Short Message Service system, as a control to the consumption of expired goods in Nigeria.

NWENE VINCENT

nwenevin@gmail.com

COMPUTER ENGINEERING DEPARTMENT, FEDERAL POLYTECHNIC OKO, ANAMBRA STATE.

Abstract

Expired goods are bought everyday by unsuspecting individuals who are always not aware that the goods they have bought have expired either in the kitchen or stock. This poses a health hazard to Nigerian Citizenry. This paper is aimed at designing an SMS alert system which informs consumers of goods or products that whatever goods they have bought is getting close to its expiry date or that it has expired. The system works in such a way that when you go to a shop to buy any product, your details which includes your phone number is recorded with the details of the goods bought. At the expiration period of these goods, SMS alert will be sent to you as to discard such goods if you still have them unused or unconsumed.. The front end of this software was designed with JAVA; while MySQL was used at the backend, to gather the data of the proposed SMS system. The SMS system was tested and it worked perfectly. Expiry SMS was gotten as the major system output, which is evoked depending on the inputted date in the Application program Interface. The study recommended that every business enterprise and shopping mall should introduce this system in order to reduce the rate of consumption of expired products by Nigerians.

Keyboard: SMS, Expiration, Goods, Business, Customer, Alert

Introduction

A web Product Expiration system is a system that takes stock and regulates

product expiring dates, solves the tedious work and activities in calculating and taking stocks of large products for large business owners in which an SMS alert is sent to consumers to inform them that the goods bought will soon expire. This system can aid Shop owners and managers to make prompt and informed decisions of products that are about to expire. Clearance sales, Immediate Consumption of Products, Gifting of Product etc. could be good measures that can be taken to minimize loss to the business or prevent health hazards to consumers when this system is installed in any business domain.

Concept of a goods or products:

A good or product is an object or system made available for consumer's use; it is anything that can be offered to a market to satisfy the desire or need of a customer (Cutright, 2015). Products are often referred to as merchandise, products are bought as raw materials and then sold as finished goods. A product needs to be relevant: the users must have an immediate use for it. A product needs to be functionally able to do what it is supposed to, and do it with a good quality. A product needs to be communicated: Users and potential users must know why they need to use it, what benefits they can derive from it, and what it does difference it does to their lives. Advertising and 'brand building' best do this. A product needs a name: a name that people remember and relate to. A product with a name becomes a brand. It helps it stand out from the clutter of products and names.

A product should be adaptable: with trends, time and change in segments, the product should lend itself to adaptation to make it more relevant and maintain its revenue stream. Products are considered as the business resources for the organization (Antai, 2014). This includes managing the product with appropriate way to review any time as per the requirement. Therefore, it is important to have a web-based Product Expiration System which has the ability to generate reports, report products expiry dates, maintain the balance of the stock, details about the purchase and sales in the organization, which helps to minimize loses to the business or negative health hazards to consumers. This web application can be used by large or small business organization for the management of their stock in the production houses. After analyzing the other Product Expiration

systems, we decided to include some common and key features that should be included in every Product Expiration system. The main aim of the project is to develop Product Expiration System Model software in which all the information regarding the stock of the organization will be presented. It is an internet based application which has admin component to manage the inventory and maintenance of the inventory system. This application is based on the management of stock of an organization. The application contains general organization profile, sales details, Purchase details and expiration dates presented in the organization. There is a provision of updating the inventory also.

Product expiration is the date after which a product might not be suitable for use as manufactured. Consumers can determine the shelf life for a product by checking its pharmaceutical packaging for an expiration date (*Rachid, 2015).* Products which are past their shelf life can decompose and either be ineffective or even harmful (*Rawas*, 2016). Standard advice from product manufacturers and some health organizations is to dispose of products after the expiration date printed on the packaging. However, the published expiration date is not an absolute indication that a product has spoiled. Consumers and organizations sometimes use expired products for medical treatment either as a cost saving measure or because they otherwise cannot access products which are not expired. Medical authorities find it difficult to discuss when consumers can safely use products after the printed expiration date because it is difficult to obtain clear information.

