

# **Personalized Data Visualization** for enhancing **Shopping Experience**

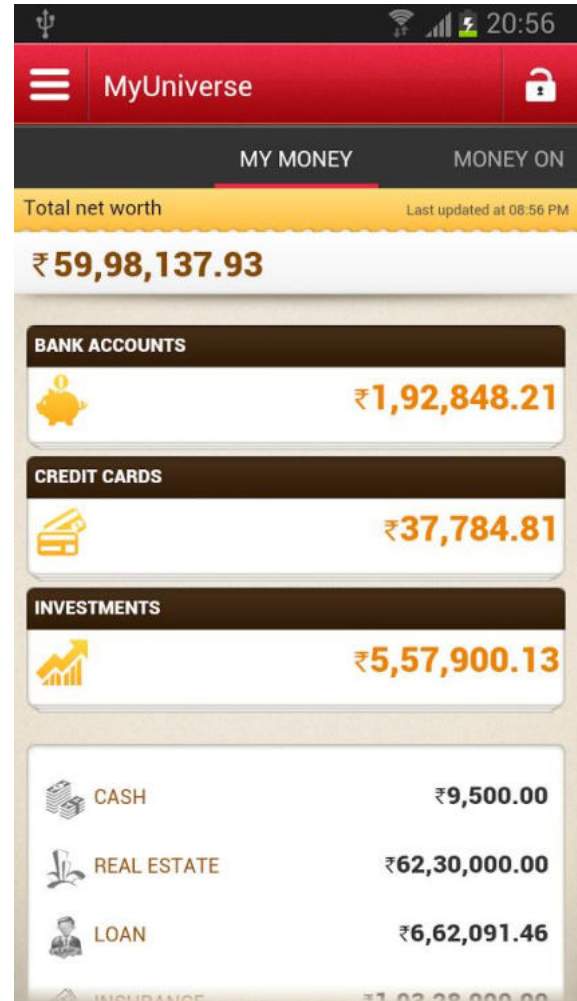
Final presentation

Jaison Jacob | 126330008 | Interaction Design

**Under the guidance of**  
Prof. Venkatesh Rajamanickam

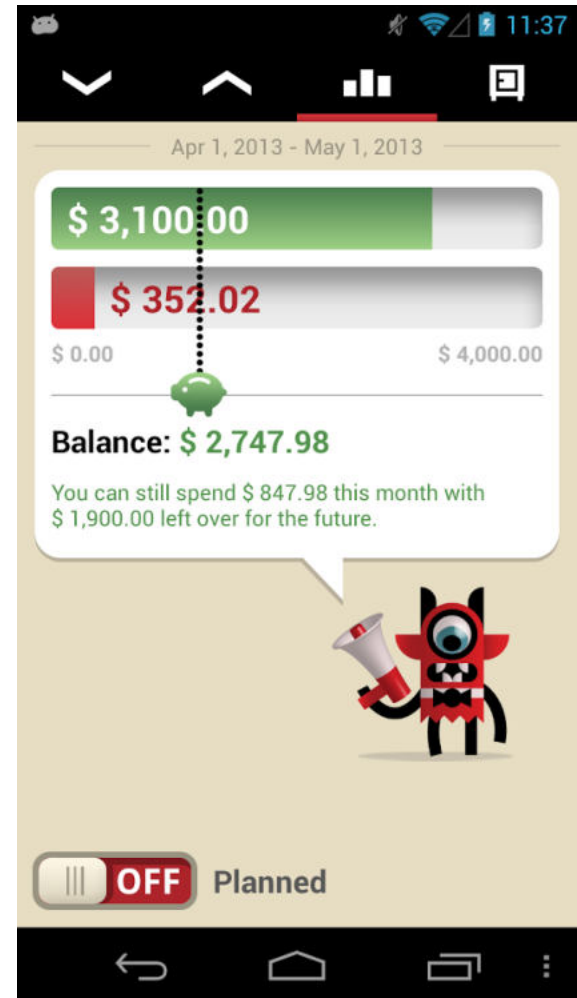
# Why this project?

- High effort/less rewarding mechanism to input expenses
- Lack of a system that react positively and quickly to user's dynamic spending habits



# Why this project?

- Spend money based on needs rather than following up a budget based on fixed assumptions like “how much money left and how many days left to survive”
- Help user spent money for his meaningful goals
- Enhance shopping experience



# Project goals

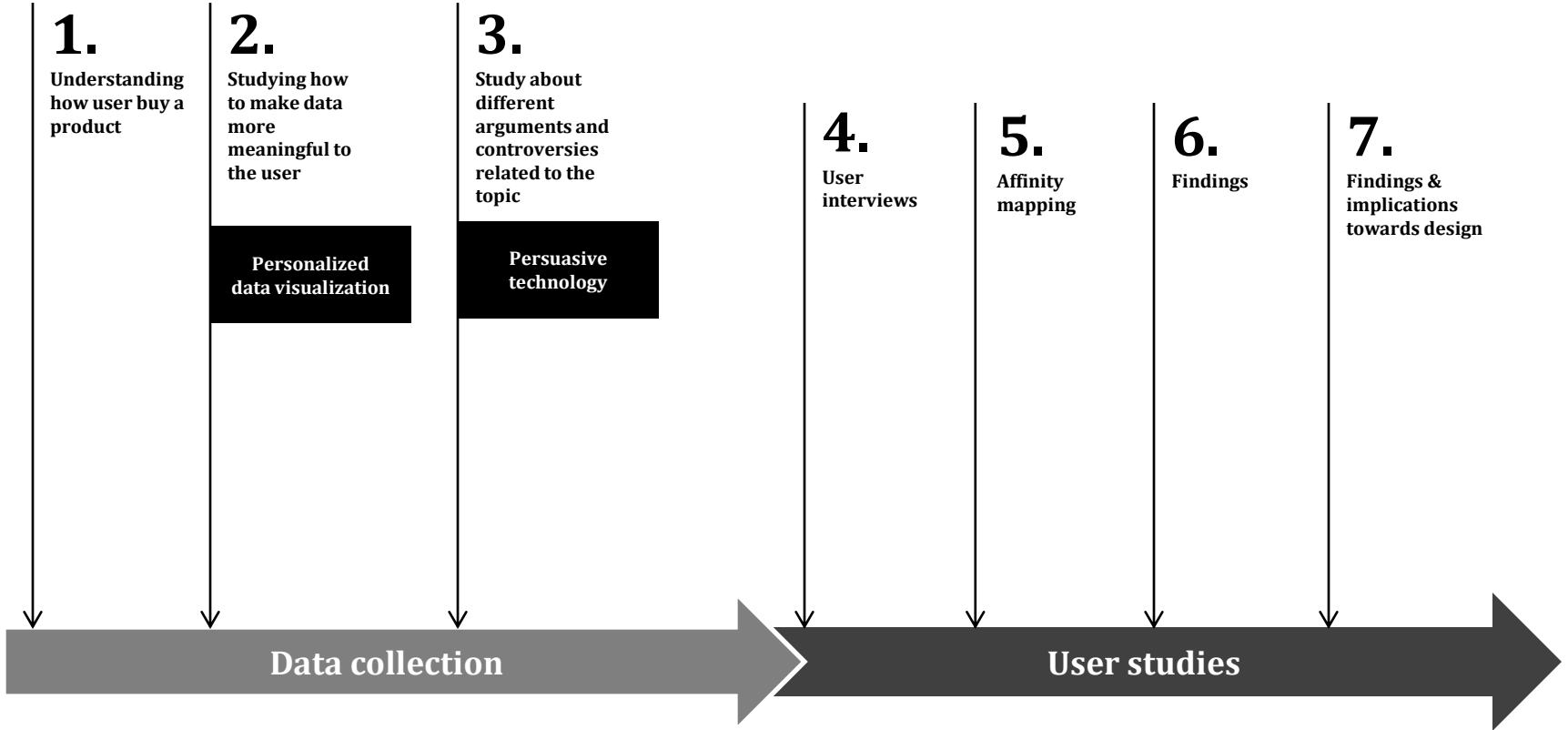
- Build an expense tracker
- Visualization as a tool
- Help user derive insights about his expenditure
- Save money for meeting his meaningful goals

