



Web Based Business Support System

For

Kuamarasinghe Distributors

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Declaration

This dissertation is my original work and has not been submitted previously for a degree at this or any other university/institute. To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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ABSTRACT

The Kumarasinghe Distribution is a well-established Distribution agency which is doing their business under PEPSI company in Gampola . The Agency is always looking forward to keep a better distributing network which they can be distribute their main beverages (Fanta,Pepsi,Mycola,etc) to entire gampola area with fast and satisfy the customer need. but they have not proper way to improve their distribution. So company has limited their business process. And also they have lack of managing their activities keeping track their payments are major problems.

Business support web application is planned to aid in tasks as helping them to improve their day to day business activities such as Mange their Stock through the application, make fast and improve their billing process, Increase fast access of the information with less searching time, etc and also with the help of this web application, their staff can reach their all information anywhere and anytime .

The system is developed Using the PHP,Jquery, HTML,(Hypertext markup language), CSS (Cascding style Sheet) with based on code igniter framework which follows MVC architecture. As the current software engineering theories and based on the clients demand. the rational unified process (RUP) was selected as most suitable software development methodology.

Business Support system for kumarasinghe distributing agency was tested in real working environment and successfully handed over to improve their company business process.

ACKNOWLEDGEMENT

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I am highly indebted managing director of Kumarasinghe Distribution Agency Mr.Aruna Shantha who gave me the golden opportunity to do this project

Special thanks go to staff members of Kumarasinghe Distribution Agency, for the valuable information and data provided by in their respective fields during the project.

I am taking this opportunity to express my appreciation all of my friends who helped me with their unconditional support and encouraging me with suggestions.

Finally, I thank all my guardians, brother, sister for their constant love and encouragement given me every time throughout the 2 years of the MIT Master Degree program.

LIST OF ACRONYMS

BSSK-Business Support System For Kumarasinghe Distribution

GUI-Graphical User Interface

IDE- Integrated Development Environment

UML - Unified Modeling Language

SQL - Structured Query Language

RUP - Rational Unified Process

AJAX - Asynchronous JavaScript and XML

CSS - Cascading Style Sheet

ER - Entity Relationship

HTML - Hypertext Mark-up Language

MVC - Model-View-Controller

PHP - Hypertext Pre-processor

RUP - Rational Unified Process

SQL - Structured Query Language

URL - Uniform Resource Locator

OOA -Object-oriented analysis

OOD -Object-oriented design

OOP -Object-oriented programming

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CHAPTER 01 – INTRODUCTION

1.1 INTRODUCTION

Business support system for Kumarasinghe distributors is a supporting online application for making their business easy and fast way. Because even though business peoples has started their business .they has failed quickly ,and lose their business Among them distributors of the main companies such as Kumarainghe Distributors are also facing this common problem. There are lot of major reasons which we identified. Because of less recode keeping regarding daily sales, billing process. And another major problem is they faced are lack of awareness about the stock which they have Therefore when sales reps are billing for the customers, it will be a problem. Managing their sale reps, reduce the corruption is another challenging problem for their business. Because of having less managing financing management is the main problem. Because of above problem, they are losing their profit and revenue.

To overcome these situations they have to reduce sale rep’s corruption activities and increase the keeping exact business records such as billing information, customer’s details, and suppliers billing details. So it was decided to develop comprehensive system to overcome these problem and increase company profit and revenue.

1.2 OBJECTIVES

This system’s main focus is provide comprehensive system to overcome current problems which kumarasinghe distributors are facing and increase their business revenue followings are objectives of the proposed system.

- To managing the stock and keep exact items stock.
- To increase of the availability of bill information.
- To Increase fast access of the information with less searching time.
- Increase availability of customer’s recodes and details
- Control the financial activities with less errors
- Managing the banking activities and increase availability those information
- Provide ability to check stores item balance before the billing by sales rep at the customer’s premises.

- Reduce the processing time after billing by sales rep.
- Make easy to process load item in to vehicle with extract billing information. Reduce the transport cost.
- Provide online accessing for the sales rep, distributors, and manager check daily sales summery.
- Taking report such as expenses details, discount details, credit list at anytime and anywhere.
- Increase of available coordination with the sales rep and distributing office.

1.3 MOTIVATION

When we want some technical person we can't find out expert person immediately. But if we have some system for contact some technical person it is very easy to our work. Not only that if we can connect some technical person to the customer we can get some income as a commits. Mainly motivated to this system because of above business purpose. And also service providers can finish their task and service seeker can jet some job to according his experience. It is very useful and great work.

As my personal perspective when I need to fix little technical crashes at my home or office i was faced much difficulties because it was difficult to find out experienced and skilled person to fix my technical issue (plumbing, electricity, etc.) and also when discussing with others i feel that this is a considerable problem in the society

Because of this reason it was decide to find the solution with ending with the supper electronics and air solution. And this will be very beautiful for the skilled and experienced technical person to find out to their job opportunities. There are many of this kind of applications. But most of them are limited to the specific area. But FTSA provides island wide service for its clients.

Main thing is using this system company is able to expand their business as well as improving their income.

1.4 Scope of the Project

- Inventory control

Controlling the inventory is the very important part of the kumarasinghe distributor's business. Because ordering items from the main company based on these inventory results and also provide facility to check the inventory at the client premises before billing is a another important part. Web based solution helps to achieve this recruitment.

- Handling billing process

Kumarasinghe distributors are make billing before they distribute there items to their customers. Because of reducing the transport cost .after getting exact items requested by customers.Requested items can be delivered.

- Payment handling system

This the important part of the business. In here kumarasinghe distributors has to handle payment. There are two major parts dealing with payments

- Customer:
 - getting check, cash or credit
- Suppliers :
 - handling credit with supplier company
 - Paid payments, check details etc.
 - Expiry discount which we have to paid for expire item by the main company.
- Banking details handling
 - Handling check details (passed check, return check, return chargers)etc.
 - Handling bank balance, over draft balance handling etc.
- Handling staff
 - Keeping proper staff records and details.
 - salary payment details(Salary Details Handling)
 - Handling no of working days(Attendance).
 - Handling paid salary details.
 - Handling item with supplier
- Handling details of purchasing items, return items, expiry items etc.
- Management reports
 - Credit details of customer

- customer details
- daily sales summery
- Discount details from the suppliers.
- Expiry item details.

1.5 Structure of the Thesis

1.5.1 Chapter 2 – Background

The chapter describes how the current system works, the problems of the manual system in use and the requirements for the project. And Review of the similar systems works Further, it provides details of the techniques which used for gathering user requirements and expectant techniques of the new system.

1.5.2 Chapter 3 – Design

Design chapter explains about the tools and techniques which used in the designing phase, database design with relevant GUI screen shots and design diagrams were included.

1.5.3 Chapter 5 – Evaluation

Evaluation chapter deals with testing methods used in system testing while project development and the results of those tests.

1.5.4 Chapter 6 – Conclusion

The last chapter of the dissertation, which includes problems, occurred in system development. This chapter also mentioned the problems can be occurred in the future, the way to overcome them and how to improve the system further.

CHAPTER 2-BACKGROUND

2.1 Background

With the improving the technology related to information technology whole world has interconnected. In parallel other activities such as banking, sharing information also has updated with the information technology. When considering kumarasinghe distributors their main business is distributing beverages which provided by the PEPSI company for the specific geographical area as a sub dealer. Kumarainghe Distributors are also facing some problems which common for the distributing industry. There are lot of major reasons which we identified. Because of less recode keeping regarding daily sales, billing process. And another major problem is they faced are lack of awareness about the stock which they have Therefore when sales reps are billing for the customers, it will be a problem. Managing their sale reps, reduce the corruption is another challenging problem for their business. Because of having less managing financing management is the main problem. Because of above problem, they are losing their profit and revenue.

There are few this type of service providing application in the market. But they provide Company oriented perspective. Because Mother company focus on their sales. But Kumarasinghe Distributors sight it is not necessary for managing day to day activities.

2.2 Literature Review

Uses of the Internet in our daily life is depending on desires and goals. Activities in our daily life are decided after the use of Internet. Internet innovated our daily life. We spend lots of time on the Web. Positive use of the Internet makes our lives easy and simple. The Internet provides us useful data, information, and knowledge for the personal, social and economic development. [1]

There is a Web Based Sales Management System Developed by the PEPSI Mother Company. But it has developed for the Indian distributors.so it makes lot of problems for the srilanken distributing agencies because PEPSI mother company focus on only their sales .it causes to generate lot of mismatching for the current distributors .when kumarasinghe distributors stocks of items are getting low, mother distributing company can't release items until distributing agency

(Kumarasinghe Distributors) stocks is nil, and above system does not provide facility to manage ordering which makes by the sales reps at the shops.

2.3. Existing Similar Systems

2.3.1. ABM Inventory

ABM Inventory is a SaaS system designed for retail, wholesale sectors. The aim of the system is to provide continuous product availability in required quantity at the right place and in due time; reduce excess inventories (over-stocks), decrease out-of-stock levels and consequently lost sales.

System Capabilities: automatic store replenishment and automatic order placement assortment management evaluation of Supplier Reliability comprehensive analytics. [2]

Increased sales

The essential reason of the system is to avoid lost sales at the optimal level of reserves. As a result, sales increase without extra efforts.

Reduced labor costs

Much obliged to the automated routine business processes, managers' attention shifts from stock administration to the implementation of strategic business development tasks.

Improved turnover

Due to the diminishment of excess inventory, improved turnover is what you get. It is the objective of all system algorithms.



Figure 2. 1 ABM Inventory Logo

2.3.2 Sales Agent Management System

Bitrix24 is a free cloud based sales agent management system. It comes with over 35 tools and covers 99% of sales team needs. Importantly, Bitrix24 comes with very flexible sales automation and access right settings. You can limit each sales agent to being able to see only his or her clients, automatically distribute leads based on their source, create 'free for all lists', create tasks for others when a certain deal stage is reached and do much more [3]

This is relying on Apache, MySQL, and PHP with word press CMS, so it can run on whatever operating system supporting those applications. It has been tested on Windows, Linux (Debian, Ubuntu, and Redhat). The application also runs on Solaris and MacOS X. Since Weifx.lk is a web-based application users don't need to deploy any client software on each user's PC. A simple web browser is sufficient (IE 8+, FF 3.5+, Chrome or Safari 5+).



Figure 2. 2 Batrix business support system

2.3.3 HappyFox

Managing a small business successfully with competing priorities, budget constraints and a small work force is always a daunting task. Being a small business ourselves, we understand your need for simplifying and automating your business processes, especially something as important as providing above-par customer service which is so crucial for your business to thrive.[4]

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based application users don't need to deploy any client software on each user's PC. A simple web browser is sufficient (IE 8+, FF 3.5+, Chrome or Safari 5+).

