Inventory Management System with POS

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ABSTRACT: In the present time, Point of Sale (POS) is becoming a huge factor of the business world. Without a proper automated system, piled up paper works might emerge and multiple issues might occur since everything is hand written in a logbook and the guaranteed safety of the data's are more likely nothing. The main purpose of this study is to design and develop an Inventory Management System using .Net framework and implement a Point of Sale with a user-monitoring feature, real time based. The objective of the study is to resolve the current issue of the client's data storing procedure and sale processing. Questionnaires was produced to differentiate the opinions of the users and owner. The result of the evaluation was ranked with Functional Suitability as the highest. The evaluation is based on ISO 25010. This shall help the client to stay away from their former data storing procedure and move on to the automated world.

KEY WORDS: Inventory Management, System, Point of Sale, User-Monitoring, Real time, Automated System

I. INTRODUCTION

Small and huge businesses or companies are enforcing inventory management systems for their organizations due to the massive intake of data that usually disrupts the flow of manual data recording of the business. Everyone knows how hard it is to manage a business and without the help of an automated system, everything will be difficult to manage and searching for a specific data might be extremely lethargic for the employee since exploring the logbook could be excruciating to filter especially when the logs are filled with many data. With an Inventory Management System, records will be accessed easily, data intakes will have a safe storing area and everything will be one click away. One of the important part is the Point of Sale (POS) where in the user could easily store the sales data, export the sales data and product a receipt for the customer. This will provide a huge ease of access for the employees in the organization.

The old school process of data recording is usually done through writing in a logbook and handing out written receipts which is terrible for the organization. However, businesses of today are implementing their own Inventory Management System for the sake of their field, it is mainly because they need to save their time and effort in terms of filtering the data that usually takes a lot of time and effort when exploring the logbook. This system will secure and manage the important data's of the business. To reduce the massive paper works required in reporting. To view the previous transactions made. To secure the system with a login portion. To issue billing receipts for the clients. To export all required data into excel or pdf file. The benefits and impact of the Inventory Management System is developed for the business to fully extend their capabilities as a whole. The group that will benefit the development of the system are as follows. Clients will benefit the system with a quick transaction from the employee together with their billing receipt. Every action or asking for stock will be done quickly as the user could easily filter the data's. Employees will benefit the system as they will achieve the ease of use in the system. Thus, allowing them to spend lesser time in exporting data for reports, making transaction with the consumers. Organization will benefit the system as they will have a proper flow in their sales and management. Easy access of reports and employee logs.

II. REVIEW OF RELATED LITERATURE AND STUDIES

Large quantities of stock items confound the stock control process. Businesses/Organizations order their stock item into a couple of gatherings and take comparable stock control strategies for the things in each gathering [1]. For the instances that have request costs, its ideal stock recharging arrangement is appeared to be of the base-stock type and of the type, individually [2]. A few examinations in the multi-echelon stock frameworks writing have utilized a negative binomial conveyance to rough a basic irregular variable emerging in the model [3]. A nourishment handling and-dispersion organization commonly stores valuables that are stored before transportation occurs to clients. Valuable assembly is in this manner. Increasing load of items that are being placed away increment valuable cost and the executive's expense and is possible to reduce stockroom efficiency. Repeated, valuable items are usually important for the focal point of the placement and-conveyance industry, usually about transient nourishments [4]. The issue of stock administration in inventory network is tended to from a control hypothesis point of view. In the broke down administration, the valuable items is used for fulfilling an obscure, time fluctuating interest are recharged by a few item suppliers. The recharging orders are acknowledged with deferral, which varies among providers and transport options [5]. Customary stock division methods, for example, ABC examination are regularly restricted to utilizing request and cost while fragmenting the stock into gatherings for simpler administration. Two division approaches, Grouped Multi-Item Individual Policies and Multi-Item Group Policies, that utilize measurable bunching are created and contrasted with investigation. An assessment of the said procedures by means of many tests was performed [6]. Stock proportioning is a stock approach that permits different kinds of treatment without utilizing distinct inventories [7]. In stochastic stock frameworks unfurling vulnerabilities sought after, lead to the update of prior renewal plans, which thus results in a shakiness or supposed framework anxiety. We give the grounds to estimating framework apprehension in non-stationary interest situations, and check the security and the cost exhibitions of (R,S) and (s,S) stock approaches [8]. Confidential inventory system and other software products that includes different database management is configured trough identifying the information about the confidential data that the enterprise has [9].In the thought about frameworks, the valuable items that are used to satisfy obscure and variable interests are liable to rot. It is renewed with numerous client suppliers described by various times [10].

