Retail Store Stock Inventory Analytics

A PROJECT REPORT

Submitted by

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1.1 Project overview

The retail industry has gone through tremendous technological changes in the past few decades. The advent of e-commerce and online retail websites has pushed retail companies to embrace technology. However, few companies still employ traditional business methods.Eventually, only those companies which adopt technology can optimise their business growth. Paper- based processes can curb the growth of your retail business. Especially, inventory Management without the use of

technology can be cumbersome.Inventory is a vital aspect of any retail enterprise. If it is not managed efficiently, it could have a ripple effect on other retail in-store processes. The retail inventory management software would help you handle complex inventory processes easily.The retail world involves constant competition, to get consumers' attention, and ultimately convince them to make a purchase. This is why you need retail inventory software that makes life behind the scenes easier and more automated.With automation in production, simplified stock tracking, and integrations for sales, accounting,and shipping. It's ideal for owners who want a wider view of

their business, and more time to focus on long-term growth. Paper-based retail inventory management can take a lot of time and effort. The retail inventory management software can cut short your in-store inventory process cycles through automation. Automation would give you time to focus on other productive business tasks.Retailers are witnessing a historic shift in the way consumers shop. Today's consumers can easily compare prices, research products, and make purchasingdecisions that align with their lifestyle. Whether online or in- store, retail customers have come to expect shopping experiences to be personalised to their unique needs and preferences, order fulfilment and returns that are hassle-free, and responsive customer service available via multiple channels. Analytics for retailers enables a data-driven approach to meet these expectations. Online retail inventory management Empty digital store shelves represent lost sales opportunities and can cause customers to migrate to competitors who are ableto consistently keep desired products in stock. With potentially hundreds or thousands of items for sale, traditional threshold- based models of inventory management are not sufficient. Modern retail analytics programs are capable of analysing past

purchasing and stock data as well as data from third-party and public sources such as weather data and point-of-sale data to more accurately predict demand for individual items.

1.2 Purpose

Saves Time Paper-based retail inventory management can take a lot of time and effort. The retail inventory management software can cut short your in-store inventory process cycles through automation. Automation would give you time to focus on other productive business tasks.

Eliminates Errors

Traditional retail inventory processes can be vulnerable to errors. Inventory process errors in retail would not only increase your expenses but would also impact your business reputation. The retail inventory software would make sure to minimise human intervention in the process. Thus, it would reduce errors considerably.

Improves Transparency

In the retail industry, the visibility of the real-time status of the

various items in the inventory is very critical. It would impact many other retail processes and important business decisions. It is challenging to keep track of multiple items in the inventory round the clock through a paper-based process. A retail inventory management system can give you 360-degree item information anytime.

Efficient Stock Counting

If done manually, stock counting is a tedious and error-prone process. The retail inventory management software can automatically count the items in your warehouse with better accuracy. Hence, it can provide you with updated inventory reports.

Process Efficiency

Inventory management is one of the crucial retail processes.Thus, any discrepancy in the inventory control would impact all other operations in your company. The retail inventory software can streamline the inventory processes, which would, in turn, improve the efficiency of your entire business.

Cost-Effective

Manual inventory control would increase your labour and process costs. The software would not only help you save time, but it would also help you reduce costs. As a result, the profitability of your business would improve. Also, you can invest the excess funds in activities that promote your business growth.

2. LITERATURE SURVEY

2.1 Existing problem

Unclear Communication

Even in straightforward business processes, miscommunication can cause irreversible damage to efficiency. You can only imagine the far-reaching impact it would have on a complex and multifarious process, like inventory management.As inventory management has numerous components, clear communication is vital for a seamless flow.For instance, having the correct prices is critical to print the price labels for the products in the inventory. However, if an update in the prices is not

communicated before printing the labels, the products would go out with the wrong price labels. The revisions for such errors would take a lot of time. Furthermore, if the miscommunication is not detected in time, it would affect the sales and profitability of the company.Automation can help you streamline your communication flow across the departments. A retail inventory automation software would provide real-time information about the inventory. Correct and timely information would decrease events of miscommunication.

Inadequate Access

Generally, insufficient access to information would lead to miscommunication issues. Every department needs to have access to data that is crucial to their processes. Hence, the impact of the lack of proper access is not limited to individual processes. But it also affects the complete retail inventory management.In the absence of adequate access, your team would resemble disconnected groups. Lack of access would leave them uninformed, which, in turn, affects their productivity.Therefore, better access would improve the efficiency of inventory and other business processes.You can simplify your

accessibility issue with retail inventory management software. The software can efficiently manage the access of the users, which would, in turn, improve the quality of the process.

Inefficient Warehouse Management

Warehouse management is a core component of brick-and-mortar retail inventories. Hence, ineffective warehouse management would affect the complete retail inventory process. A decentralised inventory management system would comprise the accuracy of the operations.Many aspects of warehouse management would be vulnerable to errors without integrated software. Inept warehouse management could lead to lost orders, delays in order fulfilment, and errors in shipment. It also causes incorrect stock counts, inaccurate barcodes and labels, increased storage costs, and misplaced products. The problem will only deteriorate if multiple warehouses support your retail operations.Barcoding technology is a boon to manage complex warehouse operations. A retail inventory management software with a barcode scanning tool could be an effective solution to manage warehouse processes efficiently.

Overselling

What is worse than not being able to sell your entire product inventory?

It has to be overselling your product and not being able to meet customers' demands.Selling more than you can deliver could stain your business' reputation for a long time.Overselling is a result of flawed communication and process flow of your inventory management. This issue can also be a result of incorrect stock counting.For instance, retail businesses keep a reserve of inventories beyond the necessary stock, referred to as safety stock. This safety stock would come to the rescue in a scenario when you are not able to meet the customers' demands with the regular stock. However, If you miscount your inventory, even safety stock may not be able to rescue your business from a chaotic situation.If you could get notifications about the level of the stock in your inventory, you would minimise the chances of overselling. A retail inventory solution can provide real-time updates about your inventory levels.

Spoiled Goods

Inventory management is more complicated for retail companies that deal with perishable goods. Expiration dates become crucial in the inventory tracking process. Inefficient inventory tracking can cause considerable stock and monetary loss for retail businesses.

For instance, the warehouse staff sends out a shipment of products with a later expiration date while warehousing considerable stock with an earlier expiration date. This error would not only hamper the process cycle but would also increase the risk of spoilage of the product with an earlier expiration date.You can manage this issue with the introduction of technology. A retail inventory management solution can trackthe status of perishable goods and help you reduce spoilage.

2.2 References

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2.3 Problem Statement Definition

Effective loss prevention and asset protection efforts areessential to minimising these values—known as stock loss, inventory shrink or simply shrink—and preserving profitability. The challenge is a significant one, however, because while robberies are relatively infrequent for the average business, shoplifting/ORC and employee theft can accommodate for more than two-thirds of shrink. Human error, paperwork snafus, spoilage, and other factors account for the remaining third.With inventory levels under assault in both cyberspace and the real world, effective inventory management requires a sophisticated and strategic approach in order to recover value—or prevent its loss in the first place.

Isn't It Time You Cut Your Losses?

If your business is still tracking and planning its inventory by hand or with outdated tech, even a banner year can become a Pyrrhic victory when stock loss bites into your profits. Integrating an automation powered inventory managementsolution into your ERP makes it possible to take control of your

inventory, meet demand more efficiently and effectively, and reduce costly losses.

Sub-Par Warehouse Management

Large, often labyrinthine, and difficult to organise manually, warehouses can create significant pain points, and serious losses, if managed inefficiently.Manual data collection, paired with a lack of a centralised data management strategy, can create a breeding ground for:

- Lost orders
- Inaccurate inventory counts
- Inaccurate or duplicated barcodes and stock keeping unit (SKU) numbers
- Slow order fulfilment
- Shipping errors
- Inaccurate or incomplete returns
- No connection between purchase orders, shipping documents, and invoices sent
- High storage costs and less space for more successful products due to excess inventory

A high amount of dead stock, or older, less popular products that aren't necessarily spoiled, damaged, or destroyed, but simply not in demand. As with excess inventory of current products, this can consume storage space and resources better spent on housing items that are in demand.That same lack of centralised data management and poor communication can also create inventory discrepancies across multiple locations, creating anexponentially expensive inventory management disaster.

3. IDEATION & PROPOSED SOLUTION

When ideation is used internally, businesses seek to gather ideas from their employees, who work on and develop the products and services. Internal ideation often consists of group activities such as brainstorming sessions and prototyping (depending on the industry).When ideation is used externally, businesses usually target their pool of existing customers since who knows their product better than those who actually use it!? Customers have the knowledge to provide businesses with ideas on product/service improvements, so most external ideation efforts are directed this way.