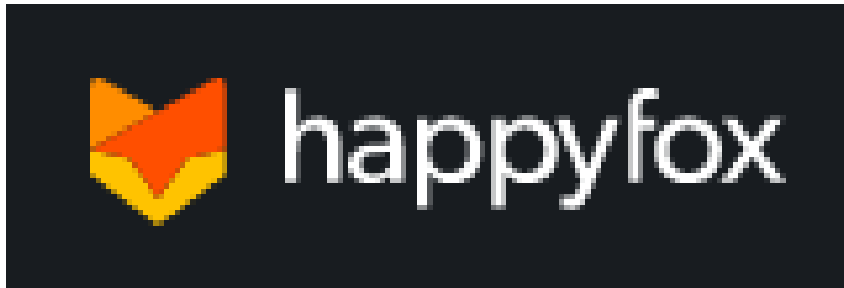


Figure 2. 3Happy fox business support system

2.4. Alternative Technologies

There are various types of Mobile application development and web Application Technologies such as content managements systems (CMS) for web and Phone gap ,Apache Cordova React native etc. for the mobile applications .When Considering the web application development there are some negative qualities of using Content Management System .For an example, if we customize CMS more and more. It may tend to loose certain features as well. What's more likely is that we may not be able to take advantages of any new changes in a new version of the same core components, because of the large number of custom modifications. CMS is a system that needs periodic upgrades such as security patches, updates. In that case system needs to undergo certain normal upkeep. Consequently, the proposed solution will be based PHP, MySQL, JQUERY, and bootstrap with the Codeignator Framework.

2.5. Requirements Gathering

Every system has been designed to fulfill the needs of a client. Those goals are called requirements. To provide the best solution to an identified problem, the analyst must go through every single aspect of the existing system and must collect details from every level of staff in an organization. To get a good idea about the requirements, analyst has to use several requirement gathering methods. [5]

2.5.1 Fact Finding Methods Used

Interviews

Project interviews were used widely to collect and validate the gathered data. Under interviews all types of system users, particularly the Selected Public community, current organizations members were interviewed as one-to-one interviews for the clarifying need of the Business Support Applications

Study system documentation

Documentations such as payment receipts, Client's Profiles, existing Technicians profiles were examined that are maintained by the client

Questionnaire

Mainly questioners were given to the end users to save the time and gathered the information from them. Under questioners' method a question paper were given which contained the questions about the difficulties they face and the way current procedures work.

Prototyping: By presenting a prototype of proposed system, functional and nonfunctional requirements of the system can be identified for developing the Business application.

Observation

There are some information were collected from observing the way current work and identify the facts cause for time wasting in the current procedure and those were corrected in designing the new system.

2.6 Existing Procedures

Currently Kumarasinghe distributors are doing their business with the full manual system. Mainly sales reps brings sales orders then items are prepared to distribute for the next day. And items are distributed as the orders which collected by the sales rep. Items are handover and if there are old bills and return cheques, quantity which hand over to shops are reduced. Discounts are offered for the loyal clients. However according to the bills collected by the sales rep, items which need to be

distribute are decided. Cash collector and porter are sent with the vehicle to collect the cash and return items.

After finishing distributing items, vehicles are come back to distributing point. Then return items are handed over by the cash collector to stock keeper. After cash collector will make the summary sheet monitoring no of items which took from stores, no of sales items, offered discounts prices, received cheques, expired items, cash. Then all the bills and summery sheet will be hand over to accountant for further calculations.

All the cash,cheques which received daily will be deposited to the banks and pay the cash which we need to pay the company. Petty cash also used for the daily routine expenses of the distributor point, employer's salary will be paid at the end of the month.

Further, items are ordering form the company when the items stock is low and expired items are resent back to company, managing credit bills, updating stores items, managing vehicles are the other main task of the distributor point.

Figure 2-4 depicts Use Case For Current Procedure

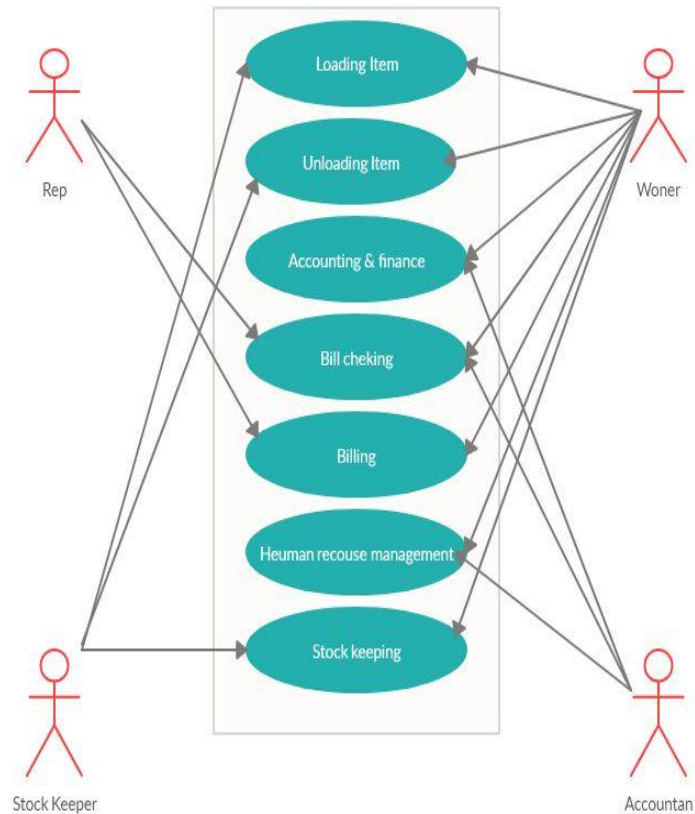


Figure 2. 4 Case For Current Procedure

2.7 Drawbacks of Current Procedures

Kumarasinghe distributors has lot of drawbacks with current manual system. Some of the them are listed below.

- There is a difference between sold items and return items.
- Wrong bill calculations.
- Missed items from the stores.
- Difficulties managing financial problems of the company.
- Misplaced of the expired items.
- Problems of the offering discounts.
- Problems of managing human resources.
- Problems of managing credit bills.

2.8 Functional Requirements

Functional requirement defines a function of a system or its component. A function is described as a set of inputs, the behavior, and outputs. Those may be calculations, technical details, data manipulation and processing and other specific functionality that defines what a system is supposed to accomplish requirements [6].

Functional requirements of the proposed system are listed below and Functional requirement can be categorized as follows of the web application

Owner

- Owner should be able to control Inventory
- Owner should be able to check the Inventory
- Owner should be able to add items the Inventory.
- Owner should be able to Handling the billing Process.
- Owner should be able to handle payment Handling System.
- Owner should be able to handle the staff.

Store Keeper

- Store Keeper should be handle the Inventory.

Sales Rep

- Sales Rep should be able to Ordering Process Online

Accountant

- Should be able to handle the all the accounting part and payment handling.

User Management

- . Administrator enable reset password of the system users.

Report generation

- System shall generate timely for fast decision making income, payment details etc.
- Enable dashboards, graphs, pitchers etc.

2.9 NON-FUNCTIONAL REQUIREMENT

Non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. This should be contrasted with functional

requirement that define specific behavior or functions and those requirements define how a system is supposed to be [7].

Some of the non-functional requirements are mentioned below.

Reliability

Provisions about how often the software fails and how much time it is necessary for the recovery .Business Support system has tested with the all the user levels in the real environment and failures are minimized.

Security

Requirements about assurance of the system and systems's data from unauthorized access. Business Support System has used MD5 Encryption methods encrypt user names and passwords.

Efficiency

The system must be consistent for the user to work with it easily without consuming much time. Business Support System is giving more facilities such as keeping user's details, Technicians payment details, keep Geographical locations etc. It provides more efficiency comparing with current manual procedures.

CHAPTER-3 -METHODOLOGY

In the design phase, specifications for a system which will meet business needs of the client have developed. The information gathered from the requirements analysis phase was aggregated and created a complete detailed design of the proposed business support system. The database is modeled and Use case diagram, Class diagram, Activity diagram which is used to design the proposed system.

1. Use case diagram- This is a modeling method which gives a description of a system's behavior from a user's standpoint. It shows a behavior of actor's interaction with the system. The actor is anyone or anything that interact with the system.
2. Class Diagram- shows set of the system's classes, attributes, methods and their relationships, addressing static view of the system.
3. Activity Diagram- shows the flow of the activities within a system addressing dynamic view of the system.

3.1 PROCESS MODELS

A software development process, also known as a software development life-cycle (SDLC), is a structure imputed on the development of a software product. It is often considered as a subset of the systems development life cycle. There are several models for such processes, each describing approaches to a variety of tasks or activities that take place during the process [8].

There are a lot of process models for developing software, among them Waterfall Process, Rational Unified Process (RUP) and Rapid Application Development are briefly described below.

3.1.1 Waterfall Model

The waterfall model is a sequential software development model which process goes as like a waterfall through several phases. It is the first system development life cycle approach that was

used for software development and waterfall model more suitable for the requirement of the project are well known, clear and fixed. Figure 3-1 depicts an overview of Waterfall model [9].

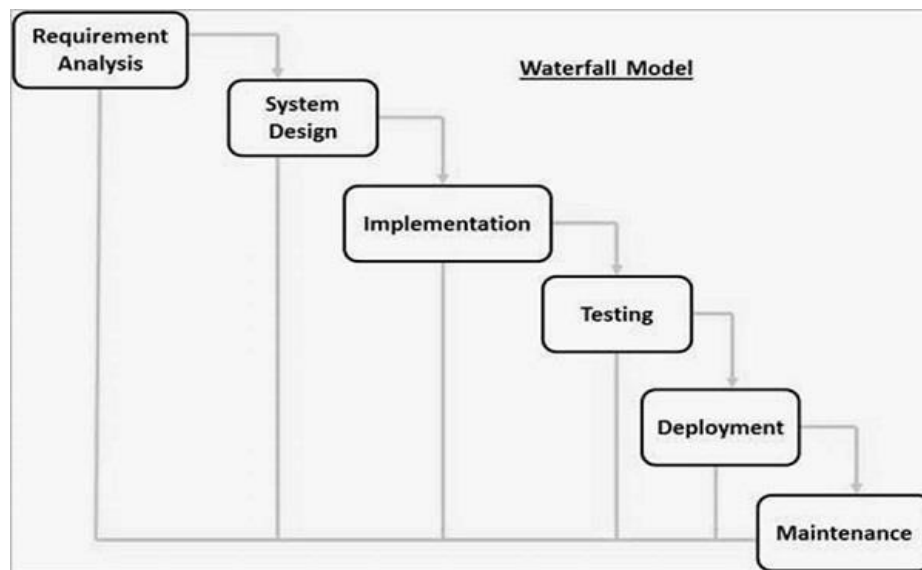


Figure3. 1 Waterfall model

Advantages of waterfall Model:

- It is simple, easy to understand and use.
- Each phase produces specific deliverables.
- Each phase produces documentation.

Disadvantage of waterfall model:

- No working, complete application is produced until end of the project during the life cycle.
- Once the application comes to a stage it is difficult to go previous stage and make changes.
- Not suitable for lengthy project, which requirements are changed during the development period.