III. SCOPE OF THE RESEARCH

The focus of this study is to analyze, design, develop, test and implement an Inventory Management System with Point of Sale for windows operating system that will contain the relevant information of the business. This will furtherly enhance the management area wherein the administrator could handle all of the reporting task and adding, removing and updating an item, supplier and user. Whereas the cashier could handle all the sales and produce a receipt for the customer. This will reduce the time spent of the employee's in their tasks without having a piled up paper works. The system has different features that are very useful for the administrator and cashier to complete their tasks. The data filtering will allow the administrator to search an item, logs of the user, and sales for reporting purposes whilst the employee could easily search an item with the given search tab to quickly find the required item. The system consists of different data coming from the Sales, Items, Users, Logs, and Reports and all of those are manageable/editable by the administrator if required. On the other hand, the system will only be implemented on PC platform with Windows 7 Operating System. Energy fee, employee's wages and other bills are excluded in the study.
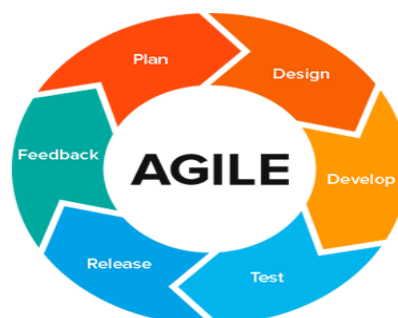
IV. METHODOLOGY

**Figure 1.0 – System Development Strategies**

The team used Agile Development Cycle for the creation of the Inventory Management System with POS. The agile method is a particular approach to the project development. This method assisted the team during the development of the system to make necessary features according to the needs of the business. In addition, this system used Visual Studio 2012 with C# as the main programming language, MySQL as the database, Adobe Photoshop and Photoscape for image editing for the certain feature the system has.

This study used the ISO 25010 criteria as the software evaluation tool for the completion of system requirements that would define the purpose and operating capability during the end-user training and during the testing phase of the system. The likert scale consists the following items, starting with Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The gathered data was analyzed and reviewed using the ISO 25010 criteria.
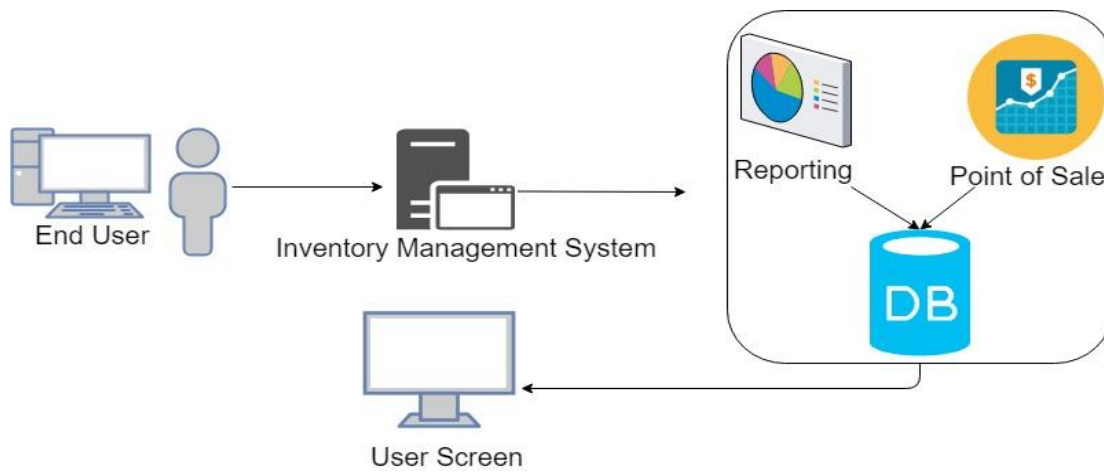
Figure 2.0 – System Architecture