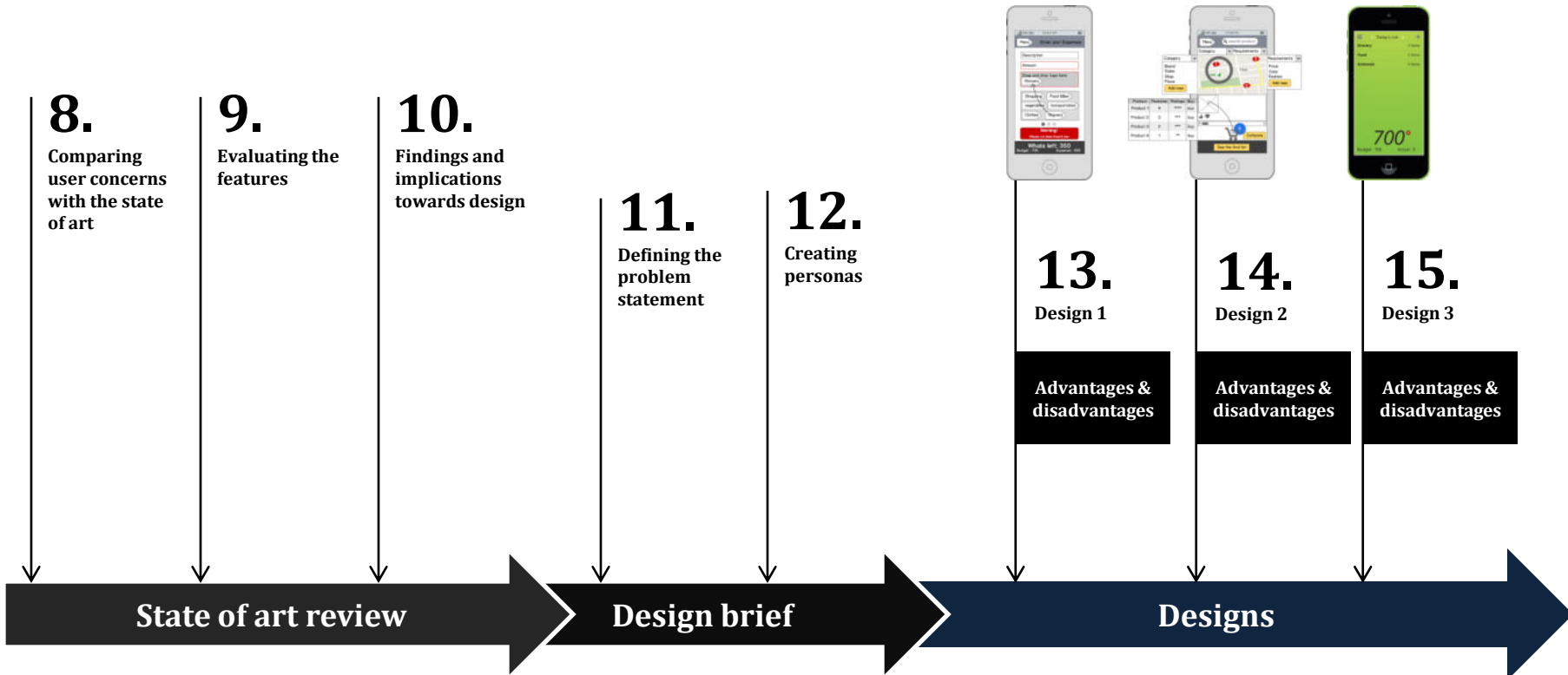
# Structure

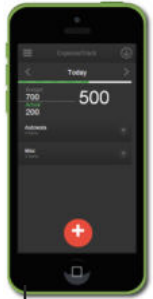
- Design process
- Data collection
- User studies
- State of art review
- Design brief
- Designs
- Final design
- Evaluation



# DESIGN PROCESS







**16.**  
Ideation

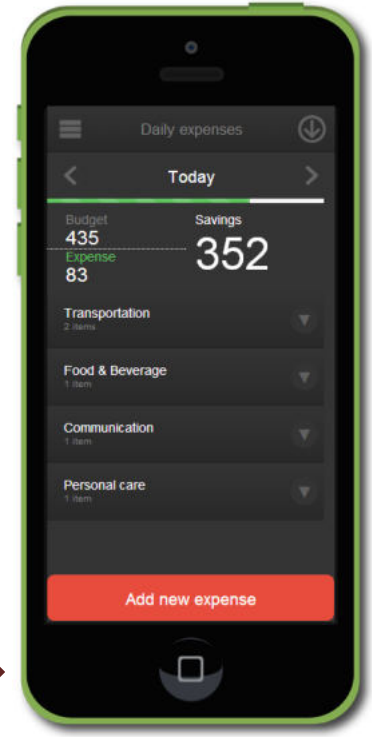
**17.**  
Generating scenarios

**18.**  
Recording user expenses for 30 days

**19.**  
Users given access to prototypes at the end of 15 days

**20.**  
Further iteration of the design based on user feedback

**21.**  
Results



**Final design**

**Evaluation**



# DATA COLLECTION

# Shopping process

- How do I buy a product?