How Ideation Can

Ideation is one of the most necessary components of a business strategy, and if you don't have a process for ideation, it's unlikely that your business will see constant improvement and will therefore be unable to deliver what your customers actually want.While it's important to get ideas internally, it's more important that ever to get ideas from your customers.Statistics show that price, while important, isn't the only reason why customers feel loyal towards a brand. In fact, 80% of customers are willing to pay more for a better customer experience. So, price aside, other factors that can increase brand loyalty are:

- Value
- Quality
- Experience

3.1 Empathy Map Canvas

The value of empathy maps

As your team identifies what they know about the user andplaces this information on a chart, you gain a more holistic view of your user's world and the problem or opportunity space. By

having a more holistic view, you gain insights that add layers of context about the relationships between the users and their experiences. A more holistic view can also reveal the ways in which your user most naturally engages with what your team designs and builds. In other words, your designs should reach out to the user. Empathy maps can help you do that.

3.2.Ideation & Brainstorming

Brainstorming is the most frequently practised form of ideation. We recommend that you use it along with Brainwriting, Brainwalking, and Brain Dumping. Here, you'll learn the best practices from the very best experts from d-school and IDEO as well of the father of the Brainstorming technique, Alex Osborn.Brainstorming is a great way to generate a lot of ideas that you would not be able to generate by just sitting down with a pen and paper. The intention of brainstorming is to leverage the collective thinking of the group, by engaging with eachother, listening, and building on other ideas. Conducting a brainstorm also creates a distinct segment of time when you intentionally turn up the generative part of your brain and turn down the evaluative part. You can use brainstorming throughoutany design or work process, of course, to generate ideas for design solutions, but also any time you are trying to generate ideas, such as planning where to do empathy work, or thinking about product and services related to your project.
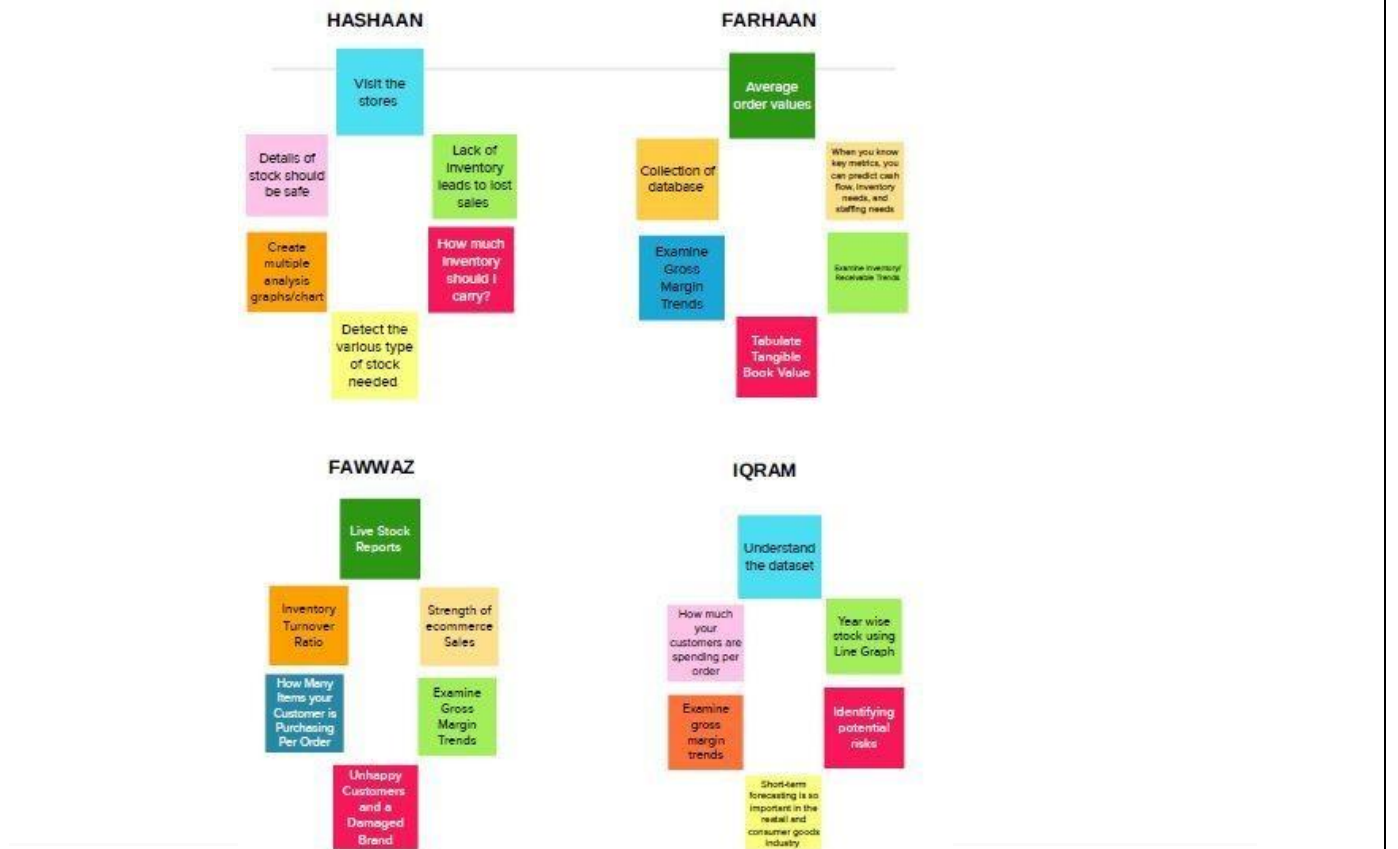
3.3 Proposed Solution

1. Problem Statement

To create an application to Manage the inventory for Solution Description.This application is used to help stores and ecommerce sellers satisfy customers,Reduce costs and increase Profits.

2. Uniqueness

This application has theUniqueness of easy handling Of huge inventory and helps The merchants to maintain the Stock up to date.

3. Customer Satisfaction

Their customers are very much Satisfied because of the easy Maintenance of the record And which is also a paperless Approach.

4. Business Model

This model includes the Information like products or Services, the business plans To sell, target markets, and Any anticipated expenses.

5 .Scalability of the Solution

This application is the measure of a system's ability To increase or decrease in performance and cost in response to changes in Application and system Processing demands.

S.No.	Parameter	Description
1.	Problem Statement	To create an application to manage the inventory for the merchants.
2.	Solution Description	This application is used to help stores and ecommerce sellers satisfy customers, reduce costs and increase profits.
3.	Uniqueness	This application has the uniqueness of easy handling of huge inventory and helps the merchants to maintain the stock upto date.
4.	Customer Satisfaction	The customers are very much satisfied because of the easy maintenance of the record and which is also a paperless approach.
5.	Business Model	This model includes the information like products or services the business plans to sell, target markets, and any anticipated expenses.
6.	Scalability of the Solution	This application is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands.

3.4 Problem Solution fit

1. Customer Segment(s)

The merchants are the Customer.The shop owners Are the customers.

2. Jobs-to-be-done/Problems

The stocks to be maintained Up to date.Monitor the daily Sales, monthly sales and the Yearly sales and the overall Sales of the individual Stocks

3. Triggers

The needs of the consumer(who buys the products from theshop) has to be satisfied.The big data Has to be stored andMaintained.

4. Emotions : Before/After

Before the records have to be maintained in a paper and document which is in physical form.After the implementation of this application the records can be online.

5. Consumer Constraints

It requires less man power.It is budget friendly and does not require more amount for Installation and maintainence.It can be accessed in offline mode also.

6. Available Solutions

The entered data will be automatically stored in the database.The user has no need to store the data every time only by just clicking the save button.This reduces the loss of the data.

7. Behaviour

It contains a chat box where the customer can ask their questions and the problems will be solved within a few hours.

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2.Jobs-to-be-done/Problems	9.Problem root cause	7.Behaviour
The stocks to be maintained up to date.Monitor the daily sales, monthly sales and the yearly sales and the overall sales of the individual stocks.	The poor internet connectivity is the root cause of the problem.	It contains a chat box where the customer can ask their questions and the problems will be solved within a few hours.

3.Triggers	10.Your solution	8.Channels of behaviour
The needs of the consumer(who buys the products from the shop) has to be satisfied.The big data has to be stored and maintained.	Using High speed internet is the solution for the poor internet connectivity problem.	8.1 Online The adding, deleting of the data and any other modifications and updating can be done only in the online mode. 8.2 Offline The data which is stored in the database can be viewed and the current price or cost of the stock can be viewed in the offline mode.
4.Emotions : Before/After Before the records have to be maintained in a paper and document which is in physical form. After the implementation of this application the records can be stored in the virtual mode and can be maintained in an easier way.		

8.Channels of behaviour

8.1 Online

The adding, deleting of the data and any other modifications and updating can be done only in the online mode.

8.2 Offline

The data which is stored in the database can be viewed and the current price or cost of the stock can be viewed in the offline mode.

9.Problem root cause

The poor internet connectivity is the root cause of the problem.

10.Your solution

Using High speed internet is the solution for the poor internet connectivity problem.

