Productivity Application for Food Stalls

Project 3 | Report

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Declaration

I declare that this written document represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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April 15, 2016

Approval Sheet

The project titled *Productivity Application for Food Stalls* by Indrajeet Roy, is approved for partial fulfillment of the requirement for the degree of 'Master of Design' in Interaction Design.

Guide : 

Chairperson : 

Internal Examiner : 

External Examiner : 

Date : 05-07-2016

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Lastly thanks to my family for their love, encouragement and support.

Indrajeet Roy
April 15, 2016

Abstract

The project was an attempt to understand various problems related to the productivity of small food stalls and how smart phones can help to mitigate them. The project aims to help the shop owners to manage orders and credit accounts of customers and reduce errors in overall transactions.

Various stalls were studied to understand the daily scenario, their job and to identify the pain points. Several design ideas were generated targeting these problem areas. The major challenges faced while designing the solution was the adoption by shopkeepers in using the application, whether they will be able to manage credits and their daily transactions with customers. Will the record keeping help them in increasing the productivity of shops.

Final concept named 'Munshee' was developed as a mobile application that helps the shop owners to have a track of the multiple orders, creates sharable invoices, accounting and insights of daily transactions. It also proposed a system that helped resolve the awkward scenario between customers and shop owners due to credits taken by customers. The application enables an intuitive way of billing for shop owners and management of credit. The debtor is notified by the system upon exceeding the credit limit. The shop owner can see the summary of the day easily. It shows revenue made through each food items, amount in credit and amount that should be with the owner.

An evaluation was conducted in 5 shops with the prototype of the final solution. The goal of the evaluation was to find any issues related to the usability of the application to determine if the proposed solution can help in checking their logs of their overall sales of the shop and management of credit accounts.

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Introduction

Small shops provide employment to almost 2 Lakh people in large metros like Mumbai and Delhi with a turnover of more than 1500 Crore Rupees(4). Many of the shop owners want to increase their business however they are rarely aware of opportunities or technologies that can help them leverage their existing capabilities to a wider audience. At the most they try to improve ambience by keeping the surroundings of the shop clean. This is a highly unorganized sector which makes it difficult to have a one fits all solution for different types of small shop owners..
Smartphone penetration of 2016 in India is 29.8% (3). A number of small shop owners use smart phones and use applications like whatsapp, youtube and facebook. Despite management of shops being a paramount activity, there is a rarity of any application available dedicated to small shop owners to help them manage regular shop activities. These systems are however readily available for medium to large scale shops.

Design Process

User study
A User study was conducted to understand the present scenario of small food stalls. A method of contextual inquiry with a semi structured interview was used to get an insight on the user behavior and needs.

Observations and Insights
It was observed that managing credits , transactions , calculations are major hurdles. Shop owners spend more than 2 hours each day to calculate the shop's investments and profit.

Secondary Research
Various applications and products related to increased customer flow, income and management of restaurants were reviewed to understand what exactly is missing in the current scenario.

Ideation
Design ideas were generated targeting one problem at a time. How can the menu be created, what type of transaction should be showed, will they keep track of customers, are they aware of their credits, how do make communication between shop owners and customers more transparent.

Final Concept
The final concept is a mobile application which helps the shop owners to have a track of multiple orders, reminders for credit customers and enables to create sharable invoices, accounting and insights of daily, weekly, monthly and yearly transactions. The final concept also proposes a system that helps resolve the awkward scenario between customers and shop owners due to small credits taken by customers.

Evaluation
Usability evaluation is been conducted in 5 shops in IIT Bombay. The product was evaluated by checking their logs of their overall sales of the shop and credits. The design was updated based on the findings.

Primary Study

Small food stalls can be seen in most of the localities in India. They have a limited menu often consisting of off the shelf items like biscuits, chips, etc. along with tea and light snacks. Most of the items are made in the shop while some items are procured from different vendors. Most food items prepared in the shop are intended for immediate consumption. These shops are confined to their geographical area and have a fixed customer flow. Every morning there is a fixed amount of work like getting groceries required for the day, preparation of food items, payments of different vendors, everyday accounts, credits of customers and many more. Shop owners also struggle to find an efficient way to track and analyze their inventory. These shops also have co-workers who help the owners manage the shop in their presence as well as absence. One common thing in all these shops is customers taking credit. Different shops keep records in different ways. Some maintain diaries and some memorize. Payment of services like LPG, rent, electricity and wages are supposed to be taken care of by the owners. At the end of the day shop owner needs to calculate the amount received in cash. Even keep some amount of money aside for the next day's transactions with other vendors.

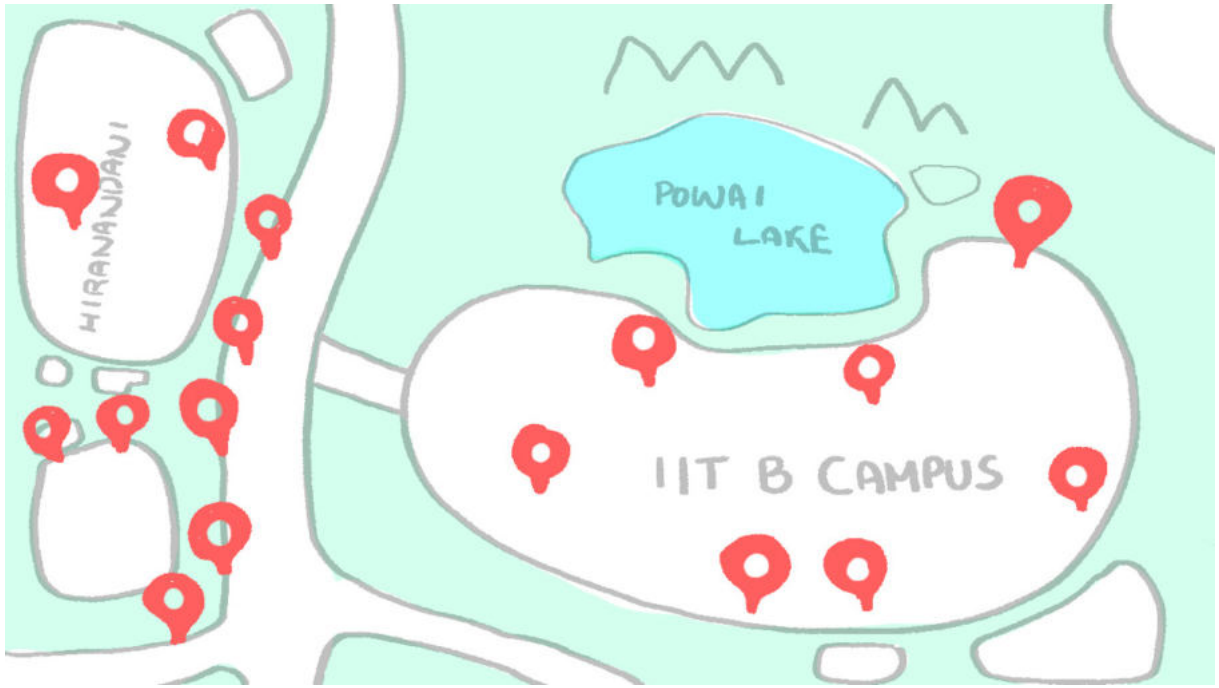


Figure 01 : Places where user study was conducted

Primary study began from canteens in IIT Bombay to food stall opposite IIT Bombay, Powai market and few stalls in Hiranandani.

A contextual inquiry with semi structured interview was conducted with 16 shop owners and 5 co-workers.

User study was done with the aim to understand users, their environment, details of their business process, current method of accounting and the complexity involved in them management of shop. Also to understand different accounting and record keeping methods used by the shop owners. Contextual Inquiry was conducted with shop owners to understand what problems they face every day. Day starts with getting all the raw materials from the local market. Some shops have permanent vendors who gets all the required materials.

Ordering of Items for the business

It was observed that for all the grocery and vegetable shopping he takes the money from the last night's income after separating each workers salary.

The food items which are taken from a vendor are also ordered by both the co-worker and owner. Communication gap between them leads to confusion and repeated orders or shortage of supply.

Co-workers open the shop and starts preparing the breakfast. Shop owners sits all the day and does all the transactions. They mostly order food items one day prior and mentions the required quantity. In the absence of owner, co-worker handles the shop. Owner has to run to the market if there is any urgent requirement.

Paying co-workers

One of the shopkeeper in the user study mentioned,

"It's very hard for me to give money to the co-workers on the last working day, so I keep saving their part of money every day."

Co-workers generally take advance before salary and it is a very common practice of taking loan from their owner.

Credit Management

Owners maintain a book for customers taking credit. He writes the name/nick name of the person and phone no. He keeps on updating the diary. They are not aware of the amount that is stuck in credits.

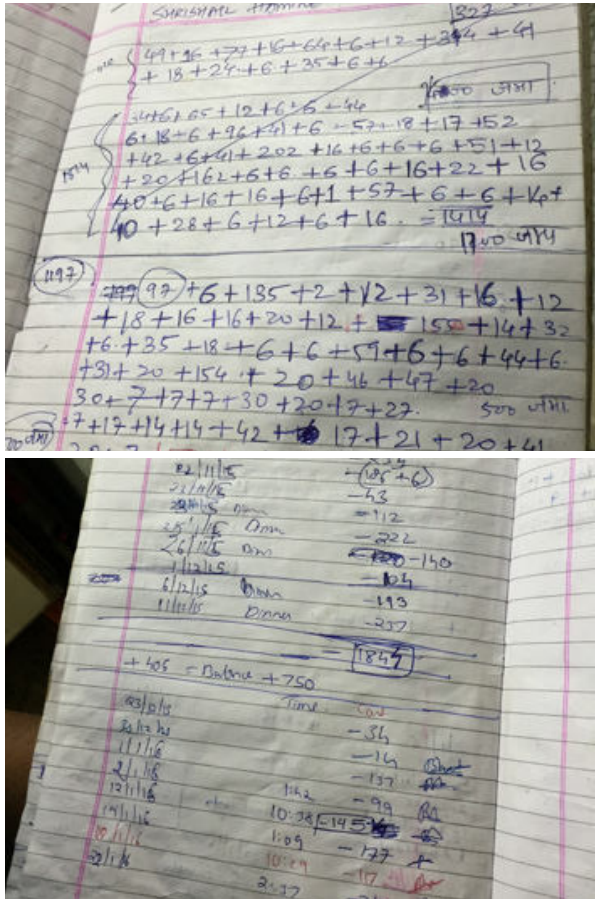


Figure 02:
Credit books of different stalls

Trust among shop management and customers

One of the customer mentioned in the interview that they try and make customers feel that the transactions are transparent and they are not fooling customers.

One of the shopkeeper mentioned,

"I always make sure that I use calculator for counting the bill, in front of my customers."

As they are not able to create copies of bills, they use calculator as the evidence of transparency for the transaction.

Shop owner: "Bhaiya kal ka kuch dena tha kya."
Customer: No

This is a problem every shop owner and customer faces. The problem raised because of inefficiency in tracking of food items sold. The problem is surfaced when there the encounters with the shop are more. When customers orders in intervals and the payment is done at the end of the order. There is a huge chance of missing out on few things at the end. The loss is always on the shop owner's side.

Managing daily and monthly accounts

Everyday shop owners invests a huge amount to get all the raw materials and packed food. He is not keeping track of the food items sold or food items sold on credit and so end of the day his calculations never matches with investment. So to cross check he asks his customers the same expecting someone might have forgot to pay.

For every small transaction they try to keep records and if any of this single receipts get misplaced then the whole calculation of the month changes. The calculation of the month is fully dependent on this receipts.

Everyday shop owners spend more than 2 hours to do all the calculation about the transactions he has made to vendors and customers. They are very keen on knowing the overall analysis of the expenditure of the month.