## Shopping Process



**Need ?**

Consumer

## Shopping Process

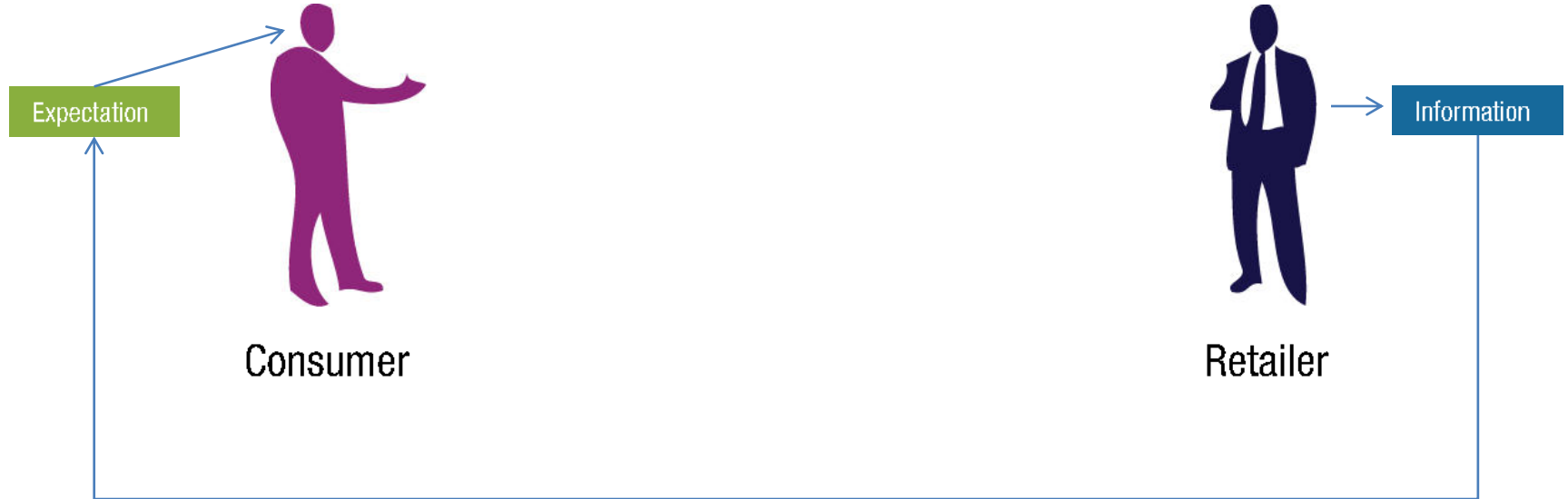


Consumer



Retailer

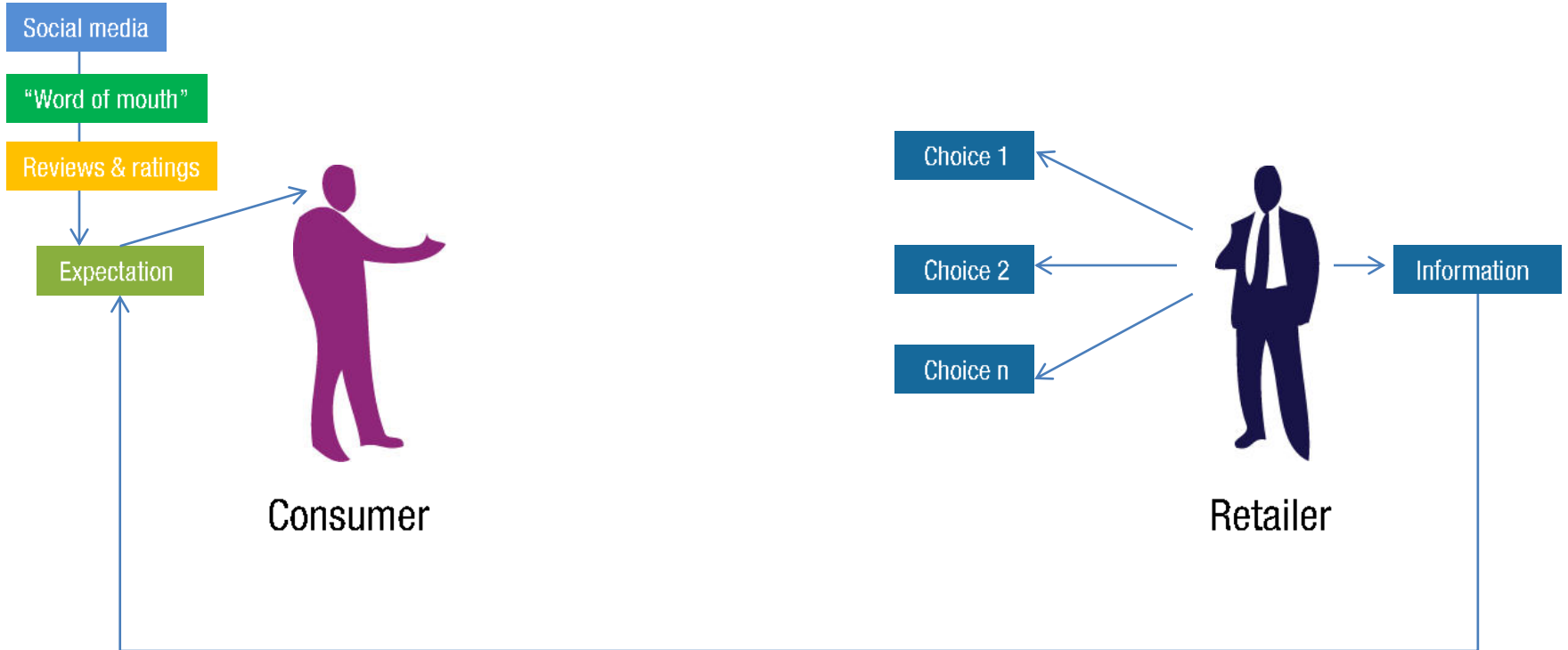
## Shopping Process



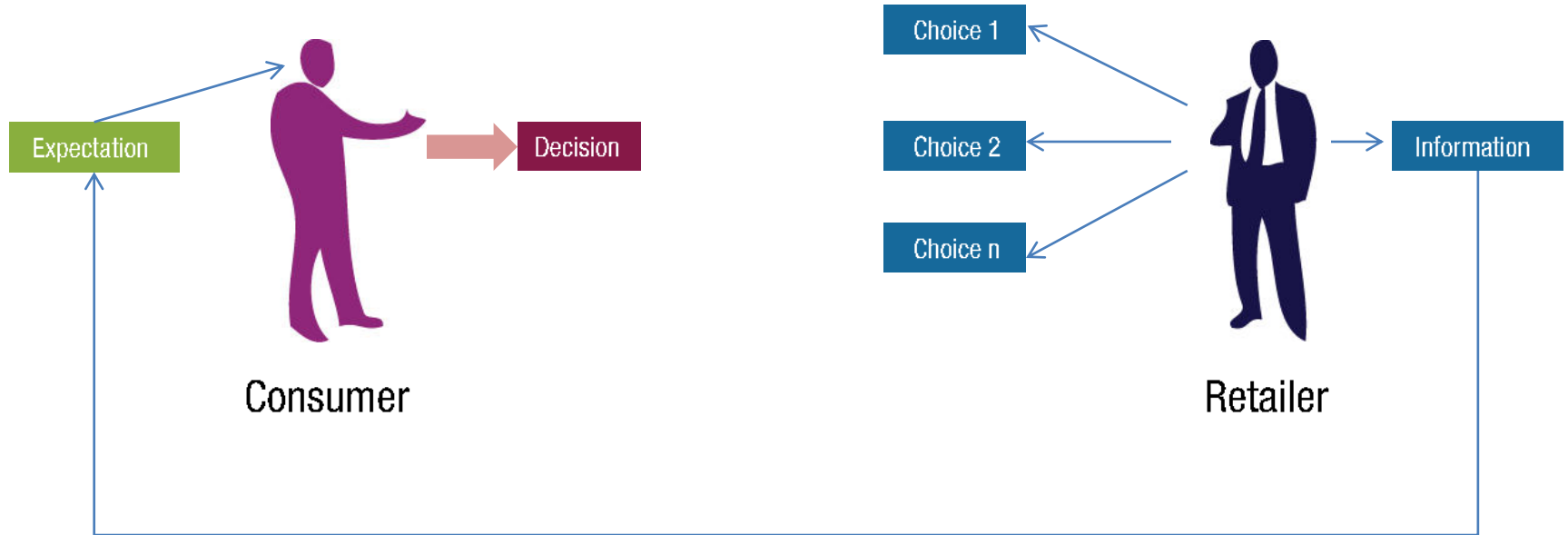
# Shopping Process



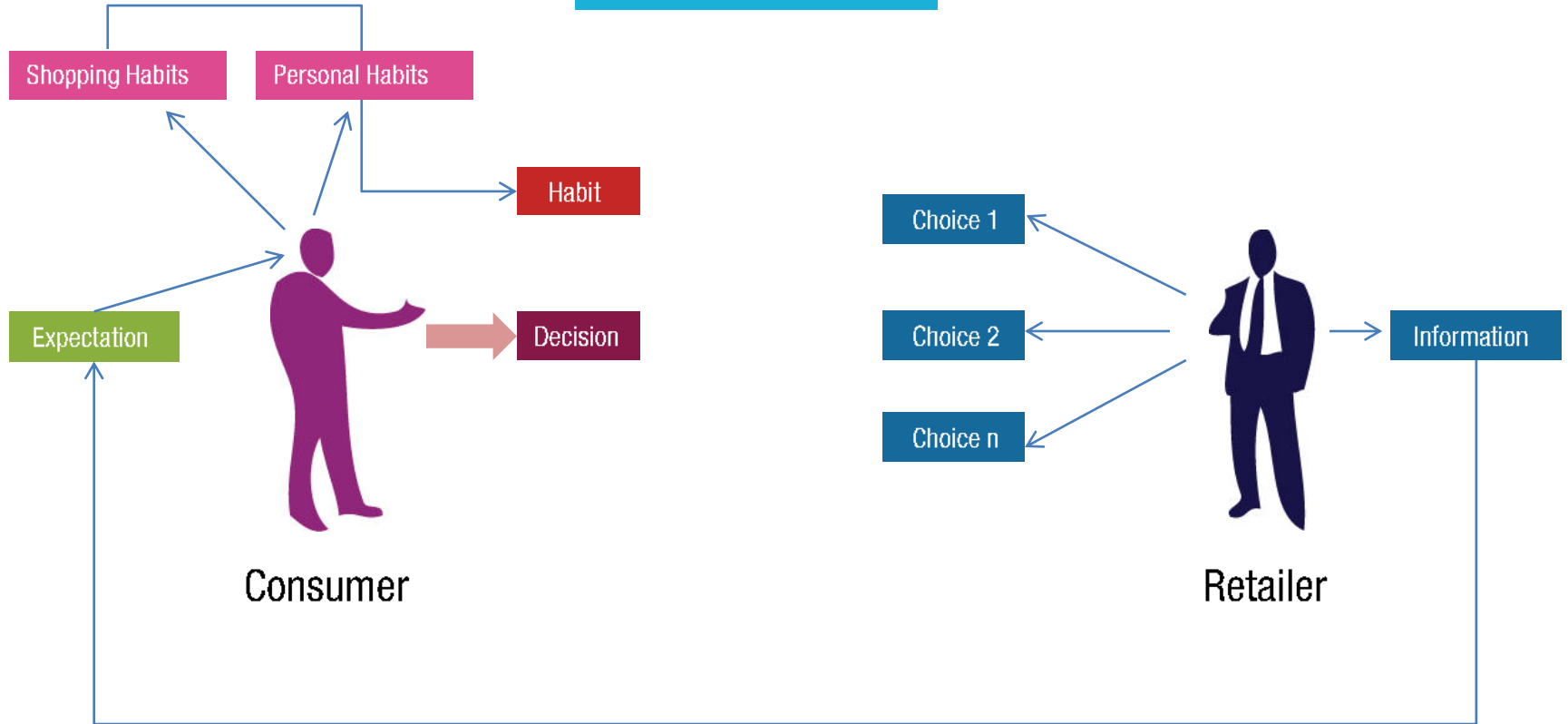