4.REQUIREMENT ANALYSIS
4.1Functional requirement

Retail Management System has a modular nature, so it is logical to address requirements to different modules (some of the

modules can be integrated into RMS as stand-alone solutions):

- Point of sale – manages sales in a retail store

- Scan item barcode and load the item info from the system

- Allow manual input and search of sale item

- Record sale, return, and exchange to the database

- Accept payment by cash, credit cards, iPay Print invoice

- Customer Relationship Management – consolidates information about customers

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form for Job/Order product Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Admin Confirmation	Confirmation via ID Confirmation via Password
FR-4	Admin Management	Add Employee Remove Employee Update new product
FR-5	Inventory management	Remove or add items from the store Remove or add items to the warehouse Ship item to customers Order supplies
FR-6	Employee management	Store information about employee Track employee' attendance Manage absence and leave requests Manage payment
FR-7	Analytics and Reports	Collect data from modules Run informative dashboard Allow custom reports creation

Save and store customer information (name, date of birth, contact info, client id, password) Apply client's discount levels

Automate marketing and customer satisfaction analytics

4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The Retail Management system is required to have a simple and user-friendly interface, and allow to customize the interface and dashboard for individual users. The system must fully support languages that business operates on and allow to import and export of data in .csv and spreadsheet file formats.
NFR-2	Security	The system restricts access to client data, analytics, and reports to only authorized users. The rights to add or correct data must be restricted for individual employees. Financial data must be secured with two-factor authentication. Data relative to the latest operational year must be duplicated on a reserve server.
NFR-3	Reliability	This application we can use for low level ram. It donot consume more storage.
NFR-4	Performance	The system must be capable of handling 100 employee accounts and 10000 orders per day without affecting its performance.
NFR-5	Availability	The availability of the system must be not less than 99.999% during the retail working hours, and not less than 95% round-the-clock for the e-commerce module.
NFR-6	Scalability	The system must support implementing new features and modules without disrupting existing processes. The system must support horizontal scaling for launching new retail stores with multiple POS.
NFR-7	Maintainability	System maintenance must run without shutting down or in automated mode during non-working hours.

Non-functional requirements define requirements to the system as a whole and should be considered with attention before approaching the architecture phase, as introducing changes in later stages will be difficult.
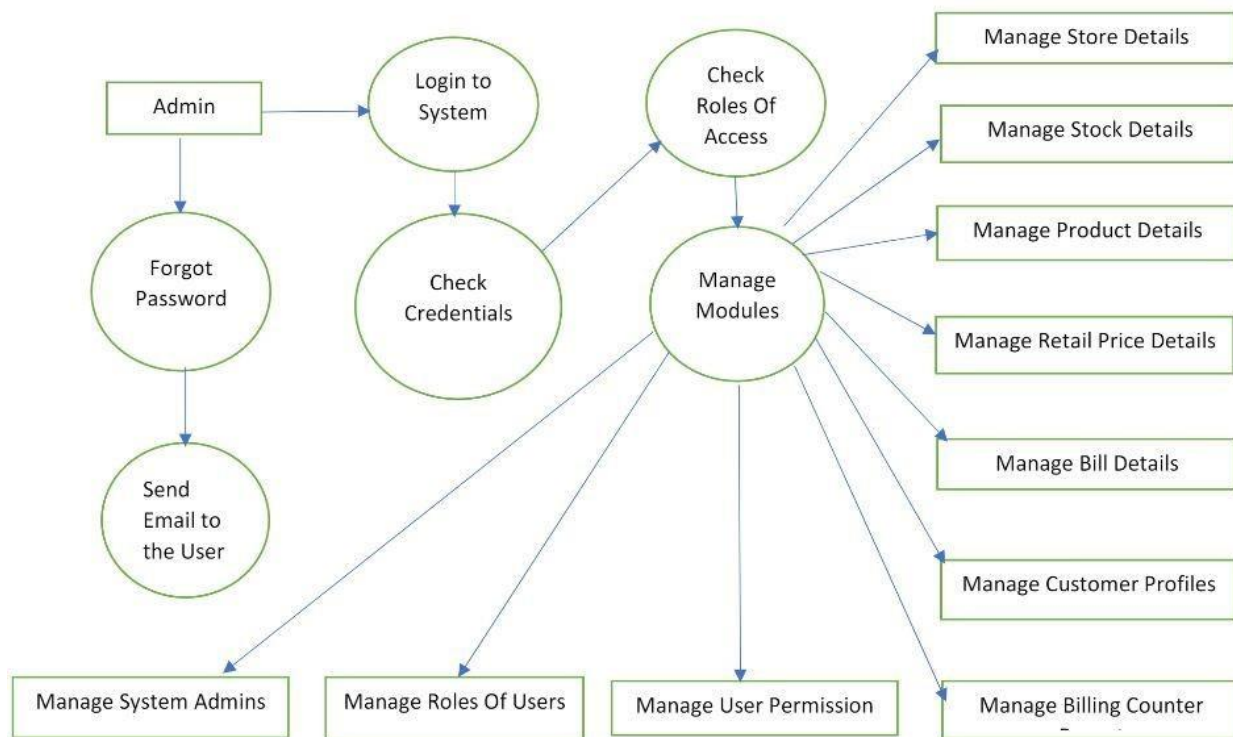
Usability

The Retail Management system is required to have a simple and

user-friendly interface, and allow customization of the interface and dashboard for individual users. The system must fully support languages that business operates on and allow importing and export of data in .csv and spreadsheet file formats.

5.PROJECT DESIGN

5.1 Data Flow Diagrams

The retail stock inventory analytics has data flow. Diagrams are often used as a preliminary step to create an overview of the inventory without going into great details, which can later be

elaborated . It normally consists of overall applications dataflow and processes of the inventory process. It contains Products names, Customer, Product Info, Product ID, Database, Payment, Purchase Info, Conformation and Cancelation, Billing Info and Receipts. All of the below Diagrams have been used for virtualization of the data process and structured designs of the inventory process.

5.2 Solution & Technical Architecture

This solution Architecture has the customer, who interact with the merchant online (web or mobile), with pickup or delivery, or physically at the stores, whether it is by interaction with a store employee, or via self-service machines.Store managers, who want to have visibility into how products and product categories are selling, get predictive insights such as inventoryconsumption and drive automatic actions, e.g. automated procurement.Upper management, who is interested in advanced real-time analytics with visualisation, reporting and AI capabilities.Data scientists, working on big data, with growing data quantity and number of sources, requiring fast processing and flexibility to easily deploy models .Low-code developers,

working on existing and new data-driven applications, with a focus on simplicity and with the least possible time spent managing security and operations.
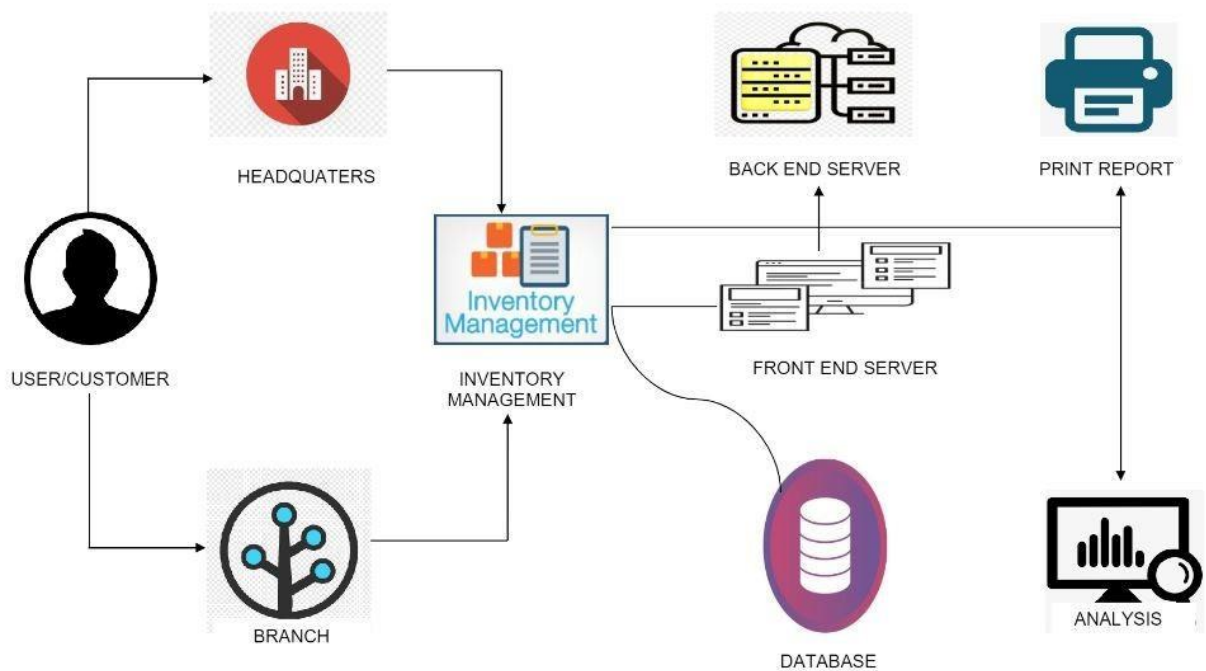
5.3 User Stories

A user story is a small, self-contained unit of development work designed to accomplish a specific goal within a product. A user story is usually written from the user's perspective and follows

the format: "As [a user persona], I want [to perform this action] so that [I can accomplish this goal]."