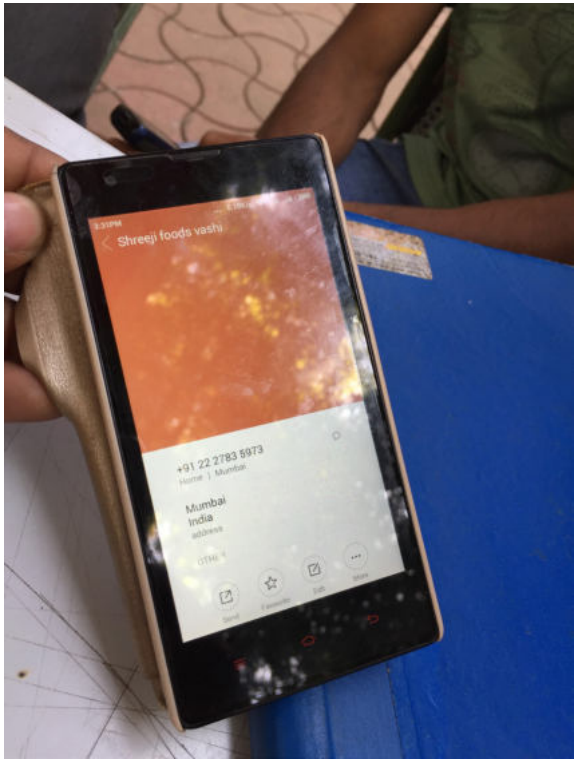


Figure 03 : Contact of a vendor

Usage of Smartphones

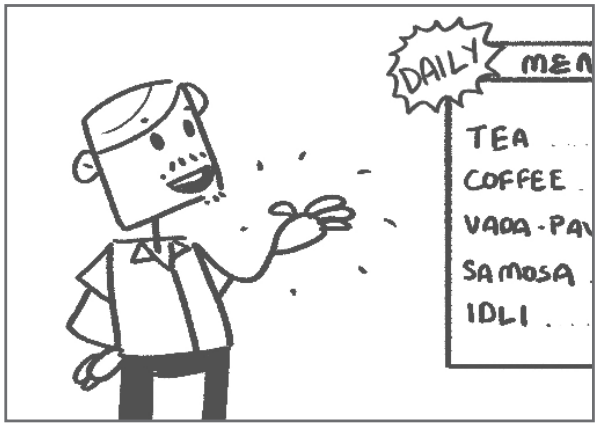
Most of the shop owner and co-workers are using smart phone. Commonly used apps are whatsapp, phonebook, messages and youtube. In phonebook, they store contacts in different styles. One of the observation was made regarding the pattern in which they store their contact number. It was NAME - HIS SERVICE, e.g Bapu Rikhshawwala, Shreeji Foods Vashi.

Observations made in bigger restaurants

A restaurant in hirandandi has 4 to 5 different stalls in the same area but the billing is done in one place and owner controls all the shop by Menson Hotel Manager Point of Sale[01]. It compromises of multi touch display, keyboard and printer. It gives insights about the sale of individual stalls. He finds it easy to use and end of the day he doesn't have to calculate income about the individual stalls. In his absence, it also updates via SMS or mails about the sale of the day.

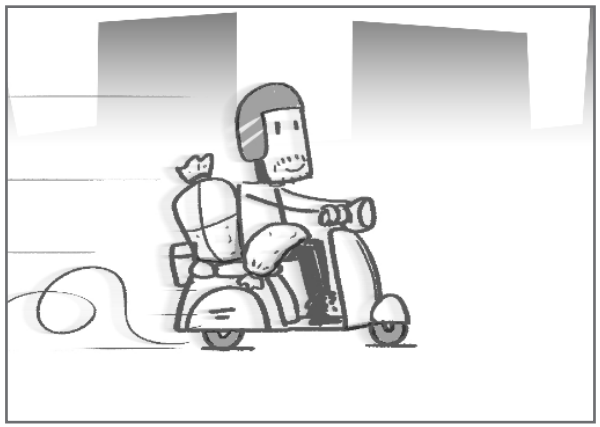
Problem Scenario

Mr. Pandya is a stall owner in IIT Bombay

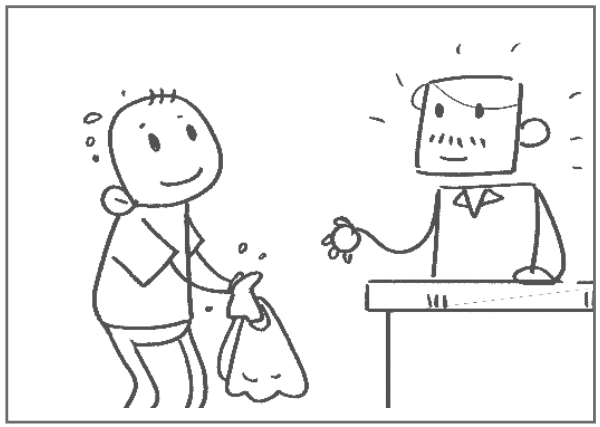


He has limited menu.

He has two co-workers who help him in running the stall in his presence as well as absence.

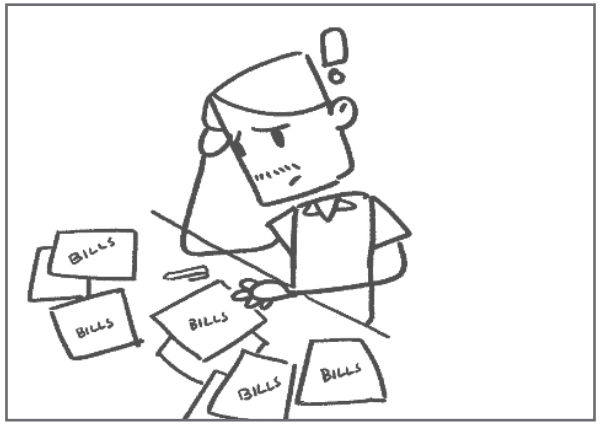


Early morning Mr. Pandya travels to the market to get raw materials. He sometimes calls his co-workers and confirms the things required for the day.

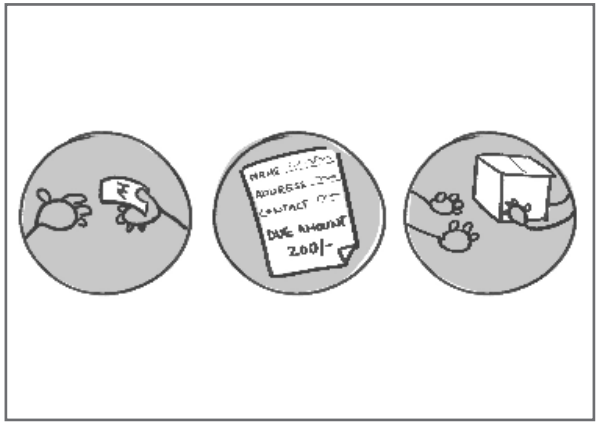


He also buys locally prepared food items from other vendors on a daily basis. He does the payment on the same day.

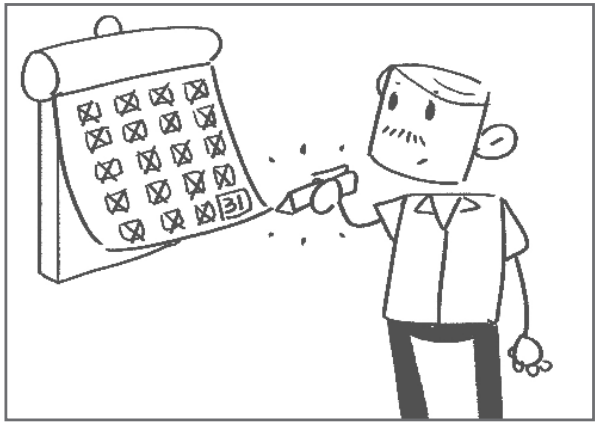
For packed food items products he places the order on a weekly basis. Payments are done after one to two weeks.



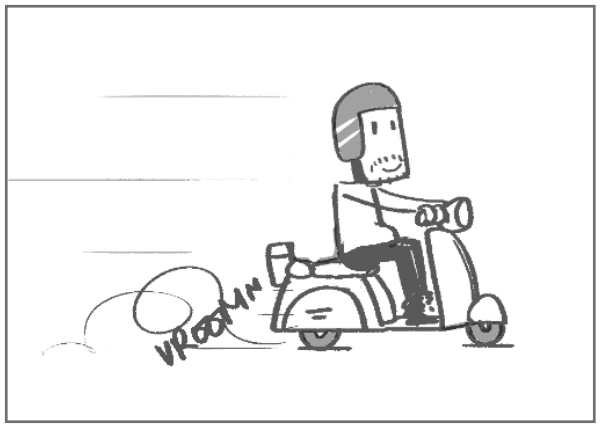
Most of the items come mostly on credit.



He procures food items and services on credit.

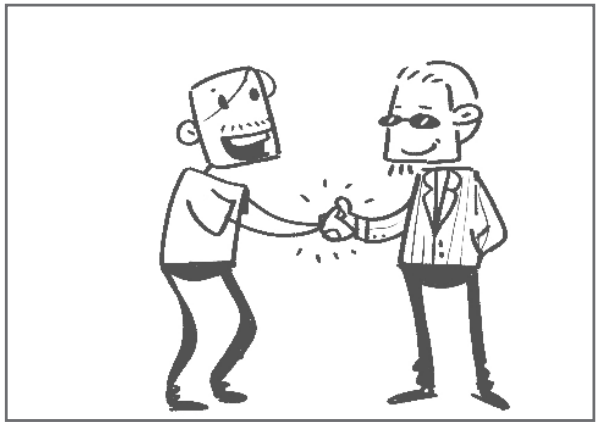


Services like LPG, rent, electricity and wages for co-workers are paid on a monthly basis.



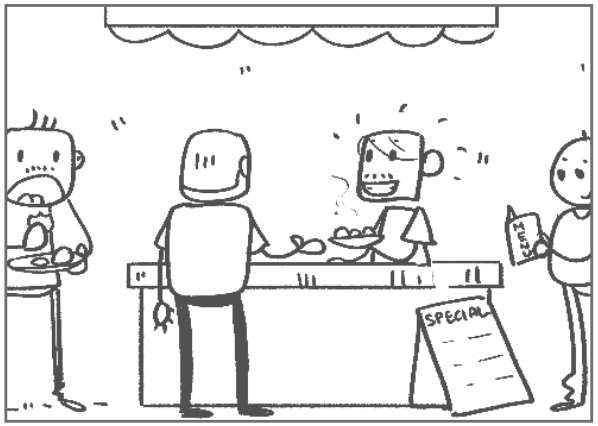
In case of any special orders the shop owners might have to visit the market to fulfill those requirements on an immediate basis.

Illustrations made by Anagh Saha



As Pandya is running his stall for so many years. He makes friends. Customers also know him and trust him. Some of his customers take regular credits.

The credit taken by customers are very small but every week there are 10 to 15 customers who take credit from him. So, this individually small amount when added becomes a huge amount for the stall owners.
It creates an awkward situation between the shop owner and customer as it looks like a small amount stuck with the customer but in effect is a huge amount. Pandya feels awkward to ask for such a small amount from his regular customers.



During the peak hours there are multiple encounters by customers, people visit in groups and order in groups. It becomes difficult for the owners to keep track of orders. Some customers take advantage of the situation and sometimes don't pay. As the owners are not keeping track of food items, sometimes it gets over and owners are late to order the required food items.

Illustrations made by Anagh Saha

He doesn't keep track of the food items he sells. Every day he keeps doing transactions with different vendors. Orders/buys food or raw materials when required.

End of the day he calculates cash of all the products which he might have sold but experiences a difference when tallying. He calculates the cash he has received but is not aware of amount stuck for the food items sold on credit.
He spends more than an hour everyday to get insights about his shops sale and expenditures.

Illustrations made by Anagh Saha

Observations

Credit Accounts (credit given)

Generally, these small shops have smaller network of people as their customers. They know most of the customers coming to their shop and have a good relationship with those customers. Having food on credit is a common thing observed in these smaller shops. In one of the shop it was observed, the register used to maintain credits was different, where the owner used to add money to the existing created profile of the customer. There was no way by which owner can see the credits given in that day. All the credit amount was added to different profiles in the credit book. So, by the end of the day, he knew there is some amount which is stuck in credits but could not precisely know the amount.

In one of the shop, it was observed that there was a regular customer who use to take credit. The amount he was had to pay to that small shop was 4275 rupees. After more inquiry, the shopkeeper mentioned that this is not the only customer with such huge credit amount, he has several more customers with similar amounts. He mentioned as they are the regular customers of the shop, it becomes awkward to ask them regularly to clear the credit. They mentioned, they always keep waiting for the customer to realize that the amount has increased a lot and they should pay it. The amount which gets stuck in credit is huge.

Not just these huge credit, there are many more customers with smaller amount, the customer feels the amount is small, but for the shopkeeper these smaller amounts sum up to a huge amount. And again, there is hesitation to ask for smaller amounts.

Tracking of food items and Inventory management

These small shops have smaller businesses and all the purchases for the business is done on a daily basis. Every day, shop owner goes to grocery shops to look for cheaper rates. They visit different markets to get items at cheaper rates. They find it difficult to manage their inventory as there is no tracking of the items they have purchased. It is also difficult to maintain the inventory of food items which are out of sight.