# Shopping Process



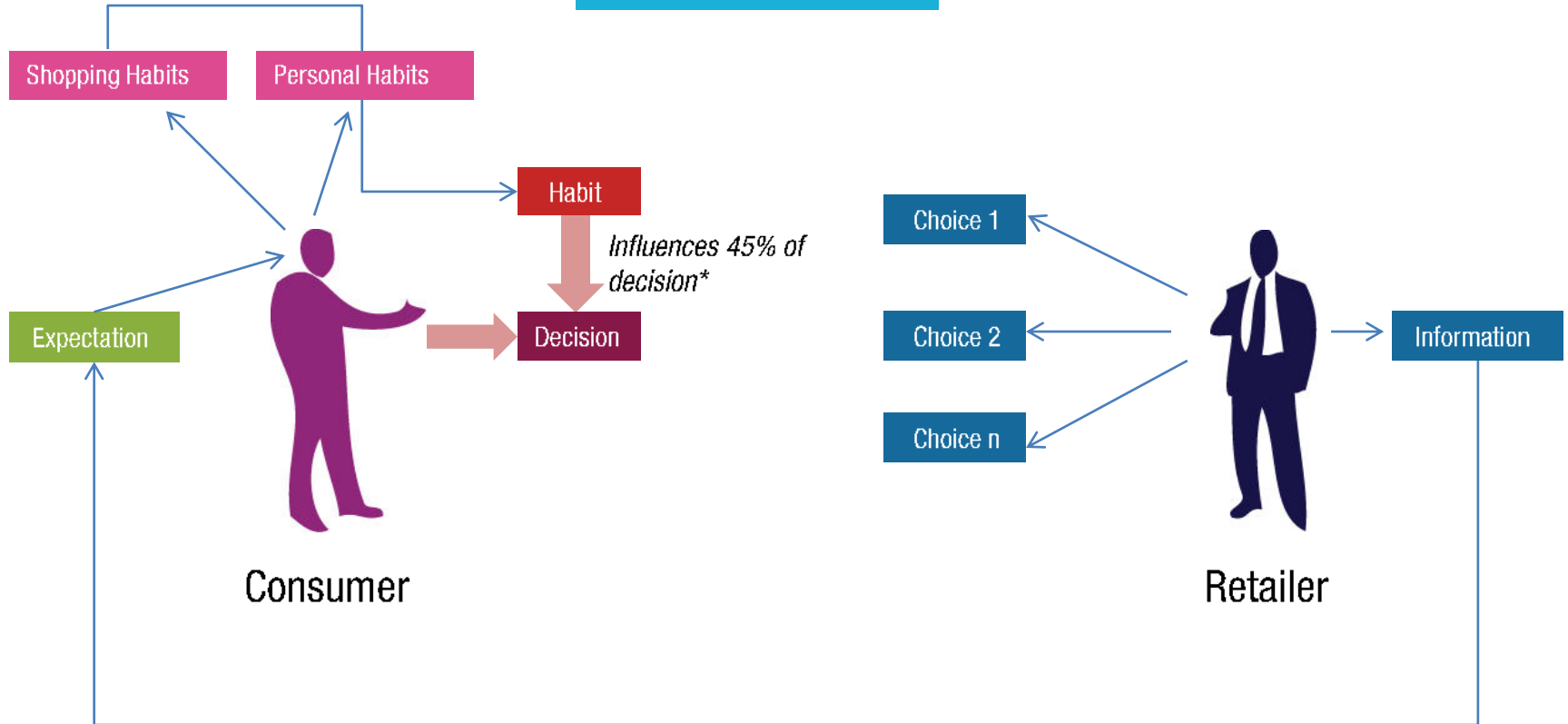
# Shopping Process



# Shopping Process

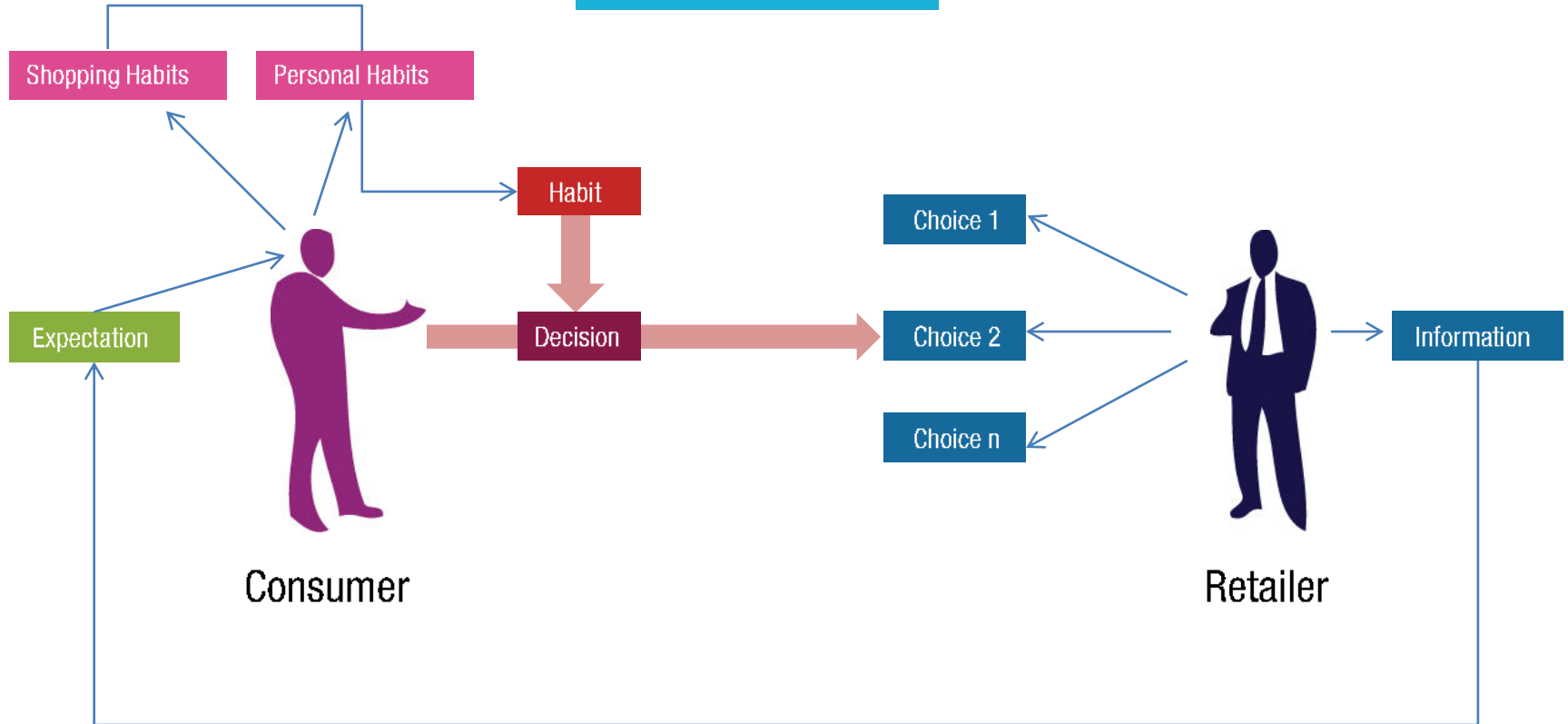


# Shopping Process

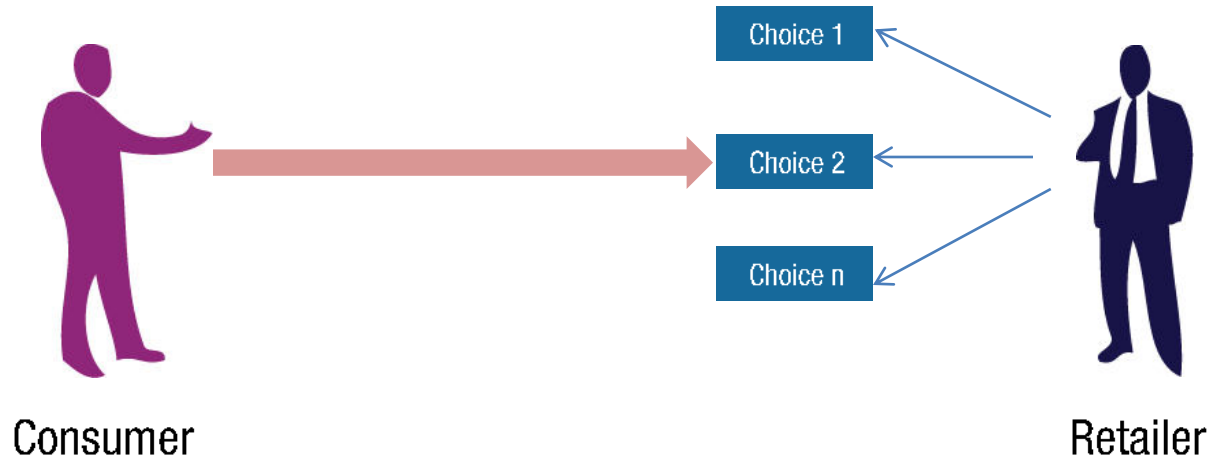


\* [“How Companies Learn Your Secrets”](#) by Charles Duhigg, NYTimes, Feb 16, 2012

