Tech saksham

Case Study Report

Data Analytics with Power BI

"Inventory and sales analysis of Departmental store"

Karuppannan Mariappan College

Muthur - 638105

NM ID	NAME
A29310D850B960BA6974B84A5BC6EF28	G.NITHISH KUMAR

Trainer Name: R.UMAMAHESWARI

Master Trainer: R.UMAMAHESWARI

INDEX

ABSTRACT

The progress of time continually accompanied by the development of technology. It leads to the competition among industries that require them to have superiority to attract more consumers. X Fashion is one of the fashion industries which sells various apparel products for people in the sale of large or small scale. The business processes of X Fashion is procuring products, managing inventory, sales, and managing finance. A lot of variations and number of products in the store are not in balance with a good management because all forms of recording are done manually. It causes potential error so that the information disseminated is inaccurate. Based on this consideration, a research is conducted as inventory and sales information system design on X Fashion clothing store to identify business process also to design an inventory and sales information system on X Fashion clothing store. The method used is Systems Development Life Cycle which consists of systematic steps for developing, designing, and maintaining the system to meet the needs of users, including supervision, recording, and reporting. Information system is designed to provide stock data, expense, and income reports automatically.

INTRODUCTION

In the development of technology, a company demanded to implement technology to build their business process. X Fashion is a developing business unit in selling various apparel products. Based on the information fromtheowner, theyhavedifficultyto manage stock due to lots of product variations. During this time, every sort ofinformationwasnotedmanually, whichspendlonger time. Moreover, collected informationis not accurate because of manual documentation. Basedonthis problem, research is conducted to design an inventory and sales information system to helpandquickeningactivity in theside of collecting and processing product information, selling, alsofinancial. The method used is Systems Development Life Cycle (SDLC) which consists of systematic steps for developing, designing, and maintaining the system to meet the needs of users. This method provides a good quality of system design, following user needs. The type of developing system design used is prototype model tocreate a model of program to visualized software components as what the user needs. Designing this information system using MySQLsoftware and PHP programming language which flexible on the operation system, fast in execution, also easy to interact with the database.

Problems Identification

The problem identification from the research is obtained by the research background which carried out from the preliminary studies. The problem of the research is the information system still manual and not integrated that causing some problems.

The data collecting stage starts from obtaining primary data form interview and also observation. The data includes the present business process, information needs analysis, also system user identification.

After collecting data, designing and building system can be done by creating the information system flowchart, context diagram, Data Flow Diagram, Entity Relationship Diagram, making CRUD matrix, present the design of the information system, then do the system construct.

RESEARCH METHODOLOGY

Preliminary Studies

The initial stage is done by an interview with the owner and every department. An observation also conducted to find out the actual condition of the company that caused the problems. Based on the interview and observation, the condition or the business process of the company is discovered.

Business Process

According to Weske (2007),business process consists of a collection of activities carried out in a coordinated manner in an organization. These activities are combined to achieve a business goal. According to Dumas, Rosa, Mendling, and Reijers (2017), business process is carried out by the company when providing service or product to consumer. The way the business process is designed and carried out affects the quality of service perceived by consumer and the efficiency of the service.

System Planning

According to Dennis, Wixom, and Roth (2012), system design is the determination of the overall architecture that consists of a collection of physical, hardware, software, human, and communication processing components. The design of a new system must meet all aspects by prioritizing the needs of consumers, selecting and evaluating potential products, applying technology, planning product life cycles, and designing products to make it easier to use.

