GoShop: A Digital Bridge between Shopkeepers and Consumers

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Abstract— GoShop is an idea to overcome the growing distance between local vendors and customers by digitizing the whole process of trading from the very beginning of maintaining inventory by the shopkeeper to the purchase of an item by consumer. Also, it aims to make the process easier and faster by binding different tools in a single package and reducing the cost of shopkeeper and saving time for the end consumer.

Keywords— Shopkeepers, Consumers, Inventory Control System, Billing System.

I. INTRODUCTION

Ongoing advancement in the technological field has made it hard for local vendors to maintain their sales ratio and grow in terms of customers. The will to grow dwindles as the cost of implementing various products/ softwares viz. Inventory Control System, Billing System, Space Management System is a big budget scenario. Customers have to wait in long queues to place an order while visiting a local vendor and if the store is big enough to provide a bag or basket on wheels, the customers have to drag a bulky cart through the whole store to add desired items in the cart. Also if the customer somehow manages to reach the billing counter he/she has to wait in long queues to get the cart billed.

To overcome these obstacles we propose an idea of digitizing the whole process of trading from the very beginning to where the shopkeeper manages its inventory to the very end where customers purchase the item. GoShop is a product based on the similar idea which helps a shopkeeper to outgrow the primitive approach of storing and selling a product by incorporating several products/softwares which helps to make the process easier into a single platform. Also it helps customers to omit the long queues to get desired item as well as get it billed by coming up with a mobile application for customer complementing with a virtual cart and various payment methods to ease the payment flow. Further in the paper we have tried to establish the structure, features and need of the product at an instance. Also, we have discussed what

has motivated us to develop the idea and what makes it stand out of the box. We also put forward the technology used in the production and what are the future scope and growing opportunities for the idea.

GoShop was developed with the vision of overcoming the challenges faced by local vendors and making the whole process of trading an item efficient, effective and easier by providing the platform which is user friendly as well as optimized.

1.1. Motivation

This paper concerns the wellbeing of consumers as well as shopkeepers. In the scenario of a pandemic where social distancing is necessary (to avoid any bad contingency), the customers were not willing to shop from local vendors due to the fear of getting affected by Covid - 19. Thus, exponential fall in the sales.

This motivated us to come along with the idea of GoShop

- "A zero touch" trading process which empowers customer's will to purchase an item by visiting the local store without any fear.

Similar ideas were also proposed by Walmart and Amazon which gave us the push start to overcome already encountered drawbacks and implement the idea practically.

II. EXISTING SYSTEM

There are various implementations of the idea with some

twitches and drawbacks. Though the previous implementation of the similar idea was based on a single large store and that being the major drawback of the approach. The two major systems which were implemented and were popular are discussed below and also the reason why they were not successful:

2.1 Walmart Scan and Go

Walmart introduced the Scan & Go program in select stores between 2012 and 2014.

Walmart's Scan & Go required customers to download an app, scan their own items as they shopped and then show their receipt at the door before exiting the store. This transferred the labor from Walmart employees and put it on the customer. The app keeps a running list of all the items you've scanned so far and a cart subtotal. You can adjust the quantity or delete an item if you no longer need it. To pay, load a debit card or credit card into your app ahead of time, and then scan the QR code at a self-checkout kiosk—this step provides your receipt and lets a Walmart associate check your ID if you've purchased age-restricted items.[3]

The option to unlock Scan & Go in the Walmart+ app was only available to those who sign up for the new membership program.A Walmart+ membership is $98 a year or $13 a month if you decide against a yearly subscription which a customer has to pay besides all the cart charges. The application was tied with so many features at the beginning that made it tough for new users to interact and understand the flow and sometimes it may be a glitch.There may be long waits at checkout and also you have to interact with the store employee at the checkout which was inevitable. The payment methods were limited to debit or credit cards only which required the user to add the relevant information to the application which can result in danger if stolen.

The program was a terrible failure, with customers complaining about the app and its issues. It was only available for iPhone users, store personnel were not trained to use the app in case of problems, and there was no troubleshooting available if a product did not scan accurately. The program ended abruptly in 2014 due to overwhelmingly negative feedback.

2.2 Amazon Go

Launched about a year ago, Amazon go store was supposed to represent the future of stores.A 1800-square-foot retail space located in the company's hometown of Seattle had a network of cameras and other devices to automatically detect what customers had removed from the shelves and charged for it with a smartphone app.