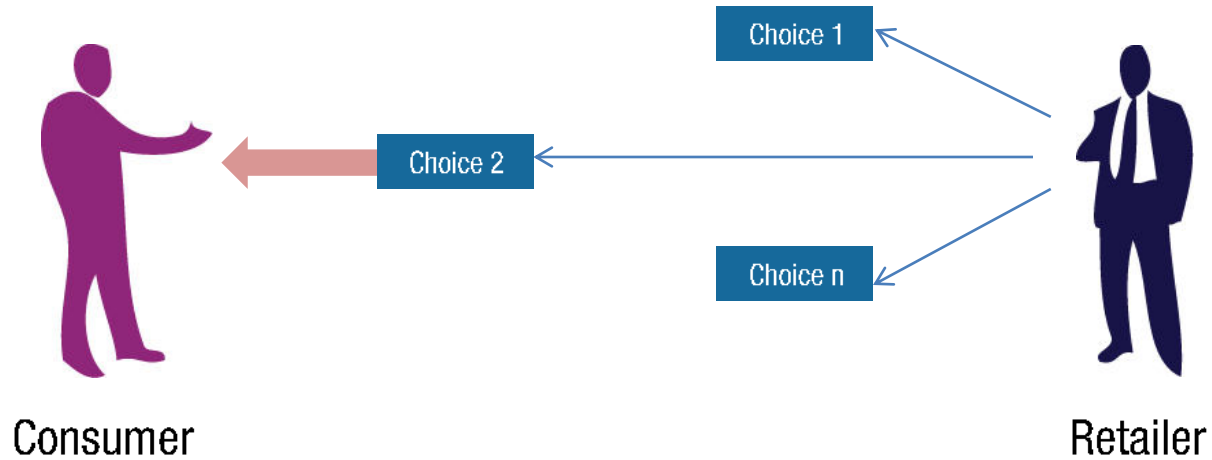
# Shopping Process



## Shopping Process



## Shopping Process



# How habits are formed?

- 3 step loop:
  - Cue
    - It's a trigger that tells you which habit to choose
    - Go on automatic mode
  - Routine
    - Physical/mental/emotional routine
  - Reward
    - Helps brain figure out if this loop is worth remembering for future

# How habits influence shopping?

- Once loop is established, habit emerges & brain stops fully participating in the decision making
  - Unless new cues and rewards are found, the existing pattern will be repeated automatically
  - **Habits never disappear**

# After choice is made, what happens?

- The confidence that user have that he made the right choice  
~ ***Post choice satisfaction (PCS)***
- Consumer side
  - Satisfaction with the product
  - Satisfaction with information on which expectations were made
- Retailer side
  - Customer loyalty, recommends store and product to friends and relatives

# Product evaluation

- Emotions that product evoke
  - Feeling that user gets from the purchase made
- Cognitive judgments\* & effective reactions
  - PCS > if user is happy with product
  - Negative Post choice arousal > if user is dissatisfied

\*That which comes to be known, as through perception, reasoning, or intuition; knowledge.

# Why measure satisfaction?

- Satisfaction ~ influence shopping habits
- User satisfaction ~ enhance shopping experience
- How?
  - Transaction-specific perspective
    - Attention will be specifically paid to all recent purchases
  - Cumulative perspective
    - All purchase experiences will be measured, not just the recent ones

## *To summarize*

- PCS can be used for?
  - Enhancing other's shopping experience > trusted source
- How to capture data?
- How to communicate the information to user?
  - Personalized data visualization

# Personalization of data

- Using technology to accommodate the differences between two individuals ~ ***Personalization***
- Predictive personalization
  - Used to improve the overall user experience online
  - Used to predict user's behavior, needs or wants and for tailoring offers and communications precisely
  - Examples:



NEW

Hi, Jaison!



We're working on new ways to give you a more personalized experience.

Please take 30 seconds to make sure your new Go Daddy profile is accurate.

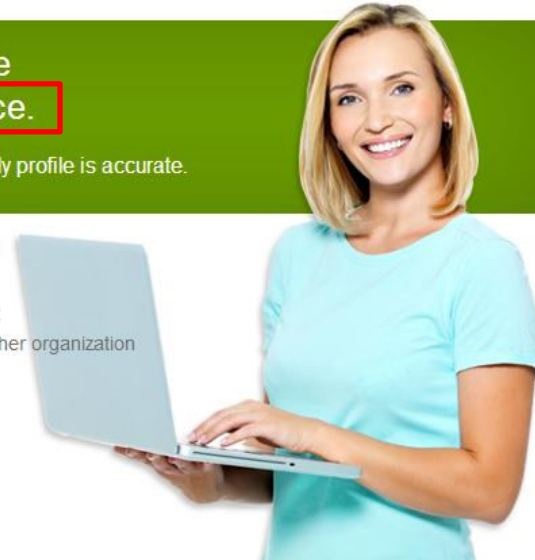
Which best describes you?

- I own a business or non-profit
- I am in the process of starting up a business or non-profit
- I'm working on behalf of a non-profit, religious, team or other organization
- None of the above

Next

[No thanks](#)

Progress:



Vishnupriya Kaulgud likes FabFurnish.com.



FabFurnish.com

Sponsored · 🌐

👍 Like Page

Bring home a piece of nature with our solid wood furniture range



Solid wood furniture starting @ just Rs 399

Products for living room, bedroom, dining room @ Up to 35% off

[HTTP://WWW.FABFURNISH.COM/ALL-PRODUCTS/?Z MAIN MATER...](http://www.fabfurnish.com/all-products/?z=main_materi...)


Shop Now


Like · Comment · Share · 👍 101 🗨 2 ➦ 1


*Can we trust these "likes"?*

# Personalized data visualization



- Approaching a person's data in a way consistent with their goals to transform the way people interact with their data
  - To make data more meaningful
  - Help user understand patterns in their life and accomplish their meaningful goals.
  - Examples


 WELCOME, [CHRISBOWLER](#)  
 DISPLAYS | [SETTINGS](#) | [ACCOUNT](#)


**CHRISBOWLER**  
[119 ENTRIES](#) | [8 ITEMS](#) | [6 CATEGORIES](#)

ITEM : AMOUNT  [Add](#)

---



▶ OPTIONS ▮ MOVE  
 COFFEE CONSUMPTION  (37 MINUTES AGO) 

---

67

---

COFFEE (62.0±), ICED COFFEE (5.0±) [ADD AN ITEM...](#)

▶ OPTIONS ▮ MOVE  
 AVERAGE COFFEES PER DAY  (ABOUT 1 HOUR AGO) 



---

2.34

---

COFFEE (77.0±), ICED COFFEE (5.0±) [ADD AN ITEM...](#)

---

▶ OPTIONS ▮ MOVE  
 BEVERAGES  (ABOUT 1 MONTH AGO) 

---

**WATER** 220.5±

---

**COFFEE** 77.0±

---



**GINGER BEER** 9.0±

---

**NON-ALC BEER** 7.0±

---

**ICED COFFEE** 5.0±

▶ OPTIONS ▮ MOVE  
 AVERAGE WATERS PER DAY  (ABOUT 1 HOUR AGO) 



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6.3

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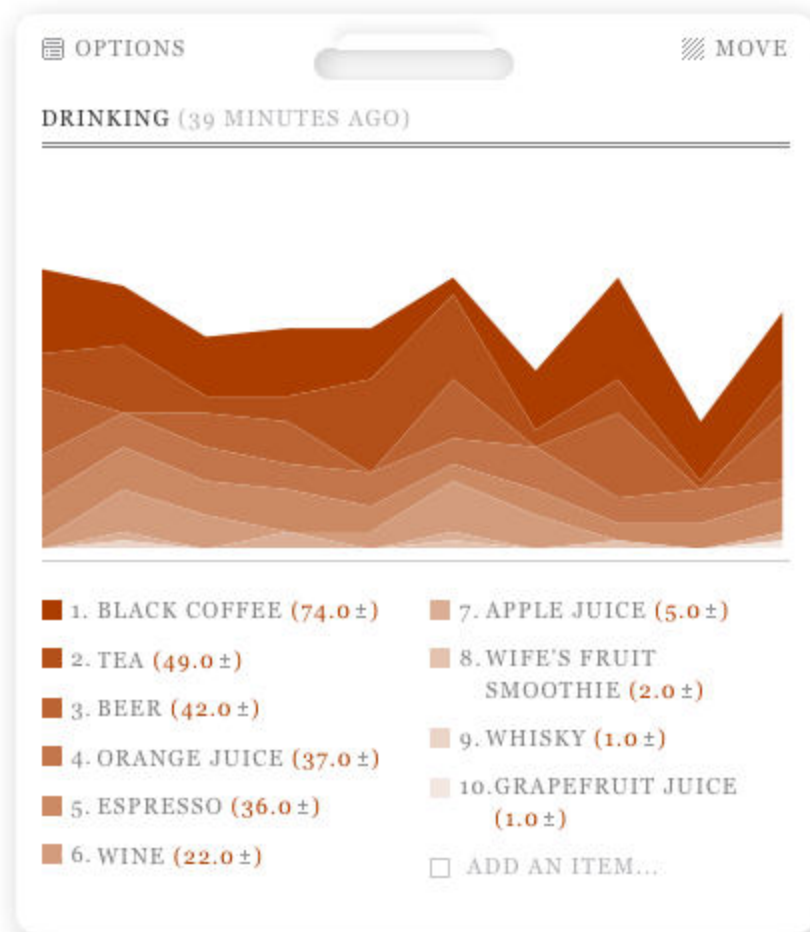
WATER (220.5±) [ADD AN ITEM...](#)

---

▶ OPTIONS ▮ MOVE  
 FAVORITE NEW SOFTWARE  (ABOUT 1 HOUR AGO) 

---

“[Seeing the Bigger Picture with Daytum](#)” by Chris Bowler, appstorm, Sept 3, 2009



“[Daytum I love you but please join the web](#)” by Tom Scott, derivadow, April 6, 2009

myfitnesspal

TODAY

DAILY SUMMARY

**418**  
CALORIES REMAINING

Add to Diary

1210 GOAL	+ 1077 FOOD	- 285 EXERCISE	792 NET
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NEWS FEED

Diet with friends to lose up to 3x more. Learn more.