In a shop, shopkeeper ordered 100 frooties 5 days back and he was thinking there might be frooties available in the freezer. As frooti was kept in the deep fridge, he could not see the sales of frooti. As there are multiple co-workers working in the shop and also frooti is stored out of sight, he got to know to that frooties are over only when they were out of stock. Now he had to order the new stock and wait for a day to get it delivered.

Transactions

Shop owner is involved in generally to do three kinds of transactions. One, to the vendors from which he gets either food items or raw materials. Two, to the customers of his shop and three, with the co-workers for paying them their wages.

Some payments are daily, some weekly and some monthly. For the packed food items which he buys from other vendors, he makes payments weekly. The inbound cash flow is generally from customers. As most of their transactions are daily, they manage all their payments from the cash generated from customers on the day of the transaction.

One of the shop owners mentioned that a lot of the times, a vendor suddenly turns up and has to pay him a huge amount upfront. So, the sale of the entire day was given to the vendor.

Also, sometimes workers asks for advance payments and he finds managing these wages for the end of the month difficult. Many shop owners keeps a fixed amount of wage of each co-worker aside every day, which they pay him at the end of the month.

Monthly payments like LPG payment, rent of the shop, and wages of co-workers are difficult for the shop owner who has all his transactions on daily basis. General observation was that they keep a fixed amount for all these payments aside every day. He also keeps a fixed amount aside for vendors whose amount is due.

Rush

At peak hours, rush is a major problem. There are times where customers take advantage of the same. Rush hour vandalism of low ticket food items is a common thing.

Multiple encounters of customers

One of the canteen owner mentioned, lot of times a group of friends come for food. One of the member of the group gives the order and as and when required some member of the group comes and orders more. As the shop owner accepts payment in the last, it is difficult for him to maintain the track of the food items ordered. At the end, one of the group member comes for billing and tries to remember food items ordered and also asks his friends for the items they ordered. Lot of the times as the order is big, there is chance of missing out on few things. This is a very severe problem which is generally observed in many places.

It is not that the customers want to cheat the shop owner but it is the case where the order is huge and to memorize the order is difficult.

The problem can be summed up to a problem when the payment is not done before order as the order keeps on updating. Customer encounters with the business a lot of times and because of this, track of the items ordered is lost.

Analysis of expenditures

Keen on knowing insights of the overall expenditure of the shop. Every day the shop owner spends more than two hours understanding his profits and liabilities.

User Group

The project focuses on shops which have limited menu with more than 2 to 3 co-workers in the shop. Daily sales of the shop is between 6000- 10000 rupees. Shop owners should have a smart phone with generic knowledge of calling and instant messaging.

Figure 04 : Small food stall

Illustration made by Anagh Saha

Stakeholders

All the work, major decisions and transactions are taken care of by the shop owner.

Owner

Manages all the cash related activities like inventory of the shop, salary of co-workers and monthly expenses. Takes orders in the shop and manages credit of customers. Tries to analyze expenditures. Keeps track of cleared and uncleared bills of vendors. Pays salary to the co-workers.

Co-workers

Updates about the daily requirement of the shop to owner. Prepares food everyday and interacts with customers. Keeps the shop clean. Takes care of the shop when owner is not available.

Vendors

Delivers food items or raw materials in time. They themselves have pending and uncleared bills of different shop owners.

Customers

Have a fixed mindset about what they want to have.

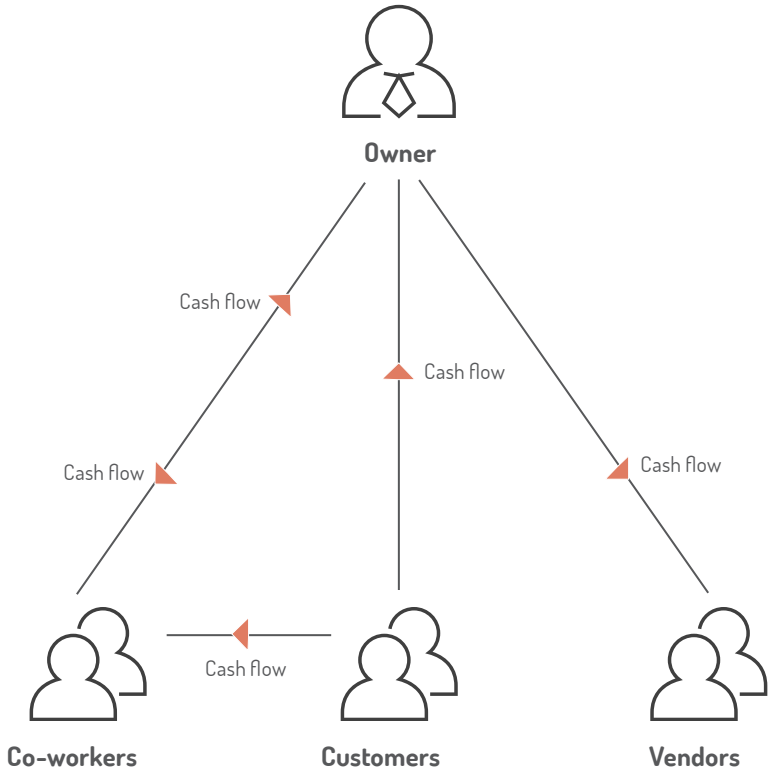


Figure 05 : Cash flow of small food stall

Existing Products

ft cash & ft cash merchant

The application is used for making payments to shops in IITs using debit and credit cards. The confirmation of the payment is instantly recieved on customer's application. Mutual handshaking is intitated before the payment. Once, owner accepts the amount, the payment is initiated. There is also an option of online wallet, where customers can add money. There are two applications, one for customer end and other for merchant.

Pros :

- Keeps record of all the all the cashless transactions. It is very useful for shop owners to keep track of online payments.
- Home screen of the application shows the accounts details of the shop owner. After every transactions amount is directly shown in his own personal account. App has built trust with the shop owners.

Cons :

- Offline transaction is missing on the application, and hence the usage has a dependency on the availability of data or wifi which is restrictive.

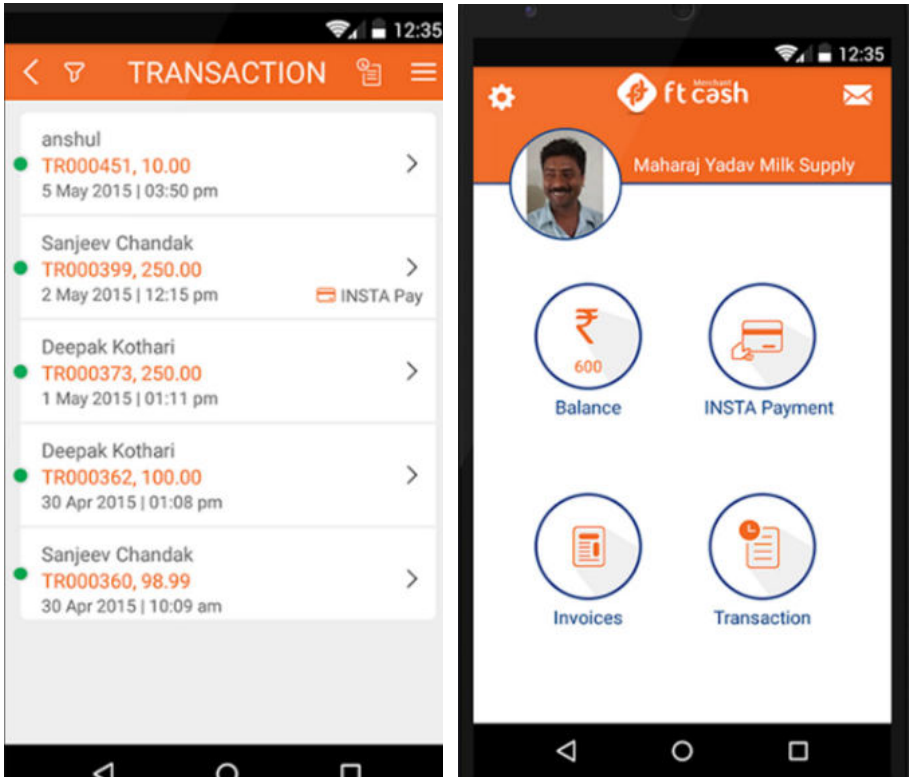


Figure 06 : Ft cash and Ft cash merchant

Zomato & Zomato for Business

Zomato is a restaurant search and discovery service provider, which helps users to locate new restaurants, order online, rate the restaurant and many more.

Zomato for Business is used by the shop owners whose shops are registered in zomato. It is an added feature for shop owners. One can simply register their restaurant online and not use the app.

Pros :

- Connects customer with the shop
- Tracking the online revenue of the restaurant, helps shop owners to take purposeful business decisions as per the feedback from customers.
- It connects the restaurant with home delivery service provider which in turn increases the scope and reach of thier business.

Cons :

- To get Zomato for Business shopowners have to register in zomato. There are more no of inputs required from the shopkeeper's side to maintain the application.
- There is an absence of user defined tags which will add other functionalities into the app.
- Zomato for Business keeps track of restaurant's online sale but there is nothing for keeping tracks of customers coming directly to the restaurant.

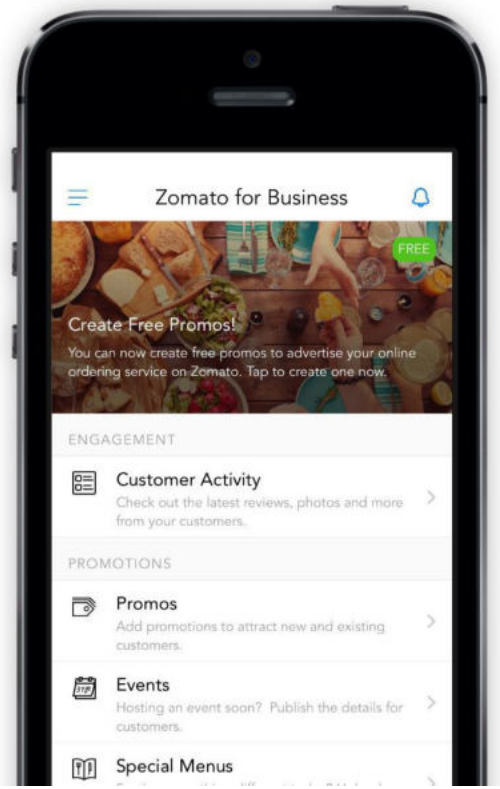


Figure 07 : Zomato for Business

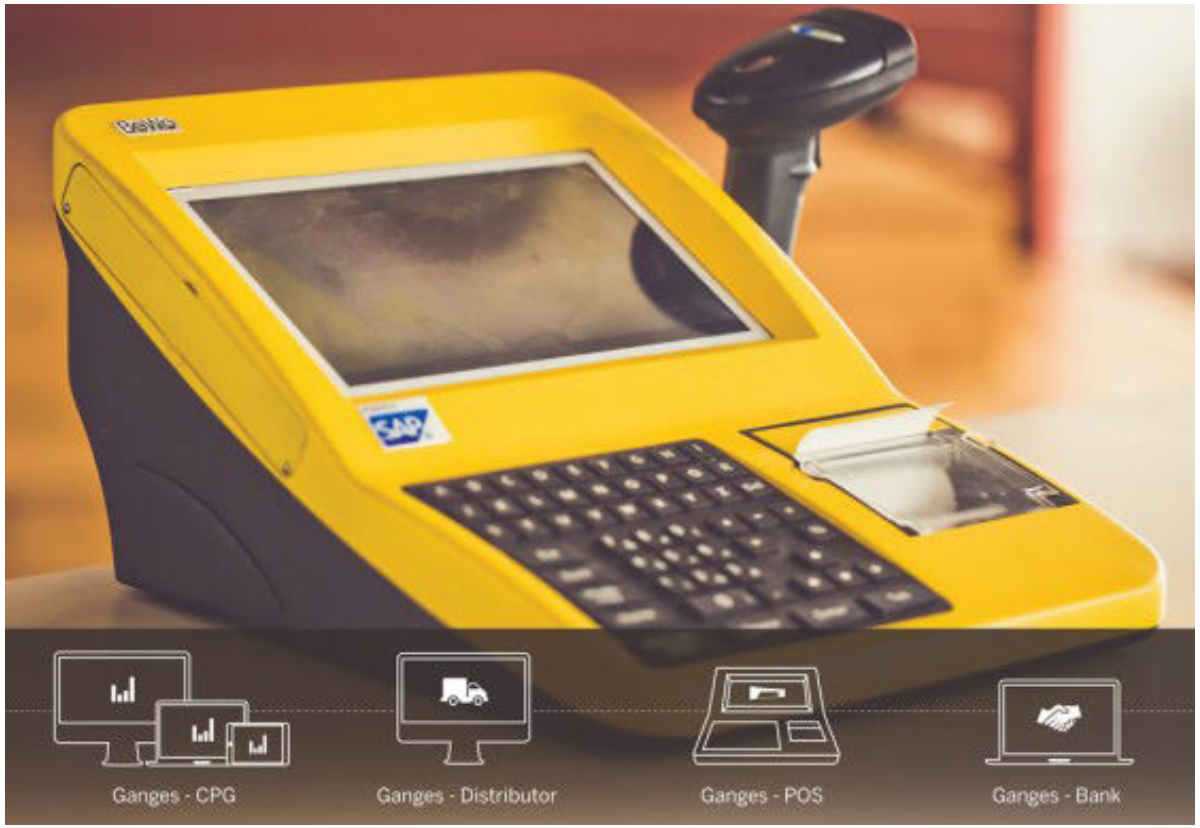


Figure 08 : Intuitive & easy to use retailer's PoS device

SAP Ganges- Retailer's PoS device

SAP Ganges started with helping the small retail store owners by providing them a solution to manage their inventory and distributors. It connects the consumer product companies directly with their distributors and retailers.[02]

Pros :

- Have created an ecosystem for retailers and have connected them with distributors and bank.
- Billing and inventory management allows the retailer to manage their daily tasks and enables a faster sales process starting from billing, printing bills, searching for items, managing customer contacts and inventory.