Amazon Go was looking for a system where customers can get on the road, pick up whatever they want, and "just-get-out." Their purchases will be tracked using computer vision and sensors and asset management systems, matched to the customer's mobile app and automatically charged to their Amazon account.[2] It'll feel like shoplifting, except you're actually being watched by more cameras than you can imagine. It was an Amazon concept quintessentially, a test of the technology used to make the sales experience easier and more efficient. Significantly, the 2,000-square-foot shopping mall did not even have any financial managers, a new phenomenon that caused economists to slander millions of timeless executives. Amazon has paid for "Just Walk Out" technology, and Amazon has upgraded the store by saying it has no lines and no exits.[7]

Technology has been crashing in trials when the store is overcrowded and requires quality control of humans, people watching video footage to ensure customers are charged for the right things, according to someone familiar with the program. There were several challenges to implement the concept as the cost of implementation was too high as the price of sensors and smart shelves is high. The concept was rotating around the specific location and has a beta implementation for amazon only. The system fails when a user picks up a loose fruit-vegetable or an unshaped wheat bag which makes it harder for the sensors to figure out the quantity and weight of an item. The system requires a whole lot of data to work and collects and tracks the user data for efficient working and needs to be active at every instance to work. The concept also requires a large area to operate and scaling of the concept is a tough and costlier process.[8]

III. PROPOSED SYSTEM

Keeping in mind the drawbacks and challenges faced by the previously implemented concepts we proposed an idea of GoShop which is a platform of a two way tool for shopkeeper and customer to make a trade easier, efficient and traceable with least amount of data involved. It aims to uplift the local vendors and provide them with different products under one panel to cut on the setup cost for easy trading. GoShop is divided into two parts in the hierarchy: an admin panel in the form of a web-app for the shopkeeper and a mobile application for customers. The shopkeeper panel has been wrapped up with inventory control system, centralised billing system, order management system whereas the customer application is wrapped up with a QR code scanner, a payment gateway, a virtual cart and order history space.

The concept is to simplify the trading process, minimize the cost of conduct and save time of the user. Shopkeeper

can add items to the cloud inventory under his unique shopkeeper ID and then generate a QR code for the corresponding item uploaded and by scanning the same with the help of mobile application the customers can add the item into its virtual cart and then can place order with multiple delivery options and different payment methods. The core idea is to map each item to a unique code which can be placed on the shelves in place of physical products to save the required space for the front store. Also, this concept doesn't target any specific kind of shopkeepers but aims to shake hands with every kind of shopkeeper at each level may it be small or large in terms of area or turnover.
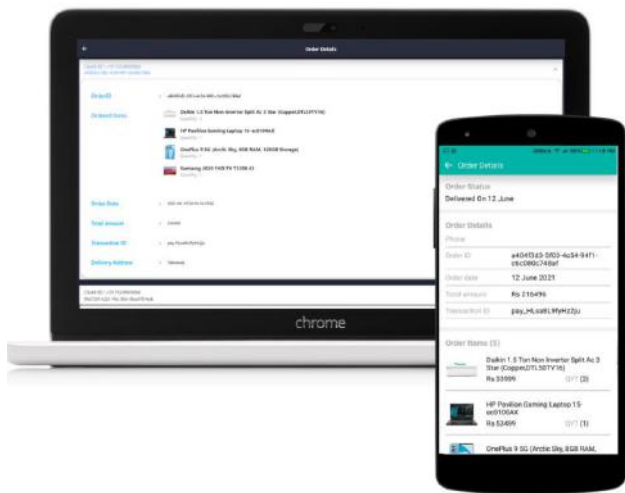

Fig. 1 User Interface of Web-App and Mobile App

2.3 System Workflow

The shopkeeper has the flexibility to register on the webapp with a unique email address and a shop name. The Shopkeeper panel is basically divided into 5 parts namely: The top header bar containing the menu option of order history and logout, the left container which notify shopkeeper of the items with low quantity in the inventory, the middle container which shows the listing of all items in the inventory and a form to add item to the inventory,

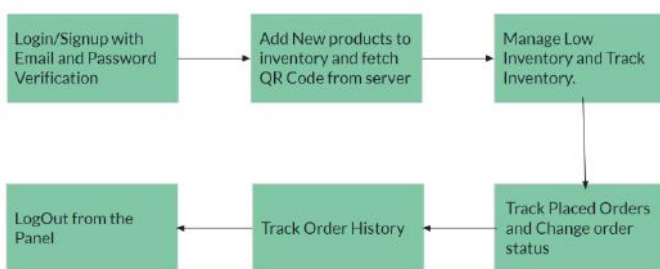the right most container to notify the recent order placed by the customers.