**renee\_fredrick** Hi Carrie!  
1 minute ago

Comment

**Carrie\_Brown** burned 285 calories doing 35 minutes of Elliptical Trainer  
2 minutes ago

SWITCH TO VERIZON WIRELESS AND GET A \$100 VISA® PREPAID CARD **xfinity** LEARN MORE

Diary

Goal	Food	Exercise	Net	Remaining
1210	1077	285	792	418

TODAY

**BREAKFAST** 318 CAL

**Nonfat Greek Strained Yogurt** 130  
Fage, 1.0 cup (227 g), 130 cal

**Strawberries - Raw** 49  
1.0 cup, halves, 49 cal

**Bread - Whole-wheat, toasted** 139  
2.0 slice, 138 cal

**LUNCH** 241 CAL

**Guacamole Medium** 50  
2.0 Tbsp, 50 cal

**Cilantro Lime Vinaigrette Dressing** 180  
Nordstom Cafe, 2.0 TBSP, 180 cal

**Jicama Sticks** 11  
Raley's, 1.0 oz., 11 cal

**SNACK** 120 CAL

**Triscuit Reduced Fat** 120

It's not a room. It's a Residence. **Residence Inn® by Marriott** TOUR SUITES

# Problems with existing trackers

- Categorization
  - Pre-defined categories
  - Single item with multiple categories
- Input
  - Too much effort
  - E.g. My fitness pal > 6 steps to input one item, 26 items to choose from

## *To summarize*

- Study about user's shopping habits
  - User study > Affinity mapping
- Find how user data is being captured & communicated
  - State of art review
- Compare the findings
  - See what all problems exist, how they are solved, how can I solve the unsolved?



# **USER STUDIES**

# User studies

- User group
  - 5 users
  - Young adults
  - Age group: 20-30
  - Single
  - Not focusing on stock, currency exchange etc.



# Artifacts

200  
 1500  
 800

400  
 - 150  
 150

420  
 420  
 580

1000  
 420  
 580

7470472

580  
 300  
 280

500  
 75 (gift)  
 425  
 100  
 325  
 20 (mom)  
 305  
 - 85 (colours)  
 220  
 = 25 (Poppy)  
 195  
 - 20 (Cadbury)  
 175  
 - 40 (Pop-up)  
 135  
 \* 200 (Robin) 15

Road  
 MR-4  
 Petrol  
 (mom)  
 (colours)  
 (Poppy)  
 (Cadbury)  
 (Pop-up)  
 (Robin)

115  
 = 10 (Priya)  
 105  
 100  
 205

6688801102

20 6203  
 (185) 00.0007  
 59.6667  
 185 0576

April

8500  
 - 4777  
 3521 → Spend 16/04/2013

8500 → (Movie)  
 - 400 10 April

400 ←  
 - 200 (movie)  
 200  
 - 100 (popcorn)  
 100 (Auto)

8100  
 - 200 (Poplates 11/04)  
 7901.64

1100 ←  
 - 390 (bro)  
 710  
 - 300 (mom)  
 410  
 - 150  
 260  
 - 20 (Auto)  
 240  
 - 160 (binny)  
 180

- 1100  
 6801.64 (Recharge)  
 - 150 (Recharge)  
 6651.64 (Recharge)  
 - 222.00 (Recharge)  
 6429.64  
 - 500.64 (Mangibhye)  
 5929.64  
 - 700.00 (Headphone)  
 5229.64 (olive oil)  
 - 250.00  
 4979.64


500  
 300  
 100

# Credit Card Expenses

File Edit View Insert Format Data Tools Help Last edit was made on

fx
undo
redo
print
\$ % 123
Arial
10
B I
underline
background color
border
font color
bullet list
numbered list
link
table
chart
filter
sum

fx

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Date	Purchase Details	Amount	Share Account		Sallu	Vijesh	Vishnu	Roy	CB	JK			
2	14-Aug-2007	Dinner at Seashells	390	Y		137.5	100				152.5			
3	15-Aug-2007	Lunch at Kumarakom	120	Y			52.5				67.5			
4	17-Aug-2007	Dinner at Visitors	175	Y			62	52			61			
5	18-Aug-2007	NikeShoes	1975	N							1975			
6	18-Aug-2007	Globus	591.5	N							591.5			
7	18-Aug-2007	Dinner at Dhaba	240	Y	Kallol Paid		35	85	35		85			
8	19-Aug-2007	SKC Shopping	2982	Y			600				2382			
9	20-Aug-2007	Petrol Pump	100	N							100			
10	22-Aug-2007	Dinner at Seashells	200	N							200			
11	25-Aug-2007	Onam Shopping at Kerala	1857	N							1857			
12	9-Sep-2007	Shopping at Landmark	850.4	N							850.4			
13	9-Sep-2007	Levi Strauss	1599	N							1599			
14														
15		<b>Total</b>	11079.9			137.5	849.5	137	35	0	9920.9			
16		Amount Payable	11034											
17		Cash Back	45.89999											
18	2-Oct-2007	Due Date												
19														
20	Click below link to goto last updated cell													
21														
22														
23														
24														



Rs. % 123 Arial 11 B I U A

Item	A	B	C	D	E	F	G	H	I	J	K	L
Item	Amount	Jk	Chankaran	Nimmy	Vivukkuttan	Dalin	Deepumon	Ajith	Mudiyan Sree	Nallakutti Arun	Per Person Sha	
Spl Moong Dal	15	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.66666666666	
Msl Pappad	90	Y	Y	Y	Y	Y	Y	Y	Y	Y	10	
Spl Chana Dal	60	Y	Y	Y	Y	Y	Y	Y	Y	Y	6.66666666666	
Green Sald	40	Y	Y	N	N	N	N	N	N	N	20	
Chicken Tandoori	170	Y	Y	Y	Y	Y	Y	Y	Y	Y	18.8888888888	
Chicken American Chopsy	190	N	N	Y	N	N	N	Y	N	N	95	
Roti	80	Y	Y	N	Y	Y	Y	N	Y	Y	11.4285714285	
Soft Drinks	44	N	N	Y	N	N	N	Y	N	N	22	
Sprite	66	Y	Y	N	N	Y	N	N	N	N	22	
Mineral Water	40	Y	Y	Y	Y	Y	Y	Y	Y	Y	4.44444444444	
	600	Y	Y	N	N	Y	N	N	N	N	200	
	480	N	N	N	Y	N	Y	N	Y	Y	120	
Cake	260	Y	Y	Y	Y	Y	N	Y	Y	Y	32.5	
	<b>2135</b>		328	328	192	206	308	174	192	206	206	<b>2140</b>
	Amount Paid		1995	328	192	206	310	174	192	200	200	3797
	Balance		-1667	0	0	0	-2	0	0	6	6	-1657
												<b>2140</b>

16:39

### Add expense


8.55 Rs

Tap to add tags

food auto movie equipment  
dmart other phone

Yesterday Today Custom

Description

Repeat: **Never**  

# Affinity mapping



Triggers  
Shopping on mobile?

Habitual  
Online/Physical

Quality Matter  
that I'm buying

What do others  
love to say  
about the product  
that I'm going to  
Reviews

Arroy fear!  
why did I even  
buy this??  
Disatisfaction

Emotional  
attachment  
with the  
products I  
buy 99

Where do I  
buy my stuff?  
LOCATION

"Choosing  
between the  
choices"  
Decision  
Making

Keeping record of  
expenses

Expenses / Fees /  
Thousands

Categorizing  
my  
Expenses  
by category

Why Online  
Shopping is  
Bad

How much  
money do I  
spend?

debt  
accounts in shop

One Good  
Expense!