User Type	Functional Requirement	User Story Number	User Story/Task	Acceptance Criteria	Priority	Release
User(Retailer)	Registration	USN-1	As a user, I can register by entering my email, password, and confirming my password and answering security question for password changing purpose	I can log in using the entered credentials	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered	I can receive confirmation email & click confirm	High	Sprint-1
	Login or Forgot password	USN-3	As a user, I can log into the application by entering email & password or send a password changing request	I can access the dashboard or request to change the password	High	Sprint-1
	Password Forget	USN-3	Change password by answering the security question	I can change the password	High	Sprint-1
	Dashboard	USN-4	As a user, after logging in I can access the dashboard containing upload, analysis and predict functions	I can interact with functions present in the dashboard	High	Sprint-2

6. PROJECT PLANNING & SCHEDULING

The planning process requires a thorough look into the Retail Store motives to determine what strategies to implement. While it may be time-consuming, drafting a detailed plan is essential for successful execution. Retailers can begin by following seven general steps-

Set Goals

Businesses need to set specific short and long-term goals. Instead of setting a general objective to increase sales, management should set benchmarks regarding which product performances need to improve, specific revenue goals, and ideal profit margins for each item. Retail Store can further breakdown their goals into two categories

Internal Objectives

Retail management should pull reports and set practical sales and revenue goals based on product performance. Organisations can set clear monthly, quarterly, and annual targets to motivate employees and keep them focused on boosting sales.

External Objectives

External goals refer to a retailer's overall performance according to customers and their experience. This can include customer

service, retention, loyalty, and product pricing. Retail stores should aim to create a personalised experience that attracts and generates returning customers.

Analyse the Market

Once the company's objectives are clearly defined, it is time to analyse the current market. Research can expose competitors' strategies, performance, and weaknesses, as well as consumer expectations. This allows companies to develop a plan of action that fulfils customer needs and stands apart from the competition.

Research can also define any risks and opportunities the Retail Store may be exposed to and how to respond. Retailers can anticipate upcoming events through risk management and planning, so they are not caught off-guard. Through this process, businesses can analyse their own strengths and weaknesses, allowing them to improve the necessary areas. This may include financial planning, resource allocation, and staffing.

Analyse Customer Behaviour

If a Retail Store does not understand their target audience, they cannot correctly launch and promote products to attract customers. Therefore, retailers need to understand what consumers expect from products and brands.First, Retail stores must understand what types of demographics are in the market for their products. Then they can innovate customised experiences and brand images to attract audiences. However, retailers should continuously monitor customer feedback andpreference to avoid becoming irrelevant or stagnant.Retail planning is vital for defining business objectives and maintaining a foothold in a competitive market. Without a detailed plan, retailers can exhaust time and resources on ineffective marketing tactics. A comprehensive retail plan ensures that employees are working in unison to provide the best service, products, and experience, boosting company revenue.

6.1 Sprint Planning & Estimation

Sprint planning is an event in scrum that defines what can be

delivered in the upcoming sprint and how that work will be achieved.The sprint is a set period of time where all the work is done. However, before you can leap into action you have to set up the sprint. You need to decide on how long the time box is going to be, the sprint goal, and where you're going to start. The sprint planning session kicks off the sprint by setting the agenda and focus. If done correctly, it also creates an environment where the team is motivated, challenged, and can be successful. Bad sprint plans can derail the team by setting unrealistic expectations.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint- 1	Dashboard	USN-1	Create a dashboard using the data module	1	High	hashaan
Sprint- 2	Report	USN-2	Create a Report using the data module	1	High	Fawwaz
Sprint-3	Story	USN-3	Create a Story using the data module	2	High	Farhaan K
Sprint-4	Embedded dashboard, story and report	USN-4	Create Embedded dashboard,Story and report	2	High	iqram

6.2 Sprint Delivery Schedule

In Agile product development, a sprint is a set period of time during which specific work has to be completed and made ready

for review.Each sprint begins with a planning meeting. During the meeting, the product owner (the person requesting the work) and the development team agree upon exactly what work will be accomplished during the sprint. The development team has the final say when it comes to determining how much work can realistically be accomplished during the sprint, and the product owner has the final say on what criteria need to be met for the work to be approved and accepted.The duration of a sprint is determined by the scrum master, the team's facilitator and manager of the Scrum framework. Once the team reaches a consensus for how many days a sprint should last, all future sprints should be the same. Traditionally, a sprint lasts 30 days.After a sprint begins, the product owner must step back and let the team do their work. During the sprint, the team holds daily stand-up meetings to discuss progress and brainstorm solutions to challenges. The project owner may attend thesemeetings as an observer but is not allowed to participate unlessit is to answer questions. (See pigs and chickens). The project owner may not make requests for changes during a sprint and only the scrum master or project manager has the power tointerrupt or stop the sprint.At the end of the sprint, the team

presents its completed work to the project owner and the project owner uses the criteria established at the sprint planning meeting to either accept or reject the work.

Velocity

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprint-2	8	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	8	6 Days	07 Nov 2022	12 Nov 2022	8	12 Nov 2022
Sprint-4	16	6 Days	14 Nov 2022	19 Nov 2022	16	19 Nov 2022

AV = sprint duration/velocity = 20/10 = 2
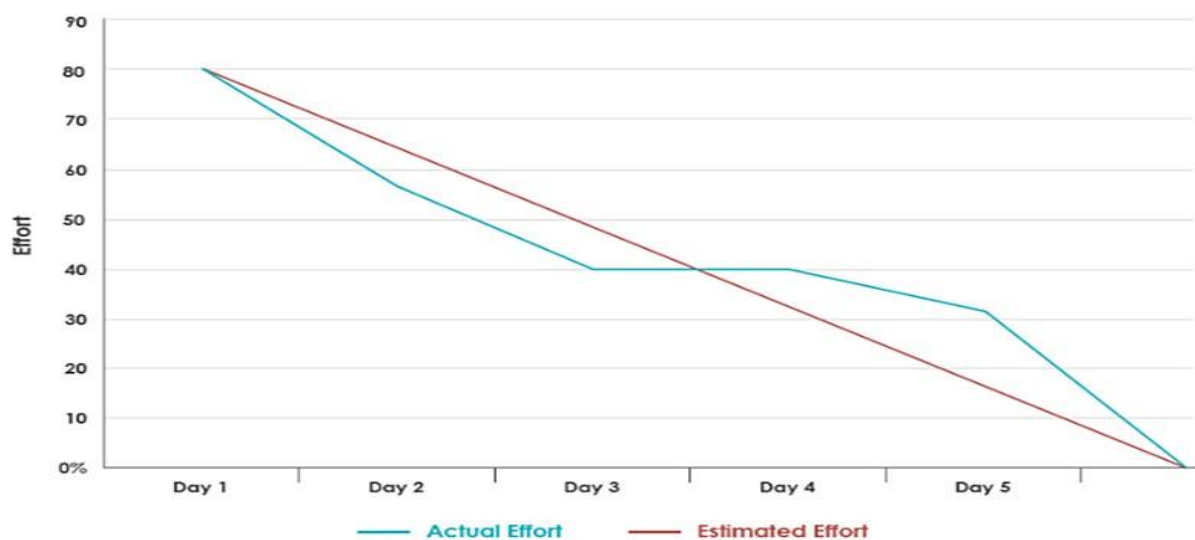
6.3 Reports from JIRA

The Jira is very useful for creating milestones which shows the project sprint timelines clearly; the sprints are planned and completed within the given time limit.

7. CODING & SOLUTIONING

7.1 Feature 1

Dataset from External API are uploaded and DB is created using IBM cloud.Then Dashboard, Story, Report is created using the external API imported dataset and the IBMDB2 cloud database is used to create the dashboard, story, report.

7.2 Feature 2

Embedded Dashboard, Story, Report is created using the external API imported dataset and the IBMDB2 cloud database is used to create the embedded dashboard, story, report.

7.3 Database Schema

The database schema is for retailDB2 connection of the data

server.

8. TESTING
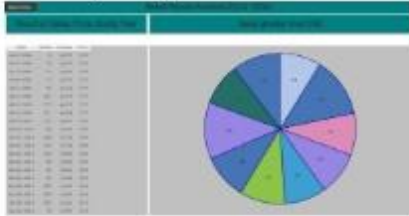
8.1 Test Cases

The test case is to download the dataset from an external API and connect DB2 connectivity.Create a dashboard,report and story.Embed the dashboard, report and story to a simple html.Create an web app and embed the dashboard,report and story which you have created.

8.2 User Acceptance Testing

The test case report and UAT Execution & Report Submission are created.The test case report consists of feature type, component, test scenario, prerequisite, steps to execute, test data,expected result, actual result, status, comments, TC for automation, bug ID and executed by columns.UAT Execution &Report Submission consists of purpose of document, defect analysis and test case analysis.