Figure 2.0 shows the system architecture of the Inventory Management System with POS. Based on the illustrated image above, the system unit is controlled by the end user which helps him/her to do his task. Report Generations are requested in the database in order to show the data. Every time that the end-user is in the system, he/she could access the point of sale form wherein the end-user makes sale on their customers. The end-user could also access the report generation form where he/she could select a specific data to export from the database into an excel file or pdf file. The database that handles all of the data is an RDBMS known as MySQL.
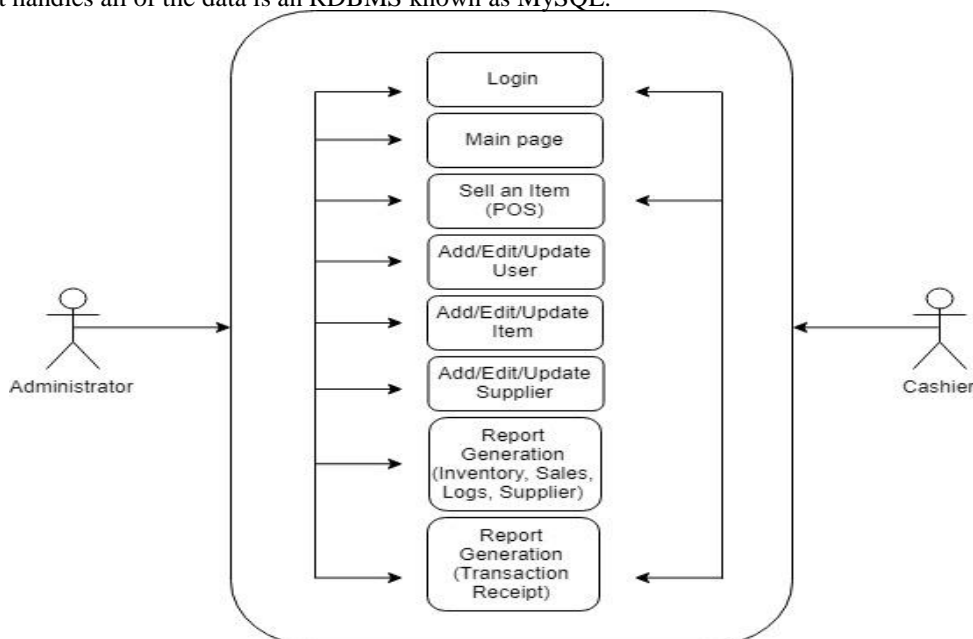

Figure 3.0 – Use Case Diagram

Figure 3.0 shows the use case diagram of the system. Based on figure 3.0, the administrator is capable and involved of doing everything such as exploring the Main page, selling an item, adding/deleting/updating a new user/item/supplier, report generations, logging in and using all of systems functions if necessary. While the cashier is limited to logging in, selling an item and receipt generation only.