Take screenshots  
How do I buy  
groceries

Shit!  
Where did My  
Money go?  
99

What  
I  
buy?  
DAILY



# Key findings

- How to improve the shopping experience
  - Remind user about his needs
    - Checklist of requirements
  - Freedom to make right choices
    - Comparing multiple products based on requirements and budget
  - How to measure quality of a product?
    - “Online reviews and ratings can be trusted” - user(**I don't think so**)
    - **“Word of mouth”**
  - Reasons for dissatisfaction?
    - Product failure
    - Bad service
    - Information based on which expectations were built ~ online

# Key findings

- How to capture the data with less effort?
  - Facts associated with a purchase
    - Product name, expense, locations etc.
  - How to categorize user expenses?
    - “**No**” to pre-defined categories
    - Unique ways > e.g. based on amount, shop name, fixed expense, future expense, debts\*\*
  - Adding bills and artifacts
  - Tool to calculate/ adaptable with situations ~ currency conversion



# STATE OF ART

# State of art

- To validate user concerns, see how they're solved
  - 4 online shopping websites
  - 7 personal finance applications
  - Compare it with findings from user studies
- Evaluate the existing features based on user concerns

# Problem 1

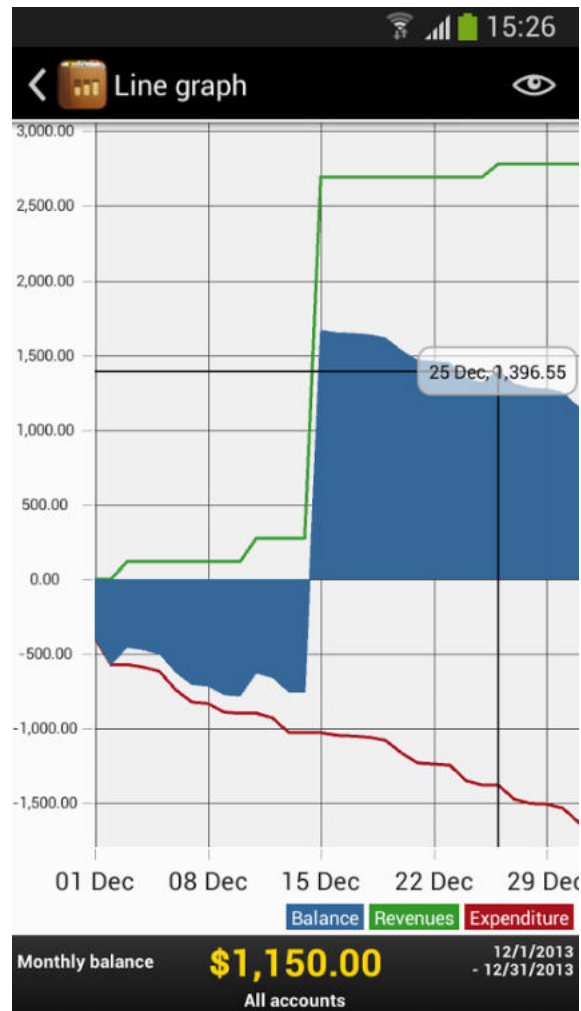
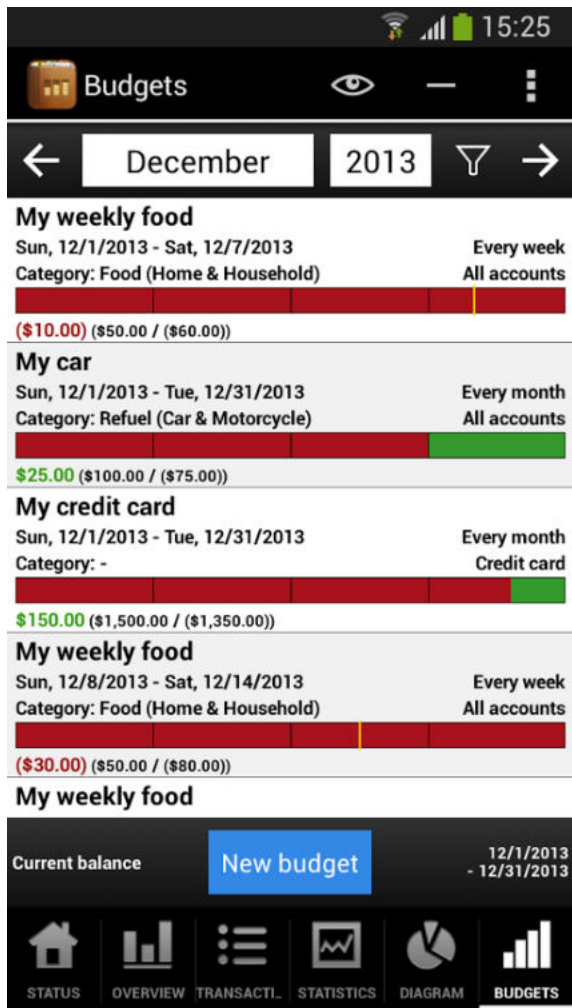
## Categorizing an expense

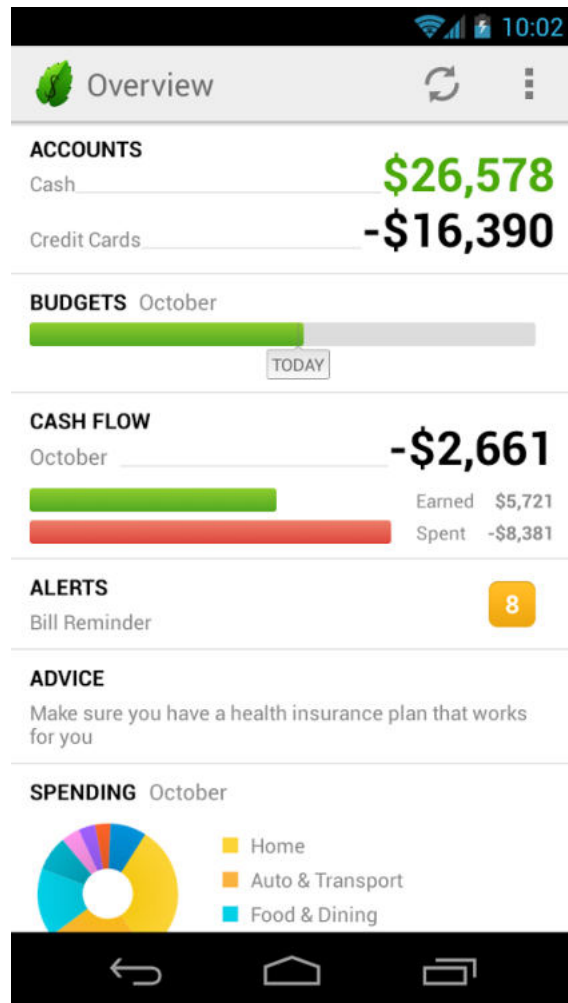
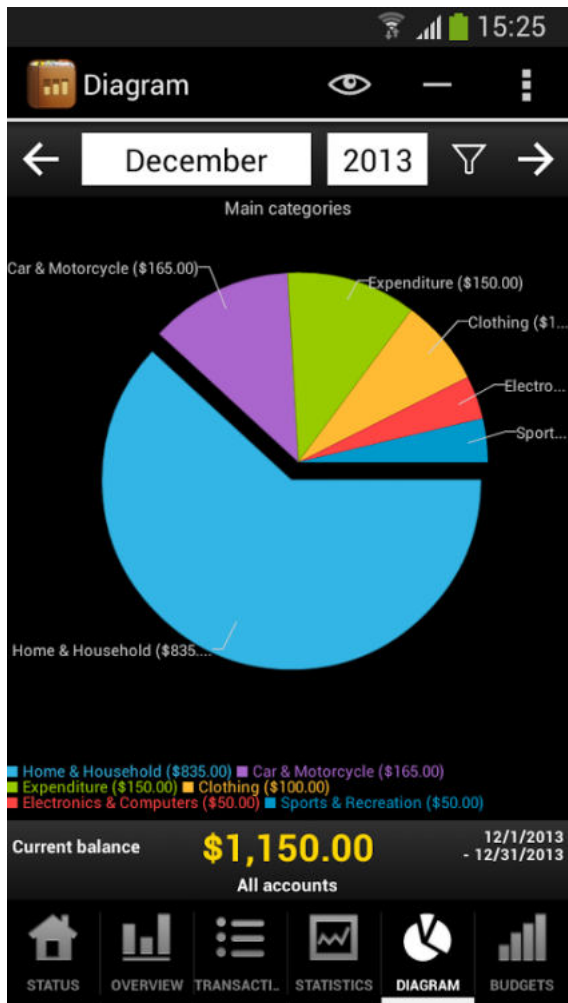
- Kinds of expenses
  - **Single product, single category**
    - e.g. dinner at a restaurant
  - **Multiple products, single category**
    - e.g. shopping at supermarket
  - **Single products, multiple categories**
    - e.g. an unexpected travel > travel, unexpected travel