Cons :

- All this small retail shops have fixed customers who buy products on credit. SAP Ganges doesn't offer solution to maintain or manage this type of customers.

Figure 09 : Electronic Cash Register

Electronic Cash Register

This alternative is widely opted by the small setup hotels and eateries as it allows the shop owners to configure their products and its price with the set of numbers. The direct mapping of menu or product list adds usability for a small scale user.

Pros :

- This system requires the payment at the beginning of the transaction and hence allows owners to avoid credit based transactions.
- The tracking and keeping record of what is being sold is quick and easy which gives shop owner control over their business by providing data that helps to take better decisions on a daily basis.

Cons :

- There record of the data it provides is on a daily basis and no long term data is available which could give shop owner a better sense of transactions, investments and profit.

Figure 10 : Menson PoS device

Menson POS Device

This is a Restaurant Management Software System caters to any size of restaurants, from Quick Service to fine dining and restaurants chains by providing complete automation of restaurant management(01).

Pros :

- This system connects multiple outlets and counters and hence adds up more possibilities like coordinating between inventory and user needs, keeping record of multiple transactions at multiple counters.
- The dataset of the usage is visualized to find out patterns and helps in taking better decisions on a short term as well as on longer terms.
-It is facilitated with cash box and the cash transactions mapped and displayed live which gives better sense of control over the current status of the business.

Using Zomato for small food stalls

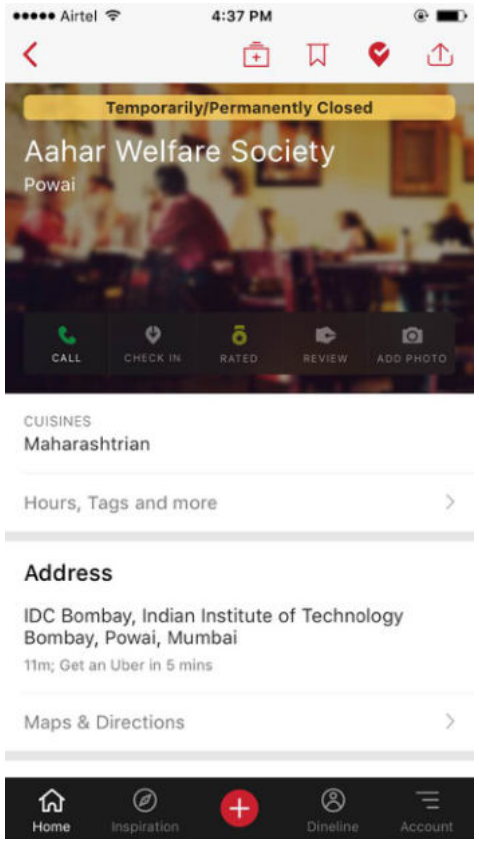


Fig. 11 : Profile of Ahar Welfare Society in Zomato

Experiment to understand how zomato works for small food stalls and how easy it will be for a stall owner to register in zomato.

Observations

01. User was overwhelmed by information because there was so many option infront of her.

02. She could only fill the name of the restaurant and phone number. She didn't understand anything else.

03. Primary language of the application was english which she couldn't understand.

04. For her, getting paid before the meal was important and she was looking for a feature where she could mention the same. But there was none to do that.

05. Drag and drop marker to locate her own restaurant was something new she was experiencing. She was confused with this option.

06. Till the time it was verified by zomato, it showed "Temporarily/ Permanently Close"

07. An employee of zomato called for confirmation after 30 days but as she was not able to explain about the shop, they deleted the page.

Design Brief

Primary objective of my solution is -

To optimize transactions with customers

Easy and fast ordering of food items, tracking of food items and money, to reduce the errors in calculation and maintain track of multiple orders.

Simplify accounting and credit management

To maintain and record credit accounts. Removing awkwardness between customers and owners.

Analysis & recommendations from the expenditures

To analyze food items sold and daily accounts.

Initial Ideas

I have started ideation process by tackling one or two problems at a time. Later, the solutions were merged together to develop a final solution.

To optimize transactions with customers

Mapping the prices of food items with visuals for fast billing

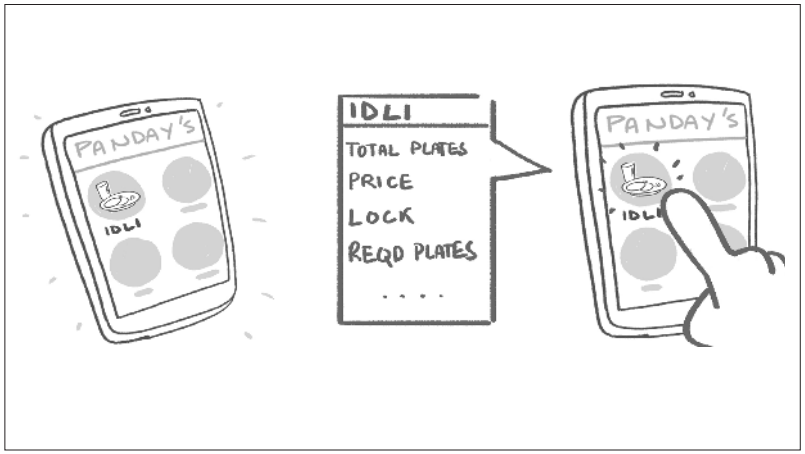
Shop owners are familiar with using a calculator. The idea is inspired from the usage of a calculator, which includes a visual calculator where the shop keeper will create bills using visuals of food items. This will reduce chances of error introduced while using a calculator.

Creating multiple bill cards

Shop owners will know the active customers who have ordered. Every customer will have his own bill card. Once the customer makes the payment, the card can be dismissed. These cards help in knowing the current orders made in the shop.

Managing customer by taking pre-orders

Peak hours rush is a major problem in managing orders. Customers can pre-order food items through phone and can get ready food by the time he/she reaches the stall.



Simplify accounting and credit management

'Automated messages are better at mitigating social awkwardness'

Small amount of money is stuck with customers in the form of credit . That small amount of money with various customers becomes a huge amount for shop owners. It becomes very awkward for shopkeeper to ask this small amount from regular customers and he wants to maintain a good relationship with his customers.

A text message mentioning the due amount can be sent to the debtor's mobile number. This will reduce the awkwardness of asking credit and also the debtor won't feel offended as the message is system generated and the owner is not asking him personally.

Chat bot for automated bill sending

A chat bot of the shop will push bills to customer's WhatsApp or Facebook messenger number. Customer can see all the bills of the orders he has made. Customer can anytime have a quick overview of all transactions. Each message will also show the cumulative credit customer has to pay.

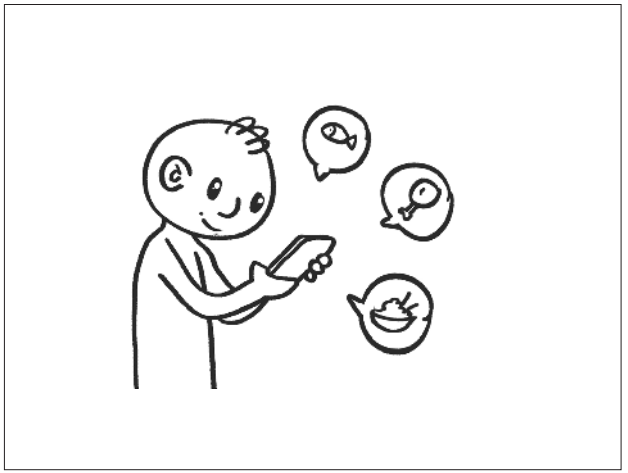
Analysis & recommendations from the expenditures

Business decision based on day wise consumption

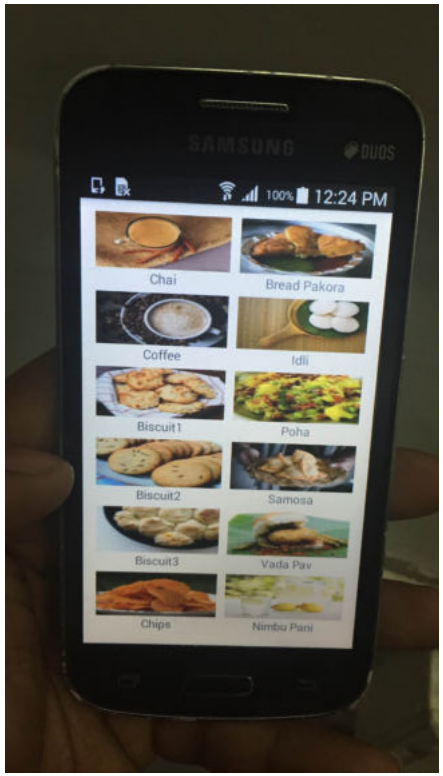
Based on the daily sales, if shop owner could track his food items, he will have a better estimate of his inventory. Knowing the sales data helps in managing inventory. This would help him in knowing which items will be going out of stock in some time, so that they can place the order of the same accordingly.

Closure of business for the day

Through the solution, shop owners can have an overview of their daily sales. Also, they can know the amount which is stuck in credits and with whom. They will also know the upcoming amount they have to pay to the vendors. By all this information, they can manage their accounts better at the end of the day.



Usability test of the Prototype



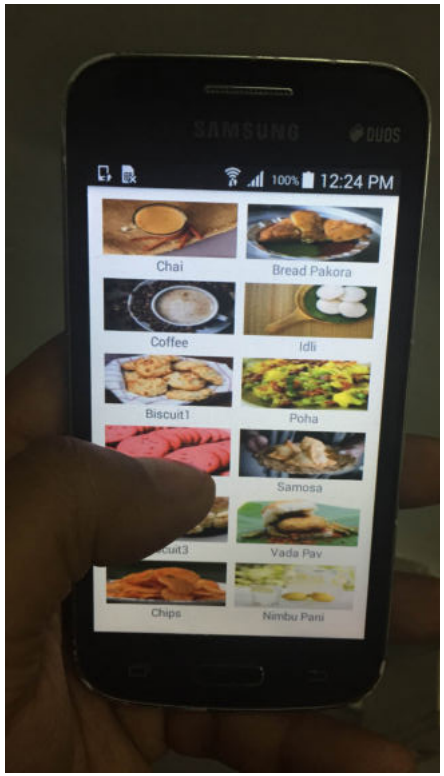


Figure 12 : Prototype 1

The aim of the experiment was to test whether shop owners are comfortable with using a phone for billing and taking orders.

Insights:

- They need some form of feedback from the application for assurance.
- They need to be able to see the prices of the items.
- There was a behavioral change observed in the customers and they started paying before receiving the food items.

Final Concept

The final concept was developed with an effort to include as many as possible advantages of the discussed ideas.

The final concept was focused on creating a easy and intuitive billing for shop owners. Each of the billing card with amount can be easily added to debtor's account. Debtor will be notified with the message. Every transaction will be recorded on the application. User can see the summary of the day easily. It shows money made by each food items, money in credit and amount of money should be with the owner.

Business decision based on day wise consumption
Analysis of food items sold in cash and credit
Analysis of daily accounts in terms of paid and unpaid transactions
Most and least sold food items of the day, week, month and year.