Waterfall model could not be adopted for the proposed system because of the above drawbacks

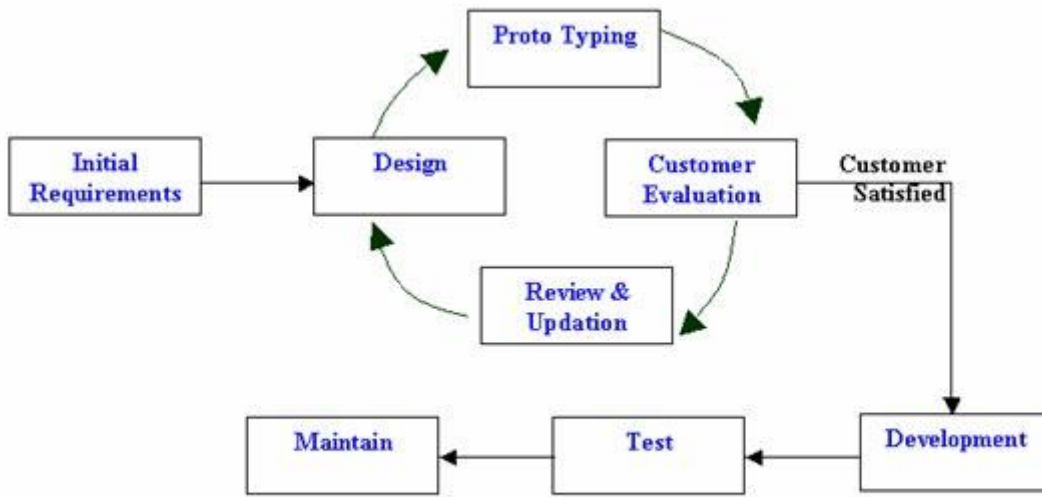
3.1.2 RAD Model

Rapid application development (RAD) is a suite of software development methodology, techniques used to expedite software application development.

RAD uses predefined prototyping techniques and tools produce software application. It encompasses a graphical user interface development environment, allowing end user to easily drag and drop required software application components [10].

3.1.3 Prototype Model

Prototype is basically developed model of the system using currently known requirement for helping with client get a better idea about how actual system will work. This enables clients to apprehend requirements of the proposed system easily. Prototype is more suitable for a large complicated system in which there is no existing system or manual process. Most of the functionality was not developed in the prototype and final deliverable provides fully functioning system. Figure 3-2 depicts an overview of prototype models [11].



Proto Type Model

Figure3. 2Prototype Model

Advantage of Prototype Model:

- High user involvement in development,
- Errors can be detected earlier.
- User can get the actual feeling of working model and able to give quick feedback for further development.

Disadvantage of Prototype Model:

- It may be caused to increase and develop the complexity of the system's scope than the original plan.
- Continuous changes may corrupt structure of the prototype.

3.2 PROCESS MODEL FOR PROPOSED SYSTEM

After analyzing requirements and making the design, Rational Unified Process (RUP) has been selected as a method to develop the system. Although Super electronics and air technicians are used manual procedure, there is a risk of changing the requirements in future, so rather than using the Waterfall Model, using RUP (an iterative development model) will help developer to give the best solution company. Waterfall improvement completes the project-wide work-products of each discipline in one step before moving on to the next discipline within the next step. Business value is conveyed all at once, and only at the very end of the project. Figure 3-3 depicts the phases of the RUP process [12].

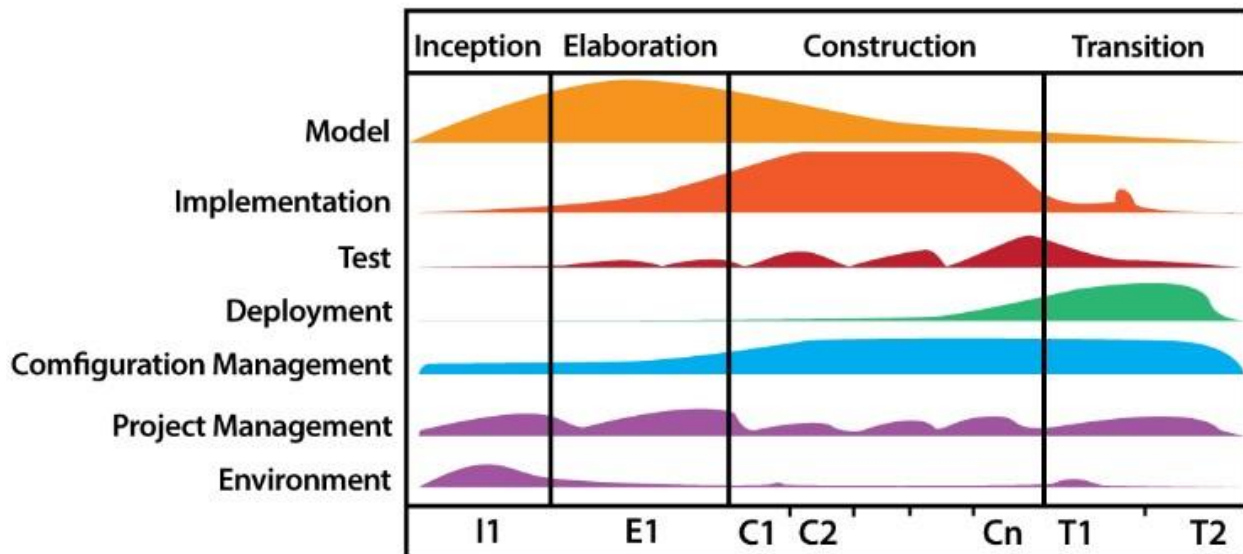


Figure3. 3RUP Phases

RUP consists of the following four phases.

1. **Inception** - During this stage, the business cases for the system were set up and scope of the project is defined.
2. **Elaboration** - During this stage architecture of the project is defined and domain analysis is done assessing required resources.
3. **Construction - Application** was developed and tested thoroughly.
4. **Transition** - During transition phase, the developed software was deployed to the user and the system is adjusted, adding required additional development as user feedback.

Some Advantages of RUP:

- Less time is required for integration.
- Faster development.
- Emphasize accurate documentation.
- Higher level of re use.
- Changing requirements-Easy to resolve client related changing requirements.

Some of Disadvantage of RUP:

- The development process is too complicated and disorganized.
- Lengthy documentation.

3.3.1 Object Oriented Analysis and Design Methodology

Object-oriented analysis and design (OOAD) is exceedingly industry-proven technique for developing Quality object-oriented systems. This prevalent OOAD software developing mythology consists main three aspects.

Object-oriented analysis (OOA) - is pointed on depicting what the system ought to do in terms of key objects within the problem domain.

Object-oriented design (OOD) - OOD convert system architecture into programming constructs (such as interfaces, classes, and strategy descriptions).

Object-oriented programming (OOP) - OOP implements these programming constructs.

3.3 PROPOSED ARCHITECTURE

The system web application part has developed with the MVC architecture based on Codeignator framework which followed by most of the industry developers. MVC has full ability to support

rapid web application development. And also provide better supports for reusability that adhere OO concept.

MVC architecture is basically splits into 3 distinct parts which are kept structurally isolated but communicate with each other to provide all aspects of the system and the administrate the system.

Figure 3-4: appears the simple interaction followed in the MVC architecture.

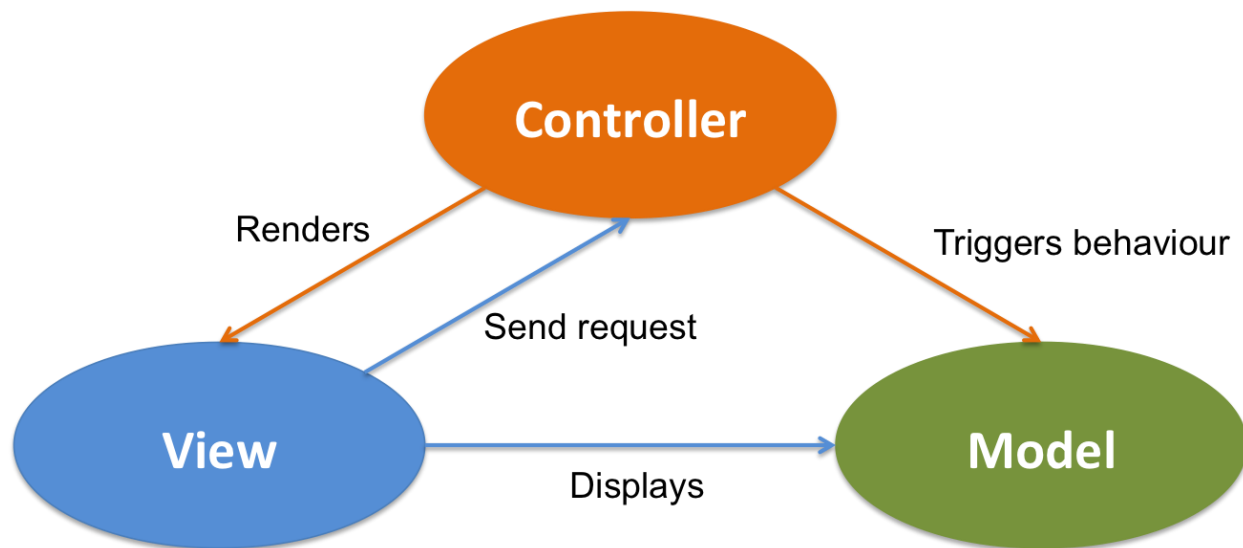


Figure3. 4 MVC architecture

Key features of the MVC architecture are described below which helps developers to accomplish a perfect design for an enterprise web application.

Model- stores data that is retrieved to the controller and displayed in the view. Whenever there is a change to the data it is updated by the controller.

View- requests information from the model that it uses to generate an output representation to the user.

Controller- can send commands to the model to update the model's state. It can also send commands to its associated view to change the view's presentation of the model [13].

3.4 USE CASE DIAGRAMS

A use case diagram is a graphical representation of users' interaction with the system in describes the specifications of use case.

A use case diagram can give diverse sort of clients of a system and various way that they connected with the system. .

3.4.1 Actors

It is identified five actors associate with the Business Support System

- Owner
- Accountant
- Stock keeper
- Sales Rep

3.4.2 Use Cases

To work with a system, clients ought to be able to control and evaluate the state of the system. To make the system interactive it should be designed to support the way humans interact with the world and information. Since the application is tourism related it should have an attractive user interface with promotional information.