Systems Development Life Cycle (SDLC)

The methodology of system analysis and design referred to System Development Life Cycle (SDLC), which includes the development of processes and ongoing maintenance processes. The methodology of analysis and design of the system was originally prepared for software development so that it only focuses on programming. In the analysis phase, the main focus is on understanding the needs of the organization. On the other hand, the design phase focuses on the physical aspect of a system to support specific organizational needs. But in its development, the process is always followed by the operation phase and the implementation phase (Ramakrishnan, 2012). According to Barjtya, Sharma, and Rani(2017), System Development Life Cycle is a collection of systematic steps for the development, design, and maintenance of a

Data Flow Diagram (DFD)

Data Flow Diagram describes the business process along with the data involved in the process, which focuses on the activities involved (Dennis et al., 2012). According to Rosenblatt (2014), Data Flow Diagram shows the movement of data through the information system but not show a logical model of how the system works. Data Flow Diagram uses symbols that represent the process, data flow, data storage, and entity.

Entity Relationship Diagram (ERD)

According to Dennis et al. (2012), Entity Relationship Diagram is an illustration that displays information that is created, stored, and used by a business system. The purpose of reading ERD is to find individual pieces of information in the system and find out how the information is organized and related to one another. Meanwhile, according to BaguiandEarp (2012), Entity Relationship Diagram is a method of mapping data to be stored in a database system. In ERD, the same information is placed in a box called an entity. The lines between entities indicate the relationship between data. The illustration of ERD is not sequential even though entities related to each other are placed closely.

SERVICES AND TOOLS REQUIRED

Services Used

- **Data Collection and Storage Services**: Banks need to collect and store customer data in real-time. This could be achieved through services like Azure Data Factory, Azure Event Hubs, or AWS Kinesis for real-time data collection, and Azure SQL Database or AWS RDS for data storage.

- **Data Processing Services**: Services like Azure Stream Analytics or AWS Kinesis Data Analytics can be used to process the real-time data.

- **Machine Learning Services**: Azure Machine Learning or AWS SageMaker can be used to build predictive models based on historical data.

Tools and Software used

Tools:

- **PowerBI**: The main tool for this project is PowerBI, which will be used to create interactive dashboards for real-time data visualization.

- **Power Query**: This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

Software Requirements:

- **PowerBI Desktop**: This is a Windows application that you can use to create reports and publish them to PowerBI.

- **PowerBI Service**: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- **PowerBI Mobile**: This is a mobile application that you can use to access your reports and dashboards on the go.
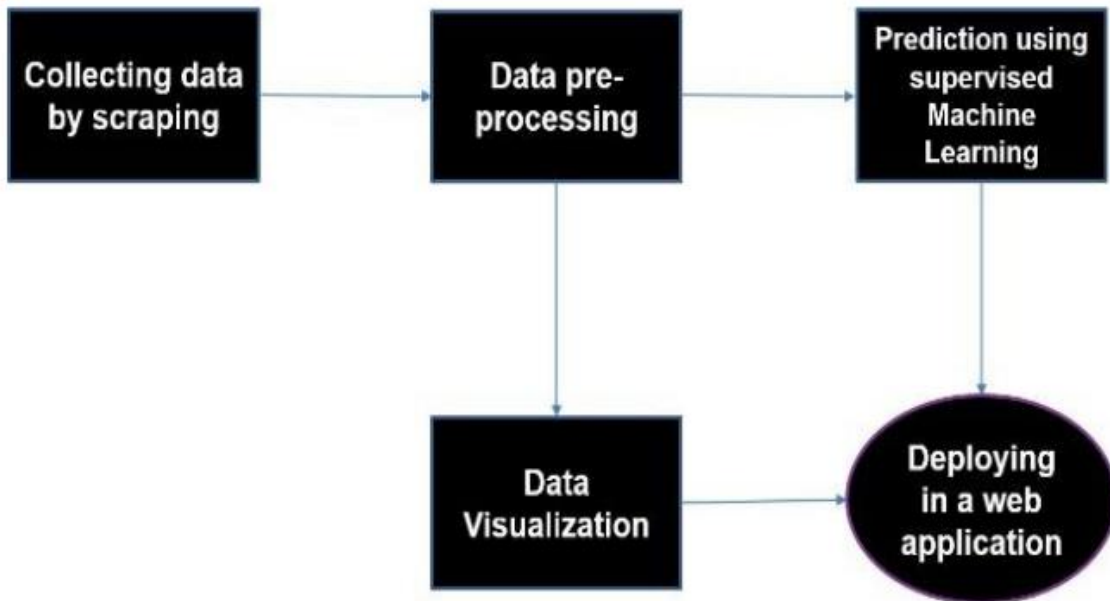
PROJECT ARCHITECTURE