Expiration dates are written in a month-and-year format on over-the-counter medications. The date will often be found next to the letters “EXP” on the printed label or stamped in plastic. This tells the consumer that the medication is safe to use and meets manufacturer potency standards until the last day of the printed month and year. The product may still be just as effective after this date, but the manufacturer guarantees its quality only until the stated date. This date is unique to

each product product and manufacturer due to differences in chemical and physical properties of the active and inactive ingredients, manufacturing procedures, formulations, containers and closures, suggested storage conditions, and other factors. Once a medication is beyond its expiration date, changes in potency, pH, water content, and appearance may render it ineffective. However, this isn't always the case.

Because each product product is unique, the FDA doesn't have a strict set of rules for setting expiration dates (Orum, 2015). Instead, it publishes broad requirements for expiration dating and stability testing in the Code of Federal Regulations (Jackson, 2014).

In 1985, the FDA and the Department of Defense started a Shelf Life Extension Program (SLEP) to investigate whether medications stockpiled for the military were still good to use after their expiration dates. Their stability data showed that 84% of the analyzed product products could be extended beyond their originally labeled expiration date. All the product products in this program were stored in their original sealed containers at the appropriate temperatures and conditions listed on their labeling (Blark, 2017).

While this study may have shown that some products remain effective beyond their expiration dates, it included only a small fraction of the thousands of products on the market. So, tell patients that after the date printed on the bottle, the medication's quality and effectiveness can't be guaranteed. Even unopened and properly stored medications may be compromised.

Proper storage is just as important to a product's viability as the expiration date. The products used in the SLEP study were all stored in their original containers, at a controlled humidity and temperature, and out of direct light. Inform patients that a medication may be compromised if it's left in a hot car, stored in a humid bathroom, or left out in open air for any amount of time

and should not be used. Teach patients to store medications in their original containers in a cool, dry area away from humidity and light. For example, instead of the bathroom cabinet, store medications in a bedroom drawer or kitchen cabinet out of children's reach and where they're less likely to be exposed to humidity.

Labeled expiration date versus true expiration

Manufacturers print expiration dates on product bottle labels (*Chow, 2014).* The labeled expiration date is a manufacturer's promise for a time until which the product will have full efficacy and be safe as manufactured. The labeled expiration date is not an indication of when a product has become ineffective or unsafe to use. Many products are effective for years after their expiration dates. However, it is difficult for anyone including researchers and physicians to find information to verify how much any given product will degrade in efficacy or become unsafe over time. Product manufacturers never support the use of products after the expiration date because that could make them liable if something went wrong (*Shao, 2016).*

The expiration date printed on product packaging will differ from the true expiration date of the product. Before the true expiration of a product, its active ingredient will retain its potency. Also before expiration, no components of the product will degrade to become harmful (*Waterman, 2015).* Since products continually change over time, the characteristics of any product are not unchanging but instead estimated with assay measurements to be within the specification required by the government regulator where the product is sold. As a general estimate, a product becomes unfit for use when 10% of the active ingredient is degraded.

Before choosing expiration date to print the manufacturer must first decide a true expiration date. After a manufacturer has

decided what true expiration date it has set, then it will decide another date to make public and advertise on the packaging of the product. The printed expiration date will always be sooner than the true expiration date, because the product should always be effective and safe before the labeled expiration date if kept properly.

Options for expired products

Disposal

It is officially recommended that products past their expiration date be disposed (*Kenneth, 2015).* It has been argued that this practice is wasteful, since consumers and medical facilities are encouraged to purchase fresh medication to replace their expired products, also resulting in additional profits for pharmaceutical firms.

Consumer use as normal

Some consumers can face the difficult position of being unable to afford their medication, and choosing between using expired medication or forgoing medication. An epipen is an example of an expensive medication which someone might consider using after expiration because of inability to purchase newer medication. Some common products which authorities say are always unsafe if expired include nitroglycerin, insulin, and liquid antibiotics. Consumers sometimes store products which they ought not use, regardless of being expired. People who have leftover antibiotics might feel that they can use them safely if they are not expired, or even if they are expired. Medical authorities recommend that no one use prescription products except under a physician's care. Authorities also encourage care in storing over-the-counter products, discarding them on a regular schedule, and using them as directed when appropriate.

