Inventory Management System

Kritsana Phunpian
Software Engineering Major,
Mae Fah Luang University
Chiang Rai, Thailand
kritsana.phu13@lamduan.mfu.ac.th

Titiphong Tawilo
Software Engineering Major,
Mae Fah Luang University
Chiang Rai, Thailand
titiphong.taw13@lamduan.mfu.ac.th

Puttaporn Junlong
Software Engineering Major,
Mae Fah Luang University
Chiang Rai, Thailand
puttaporn.jun13@lamduan.mfu.ac.th

***Abstract*— The problem of inventory management is paper-base system that hard to store and manage goods in inventory such as staff might be cannot realize location of goods, but we can implement internet and computer to apply business for fix the problems. Therefore, the inventory management system is developed based on web application technology by applying Bootstrap and Extjs under supervising of Soft Inter Company. And Extjs is organization standard of company, The SAP standard, supply chain management and inventory system were applied to develop this system. Therefore, the inventory system is developed for managing items in the inventory. The result shows the features of web application. Also, the positive user satisfaction results confirmed that this application not only use for keep information of items but also notify users when items nearly out of stock and how much does it order and not to a loss.**

Keywords—Web Application, Inventory Management System, Deposit System, Retailing System.

I. INTRODUCTION

Some organization has to do business with their goods, and some huge organization has a lot of items in the inventory, the more items are, the harder to manage. In the past, Inventory Management may not work in good performance because of low-performance system and paper-based system implementation. So we should develop new Inventory Management System to solve the problem.

A. The study of related work [3]

We will show the application that solve the organization's inventory problem from the other company that can related to our Inventory management system and we will describe and compare between other works and our developed system.

1. MessLess Inventory Management System

The MessLess Inventory Management System is from Binary Brilliant Inc., the latest version that released on 28 November 2013 is version 10 this is the commercial trail software and the user can try it for free for 30 days. And the price of this software is $149.95

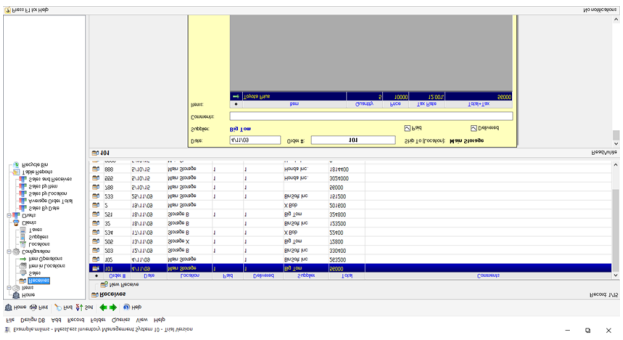

Figure 1 MessLess Inventory Management System.

After trying MessLess Inventory Management System, We found that the strength of this system is the response time of this system is pretty fast when we add the new item, receive, or new sales order. The response time is within a half of second. And another strength is the customizable function. User can customize to show whatever information they want in the system.

Nothing is perfect, this system has some of cons and misspelling in some word. First, the cons we found is the quantity of item can be only one unit type and cannot customized. Second, the user interface of the system is quite unbalanced. The layout of each section in the system is in the horizontal and its make some page are hard to see the information (such as in the sales page, they should move the detail section for each record to show in the vertical). Third, the edit information process for each record can make the user confusing. Because there are no save button when user have finish their operation. If user need to save the edited

information, they need to click somewhere outside the yellow box (information box) and the system will save and update the data in database. This might make user lost for what to do next. Fourth, this related work has a limitation that its can only run on Windows operating system. And the last cons we have found, misspelling is one of the most terrifying mistake that we did not expected. In the sales page, if user selected the record to print, they will notify that the button “Print Invoice” is misspelling into “Print Inovice”, this is not a big deal. But when user go to the print page, the word “Invoice” in the top-right corner of the paper are misspelling into “Inoice”. This mistake is a big deal because if user are the medium organization, and they sent the invoice to the clients. Clients will not trust in the invoice just because this misspelling.

II. METHODOLOGY

A. *Technology and tools being used for this system*

1. MVC Pattern[1]

MVC is framework that created in Smalltalk-80 age (20 year ago) by separate object that collect data (Model), show data object (view) and object that use to contact with user (controller) from each obvious, contacting between object is use Observer pattern, that means that the object will observe the changes that occur in the observer without the need to know the individual observer is the object of a class or not, as long as the classes that implement observer (or listener) interface.

A separate object them from each to make it easier to modify for example we can change view form GUI to HTML (JSP, ASPX and PHP), WML or text mode without edit model or support many together such as each customer shares the screen with the stock price, each will have their own views and displays only the self-interest securities while object model is the securities market.

The main principles is model that can’t call method of view or controller directly because it’s not have value to collect view or controller object, model just have only list of object observer (view or controller that implement observer interface) that observing changes, the model will be notified of changes by sending event notification message to the each observer, if that observer are view it will update display by new data. Similarly, the view was invisible controller, it can’t call methods of controller directly to the controller event will send an observer.