Automated messages are better at mitigating social awkwardness
Tracking of credit amount
Maintain credit accounts of customers
Notifying customers about their dues

Mapping the prices of food items with visuals for fast billing
Custom menu
Easy and fast ordering
Reduce the errors of the calculations

Features

Munshee, is a smart billing application which helps small food stall owners to run their business. Munshee has three key functions

Smart Billing

Morphing complex calculations done by calculator by easy to understand food menu

To maintain debtors

To update debtor's account, whenever he/she takes credit. After certain point of time, to notify debtor about his/her dues

To analyze every day sales

The phone application continuously retrieves the data from database to inform the user about
-Total sale of food items
-Inventory status of food items
-Sale of the shop
-Everyday credit account details

Own menu creation

Easy menu for users. User can select the items from the given list and create their own menu. User can edit the menu whenever there are any changes

Simplifying calculation

User don't need to use a calculator to calculate bills of the customer. App will calculate the amount itself.

Editable Bills

Every bill card be edited. User can add and remove items any time before the payment is done. As there are multiple orders from the group of people it is a useful feature of the application to keep track of food items

Sharable invoices

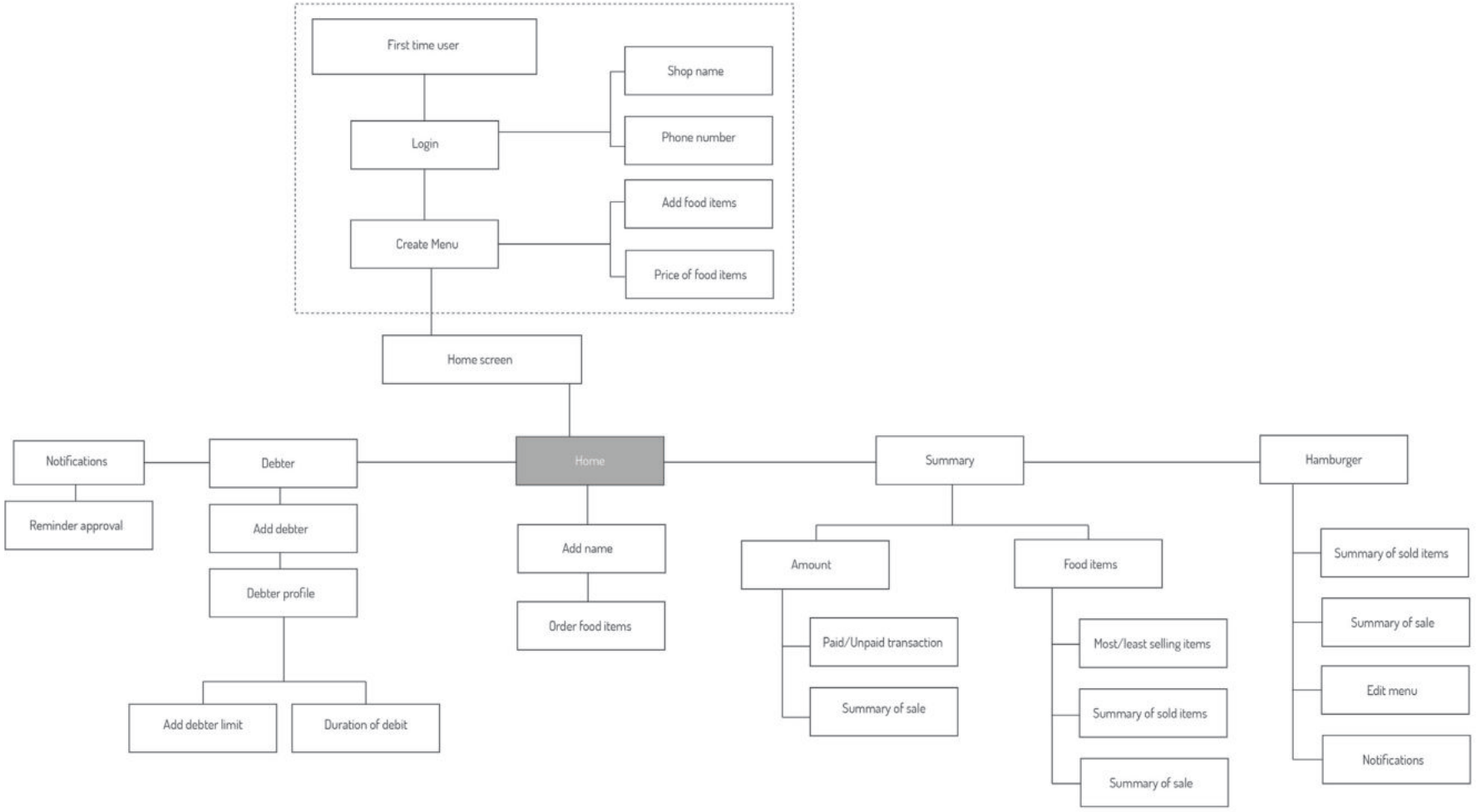
Invoices can be shared with customers at any point of time. Any change in the records is visible to all the concerned people

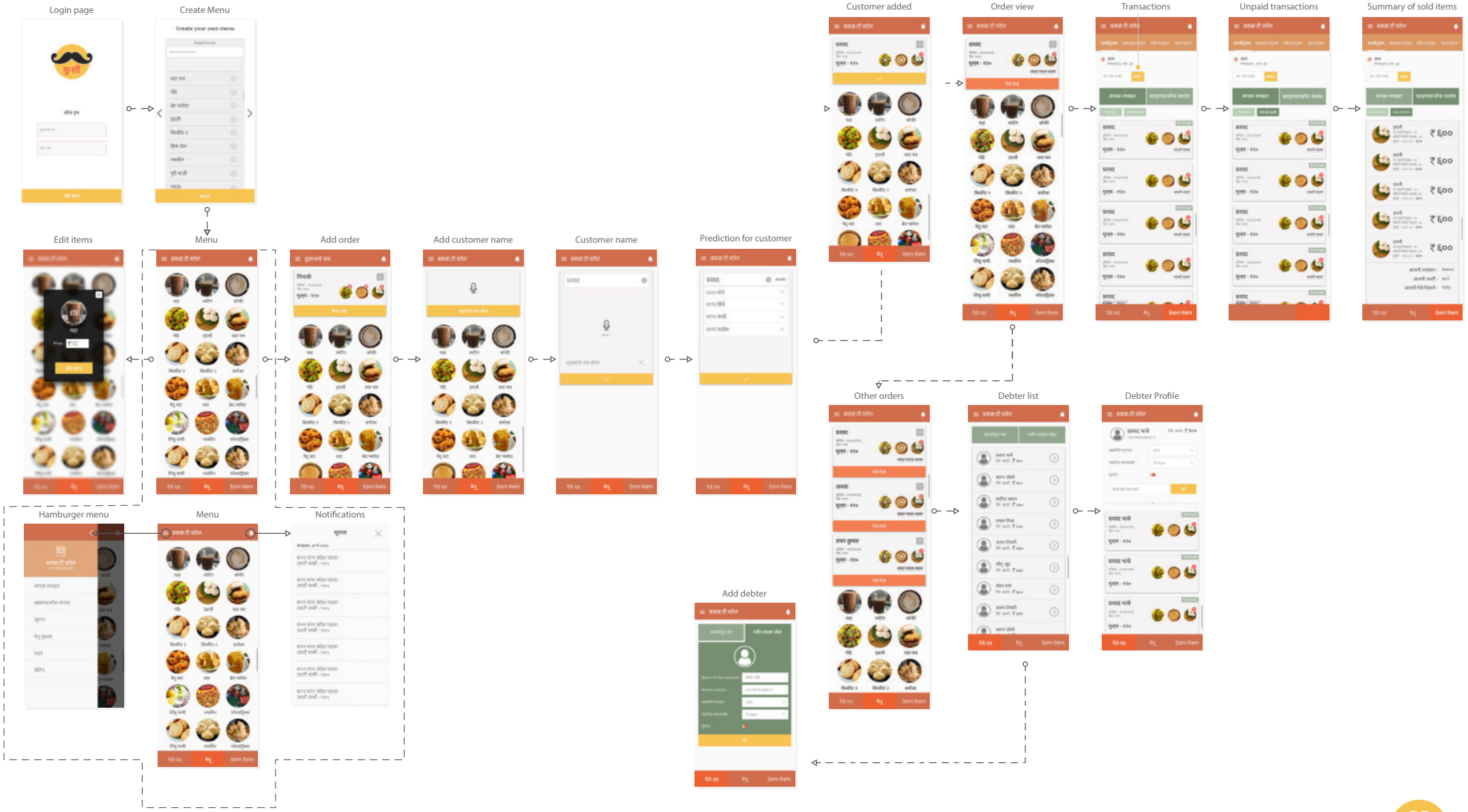
Setting limits for debtor

User can set limit for debtor, in terms of time and amount. When the limit is reached, an automated system generated message would be sent to the debtor.


प्रसन्ना टी स्टॉल
संपर्कातून घ्या
नवीन ग्राहक जोडा
Name of the customer :
प्रसाद भावे
Phone number :
+91-9954286673
उधारीची मर्यादा :
200
उधारीचा कालावधी :
15 days
सूचना :
पूर्ण
पैसे घ्या
मेनू
देवाण घेवाण
इडली
दर पूर्ण पदार्थ - २०
वकिले गेलेले पदार्थ- ३०
मूल्य - २० X ३० = ६००
₹ ६००
आजची उलाढाल - १०००
आजची उधारी - ७८२
आजची पैसे मिळाले - ९२१८
चहा
कटिंग
कॉफी
पोहे
इडली
वडा पाव
बिस्कीट १
बिस्कीट २
समोसा
मेदु वडा
वडा
ब्रेड पकोडा
प्रसाद
दनिक - २२/४/२०१६
वेळ -९:४५
मूल्य - १२०
खाद्य पदार्थ वाढवा
सरला
तपन कुमार
सरला कुमारी
₹ १२०
उधारीच्या यादीत जोडा
En
Done

Information Architecture





App flow 'Munshi'

Solution Scenarios

Scenario 01 : Raghu runs a small food stall in hiranandani. He uses munshee application to manage his shop and he wants to add pav in his menu and want to put his self clicked image of tea in menu.

Figure 13: Raghu went to the edit menu and lands to the create your menu screen

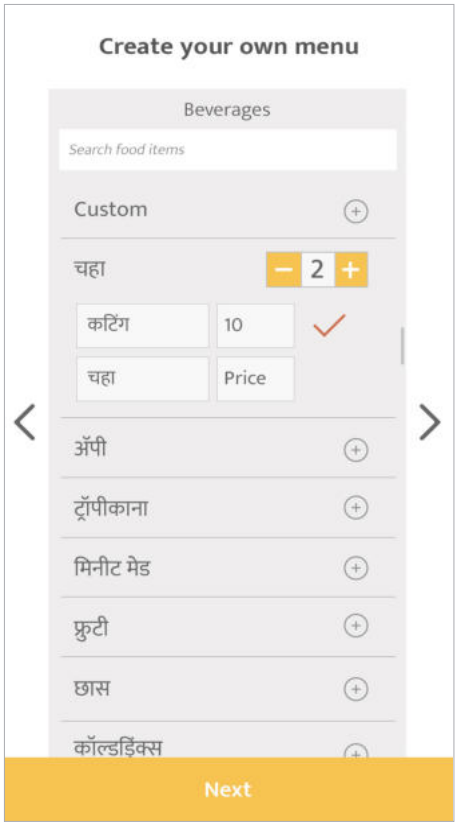


Figure 14: He swipes to the beverages category

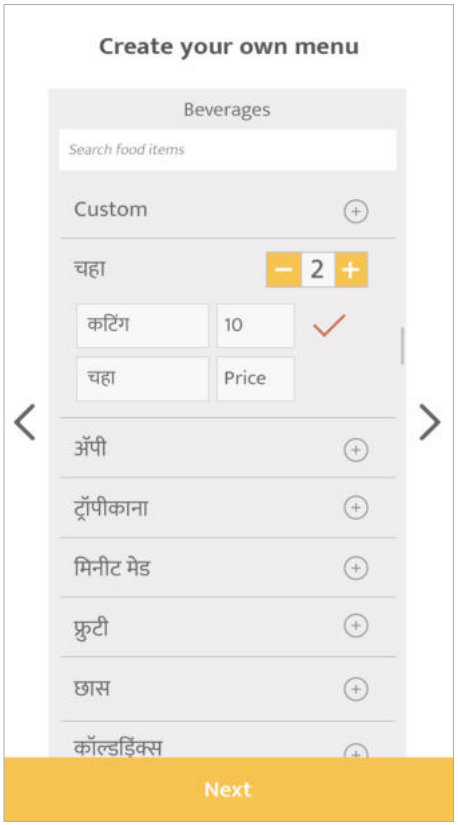


Figure 15: He searches for cutting in the menu but is not able to find it. He adds one more item under tea and adds the item cutting and price of the cutting.