Product Recycling

Product recycling is a fringe and experimental concept but in some places it happens. Sometimes, an individual or organization will have valuable medicine which they do not intend to use. If that medication could be used by other people before its expiration, then sometimes, interested parties discuss product recycling

to transfer ownership of the products away from the party which will not use them to the party which needs them. In such discussions, anyone considering the transfer of products will also consider if products could be used before their expiration (*Pomerantz, 2014).*

Expiration Date

An expiration date or expiry date is a previously determined date after which something should no longer be used, either by operation of law or by exceeding the anticipated shelf life for perishable goods. Expiration dates are applied to selected food products and to some other manufactured products like infant car seats where the age of the product may impact its safe use (*Pilar, 2017).* Arbitrary expiration dates are also commonly applied by companies to product coupons, promotional offers and credit cards. In these contexts, the expiration date is chosen for business reasons or to provide some security function rather than any product safety concern. Expiration date is often abbreviated EXP or ED. The legal definition and usage of the term expiration date will vary between countries and products.

Best Before

Best before or best by dates appear on a wide range of frozen, dried, tinned and other foods. These dates are only advisory and refer to the quality of the product, in contrast with use by dates, which indicate that the product may no longer be safe to consume after the specified date. Food kept after the best before date will not necessarily be harmful, but may begin to lose its optimum flavour and texture. Eggs are a special case, since they may contain salmonella which multiplies over time; they should therefore be eaten before the best before date, which is, in the USA, a maximum of 45 days after the eggs are packed.

Sometimes the packaging process involves using pre-printed labels, making it impractical to write the best before date in a clearly visible location. In this case,

wording like best before see bottom or best before see lid might be printed on the label and the date marked in a different location as indicated.

Use by

Generally, foods that have a use by date written on the packaging must not be eaten after the specified date. This is because such foods usually go bad quickly and may be injurious to health if spoiled. It is also important to follow storage instructions carefully for these foods (for example, if they specify that the product must be refrigerated). Bathroom products and toiletries usually state a time in months from the date the product is opened, by which they should be used. This is often indicated by a graphic of an open tub, with the number of months written inside (e.g., "12M" means use the product within 12 months of opening). Similarly, some food products say "eat within X days of opening".

Open Dating

Open dating is the use of a date stamped on the package of a food product to help determine how long to display the product for sale. This benefits the consumer by ensuring that the product is of best quality when sold. An open date does not supersede a use-by date, if shown, which should still be followed.

Objective of the Study

The aim of this paper is to Design a Product Expiry SMS system with the following objectives:

i. To save lives of consumers
ii. To detect products about to expire and expired products in the store and send alert to consumers who have bought the products, as to discard it in case they haven't consumed
iii. To maintain a record of batches of products brought to a store.

Methodology Used and Why

The methodology which the researcher considers most suitable and advanced for

this research is SSADM (**Structured System Analysis and Design Methodology**). This type of methodology i.e. SSADM is adopted because:

- It could analyze the problems of the existing system perfectly.
- It could design a new system that is structured in order to ease the organization of the pre-event problems.
- It provides for easier documentation and Maximum functionality.

SSADM is a system approach to the design and analysis of information system. SSADM is a waterfall method for the production of an information system design. SSADM can be thought to represent a pinnacle of the rigorous documental approach to system design and contrasts with more contemporary Rapid Application Development method such as (DSDM). SSADM is one particular implementation and builds on the work of different schools of structure analysis and development methods. It follows rigid method of structure and therefore is highly disciplined.

Analysis of the Existing system

The existing system was analyzed and problems were identified after data gathering.

Method of Data Collection used in the analysis of the existing system

During the research work, data needed for the project was gathered from various sources. In gathering and collecting necessary data and information needed for system analysis, two major fact-finding techniques were used in this work and they are:

(a) Primary Source

This refers to the sources of collecting original data in which the researcher made use of empirical approach such as personal interview and questionnaires.

i. **Personal Interview:** Some of the staffs were interviewed to share their feeling and experience about the manual system of processing sales data information. Their

respond was that manual system is time consuming and has element of errors. They stressed that the manual system has not helped them much.

ii. **Observation:** A situation whereby sales files and receipts will full everywhere makes the offices untidy. Having observed that searching for sales record are time consuming makes the manual method ineffectively.