SYSTEM ARCHITECTURE:

The proposed system aims to analyse the data generated by matches and predict the outcome of the match (one Pre-Toss and then Post-Toss). The steps followed are

- Collecting data by scraping

- Data pre-processing

- Prediction using supervised learning algorithm (Random Forest Classifier)

- Data Visualization

- Deploying in a web application

```
┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│ Collecting   │      │ Data pre-    │      │ Prediction using │
│ data         │─────▶│ processing   │─────▶│ supervised       │
│ by scraping  │      │              │      │ Machine          │
└──────────────┘      └──────┬───────┘      │ Learning         │
                             │              └────────┬─────────┘
                             ▼                       │
                      ┌──────────────┐               ▼
                      │ Data         │      ┌──────────────────┐
                      │ Visualization│─────▶│ Deploying        │
                      │              │      │ in a web         │
                      └──────────────┘      │ application      │
                                            └──────────────────┘
```

MODELING AND RESULT

1.stock details

2. Expense Report

3. Income Report

1. Stock

Data Stock data is information that must be maintained by the person in charge of product stock to control the remaining inventory in the warehouse. The problem of the current system is that not all stocks are successfully recorded because there are too many products in the warehouse, also not regularly arranged, thus the stocks that are still in the warehouse are considered non-existent or vice versa. This also because records are not constantly updated, that is, when sales transactions occur, the stock on the record does not automatically decrease but must be updated manually.

2. Expense Report

Expense report is a record of expenditure information from the procurement process. In the current system, the finance department records expense manually based on the invoice which is often not

3. Income Report

The income report contains a record of income information from product sales. Because the store serves direct sales also shipping sales, receipts are generated more that make itdifficult for the finance department for collecting sales information to record income. Besides, sometimes direct sales do not conduct with the transaction bill, so there is no record of the sales.

Inventory management techniques

For ease of consumption, here's a quick run-down of all the inventory management techniques we mention in this article:

1. Choose an appropriate fufillment option.

2. Take forecasting seriously.

3. Set reorder points for each product.

 4. Use EOQ for optimal order quantities.

5. Give each variant a dedicated warehouse bin.

6. Sell older inventory first.

7. Prioritize with ABC analysis.

8. Always track your metrics.

9. Verify accuracy with regular counts.

10. Automate as much as possible.

Let's explore each one of these further below:

1) Choose an appropriate fufillment option As a retailer, the whole point of having inventory is to sell it. And with ecommerce, this usually means having to store and ship it somewhere too. So deciding exactly how this fufillment process will be done is one of the most crucial inventory management techniques to get right. Your general options are:

● Dropshipping. This is where you never see or hold inventory yourself. Instead, it is purchased as each sales order comes in, and shipped directly to the customer.

● Third-party logistics (3PL). This is where you would purchase inventory in bulk, but have it sent to a 3PL service. They would then manage inventory and ship orders to your customers for a monthly fee. Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO

● Self-fufillment. This involves setting up your own facility and team. You'd be totally responsible for controlling, managing and

shipping inventory. Each of these options has its own benefits and drawbacks, with the best one depending entirely on individual business requirements. We discuss this in greater depth in Chapter 5: Inventory Storage of this guide.

2) Take forecasting seriously It's tempting to skimp out on forecasting inventory requirements. Instead, many retailers will simply guess, or just buy inventory and hope they sell it. The problem? This leaves you extremely susceptible to ending up with way too much (or too little) stock on-hand at any one time. And the extra carrying costs involved will be eating into profits every single day. Make sure to use your past sales data in two ways:

1. Short term. Look at sales over the past 30-90 days to indicate your short term sales trends and demand for the inventory you hold.