Figure 16: Raghu lands to the home screen and long press on the tea icon on the home screen

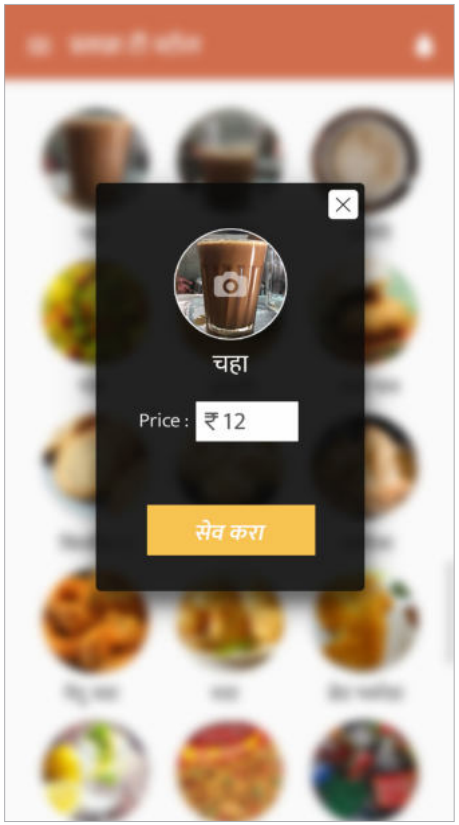


Figure 17: Pop up screen for chai opens up and he clicks on the camera icon and it opens the camera and he clicks the chai and saves it.

Scenario 02 : One of the customer(prasad) in raghu's shop want to add more items in the previous bill which he has not paid the money for.

Figure 18: Raghu searches for the card of prasad

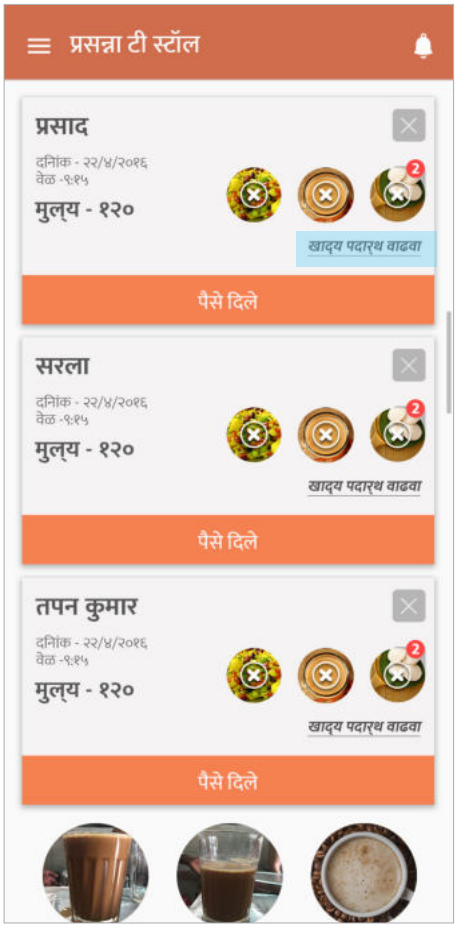


Figure 19: Raghu taps tap on the add more items button

Figure 20: The menu slides up in the screen. Now raghu can make whatever changes he wants in that particular bill according to the prasad's requirement

Scenario 03 : Raghu wants to check the unpaid bills of 13th April

Figure 21: Raghu clicks on the summary button and it will take him to the summary page. It will show the transactions he made on that day.

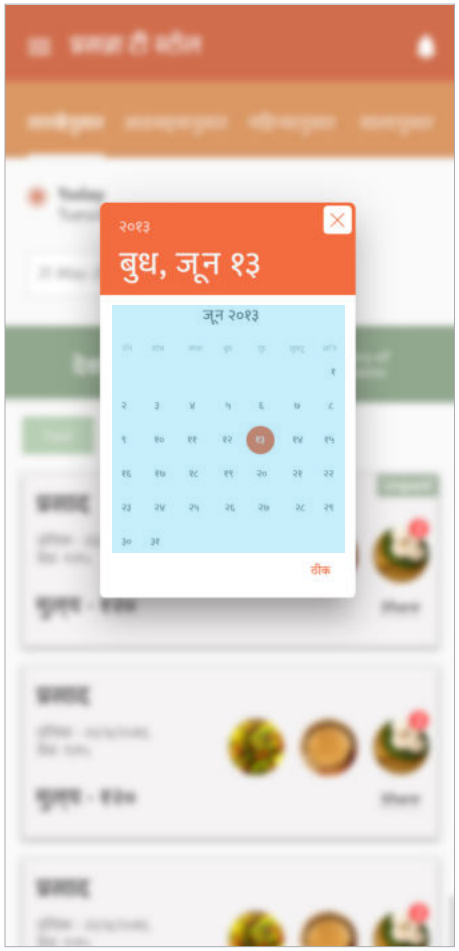


Figure 22: He taps on the calendar and selects the date and lands on the summary of that day screen.

Figure 23: He can see the the paid and unpaid transactions of 13th April. He taps on the unpaid transaction and checks the unpaid bills of that day.

Scenario 05 : One of the customer(sarla) who has a credit account in Raghu's shop is short of 100 rupees and she wants to pay 20 ruppees now and rest in the credit account.

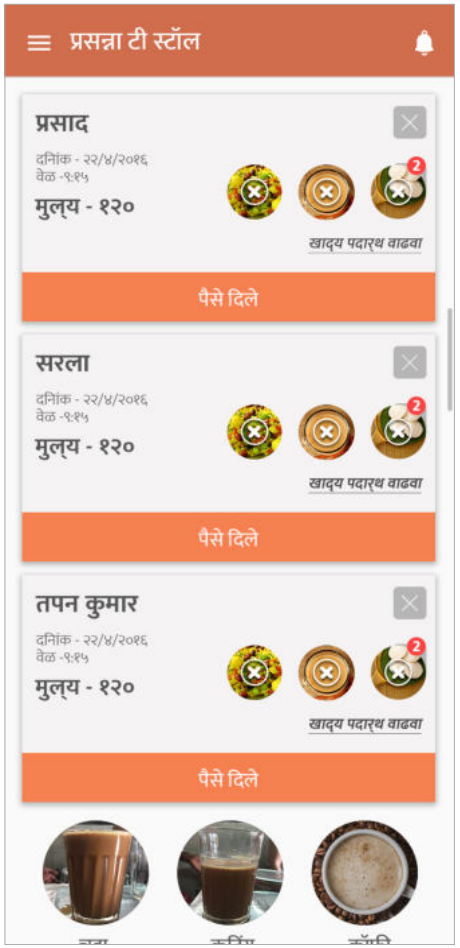


Figure 24: Raghu searches for sarla's bill and swipe left to add the customer's bill in debtor's list.

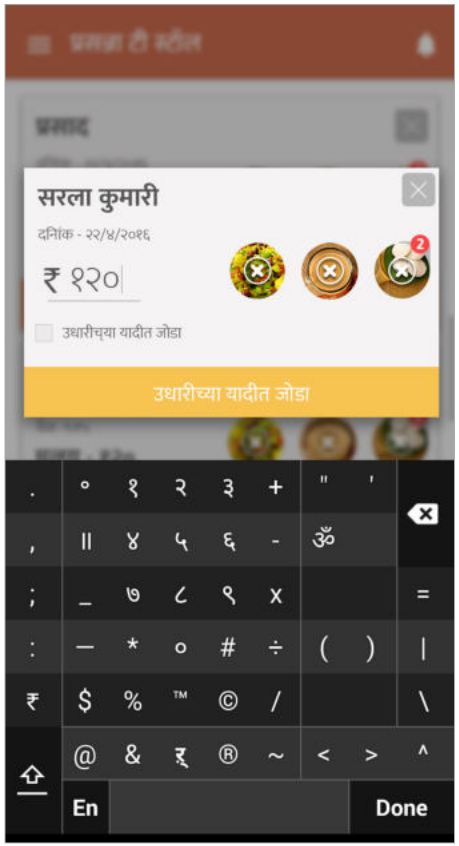


Figure 25: App ask for the confirmation of the bill and he changes the amount of credit to 100 rupees and adds it to debter list.

Scenario 06 : Prasad is one of the regular customer and he has received the message about the dues he has in raghu's shop. So prasad came to clear his dues.

Figure 26: Raghu taps on the debtor's button and lands to the debtor list which shows the list by according to the highest credit taken by the customers. He searches for prasad on the list.

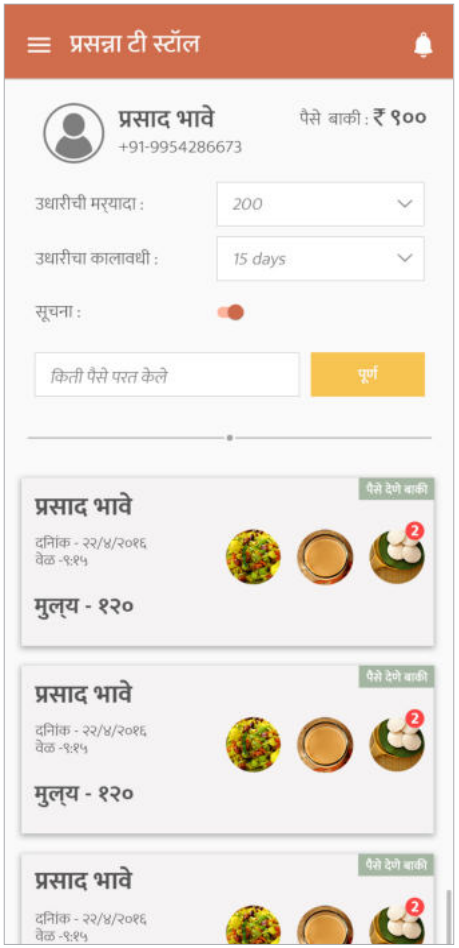


Figure 27: He taps on the profile of the prasad, adds the amount customer wants to clear.

Figure 28: Raghu taps on the summary button and opens the summary screen. At the end of the page he will get the summary of sales of that day.

Figure 29: He taps on food summary and checks the no. of frooti's he has sold.

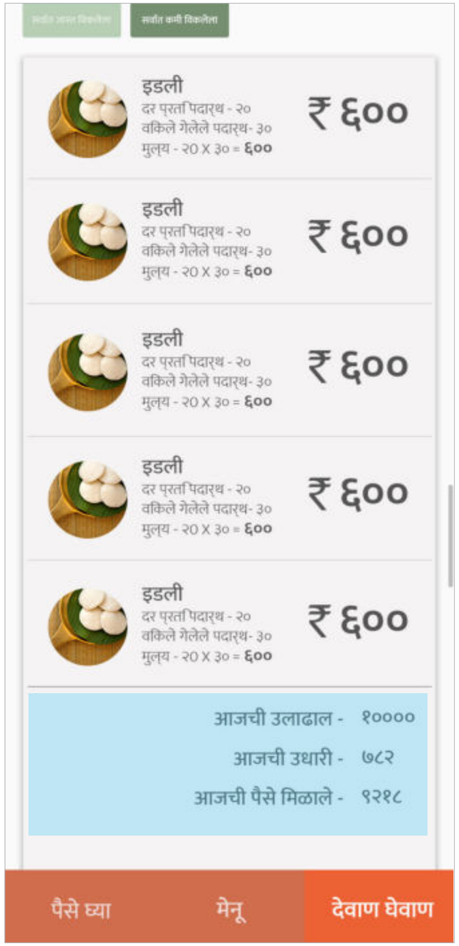


Figure 30: At the end of both the food items and transaction summary he checks total sale of the shop, credits he has given and the amount of money that should be in the cash box.

Scenario 04 : End of the day raghu wants to see the overall transactions and credits. He also wants to check how many frooti's are sold so that he can plan his next order.

Evaluation 1

Key Question

Will message as reminder work for customers ?

Method

10 randomly selected individuals who had taken credit from the shop were sent a message consecutively for two days reminding them about the credit amount. The message was posed as a system generated message.

Findings

- Out of the 10 individuals, 8 visited the shop to inquire about their credits. 4 of them paid the balance amount.

- 4 of them paid the balance amount. The rest of the customers asked for a few more days to pay the amount.

- Customers should not be reminded everyday about their credits.