3.4.3 Use Case Diagram For All the Actors

Figure 3-5: shows the Use case diagram for all the actors

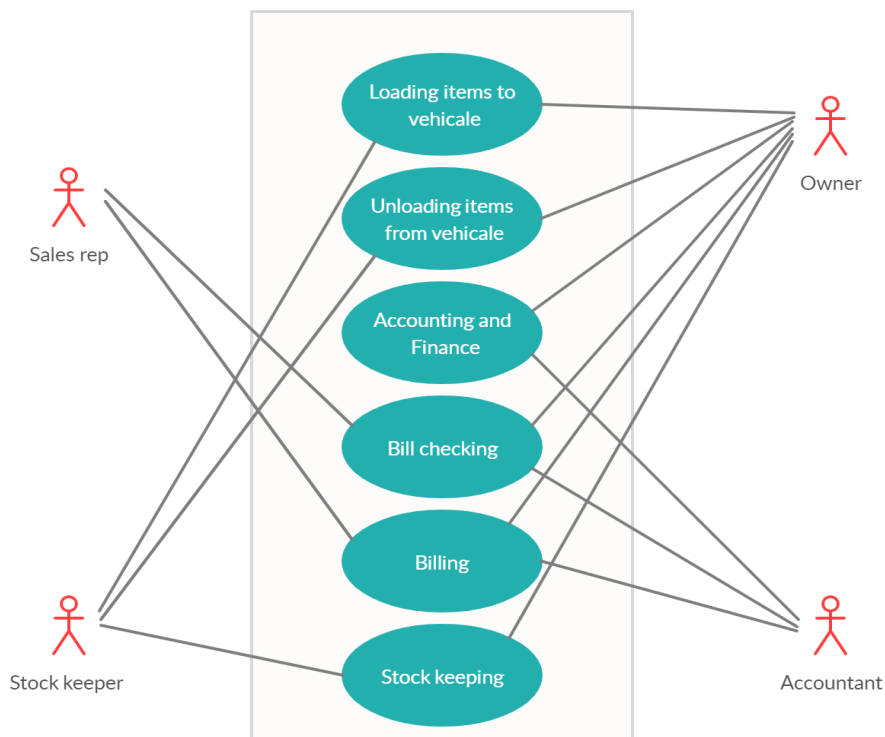


Figure3. 5 Use case for all the actors

3.4.4 Use Case Diagram Users Registration

Figure 3-6: shows the Use case diagram User Registrations

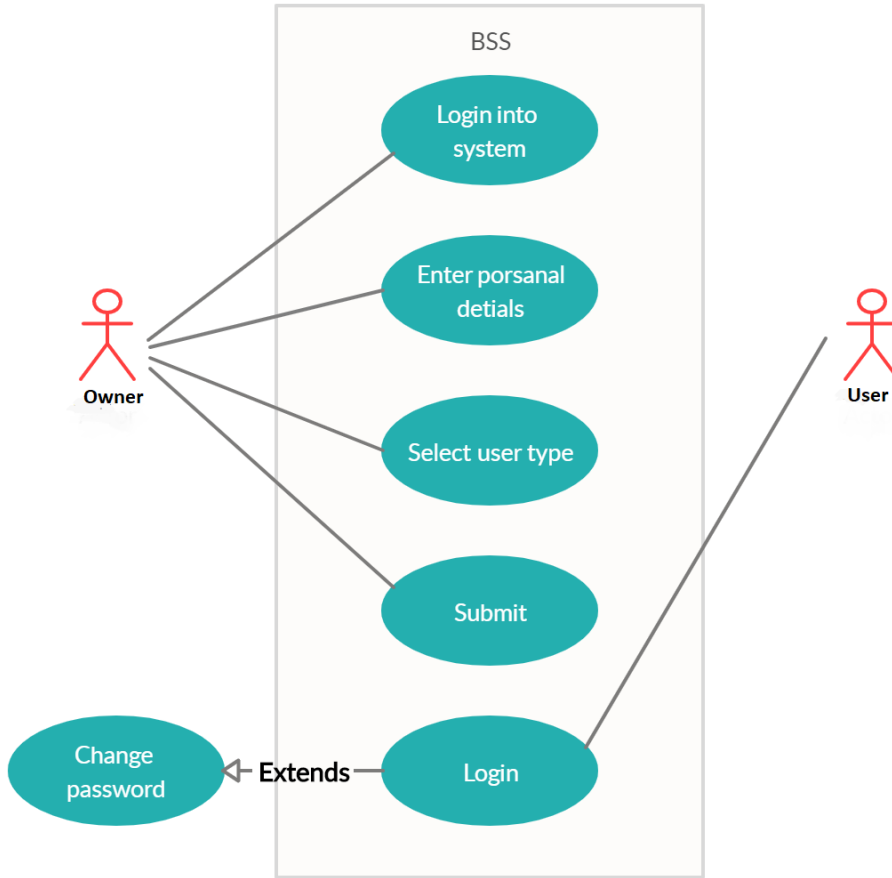


Figure3. 6 Use case for user Registration

Use case description for user registration are displayed by Table 3.1

Use case	User registration
Actors	Owner, Accountant, Sales Rep, Store keeper
Overview	
Registering Users	
Preconditions	
Users need to register in the system	
Flow of events	
1. Login into the system using owners credentials	

2. Enter Personal details under registration. 3. Select User type 4. Submit the valid data in to system and get approve.
Post Conditions
The Users have registered.

Table 3. 1 Use Case Description for user registration

3.4.5 Use Case Diagram for Insert Items to Stores

Figure 3-7: shows the Use case diagram for Insert Items to Stores

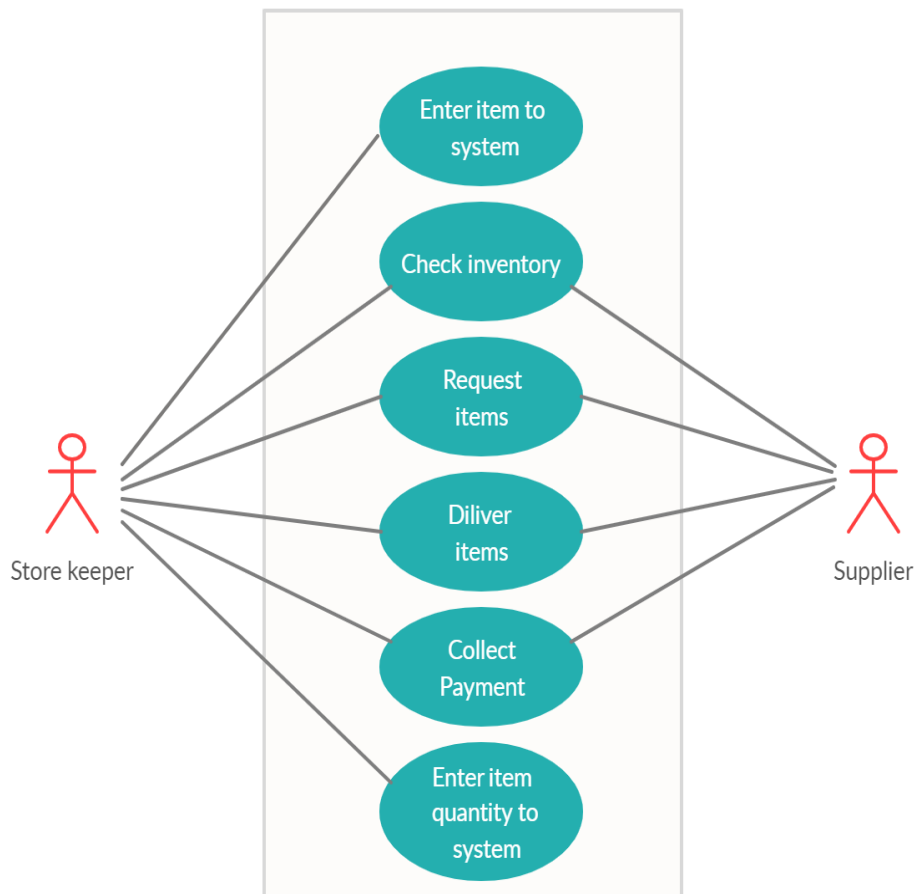


Figure3. 7 Use case for order items to stores

Use case description for order items to stores are displayed by Table 3.2

Use case	Order Items to Stores
Actors	Store Keeper ,Supplier
Overview	
Order Items to Stores	
Preconditions	
Store keeper need to order items	
Flow of events	
<ol style="list-style-type: none"> 1. Login into the system using Store keeper credentials 2. Check Inventory 3. Request Items from the suppliers 4. Make Payments to supplier. 5. Enter Items in to System 	
Post Conditions	
Store keeper Order items ,	

Table 3. 2 Use Case Description for order items to stores

3.4.6 Use Case Diagram for delivery items to customer

Figure 3-8: shows the Use case diagram for delivery items to customer



Figure3. 8 Use case for delivery items to customer

Use case description for delivery items to customer are displayed by Table 3.3

Use case	Delivery items to customer
Actors	Sales Rep,Store Keeper
Overview	
Delivery items to customer	
Preconditions	
Sales rep need to place order online	
Flow of events	
<ol style="list-style-type: none"> 1. Login into the system using sales rep credentials 2. Enter customer details into system. 3. Check Inventory by the sales rep. 4. Get orders and place order online. 5. Load items in to vehicle according to the order by store keeper. 6.dilver items to customers by sales rep 	

7. Collect Payments
8. Collect expiry items.
Post Conditions
Customer deliver the items

Table 3. 3 Use Case Description for Delivery items to customer

3.4.7 Use Case Diagram for accounting process.

Figure 3-9: shows the Use case diagram for accounting process.

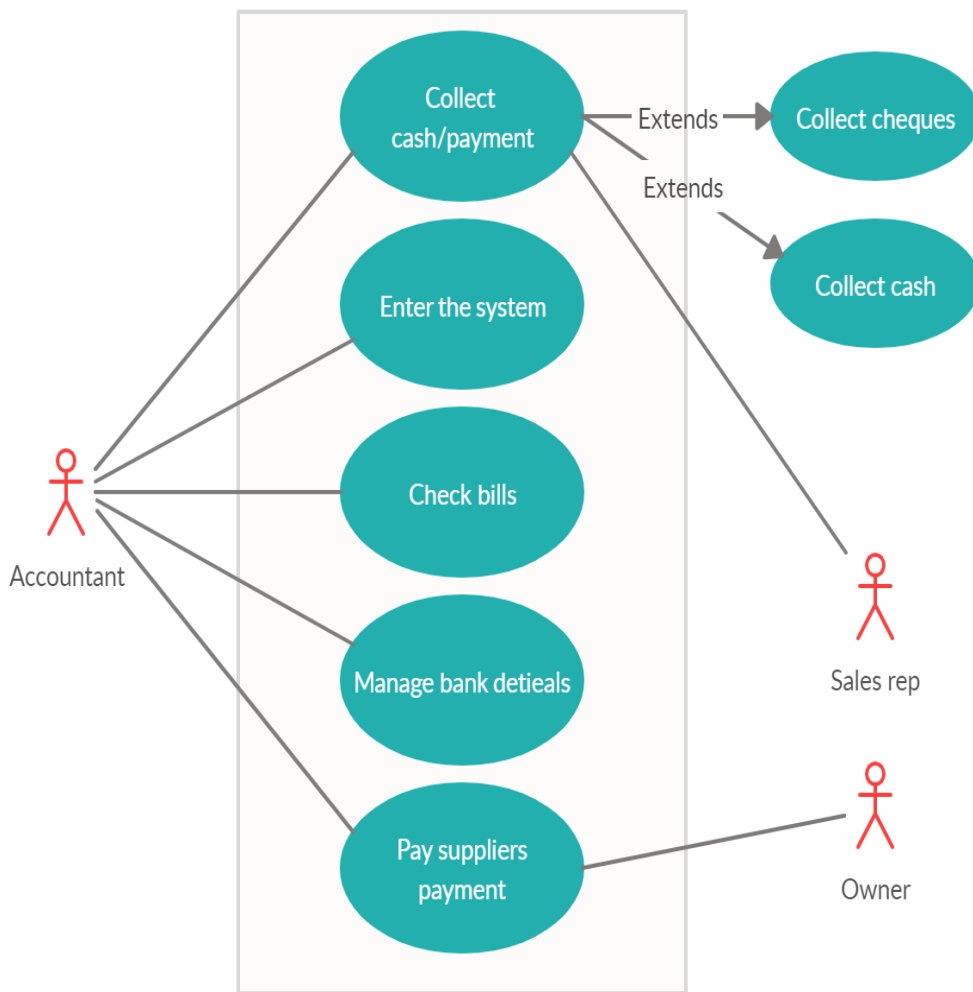


Figure3. 9 Use case for accounting process.

Use case description for Accounting process are displayed by Table 3.4

Use case	Accounting process
Actors	Sales Rep, Accountant
Overview	
Handling Payments	
Preconditions	
Accountant need to handle payment process	
Flow of events	
1. Collect payments 2.Login into the system using accountant credentials 2.Check Bills and other payments 3.Manage bank details 4.Pay supplier payments	
Post Conditions:	
Accountant mange payments.	