2. Long term. Look at what sales were like at particular points in the year to indicate where sales tend to spike and dip. We discuss this in greater depth in Chapter

3: Inventory Forecasting of this guide.

3) Set reorder points for each product Reordering your products needs to be done in a timely manner. Leave it too long and you'll run out of stock. Go too early and you'll pile up way more inventory than you

need. This is why each product (and ideally each product variant) should have its own reorder point, taking into account:

● Safety stock. So you don't eat into this emergency, backup stock unnecessarily.

● Lead time. So you can still cover sales demand while new products get shipped to your warehouse. Here's the formula to work out exact reorder points: Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO INVENTORY MANAGEMENT 43 Apply this to each product in your inventory. As soon as a product hits this level, it's time to place a new purchase order with suppliers.

4) Use EOQ for optimal order quantities It's not enough to know when to place a new purchase order. You need to work out exactly how much stock to order at once to keep carrying costs to a minimum. And economic order quantity (EOQ) is one of the best inventory management techniques to help here. This is a calculation that helps determine the best amount of inventory to order each time. Helping strike a balance between minimal ordering and carrying costs, while still satisfying demand. The three variables involved are:

1. Demand. The number of units sold over a given time period (usually a year).

2. Relevant ordering cost. Total ordering cost per purchase order. This includes all staff, transportation and any other costs associated

with making each purchase order - but not the actual cost of the order itself.

3. Relevant carrying cost. Assume the item is in stock for the entire time period in question and decipher the carrying cost per unit. You'll then put this into the following equation: Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO INVENTORY MANAGEMENT 44 We cover reorder points and EOQ further in Chapter 4: Purchasing Inventory of this guide.

5) Give each variant a dedicated warehouse bin Organizing and arranging items in the warehouse is a key part of good inventory management. Your team should be able to look at your system and easily see where any product is located. This means creating bin locations with clear labels for each product variant. It's best to avoid fancy names – simplicity and ease of understanding is king here. Numbers and letters are therefore the best route to go. Start by labeling each row, shelf, then bin location: Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO INVENTORY

MANAGEMENT 45 So you always know, for example, that all your blue t-shirts sized medium will be in Row A – Shelf B – Bin 1. And

the pattern can be continued like this. We discuss this in greater depth in Chapter

5: Inventory Storage of this guide.

6) Sell older inventory first For most retailers, the last thing you want is to be always using the newest stock to fufill orders. This leaves older inventory sitting in the warehouse and susceptible to damage, decay or passing best before dates. So it's worth making a rule to store new inventory from the back of shelves and then take from the front - automatically enforcing a first-in-first-out (FIFO) system: However: It's always worth discussing this with your accountant too as they may use a different inventory valuation method for your end-of-year accounts. Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO INVENTORY MANAGEMENT 46

7) Prioritize with ABC analysis ABC analysis is a very common inventory management technique that helps to identify your most valuable inventory. This means retailers can prioritize inventory better. Allowing them to place greater focus on the particular items and products that bring in the most revenue. The whole process is about sorting inventory into three buckets:

● A inventory. Inventory with the highest value – typically your 20% that brings in 80% of sales/profits. These are usually items with the best profit margins and/or most sales revenue.

● B inventory. Inventory that sells regularly, but doesn't have quite as much value as A – often due to having slimmer margins or higher carrying costs.

● C inventory. The remainder of inventory that doesn't sell as much as A or B, generates the least revenue and is generally least valuable. It might not make sense to prioritize like this at first. Surely all inventory is important - otherwise you wouldn't have it, right? But in reality, some products will sell much better than others. And these are the ones to focus on most to ensure they are readily available and never stock-out. 8) Always track your metrics Tracking simple metrics and KPIs is one of the inventory management techniques that often gets lost amongst other fancy ideas. But it can still be one of the most powerful. It's essential to regularly track at least the following metrics:

● Inventory turnover. Measures how many times your inventory is sold over a given time period, giving a critical insight into overall inventory management performance.