Many developer have modify MVC to use for other pattern for example, Swing call MVC2 somebody use Model-View-Presenter or Model-View-Presenter or Model-User Interface but the principle is similar to the original The only difference between the model view controller that which is notify or accept event notification.

2. Spring Bean framework. [4]

The object that is a core of application and managing by spring IoC container that we call Bean, is object that have instantiated, assembled, and otherwise complement that managed by spring IoC container. The bean was created by defining metadata in container for example, in form of XML <bean/>. Five type of scopes and for bean instantiation as of Spring 3.0 and also we can create a custom scope.

3. Ext Js [5]

ExtJS is javascript framework that was developed by Sencha used for web application development, ExtJS can help developer to develop fast and make beautiful user interface, main features of ExtJs is UI Widgets are like Grid, Tab, ComboBox and etc.

4. mySql [2]

MySQL is Relational Database Management System (RDBMS), MySQL can store, search, sort and retrieve, MySQL provides the ability for users to extract data from many people at the same time and quick access to information and decide user to access in order to properly and secure.

So, from above PHP is a language that supports every OS, whether it is Windows or Linux, MySQL can support multiple OS as well, especially Linux OS to make PHP work for best performance and in the present day to designing package it will install PHP and MySQL to instantly from couple it convenient to work with the database, there is a database management program which is developed from the PHP language called PhpMyAdmin.

5. Bootstrap [6]

Bootstrap is a Front-end Framework that allows us to create web applications quickly and beautifully, the bootstrap have CSS Component and JavaScript Plugin, we can choose to work for a wide variety, Bootstrap is design to be compatible with Responsive Website, which allows us to write once and can be run through a browser on both mobile phones and tablet PCs by not rewrite the code.

Bootstrap consists of button with various colors, forms, tables, icons, menu bars, dropdown, windows Popup, and many items available to choose.

B. *Software Development Process*

To develop information systems for the enterprise, it will have a process that is suitable for development. So we choose Agile to be applied to web applications by Agile. This method is used for handle about change of requirement from customer.

C. *System Analysis and Design*

As we mentioned in section A, The MVC pattern is the worldwide popular pattern. The request has been sent to controller. Which is already been mapping with url and link with the model. Model will get the view to show and then return back in order. This inventory management use this pattern in every programs in the system.

D. *Software Development Project Schedule*

This inventory management system has been developed during May 2016 - December 2016 and the Grant chart is as follow in Table 1

No.	Task	Assigned to	Start (day)	End (day)	2016											
					Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
	Get Requirement				↔	⟷										
1	Get Requirement from user	PM, Dev. team	24/1/2016	24/1/2016	↔											
2	Analysis and Design system form requirement	PM, Dev. team	02/02/2016	25/02/2016	⟷	⟷										
3	Make mock-up(Example System.)	Dev.	25/02/2016	19/03/2016		⟷	↔									
4	Present Mock-up to user and get feedback	PM, Dev. team	19/03/2016	19/03/2016			↔									
	System Design						⟷	⟷	⟷	⟷						
5	Analysis and Design specification, Data base (ER, Use-case, Functional)	Dev. team	09/04/2016	19/04/2016				⟷								
6	Create User Interface	Dev. team	19/04/2016	09/05/2016				↔	⟷							
7	Present software system design and user interface to user	PM, Dev. team	13/05/2016	13/05/2016					↔							
8	Create System Testing	Dev. team	03/06/2016	03/06/2016					↔	⟷						
	Implementation									⟷	⟷	⟷	⟷	⟷	⟷	
9	Database Creation	Dev. team	23/07/2016	30/08/2016						⟷	⟷	⟷				
10	Coding functional and non-fuctional	Dev. team	01/09/2016	02/11/2016								⟷	⟷	⟷	⟷	
	Testing														↔	
11	Run System and Test the Result	Dev. team	03/11/2016	05/11/2016											↔	
12	Fix bug	Dev. team	07/11/2016	10/11/2016											↔	
	Maintenance														↔	
13	Maintain the system completed	Dev. team	15/11/2016	20/11/2016											↔	

Table 1. System Grant Chart

III. Results

After the system has been developed. There are two main modules in this inventory management system. Which is Deposit Inventory module and Retailing Inventory module

Each module has the similar program inside. But the core program of each module are Stock, Item, Goods receive, and Good delivery. The example screen of each program has shown as follow:

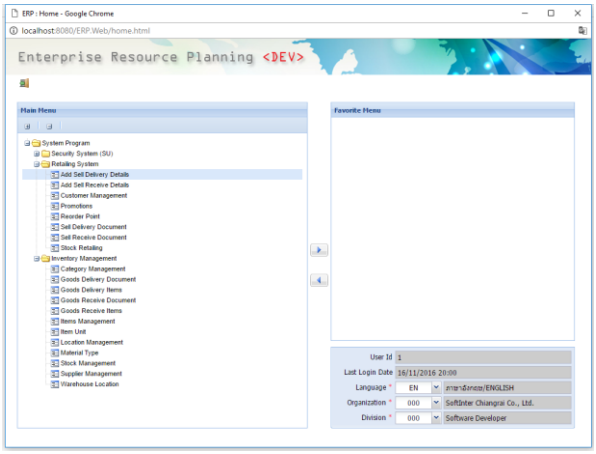

Figure 2: Main menu

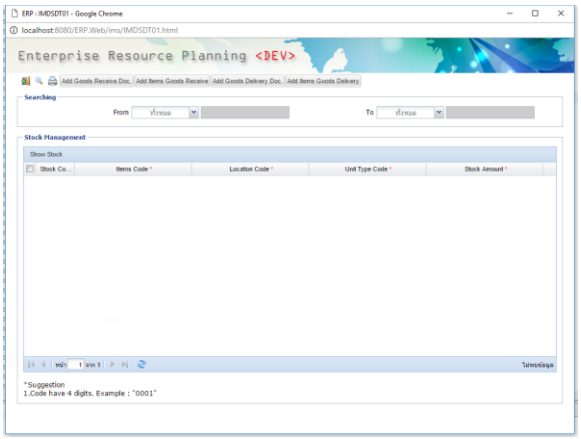

Figure 3: Stock program

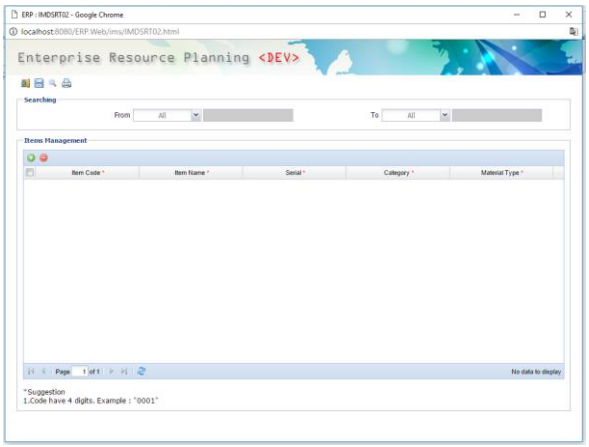

Figure 4: Item program

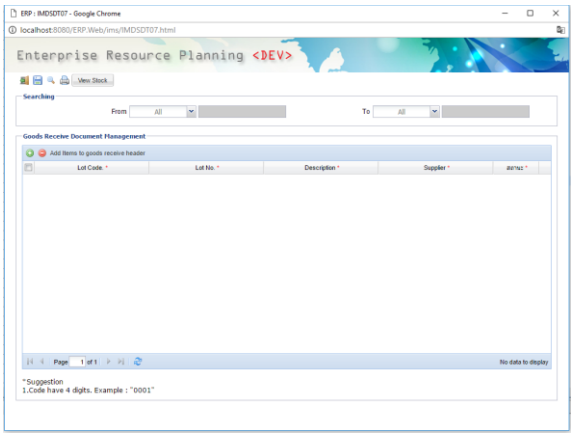

Figure 5: Goods Receive Program

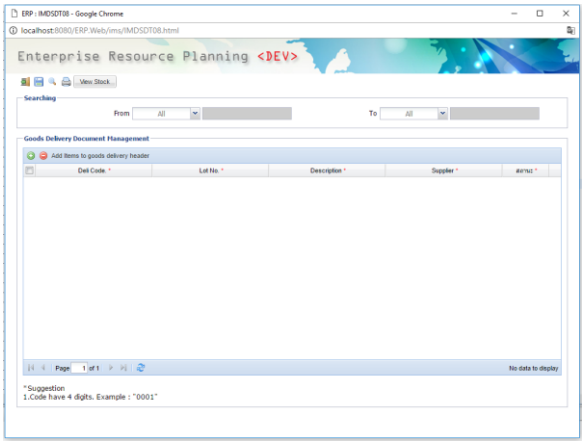

Figure 6: Goods Delivery Program

A. Comparison to existing system

We have compare our Inventory management system to the MessLess Inventory Management System. And the result are shown as follow:

Systems / Difference	MessLess Inventory Management System (Related Work)	Our Inventory Management System
System Type	Windows Client	Web Application
Operating System	Windows	All Operating System that support web browser
Financial management (tax and calculating price)	✓	×
Goods receive or goods delivery type support	One type	Vary Type
Unit type support	One type	Vary Type

Figure 7: Compare to existing system

The other system work just only in Windows operating system. But our system work in all operating system that support web browser. The other system support financial management while our system isn't. But our system support vary type of receive, delivery, and unit type.

IV. Conclusions

After application development follow step of Agile, start by work plan follow with requirement of user as well as the responsibility of the member as assigned by the plan. Then when we get requirement from user, we need to analysis and design the system to present to user for more understanding, and we has received feedback from user as well.

Then we brought into the process of developing system, the system that we develop is run on web-based system by the developer have chosen to use appropriate technology and tools to development the system such as MVC Pattern, Spring Bean, ExtJS, My SQL and Bootstrap. After the development is completed we have brought a system to testing process and test the satisfaction of users.

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