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	The dashboard is created with three category i.e. Overview, Sales, Price.

S.No.	Parameter	Screenshot / Values
2.	Data Responsiveness	The data is downloaded from an external API and uploaded in the IBM cognos analytics with watson and a data module is created.
3.	Amount Data to Rendered (DB2 Metrics)	The dataset which is downloaded from the external API and uploaded is rendered from the DB2.
4.	Utilisation of Data Filters	The data filters are used for preprocessing the data i.e cleaning of data , removing the null value.The unwanted columns are removed from the dataset and the additional data which are required are added to the dataset.
5.	Effective User Story	The story is created with two scenes i.e. Introduction, sales by year & stock.

6.	Descriptive Reports	The report is created with two visualisations i.e.result, sales greater than 350.

9. RESULTS

9.1 Performance Metrics

The Performance testing consists of dashboard design, data responsiveness, amount of data to be rendered from the utilisation of data filters, effective user story and descriptivereport.

Test Case Analysis

Section	Test Cases	Not Tested	Fail	Pass
Dataset	5	0	0	5
Dashboard	8	0	0	8
Report	2	0	0	2
Story	5	0	0	5
Embed dashboard, report and story in simple .html file	15	0	0	15
Embed dashboard, report and story in web app	25	0	0	25

10. ADVANTAGES & DISADVANTAGES

Advantages

Easy access to market - in many ways the access to market for entrepreneurs has never been easier. Online marketplaces such as eBay and Amazon allow anyone to set up a simple online shop and sell products within minutes. See selling through online marketplaces.Reduced overheads - selling online can remove the need for expensive retail premises and customer- facing staff, allowing you to invest in better marketing and customer experience on your e-commerce site.

Potential for rapid growth - selling on the internet means traditional constraints to retail growth - eg finding and payingfor larger - are not major factors. With a good digital marketing strategy and a plan to scale up order fulfilment systems, you can respond and boost growing sales. See planning for e-commerce.Widen your market / export - one major advantage over premises-based retailers is the ability to expand your market beyond local customers very quickly. You may discovera strong demand for your products in other countries which you

can respond to by targeted marketing, offering your website in a different language, or perhaps partnering with an overseas company. See basics of exporting.

Customer intelligence - ability to use online marketing tools to target new customers and website analysis tools to gain insight into your customers' needs. For advice on improving your customer's on-site experience, read how to measure your online marketing.Website costs – planning, designing, creating, hosting, securing and maintaining a professional e-commercewebsite isn't cheap, especially if you expect large and growing sales volumes. See common e-commerce pitfalls.Infrastructure costs – even if you aren't paying the cost of customer-facing premises, you'll need to think about the costs of physical space for order fulfilment, warehousing goods, dealing with returns and staffing for these tasks. See fulfilling online orders.Security and fraud – the growth of online retail market has attracted the attention of sophisticated criminal elements. The reputation of your business could be fatally damaged if you don't invest in thelatest security systems to protect your website and transaction processes. See e-commerce pitfalls – security weaknesses.

Disadvantages

Legal issues – getting to grips with e-commerce and the law can be a challenge and you'll need to be aware of, and plan to cope with, the additional customer rights which are attached to online sales. See the law and selling online.Advertising costs – while online marketing can be a very efficient way of getting the right customers to your products, it demands a generous budget. This is especially true if you are competing in a crowded sector or for popular keywords. See pay-per-click and paid search advertising.Customer trust – it can be difficult to establish a trusted brand name, especially without a physical business with a track record and face-to-face interaction between customers and sales staff. You need to consider the costs of setting up a good customer service system as part of your online offering. See manage your customer service.

11. CONCLUSION

For the success of the program, the managers of the retail stores must formulate a modern way of managing the inventory by instituting electronic systems to take care of the resources of the company. This ensures that they can be accounted for and there

are proper records available all the time for reference to be made when the need arises. Besides, the retail management system is necessary for ensuring that there is accountability in the way the company handles its stock. It helps in saving time.Retail companies have acquired significant importance within several countries due to their high economic contribution. Therefore, the need to analyse their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization.From the aspects mentioned above, the main trends in inventory management

12. FUTURE SCOPE

The enhanced version of the web application is created using the updated dashboard, report and story using the updated dataset and with better DB connectivity.

13. APPENDIX

Source Code

<!DOCTYPE html>

<html lang="en">

```html
<head>
  <meta charset="utf-8">
    <meta content="width=device-width, initial-scale=1.0"
name="viewport">

    <title>Retail Store Stock Inventory Analytics -
Index</title>
  <meta content="" name="description">
  <meta content="" name="keywords">

  <!-- Favicons -->
  <link href="assets/img/favicon.png" rel="icon">
   <link href="assets/img/apple-touch-icon.png" rel="apple-
touch-icon">

  <!-- Google Fonts -->
                                                       <link
href="https://fonts.googleapis.com/css?family=Open+Sans:
300,300i,400,400i,600,600i,700,700i|Jost:300,300i,400,400
i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,50
0,500i,600,600i,700,700i" rel="stylesheet"
```

```html
<!-- Vendor CSS Files -->
<link href="assets/vendor/aos/aos.css" rel="stylesheet">
<link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
<link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
<link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
<link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
<link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
<link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

<!-- Template Main CSS File -->
<link href="assets/css/style.css" rel="stylesheet">

<!--
```

==

==============

==

=============== -->

</head>

<body>

  <!-- ======= Header ======= -->

  <header id="header" class="fixed-top ">

    <div class="container d-flex align-items-center">

      <h1 class="logo me-auto">Retail Store Stock Inventory Analytics</h1>

      <!-- Uncomment below if you prefer to use an image logo -->

      <!-- <img src="assets/img/logo.png" alt="" class="img-fluid">-->

```html
<nav id="navbar" class="navbar">

 <ul>

            <li><a class="nav-link scrollto active"
href="#hero">Home</a></li>

               <li><a class="nav-link scrollto"
href="#about">About</a></li>

               <li><a class="nav-link scrollto"
href="#services">Dashboard</a></li>

              <li><a class="nav-link scrollto"
href="#portfolio">Report</a></li>

              <li><a class="nav-link scrollto"
href="#team">Story</a></li>


              <li><a class="nav-link scrollto"
href="#contact">Contact</a></li>

     <li><a class="getstarted scrollto" href="#about">Get
Started</a></li>

  </ul>

  <i class="bi bi-list mobile-nav-toggle"></i>

</nav><!-- .navbar -->
```

```
        </div>

     </header><!-- End Header -->

     <!-- ======= Hero Section ======= -->
     <section id="hero" class="d-flex align-items-center">

       <div class="container">

         <div class="row">

               <div class="col-lg-6 d-flex flex-column justify-
content-center pt-4 pt-lg-0 order-2 order-lg-1" data-
aos="fade-up" data-aos-delay="200">

           <h1>Better Analytics of your Retail Inventory</h1>

           <h2>Overview of your Stock</h2>

               <div class="d-flex justify-content-center justify-
content-lg-start">

                   <a href="#about" class="btn-get-started
scrollto">Get Started</a>

           </div>

         </div>

               <div class="col-lg-6 order-1 order-lg-2 hero-img"
```

```
                data-aos="zoom-in" data-aos-delay="200">

                    <img src="assets/img/hero-img.png" class="img-
fluid animated" alt="">

        </div>

      </div>

    </div>

  </section><!-- End Hero -->

  <main id="main">

    <!-- ======= Clients Section ======= -->
    <section id="clients" class="clients section-bg">
      <div class="container">


      </div>
    </section><!-- End Cliens Section -->

    <!-- ======= About Us Section ======= -->
    <section id="about" class="about">
```

```html
<div class="container" data-aos="fade-up">

  <div class="section-title">

   <h2>About Us</h2>

  </div>

  <div class="row content">

   <div class="col-lg-6">

    <p>

        Here you can find the sales, stock, year and price
of the products you handle and can Analytics their sales

      by

     </p>

     <ul>

              <li><i   class="ri-check-double-
line"></i>Dashboard  which  shows  the  overview,  sales  and
the price </li>

         <li><i class="ri-check-double-line"></i>Report
which  shows  the  sales  result  and  the  sales  greater  than
350</li>
```

```html
                    <li><i class="ri-check-double-line"></i>Story
shows the overview and the Sales</li>

        </ul>

      </div>

      <div class="col-lg-6 pt-4 pt-lg-0">

       <p>

            Dashboard which shows the overview, sales and
the price.Report which shows the sales result and the sales
greater than 350.

            Story shows the overview and the Sales are shown
below

        </p>


        </div>

      </div>

    </div>

    </section><!-- End About Us Section -->
```

```html
<!-- ======= Dashboard Section ======= -->
<section id="services" class="services section-bg">
  <div class="container" data-aos="fade-up">

    <div class="section-title">
     <h2>Dashboard</h2>
    </div>

                            <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dash
board&amp;pathRef=.my_folders%2FRetailDB2%2Bdash
board&amp;closeWindowOnLastView=true&amp;ui_appb
ar=false&amp;ui_navbar=false&amp;shareMode=embedde
d&amp;action=view&amp;mode=dashboard&amp;subVie
w=model000001846c44e9f5_00000002" width="1125"
height="1000" frameborder="0" gesture="media"
allow="encrypted-media" allowfullscreen=""></iframe>


  </div>
</section><!-- End Dashboard Section -->
```

```html
<!-- ======= Team Members Section ======= -->
<section id="cta" class="cta">
  <div class="container" data-aos="zoom-in">

    <div class="row">
      <div class="col-lg-9 text-center text-lg-start">
        <h3>Team Members

          <ul>
            <li>Nivetha</li>
            <li>Jannet emimal</li>
            <li>Vishnuvarthan</li>
            <li>Vallarasu roshan</li>
          </ul>

        </h3>


      </div>


    </div>
```

```html
        </div>

      </section><!-- Team Members Section -->

      <!-- ====== Report Section ====== -->
      <section id="portfolio" class="portfolio">
        <div class="container" data-aos="fade-up">

          <div class="section-title">
            <h2>Report</h2>
          </div>
                                    <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_fol
ders%2FRetailDB2%2Breport&amp;closeWindowOnLast
View=true&amp;ui_appbar=false&amp;ui_navbar=false&a
mp;shareMode=embedded&amp;action=run&amp;format=
HTML&amp;prompt=false" width="1125" height="1000"
frameborder="0"    gesture="media"    allow="encrypted-
media" allowfullscreen=""></iframe>

        </div>

      </section><!-- End ReportSection -->
```

```html
<!-- ======= Story Section ======= -->
<section id="team" class="team section-bg">
  <div class="container" data-aos="fade-up">

    <div class="section-title">
     <h2>Story</h2>
    </div>

                              <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story
&amp;pathRef=.my_folders%2FRetailDB2%2Bstory&amp
;closeWindowOnLastView=true&amp;ui_appbar=false&a
mp;ui_navbar=false&amp;shareMode=embedded&amp;act
ion=view&amp;sceneId=model00000184711a8500_00000
000&amp;sceneTime=17800" width="1125" height="1000"
frameborder="0"    gesture="media"    allow="encrypted-
media" allowfullscreen=""></iframe>


  </div>
</section><!-- End Story Section -->
```