Table 3. 4 Use Case Description for accounting process.

3.4.8 Activity Diagram for placing order online

Figure 3-10 shows activity diagram for placing order of the proposed system



Figure3. 10 Activity Diagram for placing order online

3.4.9 Sequence Placing order online

Figure 3-11 Sequence Diagram for placing order online of the proposed system

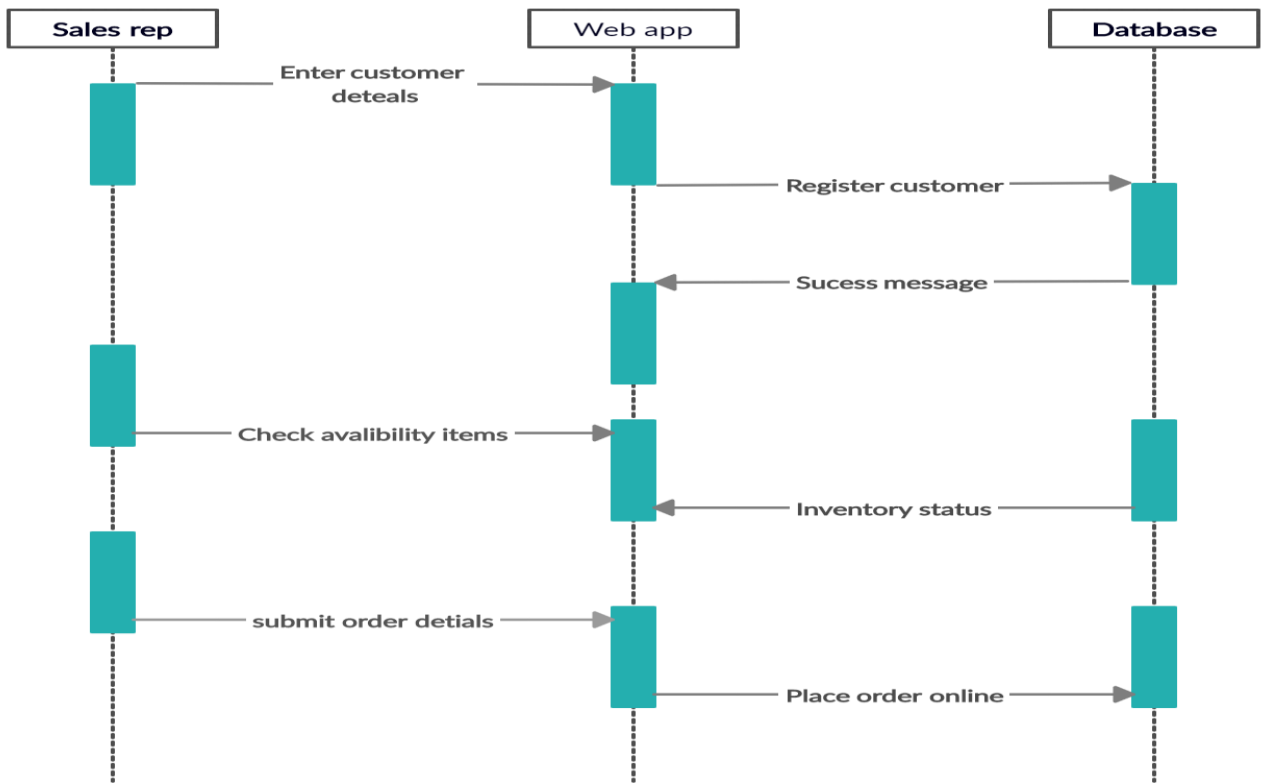


Figure3. 11 Sequence Diagram for placing order online

3.5 CLASS DIAGRAM OF THE SYSTEM

Class diagram gives an overview of the target system by depicting the objects and classes inside the system and the relationships between them. It gives a wide variety of usages from modeling the domain-specific data structure to detailed design of the target system [14].

Figure 3.12 .Depicts an overview of the proposed system using class diagram

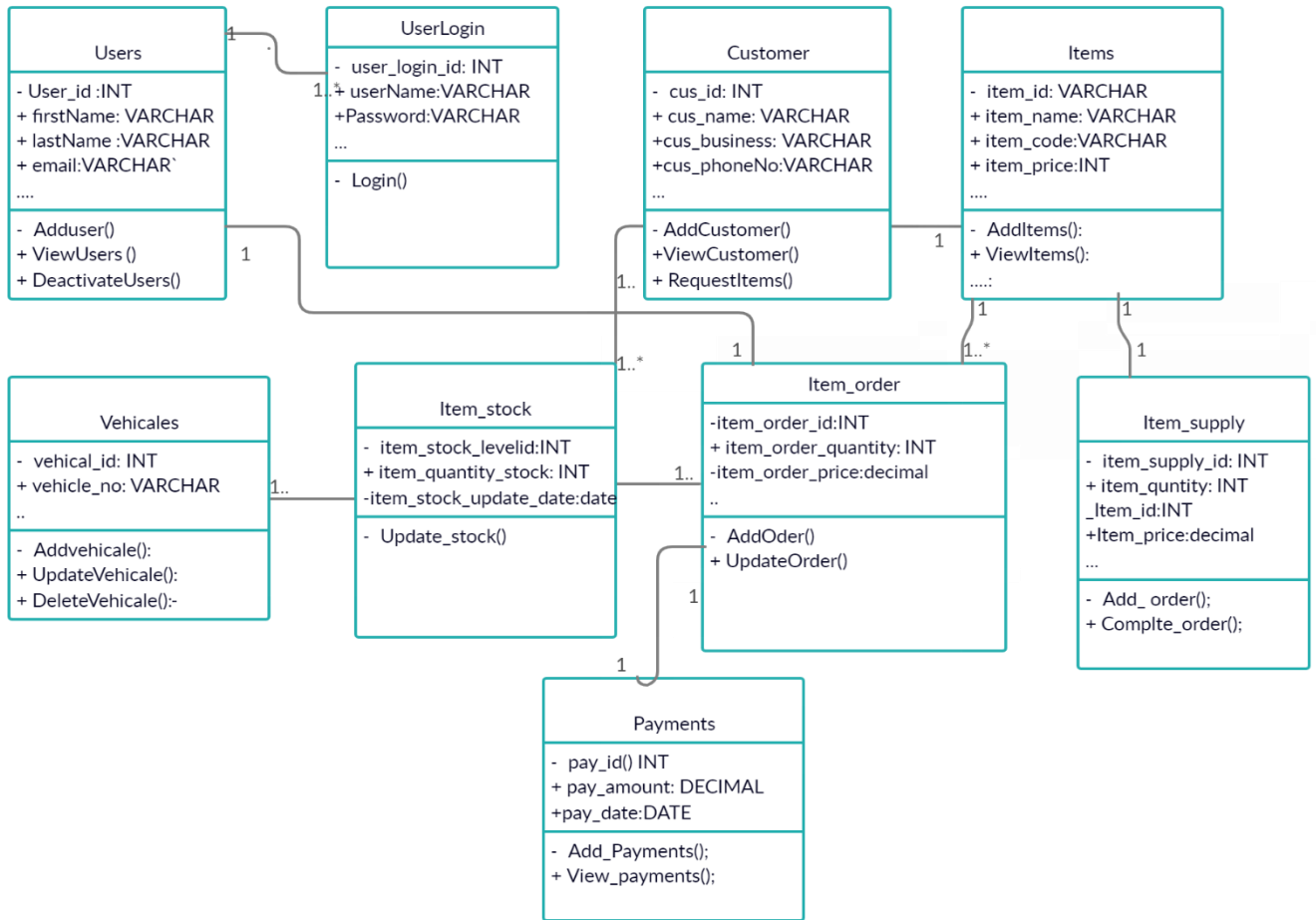


Figure3. 12 Class diagram for the proposed system

3.6 DATABASE DESIGN

Database design is the method of creating a detailed data demonstrate of a database. This logical data model contains all the required logical and physical design choices and physical storage parameters required to create a design in a data definition language, then which can be used to create a database. A fully attributed data model contains detailed attributes for each entity.

Figure 3.13. Depicts the database design of the Business support system [15].

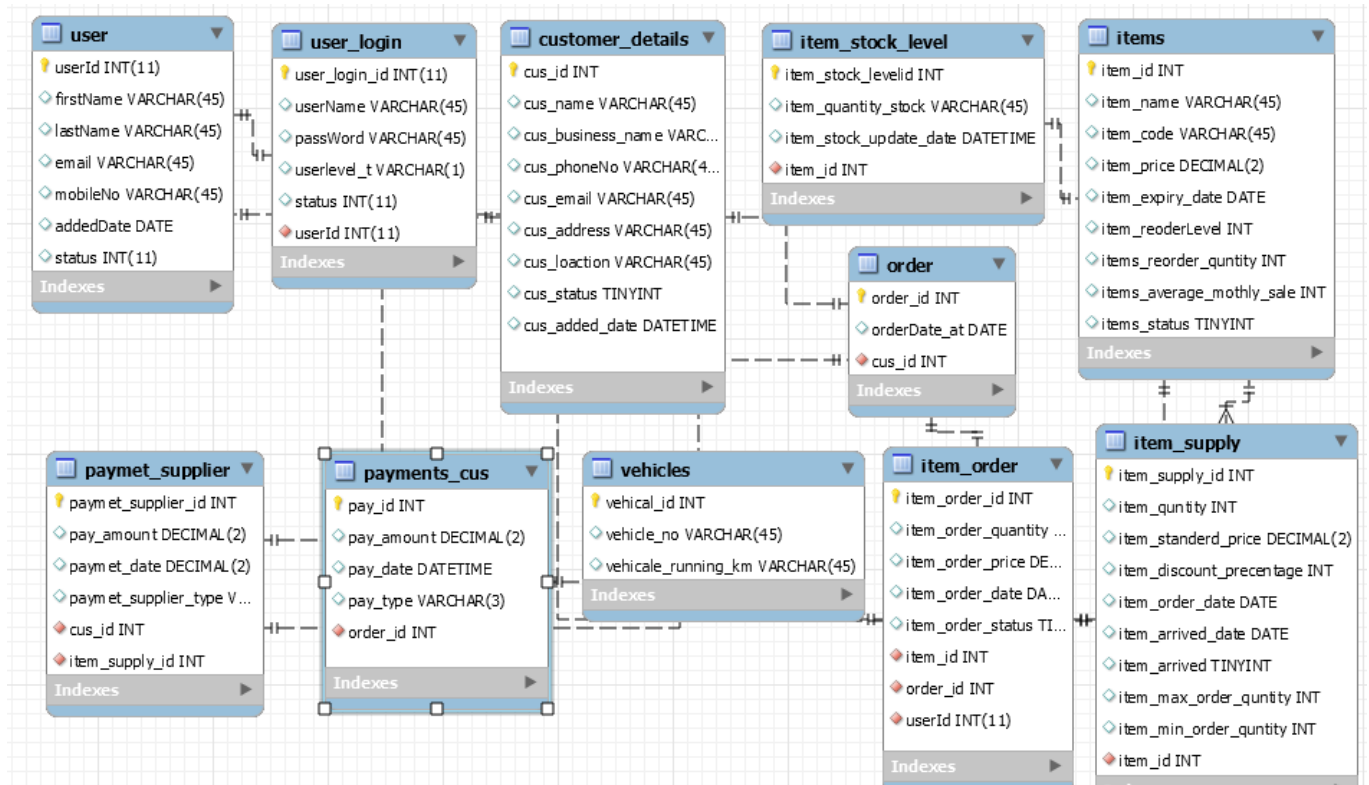


Figure3. 13 Database Diagram For Proposed System

3.5 UI Design and Implementation

A user interface is a linkage between users and a computer or a system that consists of commands or menus used to communicate with the program. The goal of this interaction is effective operation and control of the machine at the user's end and to get feedback from the system.

