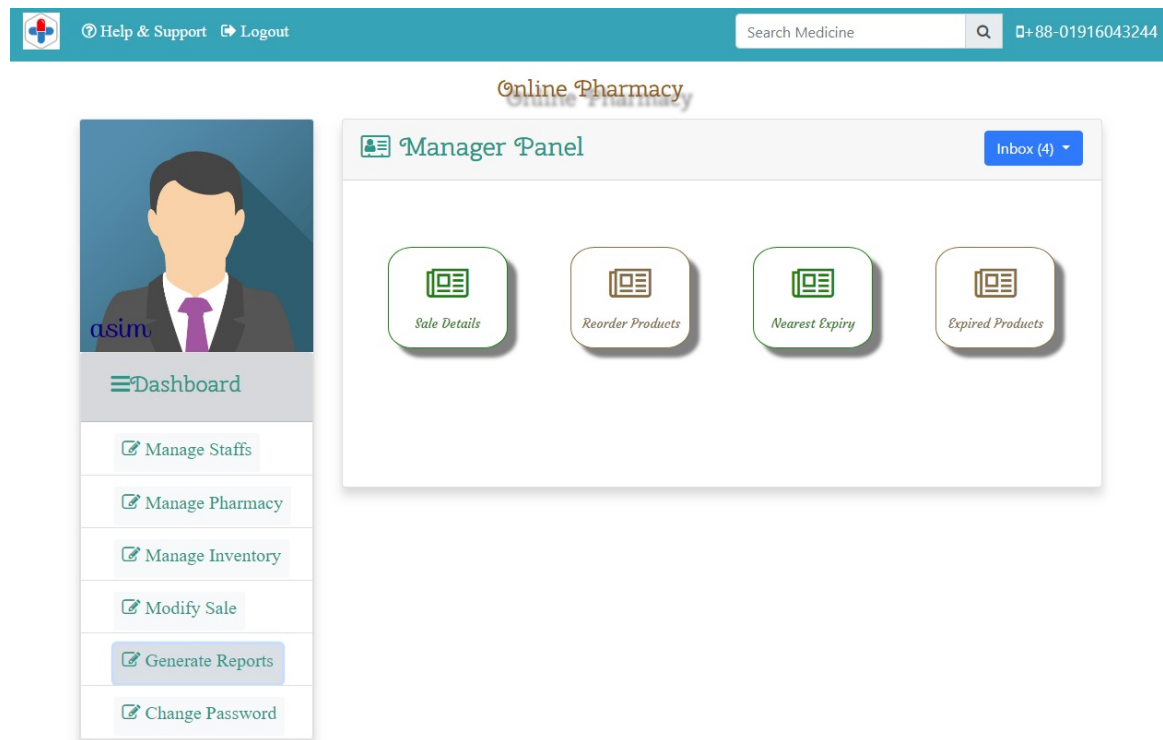


Figure 19: Reports generation output of a pharmacy

Sales report allows them to generate daily sales or specified period of sales for an individual or for all sellers. It helps to improve the efficiency of the seller. A report of nearest expire date is an opportunity for a pharmacy to sale those medicines before be expired. Expired medicine report will help them to remove those medicines from their inventory before occurring any incident.

4.3.13 Receipt Printer Output

Seller has an option to confirm the sale process as well as OIOMS allows a seller to print out the sales receipt into the thermal printer. We have organized all sales related information of a pharmacy on the receipt paper in a standard format.