- Shop owners should have control over sending reminders to customers

- Each time customers takes credit from the shop then the bill card should be shared with customers

- All the bill cards should be shared with customers with the reminder message.

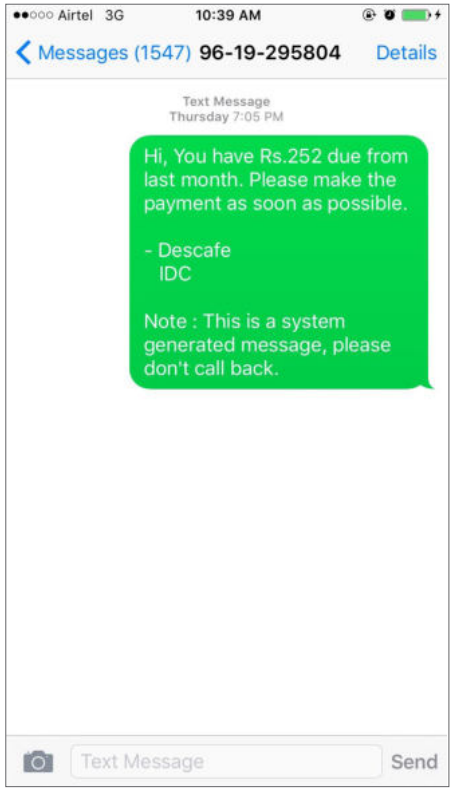


Figure 31: Screen shot of text message

Evaluation 2

Key Questions

- Will the application increase the productivity of shops ?
- Do people adopt it ?
- How does it helps ?
- Why and when do they not use it ?

Method

Evaluation was conducted in 5 shops and done with the prototype of the final solution. The goal of the evaluation was to find any issues related to the usability of the prototype and determine it the proposed solution can help in

- Planning their next day orders, with the help of their daily sales data
- Management of credit accounts

The users were explained and taught about the application in details for 3 days and later were asked to use the application. Some of the most crucial features that were explained to them before they could start using the application are as follows :

Adding a new customer : Once the shop owner taps on any food item on the menu, a bill card appears asking for the name of the customer, which later appears on the header of the bill card. The shop owner can choose not to enter the name of the customer, and directly proceed to adding more items to the bill card from the menu. If no name is entered in the bill card, it is identified by the sequential order number that appears on the header later, which appears as the header.

Why should the shop owner choose to name the bill card? : Whenever name of the customer is defined on the bill card while ordering, a record of the relevant customer's purchase is also created in the credit section. This makes it easier for the shop owner to keep track of the credit amount withheld by the

customer on a particular or multiple occasions, if applicable.

Editing individual order : To make an existing bill card active and editable, the shop owner needs to tap on the bill card. This will lead the user to customer screen which contains bill card of the customer and the menu. Tapping on any item on the menu below the customer's bill card will add the item to the card. Similarly, tapping on the cross adjacent to the item already added to the bill card will remove the item from the bill card. Once the order is finalised, tapping on the back button will take the user back to the home page which contains bill cards of various customers and the full menu below it.

Creating multiple bill cards : On home page, all the bill cards are displayed but are inactive. Hence, any tap on the items from the menu on home page, will create a new customer bill card. Once the new bill card is finalized, the user can come back to the home screen and tap on any item on the menu to create a new bill card.

Calculating total sale of the day : Tapping on the right option on footer of the home screen (पैसे घ्या) will take the user to 'transaction' screen, which displays all items sold on that particular day, with respective amounts of their total sale. At the end, the sum total of sale of all items collectively is displayed, which doesn't take the amount on credit into consideration. The total amount of cash received displayed below the list, should match the cash in the cash box of the shop owner.

Tracking least popular items : There are various ways to sort items in the 'summary of food items' list. However, default sorting style displays the least sold items first, so that it's easier for the shop owner make a mental note of the unpopular items in the store.

Tracking credit : Tapping on the left option on footer of the home screen (देवाण घेवाण) will take the user to 'total credit' page, which displays names of customers who owe money and their respective pending amounts, and the sum total of all credit amount below the list. As and when the customers clear off total or portions of their credit amount, their respective credit bill cards can be edited and cleared off from the list by clicking on the credit bill cards.

Later users were asked to use the application for 10 days and record their likes-dislikes, feasibility, benefits and shortcomings of the application.

End of the day, users were asked to do a number of tasks. Participant were observed while conducting the test and later end of the day users were asked to answer the following questions -

1. What is the total sale of the day ?
2. What is the credit ?
3. How they are going to use this information?

Deployment

The application was deployed in 5 shops.

Usage

Out of 5 users, 4 used and 2 didn't use. Users take time to adapt the application, The application is not appropriate for users who have never used a smart phone.

Name of the shop	No. of co-workers	No. of food items	Daily orders	Deployed for	Smart phone/ Feature phone
Prasana Tea Stall	4	27	> 200	10 days	Smart phone user
Juice Centre	2	10	< 250	10 days	Smart phone user
Amul Cafe	4	43	< 200	10 days	Smart phone user
Udupi Restaurant	3	11	< 200	10 days	Feature phone user
Javed Caterers	4	8	< 180	8 days	Smart phone user

Figure 32: List of shops where the application was deployed

Findings

- It is awkward for shop owners to ask names of female customers. So they don't keep record for them
- They use their own way to remember a person's identity (using own prefixes like IDC, OFFICE, Chemical Department)
- Keen on seeing a prediction of customer's name.
- Permanent receipt for most sold item, giving the users an option of adding favorites in menu. Most of the owners are aware of the most popular food item of the shop.
- On seeing the shop owners' using a digital system, there was a behavioral change in customers. Many started paying before the order / item was received. As the customers were paying before receiving the food item so shop owners were not interested in keeping the record of the names. If someone is paying money before eating then adding the name is not important.
- Keeping records of credits is more important for shop owners.
- They use english input to type marathi or hindi words.
- Young shop owners use the application more than older people.
- 'Shop owner - Order phone mein ayega?' Shop keepers who are aware of online food service and they expect the application to be same.
- As they have alot of spelling mistakes while taking customers' name, they end up creating two profiles of same customer.
- During rush hours one of the shop owner keeps adding to the single bill(Figure 33).
- Getting more customer is the primary objective for the shop owners.
- Deleting items from the bill card was misleading and they were not able to

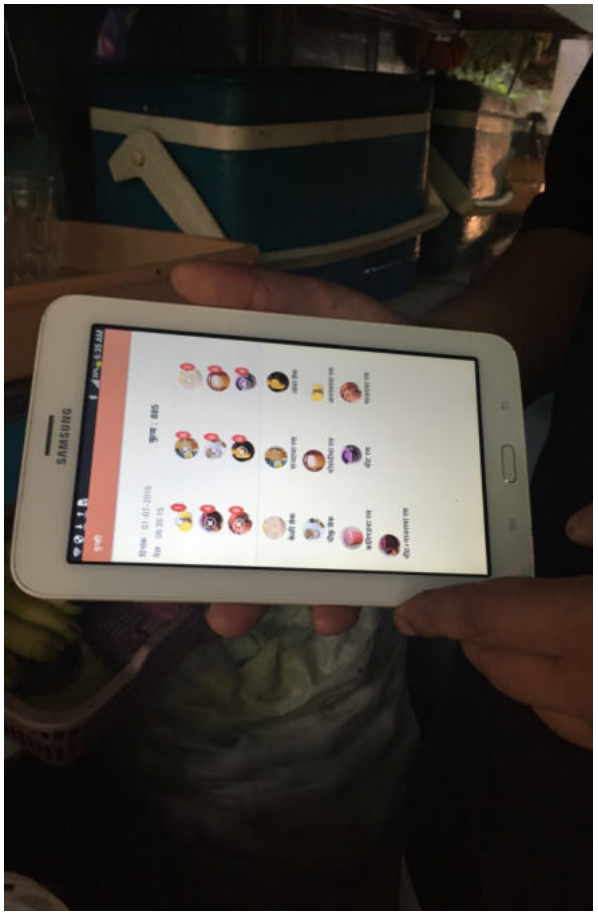


Figure 33

understand which food item they were deleting.

- Except food items they also sell dog food, cigarettes,etc which doesn't comes under food items or beverages

Problems

- In rush the application is not efficient. Shop owners add all the items in one card rather than adding it to the different cards (Figure 33).
- Syncing of two or more phones. As the owners leaves the shop at any point of time and co-worker takes care of the shop. So there should be two phones through which the account of the shop can be maintained.
- Mathematical operation on the final amount of the day. Shop owners have further calculations with the amount regarding the next payment to different vendors.
- Vendor credits and payments should also be a part of the application. A lot of times there is a difference in tally in the money in the cash box and total sale of the shop. This is because shop owners pay the money to different vendors from their daily sale.

Figure 34 : After using the application, one of the stall had put this sign-age before the counter

NUMBER OF DAY	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
CASH SALE IN APP	1594	9316	6753	4619	8205	8303	2667	2802	1509	2305
CREDIT IN SALE APP	54	659	758	136	397	285	78	0	0	0
TOTAL SALE IN CASHBOX	7843	10240	7190	6279	8940	8720	8780	8472	7420	8846
PAID TO VENDOR	4190	4000	4300	4200	4200	4000	4580	4190	4720	4300
DIFFERENCE OF SALE IN APP AND AMOUNT IN CASH BOX	6195	265	321	1524	338	132	6035	5670	5911	6541
% CASH SALE IN APP OF TOTAL CASH SALE	20	90	93	51	91	95	30	33	20	26

Figure 35: Overall sales details of Prasana tea stall

The Prasana tea stall is a shop that operates in IDC from morning to evening. There is disparity between the tally in the cash box and what was seen in the application. The shopkeepers were under supervision during Day 2, Day 5 and Day 6 and hence there is a low level of disparity observed. However, there is declining trend seen in the usage of the app.

NUMBER OF DAY	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
TOTAL SALE IN APP	180	10780	5110	6710	7445	4540	5345	8610	5110	5860
CREDIT IN APP	25	1860	330	70	140	340	0	3510	2255	2915
AMOUNT IN CASH BOX	6840	13430	7880	8290	10270	9035	8670	12470	8010	9040
PAID TO VENDOR	5140	470	400	600	5400	430	400	5000	480	540
DIFFERENCE OF SALE IN APP AND AMOUNT IN CASH BOX	6635	790	2440	1510	2685	4155	3325	350	645	265
% CASH SALE IN APP OF TOTAL CASH SALE	2	80	64	80	72	50	61	69	63	64

Figure 37: Overall sales details of Juice Centre

Juice Centre is one of the shop in Powai market. The owner was skeptical about using the app when introduced to the application for the first time. The shopkeepers were under a full day supervision during Day 2 and hence there is a low level of disparity observed. However, one can see an upward trend in the app usage after the supervision.

DATE	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
TOTAL SALE IN APP	350	0	1270	3480	0	8303	6360	1920		
CREDIT IN APP	0	0	0	200	0	285	78	0		
AMOUNT IN CASH BOX	5000 (approx)	5000 (approx)	15280	13800	7100	11070	13340	6000 (approx)		
PAID TO VENDOR	0	0	9000	9000	9000	9000	9000	9000		
DIFFERENCE OF SALE IN APP AND AMOUNT IN CASH BOX	4650	5000	1270	10120	7100	2588	6902	4080		
% CASH SALE IN APP OF TOTAL CASH SALE	7	0	8	25	0	75	47	32		

Figure 39: Overall sales details of Biryani Centre

The Biryani centre is a roadside shop that operates in the afternoon and evenings. The Figure 39 indicates the disparity between tally in cash box and what was seen in the application. However, there is no trend observed in the usage of the application.

Here we can see clear correlation between the usage of app and age group of the users. The father-son duo that runs the business were miles apart on their interest in the app. The father, who is not used to technology, found the app architecture too complex and failed to follow consecutive steps further into the app. Hence, he thought of it as additional work and not assistance and didn't use the app at all (which is indicated in the table in '0's).