<!-- ======= Pricing Section ======= -->

<!-- ======= Frequently Asked Questions Section ======= -->
<section id="faq" class="faq section-bg">
  <div class="container" data-aos="fade-up">

    <div class="section-title">
      <h2>Frequently Asked Questions</h2>
    </div>

    <div class="faq-list">

        <li data-aos="fade-up" data-aos-delay="100">
          <i class="bx bx-help-circle icon-help"></i> <a data-bs-toggle="collapse" class="collapse" data-bs-target="#faq-list-1">Is the dashboard only show the sales and price?<i class="bx bx-chevron-down icon-show"></i><i class="bx bx-chevron-up icon-close"></i>

```html
        <div id="faq-list-1" class="collapse show" data-bs-parent=".faq-list">
          <p>
            The Dashboard can the entire detail about the sales and the price
          </p>
        </div>
      </li>

      <li data-aos="fade-up" data-aos-delay="200">
        <i class="bx bx-help-circle icon-help"></i> <a data-bs-toggle="collapse" data-bs-target="#faq-list-2" class="collapsed">Is the report only display the data? <i class="bx bx-chevron-down icon-show"></i><i class="bx bx-chevron-up icon-close"></i></a>
        <div id="faq-list-2" class="collapse" data-bs-parent=".faq-list">
          <p>
            The Report gives the entire analytics of the data
          </p>
```

```html
        </div>
      </li>

      <li data-aos="fade-up" data-aos-delay="300">
        <i class="bx bx-help-circle icon-help"></i> <a
data-bs-toggle="collapse"       data-bs-target="#faq-list-3"
class="collapsed">Is the Story only just display  the content?
<i class="bx bx-chevron-down icon-show"></i><iclass="bx
bx-chevron-up icon-close"></i></a>
        <div id="faq-list-3" class="collapse" data-bs-