(b) Secondary Source

The secondary data were obtained by the researcher from magazines, Journal, Newspapers, Library source and Internet downloads. The data collected from this means have been covered in literature review in the chapter two of the project.

Choice of Programming Language used in the proposed system

The choice of programming language is JABA and the database used is MySQL which was integrated with PHP scripting language that helps to control the expiry SMS alert. JAVA is a high level programming language by Microsoft Corporation. It has elements of an object oriented language.

Reason for Using JAVA

Reusability

JAVA code features reusable components called controls. These controls let programmers employ fully tested, working code written by other programmers, resulting in significant time savings. For example, if a programmer wants to write a program allowing users to load a file into memory, she need only drag the File Dialog control onto her program's user input form and set the control's parameters. By contrast, programming languages before JAVA, such as C and C++, had no such pre-packaged controls. Programmers had to cut and paste code from existing programs, an error-prone process.

System Design

System design is the process of defining the architecture, components, interface and data for a system design, which

computerized or computer base is aim at evacuating the whole problem associated with the existing system.

The major factor taken into consideration in the design of the new system is the issue of processing SMS alerts, and storing sales data/information in an electrical format. The new system has a schema for bought items, sold items, remaining items, sales report and SMS alert.

The Design of the new system

The new system tackled all burning issues listed in the study objective including:

i. To develop the easy management of the inventory.

ii. To handle the inventory details like purchase details, manufacturer details and expiration dates of Products.

iii. To maintain a record of batches of product brought to the store.

iv. To keep a record of product brought to the store.

v. To detect about to expire and expired products in the store.

These helped to give solutions to the ab initio stated problems posed by not having alert expiry system.

DISCUSSION

- The topic of the research is aimed at making improvement over the manual method of sales without expiry SMS alert into a computerized one which has finally solved the under listed objectives:
- Saving of consumer's lives.
- Expiration dates of Products alert which helps to alert consumers not to consume such products.
- Maintenance of a record of batches of products brought to the store.
- Calculation of the loss on expired products.

More so, the result of the design includes:

- Increase in speed of processing information
- Efficiency
- Reliability
- Security of production and sales of products.

Conclusion

Having carried out the required study of the design and implementation of product expiry alert management system, sales organizations can now comfortably eliminate the manual methods which have been proved inefficient, tedious, time consuming and prone to errors. The new system is the major target of this research. So the computerization activity depends on the maturity and honesty of the staff. Implementing the new system enables the workers to be well trained and creates new jobs for them. Based on the findings of this work, one can see the product expiry areas of potentiality high cost saving and improved customer's satisfaction. This research study is therefore designed to see to the possibility of eliminating the manual methods that has been in use and the errors that come with the manual system in product expiry alert management system.

Recommendation

This program which was designed and developed through the careful documentation done during the system investigation, has produced a product expiry software. It is recommended that companies should get this system installed as to help save lives that should have been lost if an expiry reminder was not there.

Application Areas

The application area of this software is in every business domain that sells consumable goods, more especially in the stock and product management of Shoprite, Roban Store and other big shopping malls. In view of this, the research recommends that the following consideration be made or effected to make the system work effectively

i. Training of staff in line with the new designed system
ii. Modification and further enhancement can be done to the system
iii. Other companies with distribution problem can use this system with little or no modification

References

Antai, I. (2014). Health status assessments using reverse supply chain data. *Management Research Review*. 33 (2) : 111-122.

Antai, I. and Mutshinda C. M. (2010), Health status assessement using reverse supply chain data. *Management Research Review*. 33 (2) : 111-122.

Hugo, M. (2013), *Essentials of Supply Chain Management*, 2nd ed., John Wiley and Sons, New Jersey.

Cutright, K. (2015), Modelling the influence of multiple expiration dates on revenue generation in the supply chain. *International Journal of Physical Distribution and Logistics Management*. 35 (3) : 152-160.