Following user interface design principal were observed while designing Business Support System.

- Simplicity - is a very important factor which should be adhered while the user interfaces designing. The main goal is providing complex task as simple to use within a proper user interface. Ex BSSK Web Application were designed as much as simple because most of the users have less IT Literacy.
- Consistent - icons, menus, buttons should be consistent throughout the whole software, it helps in fast data entering for the users.

- Feedback - Main goal of this principle is making awareness each and every task those users do. In the BSSK has addressed this as success message or an error message.
- Visibility - Making all the Controls required for a task, options available for specific tasks without confusing to the user.
- Structure - This principal has addressed in the BSSK grouping all the related things together and designing whole software as modules by putting functions related to each module.

Few user interfaces of the business support system are given below.

System users should have to log in within correct user names and passwords to access the system.

Figure 3.14 depicts the login interface of the business support system for the Users.

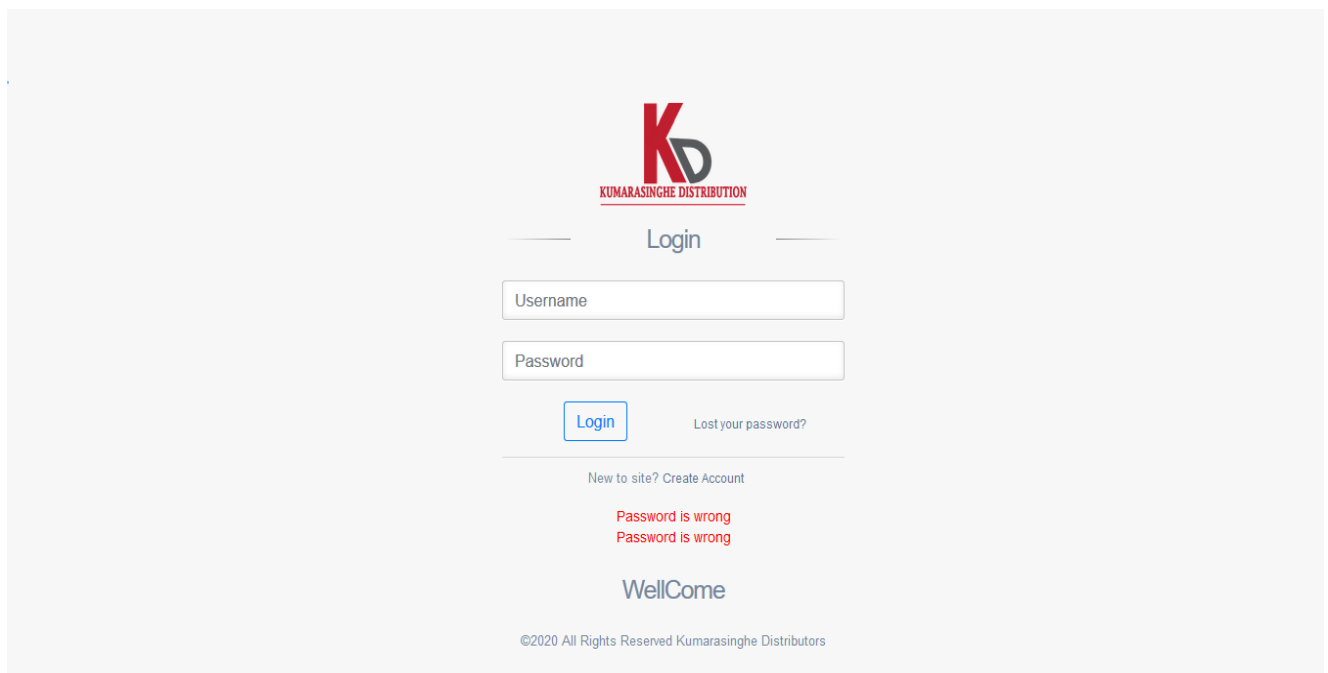


Figure3. 14 Login Screen

Figure 3.15 depicts the Forget password interface of the system for the Users.

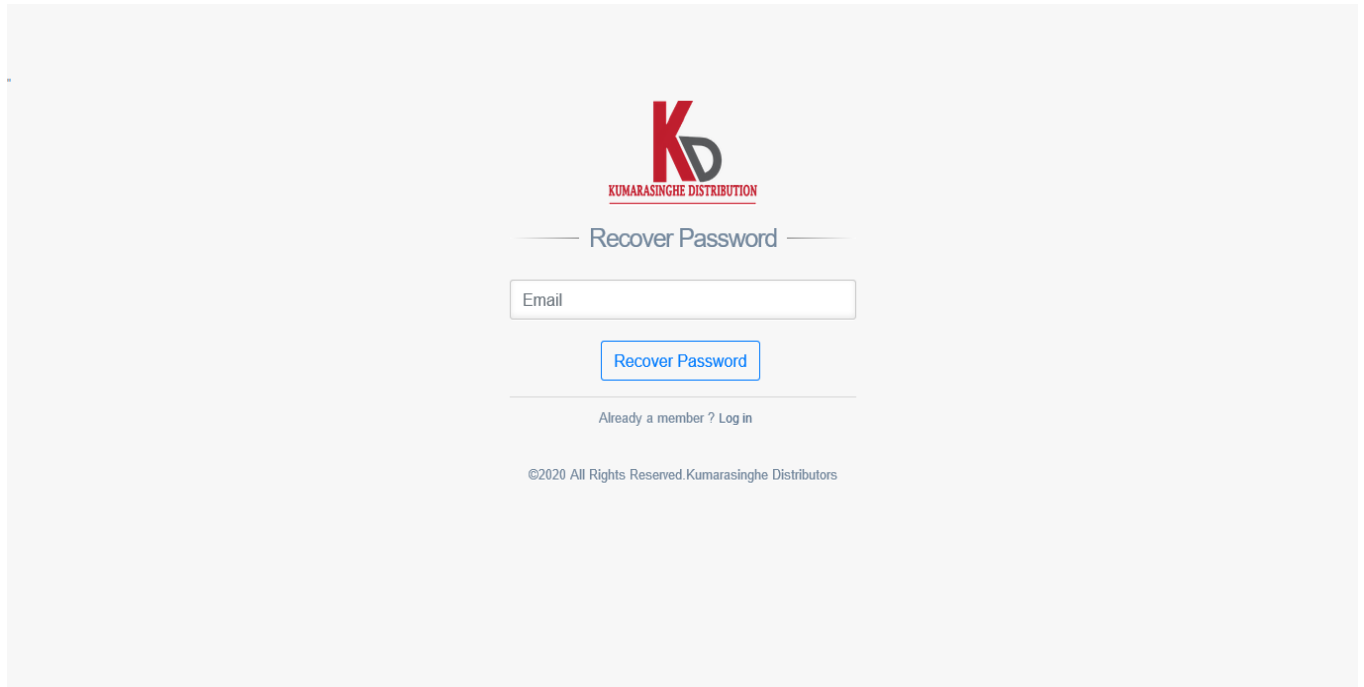


Figure3. 15Login Screen

Figure 3.16 depicts the home page interface of the system for the Users.

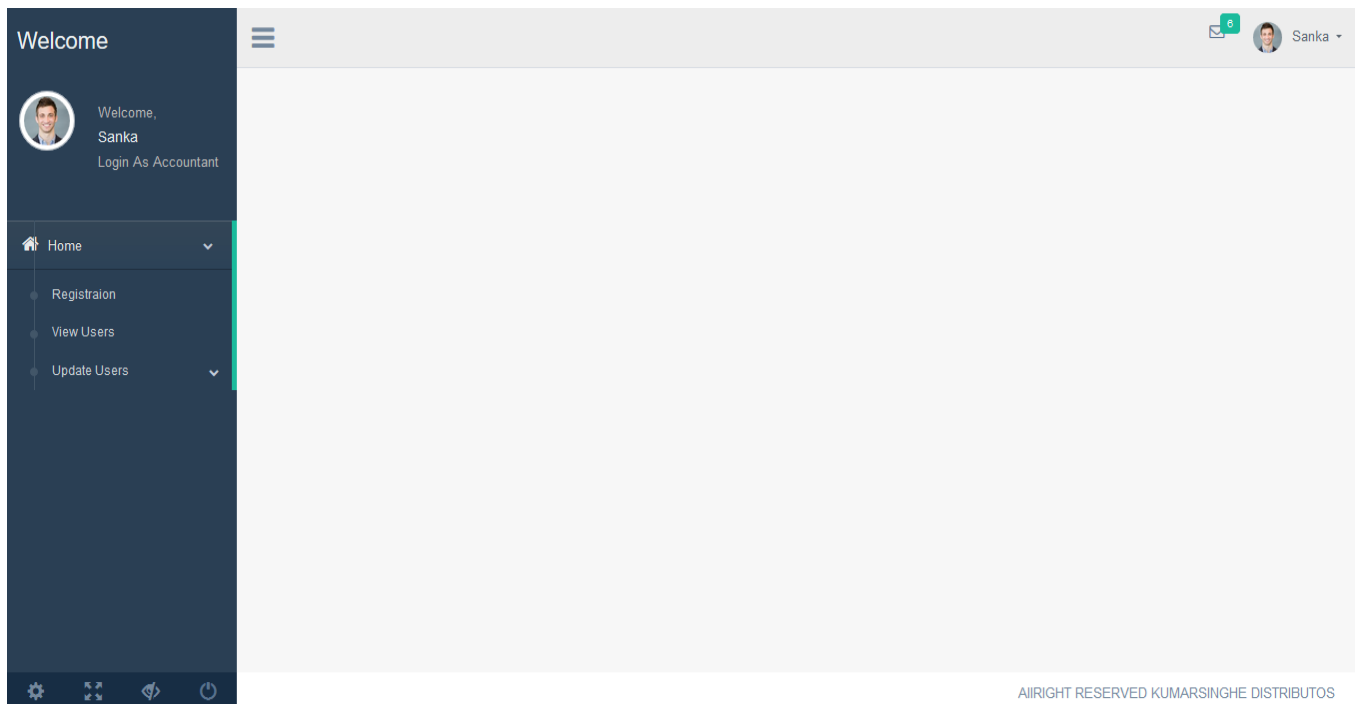
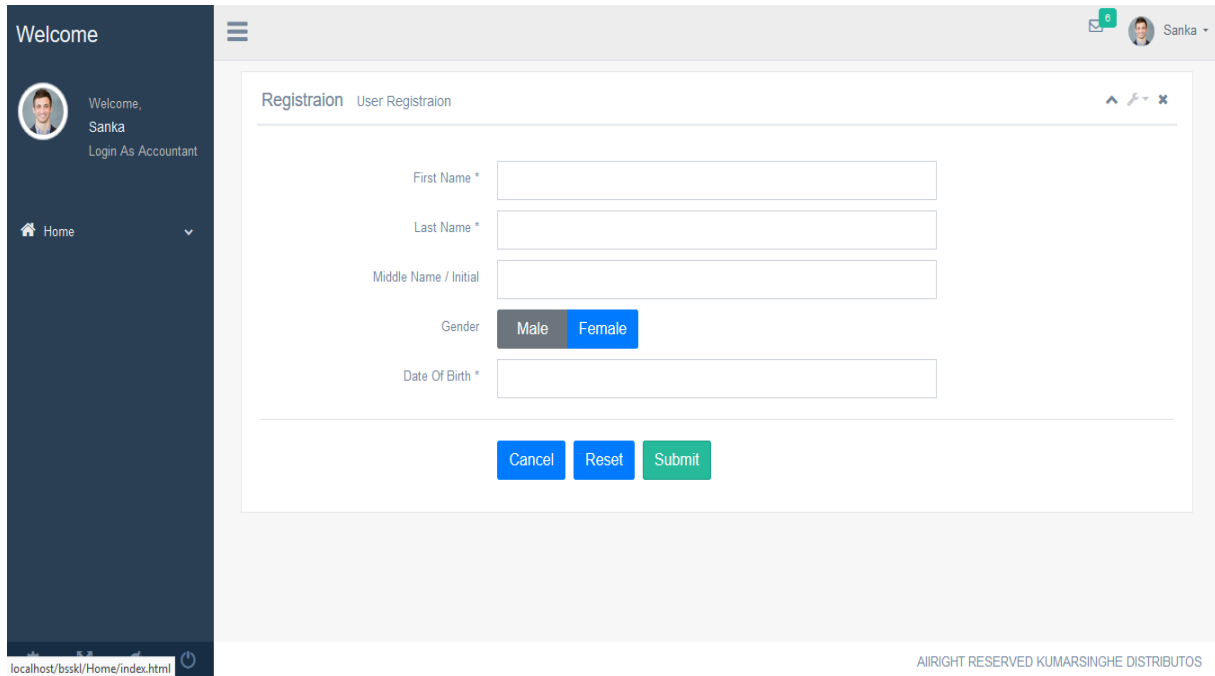