● Inventory write-off. A measure of any unsold inventory that has become defunct or no longer has any value for the business over a given period.

● Gross margin return on investment (GMROI). Measures the profitability of your inventory over a certain period, giving the gross profit made for every dollar of inventory that's purchased.

● Sell through rate. Takes the amount of inventory a retailer receives, and compares it against what is actually sold over a given period.

● Days of inventory outstanding (DOI). Measures how many days it typically takes to create or buy inventory and turn it into a sale.

● Back order rate. Shows the percentage of your total orders over a given period that ended up being placed on back order. Veeqo helps retail brands provide the best experience to their customers everywhere Click here to start your 14-day free trial today, or get in touch at sales@veeqo.com THE COMPLETE GUIDE TO INVENTORY MANAGEMENT 47 We discuss ABC analysis and these metrics (including the actual calculations needed) in greater detail in Chapter 6: Inventory Analysis.

9) Verify accuracy with regular counts Unfortunately, errors are inevitable when it comes to your stock. Even with all the inventory management techniques and automations mentioned in this chapter. So taking a physical count of inventory with regular stock takes is

critical. The traditional way of doing this is to shut the warehouse down for a night (or longer) and complete a big count once or twice a year. But this can be an extremely time-consuming and complex task,

especially for large inventories or facilities. Instead, try spreading it out through the year:

● Cycle counting. This is where team members would be given 'counting tasks' of a small number of items to do each week. Over the year, each product has then usually been counted and verified several times.

● Spot checking. This isn't done with any specific regularity. It can simply be done if a product is proving particularly problematic or if a team member finds they have some spare time and needs something to do. Good inventory systems will manage this for you. Assigning regular counting tasks to your team and allowing for easy corrections via digital barcode scanners.

10) Automate as much as possible Inventory management is a complex job. And it becomes even more complex the more you grow and the more products that get added into your catalogue. So taking advantage of automation can be possibly the most important inventory management technique out there. This means utilizing quality inventory management software to do most of the heavy lifting for you. Helping take care of tasks like:

● Tracking. So you can sync inventory in real-time across multiple channels without overselling and back orders.

● Forecasting. To remove the guesswork and never have too much or too little inventory on-hand.

 ● Purchasing. So you can handle all suppliers and create and manage POs in one place.

● Counts. To keep inventory numbers accurate by automatically assigning weekly cycle counting tasks to your team.

CONCLUSION

Based on the research, some conclusions can be taken:

1. The business process on X Fashion clothing store consists of product procurement, stock management, selling, and financial management.

2. Circumstances occur at this time are the number of variation and product, but all forms of records are done manually which takes time and raises the potential for errors so that the information obtained is inaccurate.

3. The needs of the owner are the integration of stock, sales, and financial data so that the delivery of information can be done quickly,therefore the information obtained is accurate.

4. The application of information system technology can answer all the needs of every department.

5. Based on the testing, the information system is declared feasible to be used in supporting the clothing store business process because it can accommodate all needs of the owner as well as every department on X Fashion clothing store.

6. Adding brief information on each menu and button or making a manual book, so users can find out the function of each control in the information system.

REFERENCES

[1]. Bagui, S., & Earp, R. (2012). Database Design Using Entity-Relationship Diagrams. United States of America: Taylor &Francis Group.

[2]. Barjtya, S., Sharma, A., & Rani, U. (2017). A Detailed Study of Software Development Life Cycle (SDLC) Models. International Xurnal of Engineering and Computer Science,6(7), 22097-22100.

[3]. Dennis, A., Wixom, B. H., & Roth, R. (2012). System Analysis and Design. United States of America: XhnWiley& Sons, Inc.

[4]. Dumas, M., Rosa, M., Mendling, J., & Reijers, H. (2017). Fundamental of Business Process Management. Berlin: Springer.

[5]. Ramakrishnan. (2012). System Analysis and Design. Xurnal of Information Technology and Software Engineering, 8(1),65-66.

LINK