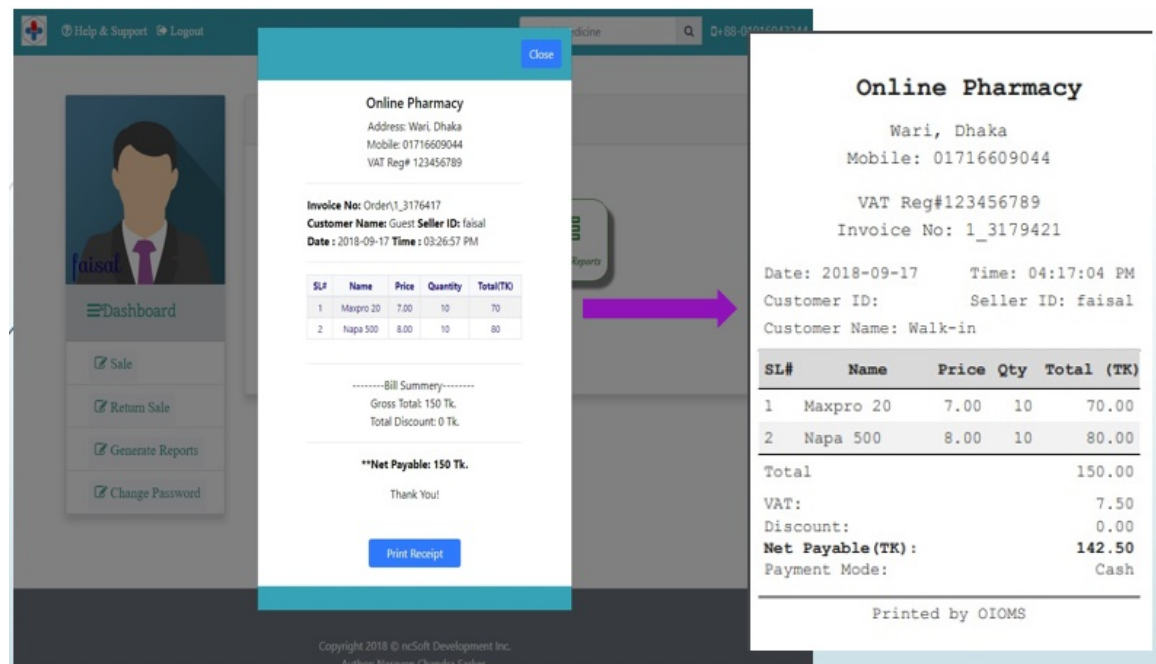


Figure 20: Print receipt paper output

Sales receipt is required for our return medicine feature along with other recommendation. Return or change medicine option is allowed in our system which will increase customer faith.

4.3.14 Receipt Printer Output

Due to any unavoidable problem, seller could not print sales receipt. Considering that circumstance, we have an option to reprint any sale receipt.

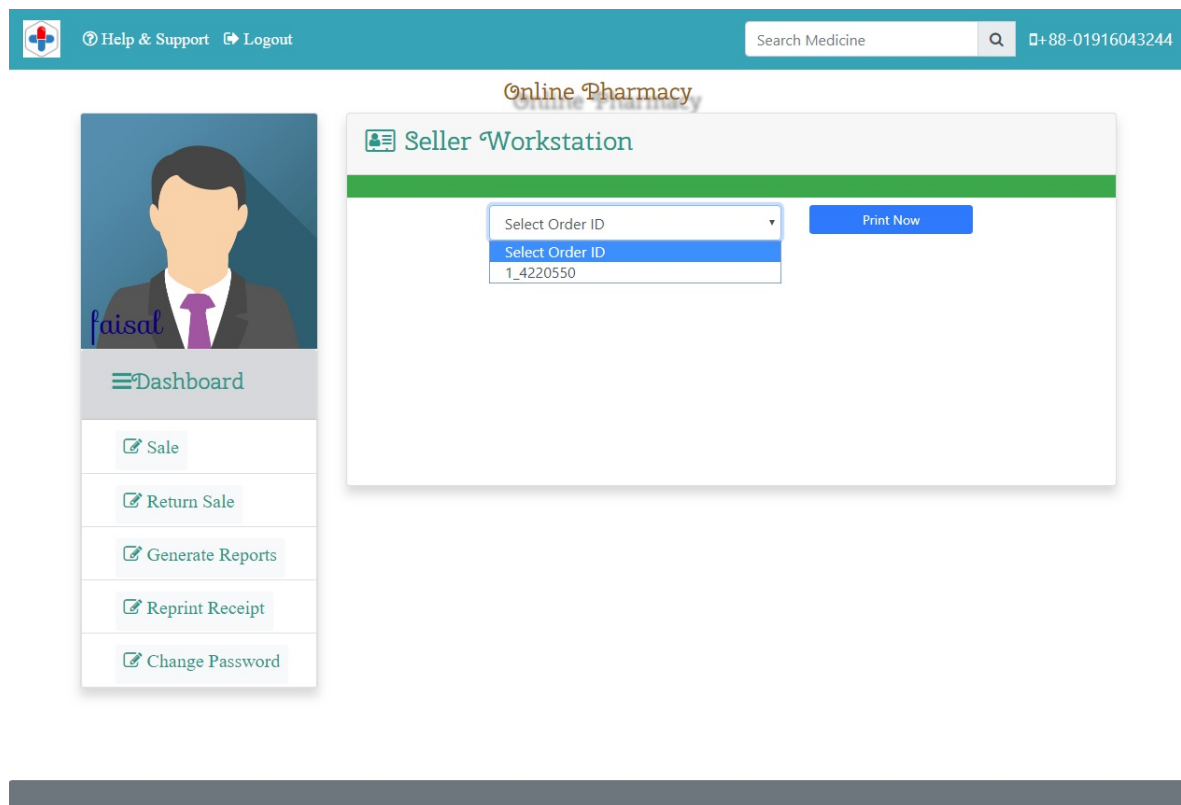


Figure 21: Reprint sales receipt page

Sellers are able to view all of their orders, select the specific order id and print the receipt any time within the transaction day.