V. RESULTS AND DISCUSSION

The following figures below are the discussion of the inventory management system and the results of the system evaluation based on ISO 25010.Five figures are used to discuss the system and one table is used to discuss the evaluation results.
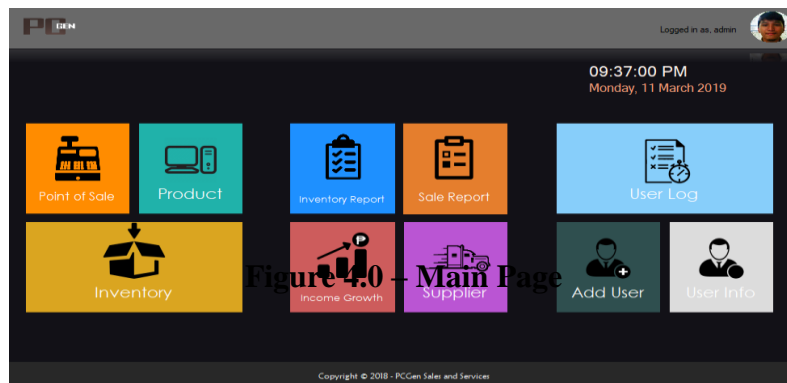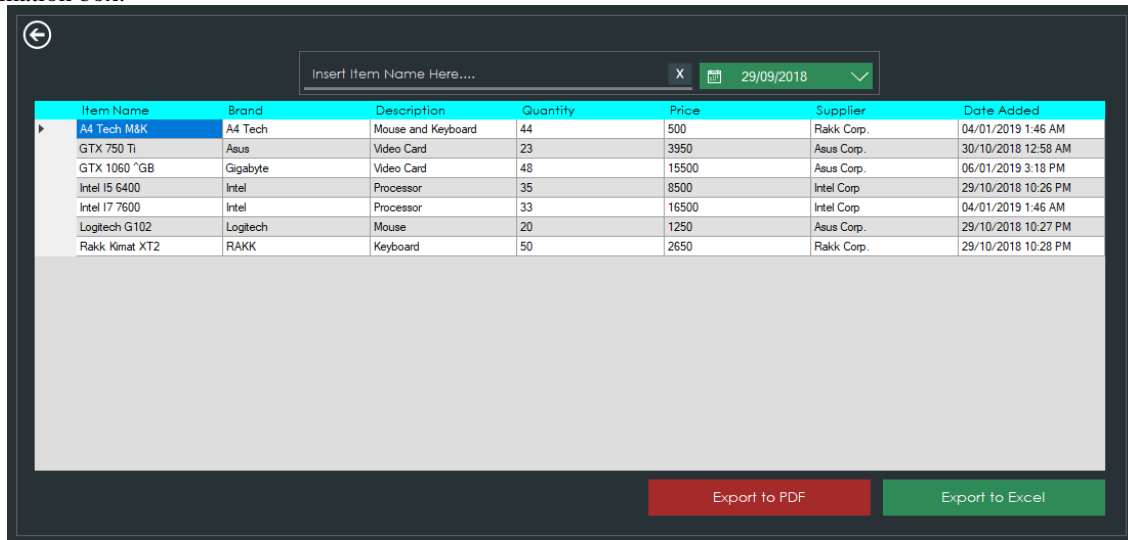
Figure 4.0 – Main Page