Fig. 2 Flow of Shopkeeper Panel

The customer has the effortless way of signing up to the mobile application with the phone number and OTP verification. The customer application mainly consists of four screens namely: Authentication Screen for login, Home Screen for scanning QR codes, Adding items to cart, Cart Screen to trace out the items added to cart, the total amount, to choose delivery option and place order accordingly and at last the Order Screen which keeps the history of all orders and allow user to track the status of the placed orders as well.
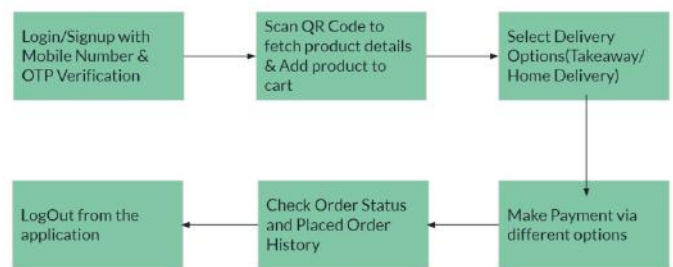

Fig. 3 Flow of Customer Application

3.2 Features of GoShop

- In interest of Shopkeeper:
  - Inventory Control Systems.
  - Centralised E-Billing System.
  - Cost cutting of Resources.
  - Maintenance of Order History.
- In Interest of Customer :
  - Saves Time.
  - No Physical carts anymore.
  - Track placed orders.
  - Option for delivery.
  - Ease of payment with privacy.

3.3 How is it different from previous concepts?

The implementing cost of the idea is minimal as in current time everyone has a smartphone so that the admin panel as well as the customer application can make its reach to almost all the smart phone operators. The customer does not have to pay any membership cost to use the application and a minimal charge is placed on the shopkeeper to keep servers up and running. Also, no critical data is collected from the user and no important data is stored without encryption that makes the system robust and impenetrable by any cyberpunk. Also, the concept is scalable in terms of inventory or area and the shopkeeper doesn't have to pay any extra cost as well as

no additional setup is required. This concept is built while keeping in mind all sorts of shopkeepers or vendors and not restricted to any sort of trading. To implement the idea no advanced sensors or cameras or any sort of smart shelves are required and can be onboard with just a smartphone. The usage of QR code helps to keep the product identification unique and no other identification sensors have to be employed for example RFID or NFC tags. The code can be scanned by the mobile application as a scanner is already employed in the Home Screen of the customer application.

It has given a tagline "Shop on a Go", just because it helps you save the waiting time for getting the product to your cart and also helps you avoid the long billing queues and reduces the human interaction which is helpful in current pandemic scenarios.
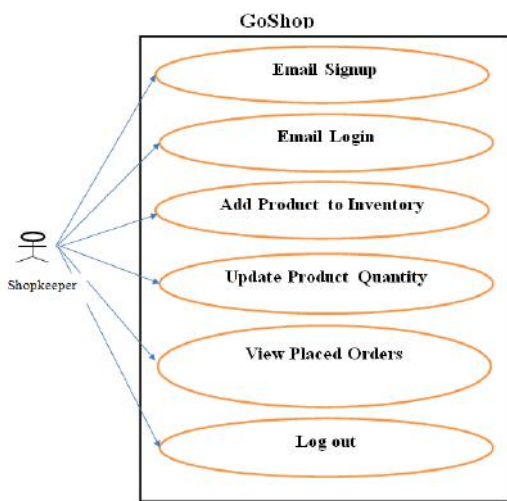
3.4 Flow Planning Diagrams

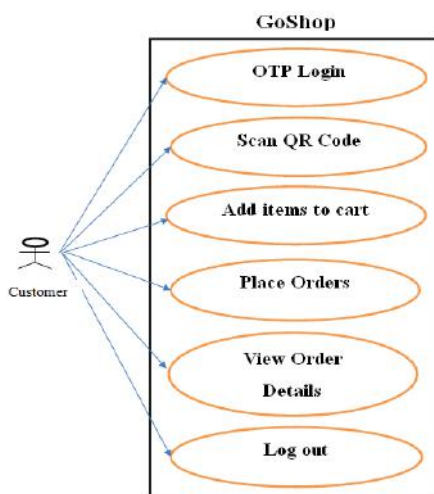*Fig. 4 Use Case Diagram of Shopkeeper Panel*