parent=".faq-list">
          <p>
            The Story gives the overview of the Inventory
          </p>
        </div>




    </ul>
  </div>
```

```html
      </div>

    </section><!-- End Frequently Asked Questions Section
-->


    <!-- ======= Contact Section ======= -->
    <section id="contact" class="contact">
      <div class="container" data-aos="fade-up">

        <div class="section-title">
          <h2>Contact Us</h2>


            <a href="https://github.com/IBM-EPBL/IBM-
Project-43738-1660719127">Github</a>


        </div>


      </div>
    </section><!-- End Contact Section -->
```

```html
</main><!-- End #main -->

<!-- ======= Footer ======= -->


<div id="preloader"></div>
<a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i class="bi bi-arrow-up-short"></i></a>

<!-- Vendor JS Files -->
<script src="assets/vendor/aos/aos.js"></script>
<script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
<script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
<script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
<script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
```
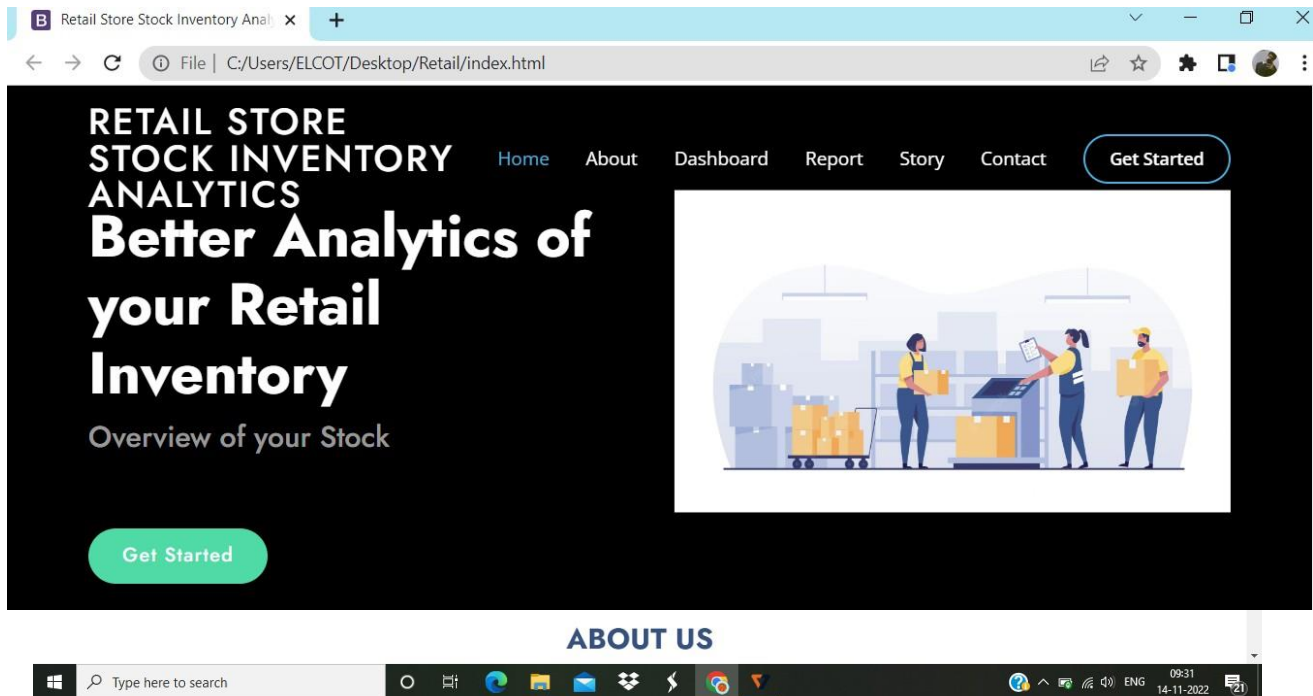
```
                                                        <script

src="assets/vendor/waypoints/noframework.waypoints.js">

</script>

                        <script        src="assets/vendor/php-email-

form/validate.js"></script>


  <!-- Template Main JS File -->

  <script src="assets/js/main.js"></script>


</body>


</html>
```
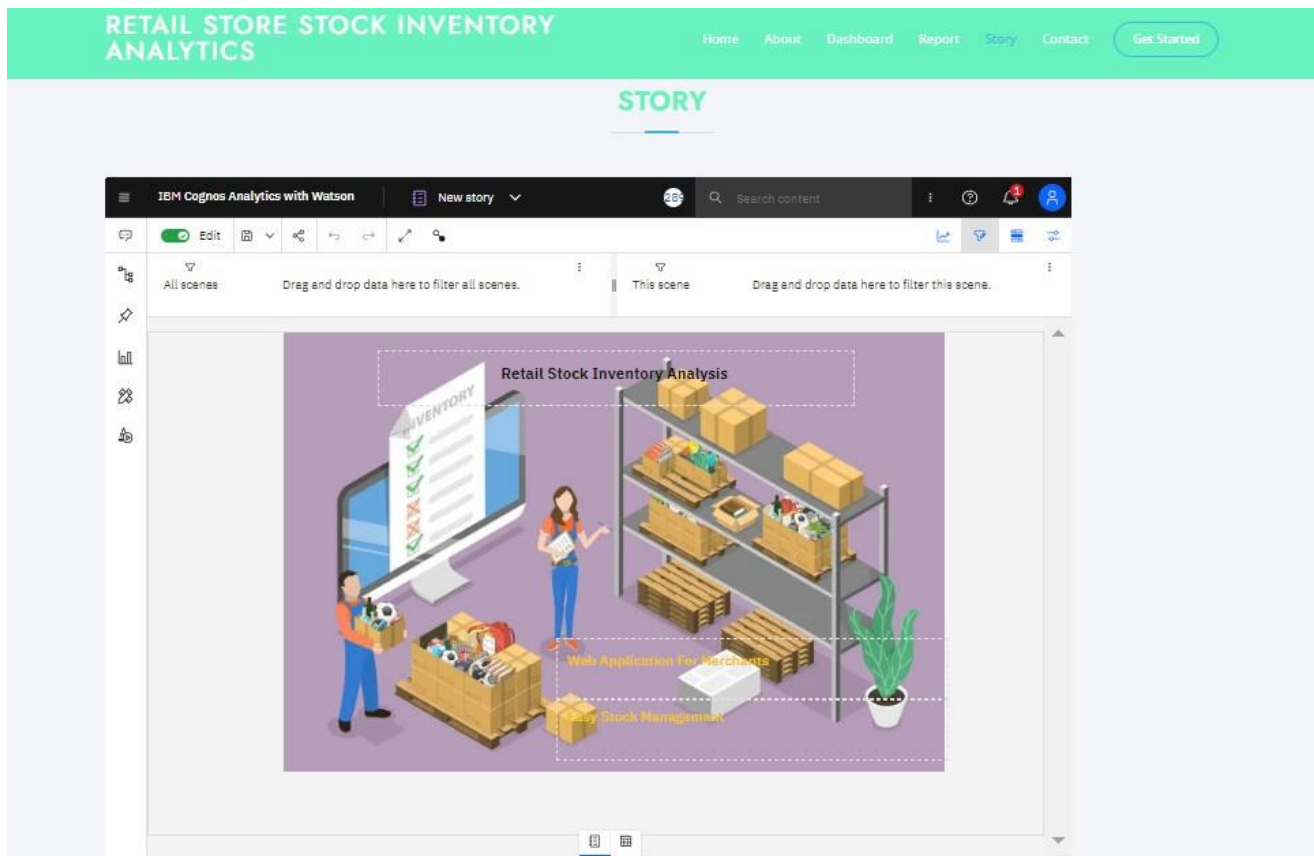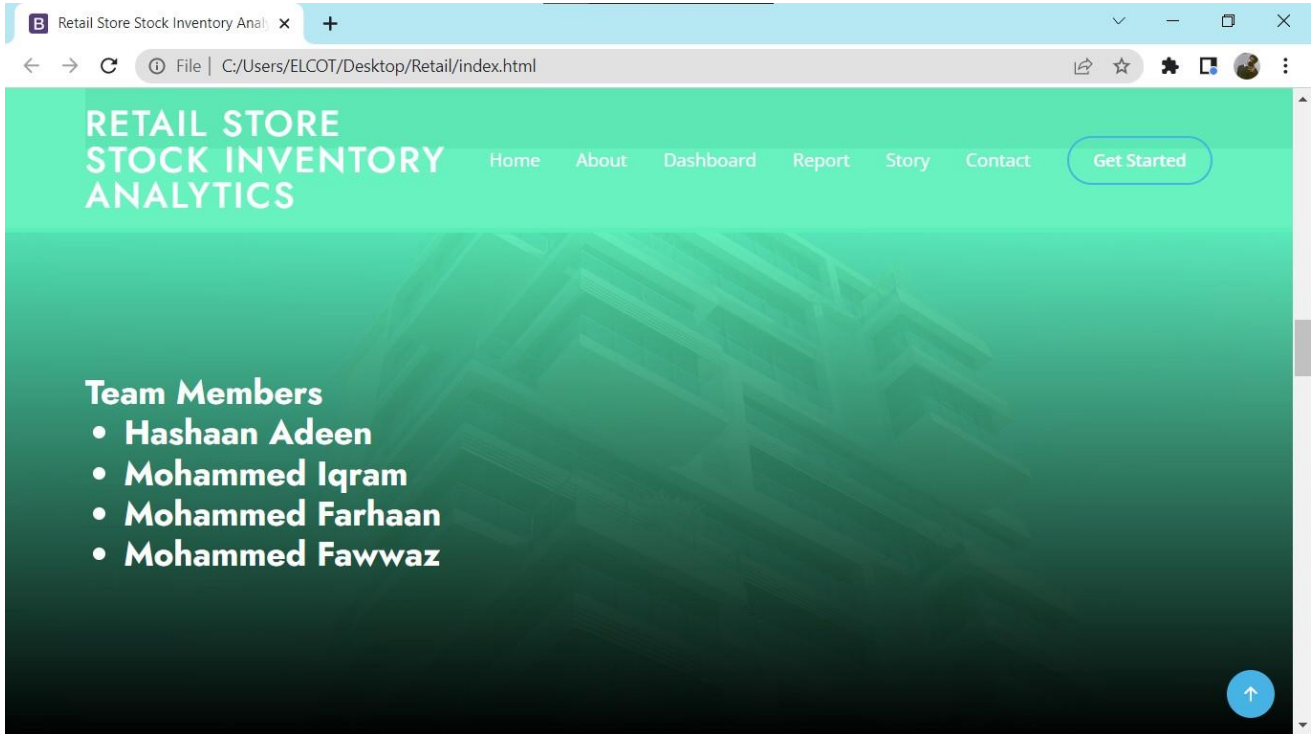
Screenshots
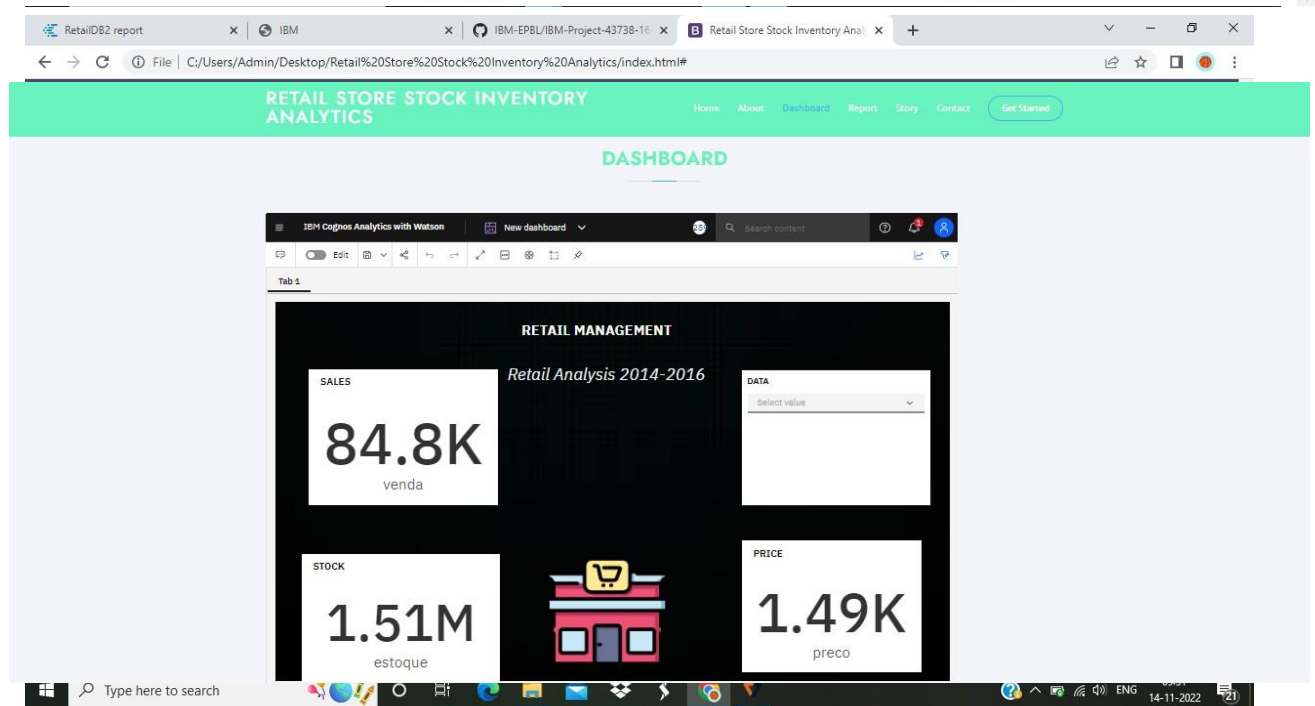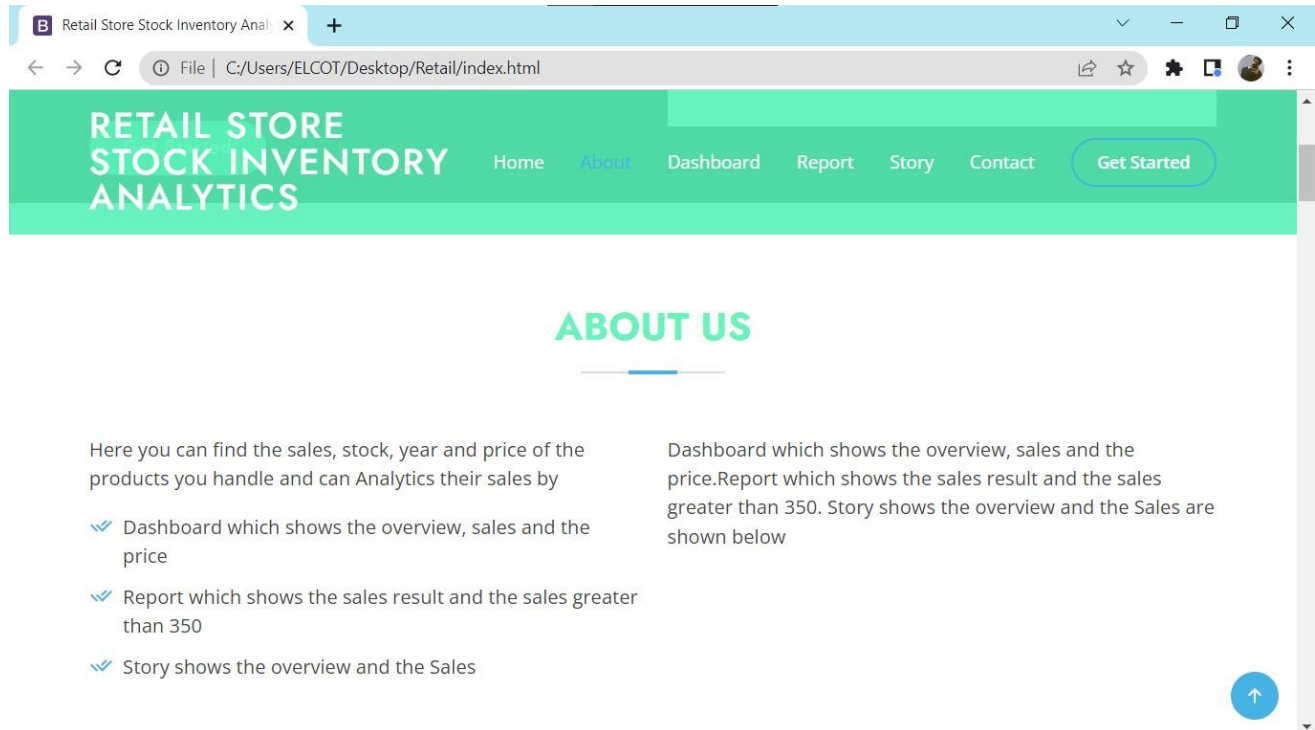
ABOUT US