DATE	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
TOTAL SALE IN APP	180	10780	5110	6710	7445	4540	5345	8610	5110	5860
CREDIT IN APP	25	1860	330	70	140	340	0	3510	2255	2915
AMOUNT IN CASH BOX	6840	13458	8276	7241	8010	5224	5670	12280	7554	8802
PAID TO VENDOR	5670	500	5300	600	5000	490	4860	700	5000	560
DIFFERENCE OF SALE IN APP AND AMOUNT IN CASH BOX	6635	818	2836	461	425	344	325	160	189	27
% CASH SALE IN APP OF TOTAL CASH SALE	2	80	61	92	92	86	94	70	67	66

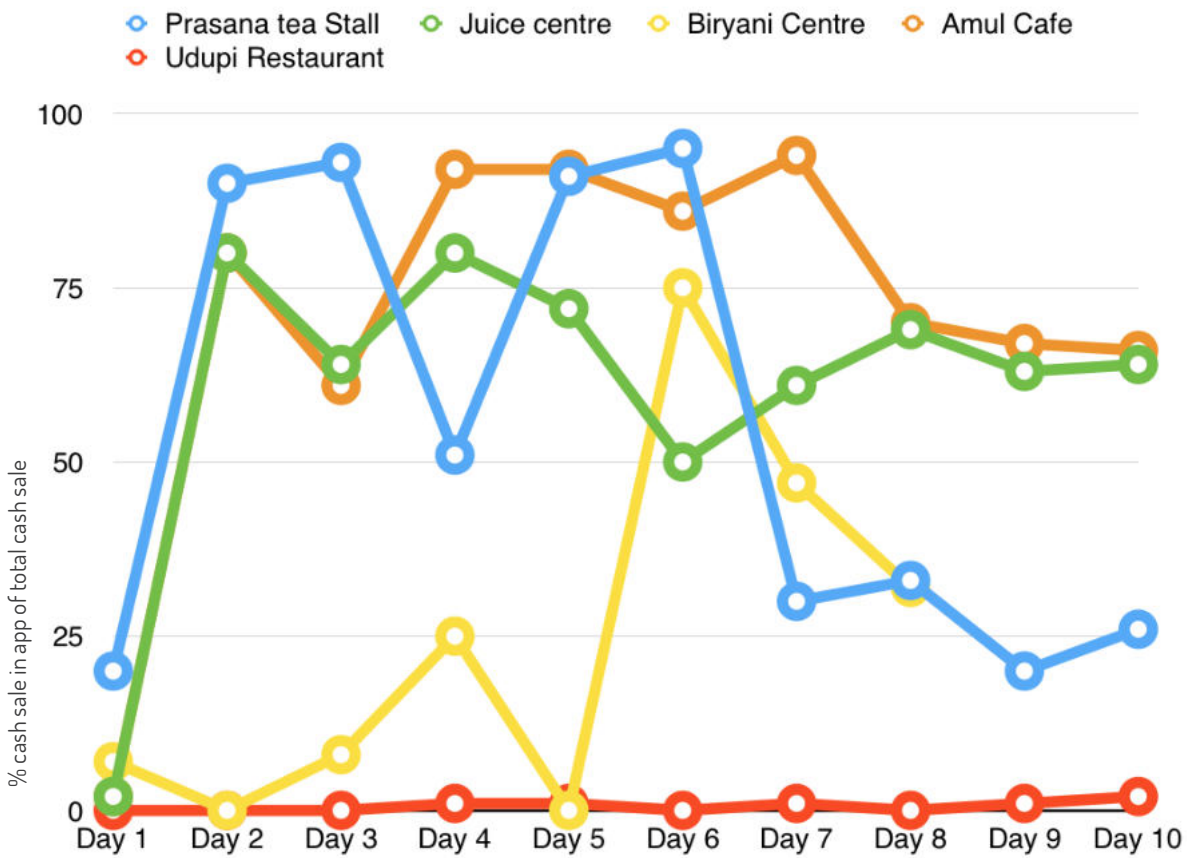
Figure 41: Overall sales details of Amul Cafe

The Amul Cafe which is a slightly formal establishment was open to using the application readily after the first day. The shopkeepers were under a full day supervision during Day 2 and hence there is a low level of disparity observed (One can see an initial upward trend in the app usage after the supervision). However, the usage gradually declines as the owner gets acquainted with the scope of app's utility. He had been using another app for small businesses earlier (Namely, FT Cash, which provides fast cashless services to small businesses). His idea on a useful app for his business extends to cashless transactions and online payments, beyond the managerial services that 'Munshee' already offers. He found the app limited in it's utility. Hence, the usage is accordingly seen to diminish towards the end despite them successfully using it to it's full potential.

DATE	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
TOTAL SALE IN APP	0	0	0	60	132	0	78	0	88	118
CREDIT IN APP	0	0	0	0	0	0	0	0	0	0
AMOUNT IN CASH BOX	7800	6940	4794	5060	6830	4882	5682	6000	5978	4823
PAID TO VENDOR	0	5300	5000	3560	5000	3700	3400	3000	4300	3260
DIFFERENCE OF SALE IN APP AND AMOUNT IN CASH BOX	7800	6940	4794	5000	6698	4882	5604	6000	5890	4705
% CASH SALE IN APP OF TOTAL CASH SALE	0	0	0	1	1	0	1	0	1	2

Figure 43: Overall sales details of Udupi Restaurant

The Udupi Restaurant which already had a similar system in place was reluctant to use the app. The app was used scarcely only when asked to.



Results

1.Utility - It was observed that the trend in usage of "Munshee" statistically resembles a quadratic Bezier curve. There is an upward trend in the beginning of usage of the app after a day or two of supervision. However, the usage eventually declines.

a. The app, after being used to it's full potential, was considered limited in it's utility by the shop keepers. The primary objective for most shop owners, which is to get more customers, was not catered to in the app. Some shop owners suggested additional services like, cashless payments, online/mobile order placement etc. to help attract new customers to their business, for the app to be truly useful.

b. The application helped shop owners to keep track of their customers' credits. To begin with, the app brought to their notice, large sums on credit that are never paid back, which they

found to be very useful. However, considering the fact that credit tracing is not the focus of the app, their interest in the app eventually declines nonetheless.

2. Nature of existing managerial methods in small businesses and their response to the app :

a. Highly formalised shops which already had similar systems in place were reluctant to use the app even for a while.

b. Small shops with a slightly formal establishment like the Amul Cafe and the Prasana Tea stall showed a better interest in using the application.

c. Informal establishments like Biryani centre that do not have strictly sequential methods of making sales focused more on dealing with the magnitude of customers hands-on instead of using the app to manage and trace the sales. Keeping a track of daily sales was found to not be a priority to them.

3. The "Total sale" section which had crucial information on daily sales was not used to it's full potential by the shop keepers. An important feature in sorting of products (sold on that particular day), that indicated products that aren't much in demand, by listing them higher in the sequence, was meant to help them plan their wholesale purchases better. However, just sorting didn't ensure the visibility of lack in their demand, since there were no visual cues associated with such a conclusion. Better UI decisions (through colour or elemental coding of products less in demand in comparison to others in the market) could have lead to a more apparent visualisation of the summary they were intended to arrive upon through the app. In conclusion, the app's sorting feature failed at ensuring effective planning on shop keepers' parts and hence needs further work.

Final Design after Evaluation

1. While testing the prototype it was found out that all food stalls might have some of their own regional specific dishes or other special items which are unique to them. For instance, some shops also sell other items which can't be categorised under food items and beverages, like dog food, cigarettes, etc.

   After this insight, customisation option is added in the menu. Apart for the generic items available, the user now has the option to add items which aren't listed by default. Tapping the custom button, opens a new slot for a new food item and it's price, value for both of which can be entered in the slots. By tapping on "+" sign, multiple new items & their respective prices can also be added accordingly. These items then appear on the final menu on home page along with other preselected food items from the list.

2. The final chosen method of input was text and not voice, as shopkeepers found it awkward to say the customer's name out loud during order placement. Also, the generic environment around such shops is mostly noisy which made voice input, unfeasible and tedious. Resultantly, the shop keepers, when provided with the only option of voice input, stopped using the app entirely. The technology behind voice input itself has not evolved enough for it to be a reliable method of input. Hence, it was eventually replaced by type in input.

3. Creating a bill card earlier required the shop keepers to necessarily define a name for the card. This, however, was found to be totally undesirable as remembering the name of a customer was desired only when the customer with-held payment on credit. Hence, the option of having to enter a name for the bill card was removed entirely and the bill cards were chosen to be marked by number. Only, in case of a bill card being swiped left (considered a credit transaction) the app prompts the owner to define a name for the bill card so that the debtor can be traced later for payment.

4. The notification feature that entails reminding the shop keeper about pending credit amounts and their respective debtor after a chosen time duration, would earlier sent a reminder to the debtor automatically. However, it was later found that shop keepers were selective about who to send the

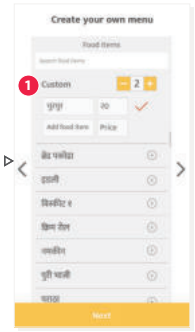
reminder to, as in some cases, the debtor would be a trusted customer who had already assured payment at a later point. Hence, automatic mode on the notification feature was later taken off and the reminder was only sent if the shop keeper would approve of it.

5 Two of the most crucial editable slots in the 'Add debtor' screen are : (i) Amount on credit : Based on the shops studied and the amount shop keepers were willing to lend their customers, the allowable amount on credit has an upper limit of 300 and lower limit of 50. (ii) Time duration at which the notifications are sent to debtors : It was found that shop keepers need to pay their vendors/suppliers weekly. Accordingly, the checkpoints at which debtors were sent approved notifications by the vendors were at 7 days, 14 days and 21 days; 21 being the farthest the shop keepers can stretch the time limit for payment.

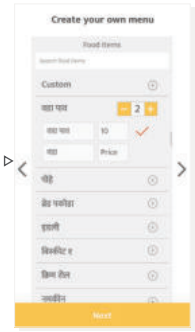
Login page

Create Menu

Add product & value



Add product & value

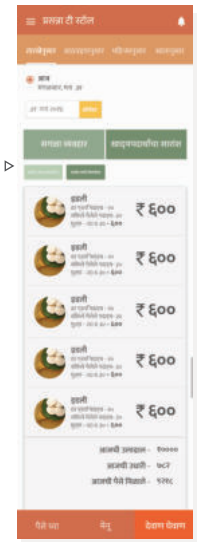


Add product & value

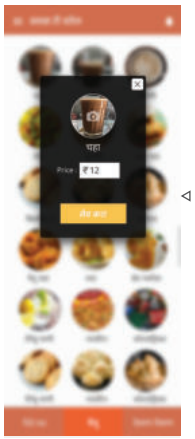
Order view

Produ Transactions on for Food Stall Unpaid transactions 146330012

Summary of sold items



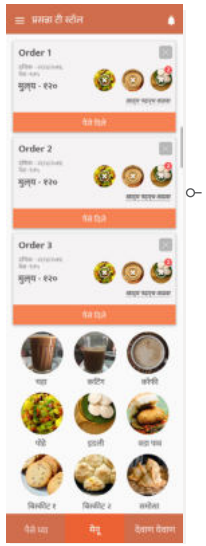
Edit items



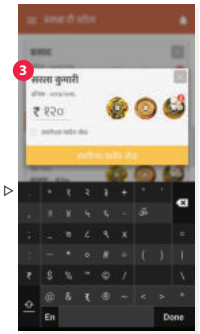
Menu

Add customer name and order

Multiple orders

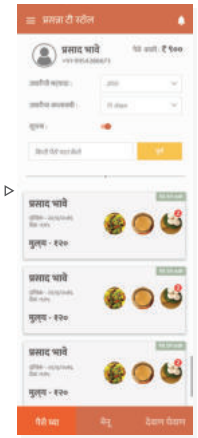


Confirmation of credit

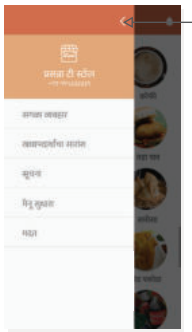


Debter list

Debter Profile



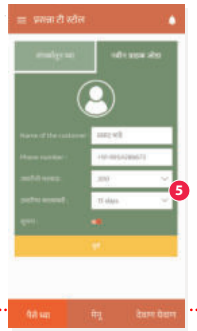
Hamburger menu



Menu

Notifications

Add debter



App flow 'Munshee'

Conclusion

This project attempts to help small food stalls to manage their daily orders , gives an overview of overall sales and manage their debtors. It also helps shop owners in decision making.

Users found this app complex as there were too many tasks on the application and most of them have never used their phone to even use a calculator. So convincing them to use a phone to do billing, calculation and keeping track of credit was a difficult task. They liked the idea of keeping track of their credits but expected online ordering from the application.

However, they felt keeping record of each order is not very important and it will waste a lot of time while doing business.

Future Work

No project is complete and as such 'Munshee' has a long way to go to be implemented at a large scale. It is an attempt to use technology to augment the workflow of small shop owners. In the future, many improvements can be made and incorporated in the solution. Some of which are listed below,

- Tutorials for the application
- Syncing of two or more smart phones
- Vendor management should be the part of this application
- Payments via mobile phones

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09. play.google.com/store/apps/details?id=com.application.zomatomerchant