Fig. 5 Use Case Diagram of Customer Application

IV. TECHNOLOGY STACK

The main motive of this section is to view in short about technology used in implementing the concept of GoShop.
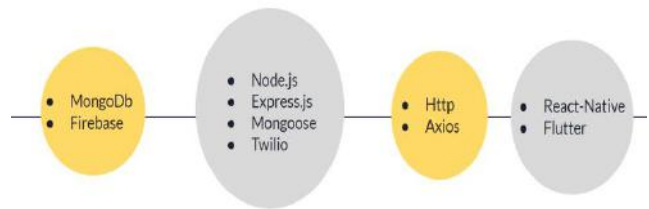

Fig. 6 Technological Stack of the Concept

4.1. Database

We have used MongoDb and firebase cloud storage for storing all sorts of data generated from the frontend viz:Shopkeeper panel or customer mobile application. MongoDB is a document-focused database, not a relationship. The main reason for using this model is to make scaling easier, but there are other benefits as well. A document-based database replaces the concept of "row" with a flexible model, "document". There are also no previously defined schemas.Without a fixed schema, inserting or deleting fields as needed is easy. In general, this speeds up development as engineers can accelerate faster.[4]

Firebase Cloud Storage allows you to upload and share user-generated content, such as photos and videos, allowing you to create rich media content for your apps. Your information is stored in Google Cloud Storage bucket - an exabyte scale object storage solution with high availability and global demand. Firebase Cloud Storage allows you to securely upload these files directly from mobile devices and web browsers, managing dot networks easily.[5]

4.2. Backend

We have used Node.JS, Express,JS, Mongoose and Twilio to set up the backend connecting the database and the frontend and to develop the APIs.

The simple reason for using Node js : The basic functionality of the Node js is kept to a minimum and all existing APIs are very good, showing a low level of complexity for the programmers. If you want to build something more complex, you can easily select, install, and use available third-party modules.Another reason why Node js is so attractive is because it is so easy to start using. [9]

The express js module was used to create routes on the backend to make the request url structured and segment the code properly. Mongoose is a fully expanded library of the related object (ORM) of Node.js and MongoDB.

Twilio is an American cloud-based communications platform as a service, the company is headquartered in San Francisco, California, usa. Twilio software developers programmatically make and receive calls, send and receive text messages, and perform other communication functions using its Web Services API.[1]

4.3 Frontend

We have used Flutter to develop webapp for shopkeepers and React Native to develop mobile applications for customers.

Flutter web support brings the same feelings to the web as mobile. Building on Dart management, the power of the web platform and the flexibility of the Flutter framework. You can combine the existing Flutter code written in Dart into a web experience because it looks like a Flutter framework and the web is just another object aimed at your app. Adding web support to Flutter includes using a layer of advanced Flutter graphics over standard browser APIs, in addition to integrating Dart into JavaScript, instead of the ARM machine code used for mobile applications. Using a combination of DOM, Canvas, and WebAssembly, Flutter can provide portable, high-quality, and efficient user information to modern browsers.[10]

React Native is a framework capable of generating hybrid mobile applications for cross platforms. It tends to have a single place to write code in javascript ES6 as the programming language and build mobile applications for both iOS and Android at the same time with single code. Besides, the framework of the popular hybrid application of developers has not been very successful in creating a similar feeling on many indigenous platforms.[6]

V. SUMMARY

In this paper we have done various investigations on the existing system to make trading easier for customers and proposed a new system considering the challenges and overcoming the drawbacks of them. It proposes a system that envisions to uplift the local vendors to grow in the advanced scenarios and provide them the platform to digitize the whole process with minimal upfront cost. Also, this system aims to reduce the time taken by a customer to purchase a product and provide ease of payment and order tracing facility.

VI. CONTRIBUTIONS

The paper contributes to the advancement in the trading process by making it a lot easier and safer than before. It not only puts stress on digitizing the process but also focuses on the health of customers as well as shopkeepers

by minimizing human interaction. GoShop will share several advantages to Shopkeeper such as : Reducing the land size for inventory display, Minimizing the cost of labour, Inventory management, E-Billing system. Also, for customers, they won't have to wait in long queues for billing, hassle free check in and check out of store, multiple modes of payment.

VII. FUTURE SCOPE

In future, the GoShop concept can be applied across the globe by introducing maps and navigational services, which will make it easier for consumers to get quickly introduced to their local stores. Also, it has a possibility to be employed with the Branch System therefore a shop having multiple branches will have a specific shopkeeper ID but different branch IDs.

Voice System can be embedded with the current concept to automate the process with users voice to reduce touch interaction.

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