Here you can find the sales, stock, year and price of the products you handle and can Analytics their sales by

✅ Dashboard which shows the overview, sales and the price

✅ Report which shows the sales result and the sales greater than 350

✅ Story shows the overview and the Sales

Dashboard which shows the overview, sales and the price.Report which shows the sales result and the sales greater than 350. Story shows the overview and the Sales are shown below

DASHBOARD

RETAIL MANAGEMENT

Retail Analysis 2014-2016

SALES
84.8K
venda

DATA
Select value

STOCK
1.51M
estoque

PRICE
1.49K
preco

REPORT

Retail Report Analysis 2014 -2016

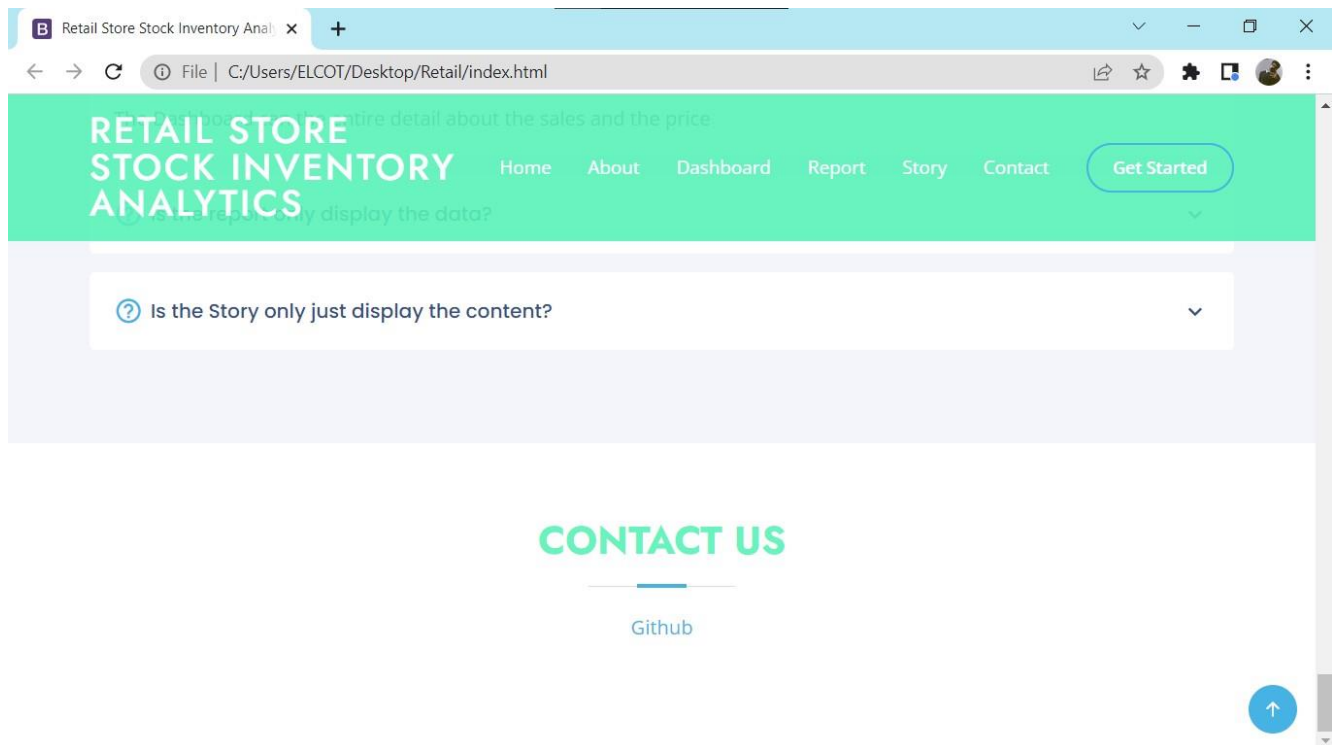| Result of Sales, Price, Stock, Year | Sales greater than 350 |
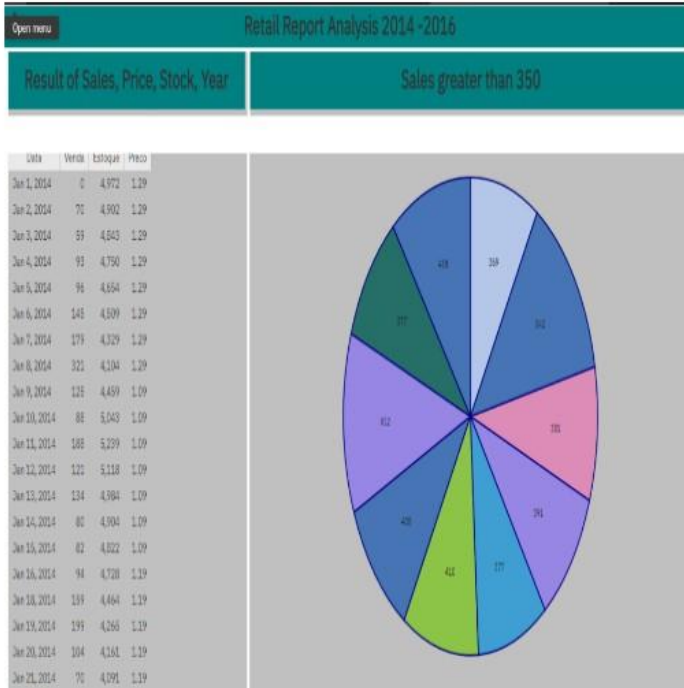
FREQUENTLY ASKED QUESTIONS

(?) Is the dashboard only show the sales and price?   ⌃

The Dashboard can the entire detail about the sales and the price

(?) Is the report only display the data?   ⌄

(?) Is the Story only just display the content?   ⌄

PROJECT DEMO LINK
https://drive.google.com/drive/folders/1leGcouNOvtSLO-
BDju8uuqZU5QUpQxQD?usp=sharing