4.3.15 Secure Login Module

PHP now provides with a couple new methods to hash user passwords in a much more optimized and secure way to serve the purpose of Password Hashing. We have used the recommended function `password_hash()`. This function returns the hashed string on success or FALSE. This is presently use BCrypt algorithm, and produce a 60 characters result.

A hashing algorithm should preferably be a one-way route i.e. there should not exist a decrypt method, following this concept, the described functions has no decrypt method. Not having any decrypting method the validation of password would require to crypt every input provided by the user on login time, we use PHP provided `password_verify()` function to validate the same.

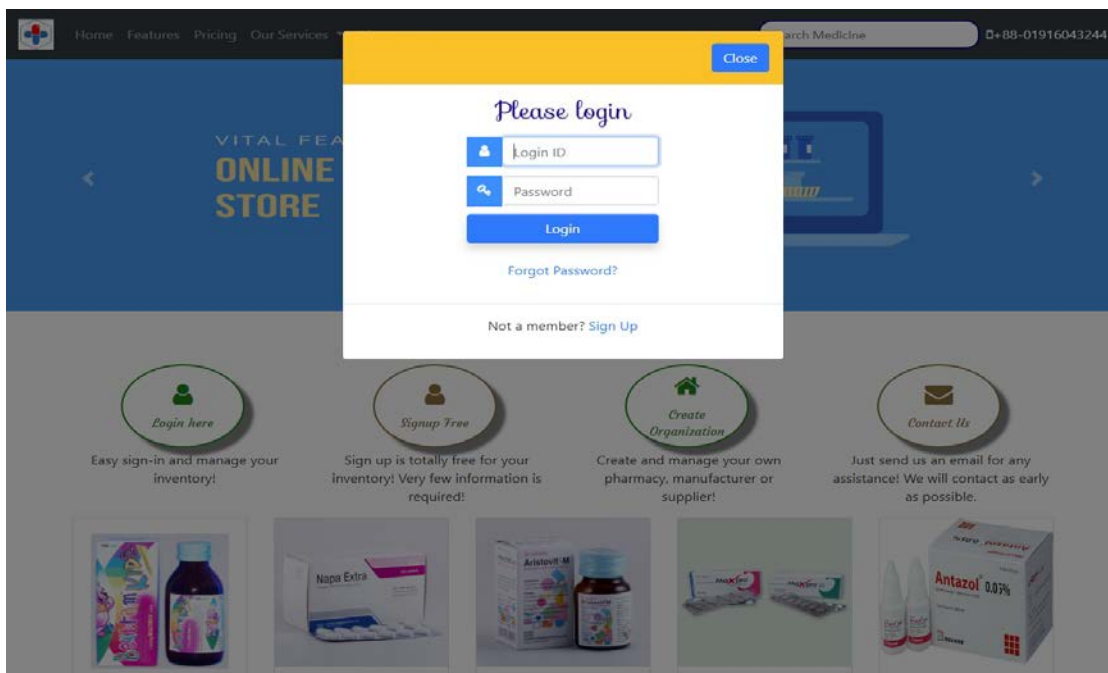


Figure 21: Secure login page

We use `mysqli_real_escape_string()` function which escapes special characters in a string for use in an SQL statement. This can help prevent SQL injection attacks. Using this methods, we have secured our login module which provides customer security.

Chapter 5

Conclusion

Inventory management is a challenging problem for a pharmacy. In our survey, we have explored that most of the existing methods do not solve all the requirements. The aim of this work is to provide the basic tool for tracking as well as monitoring sales and inventory to individuals and small businesses who cannot afford the investment of a complete dedicated Inventory Management System.

We have a plan that OIOMS will be free or a minimal license fee will be charged which will help a pharmacy to use our system without requiring an initial investment. We hope that OIOMS will be the replacement of existing systems as well as efficient web application with its user friendly UI and effectiveness which will gear up their organizational performances.

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