Figure 4.0 shows the main page of the system that is only accessible by the administrator. This is where the administrator selects his task and does everything like Report generating, adding a new user/item and selling an item. There are 10 functions for the administrator to use, there is point of sale where he/she could sell an item, product to view the items and update it. Inventory to add a new item, Inventory report to view the date and time of the added item, Income growth to view the statistical record of the income, supplier to show the organization's item supplier, User Log to view the login and logout time of the employee's, add user to add a new user whether he/she is an administrator or employee and user info to view the details of a selected user.
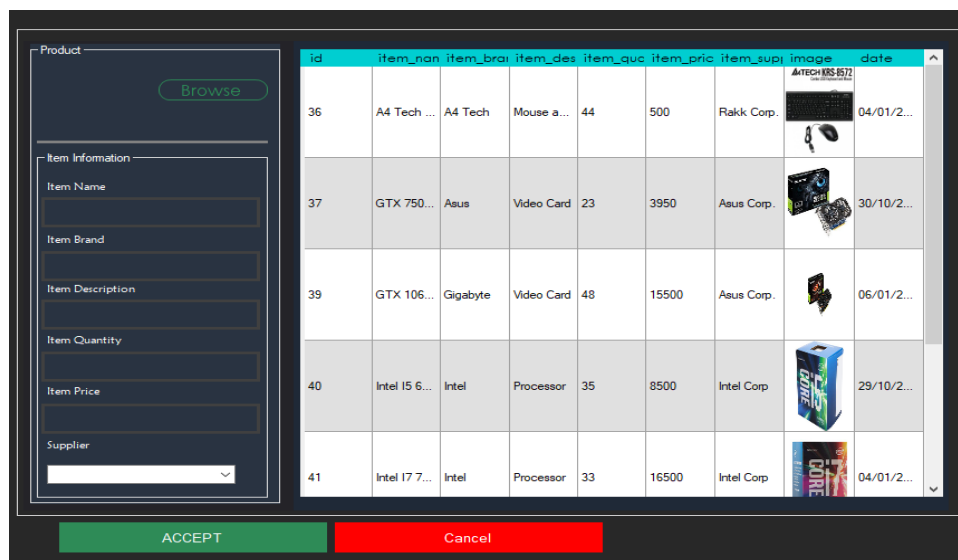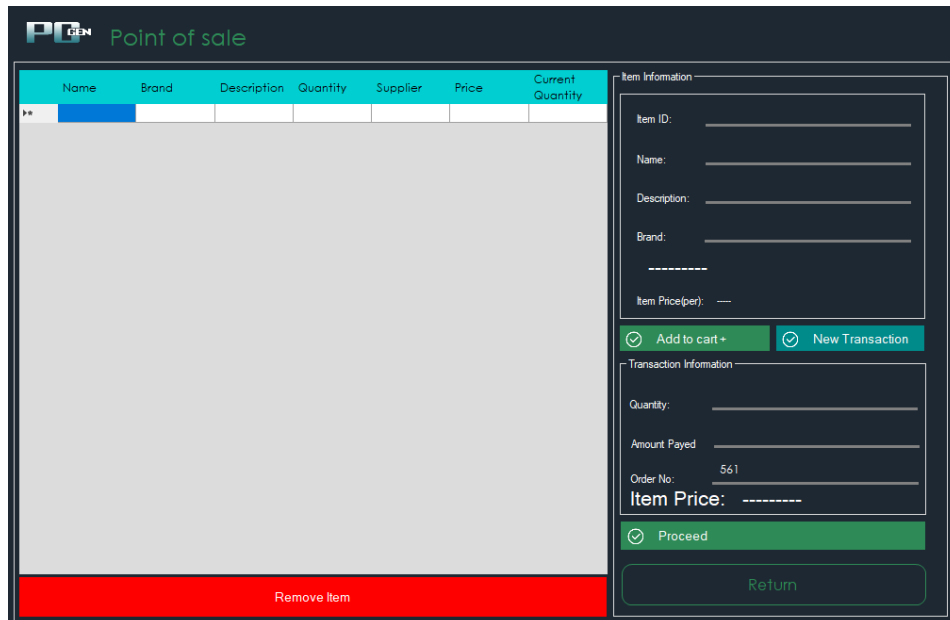

Figure 5.0 – Inventory Form

Figure 5.0 shows the inventory form where the administrator could add a new item to be sold. This form is only accessible by the administrator account to confirm the items that are currently being sold in the business. The browse button opens up a file dialog to allow the user to add an image for the item and encode the details of it in the item information box.

Figure 6.0 – Inventory Report Form

Figure 6.0shows the inventory of the system for the administrator reporting purposes. This form allows the administrator to filter the data through searching or selecting a respective date. The textbox on the middle top allows the end user to input any text that matches the needed data to export. Excel and PDF are used in exporting the data

Figure 7.0 – Point of Sale Form

Figure 7.0 show the point of sale where the cashier could do his/her task properly. In addition, this form is accessible by the administrator just in case there is no cashier available to continue the process. The item ID is used when searching for an item and it will automatically show all of its details below. The transaction information shows the quantity of the selected item and its order number. Add to cart is used to have a multiple data's to sell if required.