Figure3. 16.Home Page Screen

Forms

Forms are used to get the inputs from the user. Each and every module has input form with following format. Figure in 3:15 depicts data inserting form.



The image shows a web application interface with a dark blue sidebar on the left and a main content area. The sidebar contains a 'Welcome' message, a user profile picture, the name 'Sanka', and the text 'Login As Accountant'. Below this is a 'Home' button with a dropdown arrow. The main content area features a 'Registraion User Registraion' form. The form has five input fields: 'First Name *', 'Last Name *', 'Middle Name / Initial', 'Date Of Birth *', and a 'Gender' field with 'Male' and 'Female' radio buttons. At the bottom of the form are three buttons: 'Cancel', 'Reset', and 'Submit'. The browser's address bar shows 'localhost/bsskl/Home/index.html' and the footer contains the text 'AIRRIGHT RESERVED KUMARSINGHE DISTRIBUTOS'.

Figure3. 17 Forms

CHAPTER 4 - IMPLEMENTATION

4.1 INTRODUCTION

Implementation is defined as a specified set of activities designed to put into practice an activity or program of known dimensions. According to this definition, implementation processes are purposeful and are described in adequate detail such that independent observers can identify the presence and strength of the "particular set of activities" related to implementation [16].

Business support system for Kumarasinghe Distributors has been implemented as the requirements identified in the system analysis phase to satisfy the system users.

Software code was written and concluded in an understandable and readable format using comment that will be able maintain in the future by choosing appropriate tools.

4.2 IMPLEMENTATION ENVIRONMENT

Technologies. And tools which used for the system development are displayed by Table4.1

Hardware	Software
<ul style="list-style-type: none">• Intel® Core™ 2 Duo 240GHz processor• 4GB RAM• 250GB hard disk with 80 GB free Space	<ul style="list-style-type: none">• Microsoft Windows 10• WAMP Server 3.1.7• PHP 5.6.40• Apache 2.4• phpMyAdmin 4.0.4• MySQL Server version: 5.7.24

Table 4. 1 Technologies. And tools

The System has been developed using the following languages and technologies.

Language Or Technology	Description
PHP (Hypertext Pre Processor)	PHP was the main development language used to create the most system and its logics.
Bootstrap Version 3.3.5	Bootstrap was used to build the base Interfaces of the system.
CSS	CSS (Cascading Style Sheets) was used to make the plain HTML interfaces more alluring and user friendly.
JQUERY	Jquery is also based on JavaScript used to client side validation and pre coded library also used.
AJAX	AJAX is based on JavaScript was used to get data from the server without refreshing it repetitively. [17]

Table 4. 2Technologies. And tools

Development Tools

- MySQL workbench 8.0CE – to handle database.
- Adobe Photoshop CS3 – for image retouching.
- DoPDF– for PDF creation.
- Sublime Text- Sublime Text IDE was used as IDE.

4.3 REUSED COMPONENT

The following pre-coded modules were used while developing the system

Jquery datepicker- The *datepicker* is tied to a standard form input field. Focus on the input (click, or use the tab key) to open an interactive *calendar* in a small overlay. [18]

Jquery chosen-*Chosen* is a JavaScript plugin that makes long, unwieldy select boxes much more user-friendly. [19]

Jquery data tables-*DataTables* is a plug-in for the *jQuery* Javascript library. For show data in data grid.

4.4 MAJOR CODE SEGMENTS

As mentioned previous chapters BSSK’s web application is built on top of MVC architecture based on Codeignator frame work which is not vary developer to developer when it comes to implementation. Controller can send commands to the model to upgrade the model's state It can moreover send commands to its associated view to change the view's presentation of the model. And model stores data that's retrieved to the controller and displayed in the view. Whenever there's a change to the data it is updated by the controller finally the view represent the data on GUI interface interacting with controller

Figure 4-1: depicts how the BSSK Interacts each MVC files.

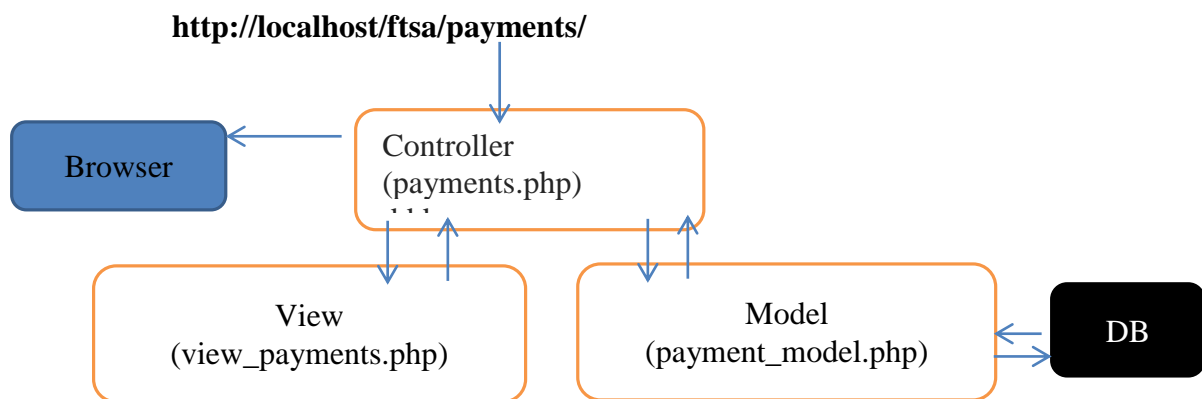


Figure 4. 1 MVC Interaction overview

4.4.1 Model

The model is the place the framework completes the CRUD operations in the database tables. The accompanying code piece demonstrates the code for insertion of a record (Validations Of the Login).

```

1  <?php if ( ! defined('BASEPATH')) exit('No direct script access allowed');
2
3  class Model_login extends CI_Model{
4
5  public function login_logic($user_name,$password)
6  {
7      $this->db->where('userName', $user_name);
8      $this->db->where('passWord', $password);
9      $this->db->where('status',1);
10     $query = $this->db->get('user_login');
11     $results = $query->result();
12     if($results ){
13         return $results[0];
14     }else{
15         return false;
16     }
17 }
18 }
19 public function chk_email($re_email)
20 {
21
22     $this->db->select('*');
23     $this->db->from('user');
24     $this->db->join('user_login', 'user_login.user_login_id = user.userId');
25     $this->db->where('email',$re_email);
26     $query = $this->db->get();
27     $results = $query->result();
28     if($results ){
29         return $results;
30     }
31 }
32 }public function update_email($user_id,$password){
33
34
35     $this->db->set('passWord', $password);
36     $this->db->where('user_login_id', $user_id);
37     $this->db->update('user_login');
38 }
39 }
40 }
41 }

```

Figure 4. 2 Model Class

4.4.2 CONTROLLER

Controller act as a communicator between the models, and views. It gets the requests and responses from the model, and after that upgrades the view files as the outcome results.

Following codes appears how files are loaded.

```

52
53 public function login_logic(){
54     $data = (object)null;
55     //set validations rules
56     $this->form_validation->set_rules('user_name','user name','required|min_length[4]');
57     $this->form_validation->set_rules('password','password','required|min_length[4]');
58     if($this->form_validation->run() == false){
59         $json_result = array(
60             'status_result'=>'VEERROR',
61             'error_user_name'=>form_error('user_name'),
62             'error_password'=>form_error('password')
63         );
64     }else{
65         //get data form post from view
66         $user_name = $this->input->post('user_name');
67         $user_password = $this->input->post('password');
68         //encrypt the password
69         $password =sha1(md5($user_password));
70         $userdata = $this->model_login->login_logic($user_name,$password);
71
72         // die();
73         if($userdata){
74             //keep user data using session
75             $this->session->set_userdata('username',$userdata->userName );
76             $this->session->set_userdata('userlevel_t',$userdata->userlevel_t);
77             $this->session->set_userdata('user_login_id',$userdata->user_login_id);
78
79             // $this->layout->add_activity($this->session->userdata('user_login_id'),'1','");
80
81             //send json results to js file show error messages or success messages
82             $json_result = array(
83                 'status_result'=>'SUCCESS'
84             );
85         }else{
86             $json_result = array(
87                 'status_result'=>'ERROR'
88             );
89         }
90     }
91 }
92 echo json_encode($json_result);

```

Figure 4. 3Controller Class

4.4.3 VIEW

View is consist of all the interfaces and presentation logics reside, main function of the view is get data that inserted by user and pass them into controller and show responses to users that sends by controller .