Table 1.0 – Evaluation Result

CRITERIA	WEIGHTED MEAN	VERBAL INTERPRETATION
Functional Suitability	4.43	Agree
Performance Efficiency	4.25	Agree
Compatibility	3.95	Agree
Usability	4.38	Agree
Reliability	4.51	Strongly Agree
Security	4.11	Agree
Maintainability	4.44	Agree
Portability	4.60	Strongly Agree

Table 1.0 represent the overall result of the evaluation. The highest scores are recorded in Portability that has a weighted mean of 4.60 followed by Reliability that has a weighted mean of 4.51, Maintainability that has a weighted mean of 4.44, Functional Suitability that has a weighted mean of 4.43, Usability that has a weighted mean of 4.38, Performance Efficiency that has a weighted mean of 4.25, Security that has a mean of 4.11 and Compatibility that has a weighted mean of 3.95 marked as the lowest.

VI. CONCLUSION

The Inventory Management System with POS was successfully developed and everything went according to plan, every functions were completed, designs are solid and the development process was smooth. The system was able to show everything that was expected and every little details to it matters. It process the required task of the user and give an accurate output in reports. This system will help the client to stay away from their old strategy which is written data acquisition and reports. In addition to that, the system could also filter the data if required to enable the quick and accurate processing of output. On the other hand, this system still requires further improvement such as UI updates and monthly income in statistic form for the client's advance report. Lastly, system should still be optimized for the best performance.

VII. ACKNOWLEDGEMENT

REFERENCES

[1]   Mohammaditabar, D., Ghodsypour, S. H., & O'Brien, C. (2012). Inventory control system design by integrating inventory classification and policy selection. International Journal of Production Economics, 140(2), 655-659.

[2]   Chen, Y., Lu, Y., & Xu, M. (2012). Optimal inventory control policy for periodic- review inventory systems with inventory- level- dependent demand. Naval Research Logistics (NRL), 59(6), 430-440.

[3]   Solis, A. O., Longo, F., Nicoletti, L., Caruso, P., &Fazzari, E. (2014). A modelling and simulation approach to assessment of a negative binomial approximation in a multi-echelon inventory system. International Journal of Simulation and Process Modelling, 9(3), 146-156.

[4]   Liang, C. C. (2013). Smart inventory management system of food-processing-and-distribution industry. Procedia Computer Science, 17, 373-378.

[5]   Ignaciuk, P., &Bartoszewicz, A. (2010). LQ optimal sliding mode supply policy for periodic review inventory systems. IEEE Transactions on Automatic Control, 55(1), 269-274.

[6]   Rossetti, M. D., &Achlerkar, A. V. (2011). Evaluation of segmentation techniques for inventory management in large-scale multi-item inventory systems. International Journal of Logistics Systems and Management, 8(4), 403-424.

[7]   Fadıloğlu, M. M., &Bulut, Ö. (2010). A dynamic rationing policy for continuous-review inventory systems. European Journal of Operational Research, 202(3), 675-685.

[8]   Kilic, O. A., &Tarim, S. A. (2011). An investigation of setup instability in non-stationary stochastic inventory systems. International Journal of Production Economics, 133(1), 286-292.

[9]   Jordan, G. S., Robinson, J. M., & Fisher, R. D. (2010). U.S. Patent No. 7,739,227. Washington, DC: U.S. Patent and Trademark Office.

[10] Ignaciuk, P., &Bartoszewicz, A. (2012). Sliding mode dead-beat control of perishable inventory systems with multiple suppliers. IEEE Transactions on Automation Science and Engineering, 9(2), 418-423.