Following code shows login view of the system.

```
<!DOCTYPE html>
<html lang="en">
  <head >
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <!-- Meta, title, CSS, favicons, etc. -->
    <meta charset="utf-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <title>BSS</title>
    <!-- external css -->
    <link href="<?php echo base_url();>assets/css/login_page.css" rel="stylesheet">
    <!-- Bootstrap -->
    <link href="<?php echo base_url();>/assets/gen/vendors/bootstrap/dist/css/bootstrap.min.css" rel="stylesheet">
    <!-- Font Awesome -->
    <link href="<?php echo base_url();>/assets/gen/vendors/font-awesome/css/font-awesome.min.css" rel="stylesheet">
    <!-- NProgress -->
    <link href="<?php echo base_url();>/assets/gen/vendors/nprogress/nprogress.css" rel="stylesheet">
    <!-- Animate.css -->
    <link href="<?php echo base_url();>/assets/gen/vendors/animate.css/animate.min.css" rel="stylesheet">

    <!-- Custom Theme Style -->
    <link href="<?php echo base_url();>/assets/gen/build/css/custom.min.css" rel="stylesheet">
  </head>

  <body class="login" >
    <div >
      <a class="hiddenanchor" id="signup"></a>
      <a class="hiddenanchor" id="signin"></a>

      <div class="login_wrapper">
        <div class="animate form login_form" >
          <section class="login_content">
            
            <form id="login_form_data">

              <h1>Login </h1>
              <div>
                <input type="text" class="form-control" placeholder="Username" id="user_name" name="user_name" required="" />
              </div>
            </form>
          </section>
        </div>
      </div>
    </div>
  </body>
</html>
```

Figure 4. 4View Class

CHAPTER 05- EVALUATION

5.1 INTRODUCTION

A software evaluation is a sort of assessment that looks for to determine in case BSSK or a combination of software programs is the finest possible fit for the needs of the Kumarasinghe Distributors. The idea is to look closely at the resources and tools provided by the software that's either currently in use or is being examined as a possible addition to programs already in use by that client. Based on a arranged list of criteria along with some practical experimentation, a software evaluation makes it possible to decide if the BSSK would be helpful to the client or if some other combination of software products would serve to way better advantage. [20]

5.2 TESTING METHOD

There are different sorts of testing strategies to verify the strength and weakness of the system. Main testing strategies used in software testing are black –box testing and white box testing.

5.2.1 White box testing

White-box testing is a strategy of testing BSSK that tests internal structures or workings of an application, as opposed to its functionality. In white-box testing an internal perspective of the BSSK, as well as programming abilities, were utilized to plan test cases. [21]

5.2.2 Black box testing

Black-box testing is a strategy of BSSK testing that examines the functionality of an application (e.g. what the BSSK does) without peering into its inside structures or workings. This strategy of test can be applied to virtually each level of software testing. [22]

5.3 TEST PLAN

5.3.1 Unit testing

The intension of the unit testing is taking pieces of the BSSK's code with contain small functionality and separates it from remainder of code and check whether we are getting the intended output .This could be black box testing or white box testing.

5.3.2 Integration testing

Unit tested individual code Fragment of the BSSK have to be Integrated and tested as a group. Sometimes the individual code part may work legitimately as single, but when integrated with other module it may give Errors .The main goal of Integration testing is to identify those issues.

5.3.3 Regression testing

BSSK is usually added new features, functionality and new enhancement over the time and those changes should not be introduced now. The intent of the Regression testing is recognizing issues emerged with the modern changes made to the system.

5.3.4 System testing

System testing is performed on the whole BSSK in a real Environment After completion, successful unit testing and integration testing for Identifying problem arisen in a real working Environment.

5.3.5 User acceptance testing

Under acceptance testing system should be tested by end users to verify developed system can be handled required task in a real world scenario, and verify whether intended functionalities of the specification were implemented. BSSK was tested in real working Environment by the End user with different privileges. After testing, implemented functionalities were accepted and gave positive feedback. Finally, it was decided BSSK has successfully achieved Required Functionalities as specification and system was accepted by the End user.

5.4 TEST CASES

Test case for User Registration are displayed by Table 5.1

Test Case ID	1		
Module Name	User Registration		
Tested Components	Registration		
Test No	Test case Description	Testing Procedure	Expected Results
1	Registration	Click Save Button without required details	System promote an error message
2	Data Validation	Enter Invalid email	System is prompting customized error message
4	Enter Invalid Password	Click save button inserting invalid date	System promote an error message
5	Enter confirm password different	Click save button inserting invalid date	System promote an error message
6	Enter Valid registration Data	Click Save button	System promote success message

Table 5. 1Test Cases of User Registration

Test case for Check login are displayed by Table 5.2

Test Case ID		2	
Module Name		Check Login	
Tested Components		Login in to system	
Test No	Test case Description	Testing Procedure	Expected Results
1	Enter Invalid Password	Click login button	System promote an error message
2	Enter Invalid Password	Click login button	System promote an error message
3	Enter invalid user name and password	Click login button	System promote an error message
4	Enter valid user name and password	Click login button	Successfully login into system
5	Try to login using only url	Enter url in address bar	Redirect to login screen

Table 5. 2 Test Case Login

Test case for Reset Password are displayed by Table 5.3

Test Case ID		3	
Module Name		Check Password reset	
Tested Components		Login	
Test No	Test case Description	Testing Procedure	Expected Results

1	Enter Invalid Email	Click recover password button	System promote an error message
2	Enter email not exists in db	Click recover password	System promote an error message
3	Enter valid and exists password	Click recover password	Email received tempory password
4	Enter valid user name and password	Click login button	Successfully login into system

Table 5. 3 Test Case Login

5.5 TEST RESULTS

The information expected to test the functions of the system, were made by alluding to the past information accumulated from the report sampling technique followed in the investigation stage. Model information sets were created for each module with a particular end objective to test the functionalities.

Each data field in individual form was tested with sample dummy data to guarantee the working condition of each form component. A common arrangement of lapse messages were reused in suitable forms to reduce weight and perplexity by giving distinctive error messages for same functionalities. The test results of important test cases are added to Appendix- C with some screen shots.

Test results for User Registration are displayed by Table 5.4

Test Case ID		1	
Module Name		User Registration	
Tested Components		Registration	
Test No	Test case Description	Actual output	Status

1	Registration	First Name Is Required	Pass
2	Data Validation	Password Is Required	Pass
4	Enter Invalid Password	Password should have atleast 4 Characters	Pass
5	Enter confirm password different	Password Should Dont Match	Pass
6	Enter Valid registration Data	User is Sucessfully Registerd	Pass

Table 5. 4 Test result User Registration

Test results for Check login are displayed by Table 5.5

Test Case ID		2	
Module Name		Check Login	
Tested Components		Login in to system	
Test No	Test case Description	Actual Output	Expected Results
1	Enter Invalid Password	The password field must be at least 4 characters in length.	Pass
2	Enter Invalid User Name	The user name field must be at least 4 characters in length.	Pass
3	Enter invalid user name and password	User Name or Password is invalid	Pass

4	Enter valid user name and password	Sucessfully Logged	Pass
5	Try to login using only url	Redirect to Login page	Pass

Table 5. 5 Test Result Login

Test results for Check password reset are displayed by Table 5.6

Test Case ID		3	
Module Name		Check Password reset	
Tested Components		Login	
Test No	Test case Description	Actual Output	Status
1	Enter Invalid Email	The Email field must contain a valid email address.	Pass
2	Enter email not exists in db	No Related Email,Please Enter valid Email Address	Pass
3	Enter valid and exists password	New Passowrd is successfully sent to your email	Pass

Table 5. 6 Test Result Password Reset

5.6 USER ACCEPTENCE TESTING

The BSSK was tested in the client-side; after the system was developed. The user acceptance testing was carried out with the Technicians, and randomly chosen benefit seekers. With real transaction data sets. Appropriate administrators were chosen from the staff people, and were asked to work with certain modules and their functionalities agreeing to their privileges. The chosen users' activities were observed whereas they were working with the system.

Overall BSSK was tested by the client based on their privileges. As the requirements of gathered at the requirement analysis stage all the system operational privileges should consist with administrator (Owner) account. Therefore system was tested with administrator level first. After testing administer then it had been requested to test the system using Accountant by logging their user account and as the Technicians response some minor modifications were done. After giving brief description about how the system works. BSSK was tested with Sales Rep user level logging with their user accounts.

After finishing the user acceptance testing all the system users gave a positive response about the system and minor modification were done for satisfying some user requirement. After testing overall system with deferent user privileges, response of the users were summarized.

Figure 5-1 depicts summery of user feedback.

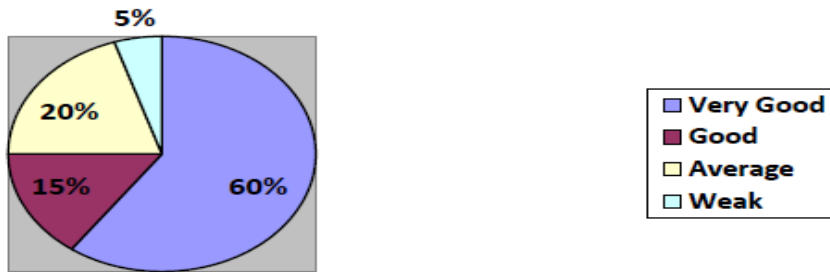


Figure 5. 1summery of user feedback.

CHAPTER 6 – CONCLUSION

6.1 INTRODUCTION

The Kumarasinghe Distribution is a well-established Distribution agency which is doing their business under PEPSI company in Gampola .The Agency is always looking forward to keep a better distributing network which they can be distribute their main beverages (Fanta,Pepsi,Mycola,etc) to entire gampola area with fast and satisfy the customer need.

The distributing agency needed to improve their manual business process with the information technology and give fast delivery to their products to their customers .with the current manual process they have to face lot of barriers. some of the main reasons are store keepers have to wait until the receiving invoice from the sales rep which get from customers in the gampola area to prepare their vehicles (Load the items into vehicles) and also their accounting process is very poor with the current manual system .because of this lot of corruption may happened .because of above reasons is was decided to implement the web application which can be access anywhere and increase efficiency of the their distribution process with the help of information technology.

Developed the Business support system for was able to meet those requirements improving productivity and efficiency of the functions with the main functions managing their inventory very easily ,billing process can do fast and accurately and manage their vehicles easily etc .

Finally the project achieved the proposed functional and non- functional requirements. The feedbacks from the client, users and the other stack holders were positive proving that the project was a success.

6.2 PROBLEMS ENCOUNTERED

Major Issues encountered during the Project are,

- Lack of knowledge with respect to the development language and tools some hardware and software integration problems.
- To overcome these problems it used some books on and online API s regarding PHP, JQUERY and bootstrap.
- Lack of experience to develop android application development.

6.3 LESSONS LEARNT

- Business support system for Kumarasinghe distributing agency was a great opportunity for me to use the knowledge which gathered through the MIT Degree program. By developing BSSK systemI was able to learn how to control and manage the work on time. Organizing the workflow was a one of the most important lesson to be learnt. And how to work in a stressful environment.
- Creating BSSK allowed me to learn more current innovations like web Applications Development, PHP , HTML, CSS, JQUEYR, AJAX and MYSQL Server and to figure out how the actual programming improvement industry in applying those advances. Also, how to write technical documents was another key lesson learnt by me.

6.4 FUTURE ENHANCEMENTS

Some future environment is listed below client willing to have

- The system can be further enhanced to provide More functions such as managing human resources, payroll etc.

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APPENDIX A - SYSTEM DOCUMENTATION

System documentation gives guidelines to the users of the FTSA or to any other users, and how to install this system in their Database server, PC's or their work stations.

Hardware Requirement

Hardware	Hardware Requirement
Processor	3.0 GHz Intel Processor
Memory	4GB
Hard Disk	500GB
Monitor	1024*768 Resolution Monitor.
Printer	Dot-matrix printer or Inkjet printer or Laser printer
Internet	ADSLConnection (Minimum Speed 512Kbps)

Table A. 1 Hardware Requirements

Software Requirement

Software	Software Requirement
Operating System	Microsoft Windows XP/Vista/Windows 7. /Windows 8 /Windows 10
Bundle package	XAMPP 1.7.1 or above Or Individual packages- MySQL5.1, Apache2.2., phpMyAdmin 4.0.4,PHP 5.4.16
Web browser	Fire Fox/Google Chrome

Table A. 2 Software Requirements