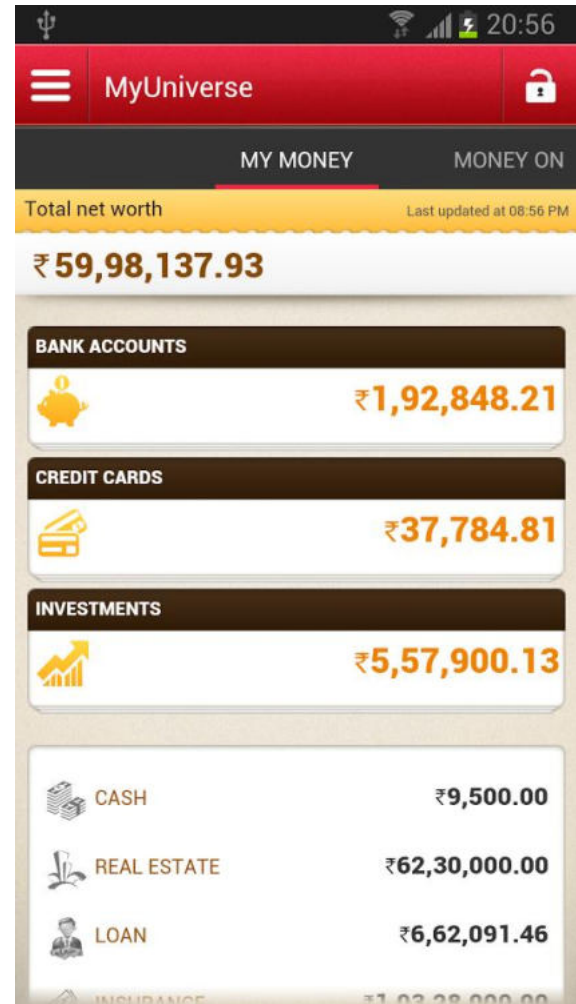
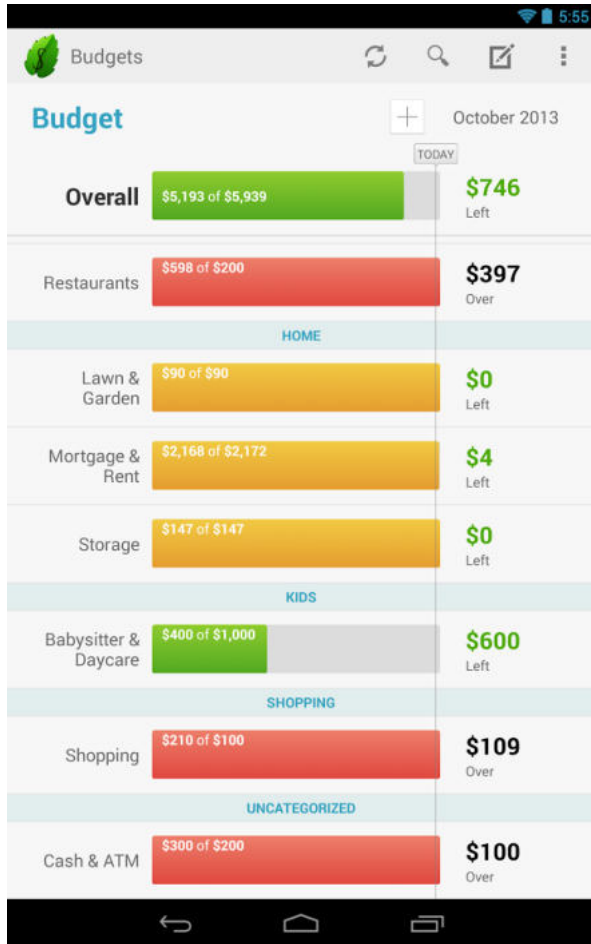
# Problem 2

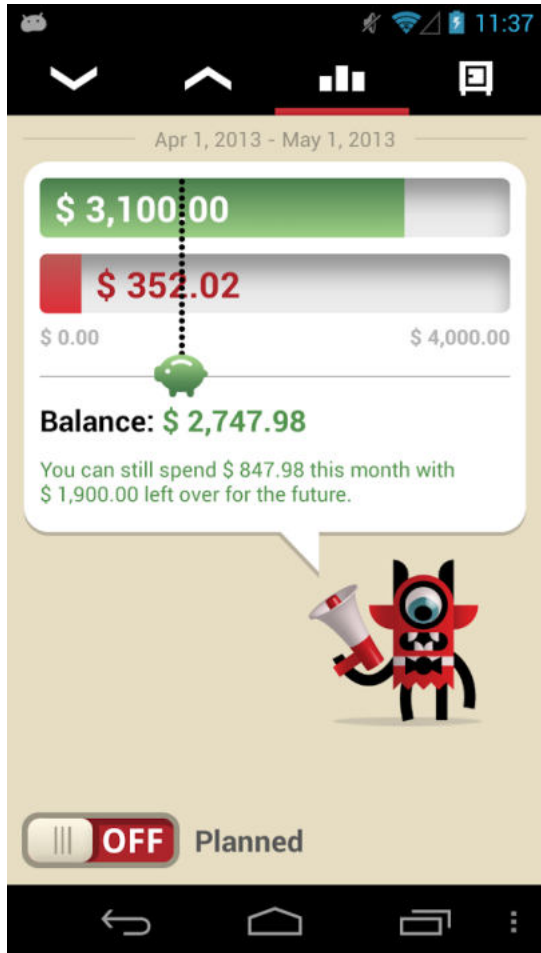
## Visualizing the expenses

- Facts associated with a single purchase
  - Product name, description
  - Shopping location
  - **Categories** > a product may fall in multiple categories
  - **Expense**
- Reducing user's freedom to spend the money
  - **Focus on need**: money to meet needs, not "*needs to meet money*"









# Problem 3

## Setting up a budget


- User concern:
  - “I make one budget for an year, then fill it > day wise, month wise > budget, actual”  
~ **too much work**
- Insight:
  - “..practices like leaving cash with friends for safekeeping and to reduce temptation to spend it”

# Problem 4

- Input expenses with lesser effort
  - Motivated and disciplined to use the app
  - Existing input systems are not rewarding
    - User should manually make most of the decisions despite running the application on a **“smart device”**
  - Not flexible with users expenses
    - Money left: days left

# Problem 5

- Freedom to make a right choice
  - Compare multiple products with **requirements** not with features



**DESIGN BRIEF**

# Design brief

- To build a smart phone based expense tracking application
- Capture user's expenses(habits)
- Use visualization as a tool to communicate personal data to user
- Help user derive insights about his expenditures
- Help user spend, save money for meeting his meaningful goals

# Persona

## Rohit Raj

- 26 year old engineer in Chennai. He lives 10 kilometers away from his office. He shares his rented flat with two others.
- Eats his lunch outside, cooks his breakfast and dinner. He doesn't own a refrigerator so he buys his grocery daily.
- He keeps changing his mobile phone every year. He always go for the best product available in the market.



**Rohit:** always opt for the best; price doesn't matter

# Persona

## Rohit Raj

- He doesn't miss his newspaper and a packet of cigarette before he boards the train.
- He has an account in the hotel where he eats his lunch, comes back home at 8 pm.
- He buys milk and other groceries on the way back.
- His weekends include a night out and the other days looking for the best restaurants around the city for lunch.



**Rohit:** always opt for the best; price doesn't matter

# Persona

## Financial Status

- Rohit is not financially stable. He misses his due dates for paying the rent and electricity bills.
- His latest purchase of an iPhone has claimed all his bank savings.
- Some of his friends asked him to write down his expenses, but he stopped doing as it didn't help him much.
- Rohit is now worried as he has no savings and his expenses are increasing



**Rohit:** always opt for the best; price doesn't matter

# Persona

## Deepak Soman

- Deepak is a 22 year old College Student; stays in college hostel with his friends at Christ College, Bengaluru and regularly travels to college located 2 kilometers away in his bike.
- He doesn't like hostel food so he prefers to have food outside in a local restaurant. Deepak is a fashion freak, spends his money on clothes and shoes.
- He leaves for college at 8 in the morning with breakfast on the way to college, lunch at college canteen and a late night dinner at his favorite diner.
- Weekends are fully occupied as he roams around the shopping malls and watching movies.



**Deepak:** fashionable and biker

# Persona

## Financial status

- Deepak hails from a Malayali family. He is the eldest of 3 and his parents are government employees.
- His only source of income is from his parents and sometimes he has to ask for extra money as he doesn't have control over his expenses.
- Deepak feels bad for taking extra money from his parents as his younger brothers are also studying and his parents can't afford to pay him.



**Deepak:** fashionable and biker

# Persona

## Radhika Krishnan

- Radhika is 26 year old HR Manager in Pune.
- She lives with her family in a small town that requires 1 hour commute to the office.
- She spends much of her time at home with parents and does all the shopping for the family.
- Her typical day starts at morning 5am; drives her bike to the bus stand where she boards the bus to workplace.
- On weekends, she goes out with her friends and prefers good restaurants to dine.



**Radhika:** Spends her money wisely

# Persona

## Financial status

- Radhika is the only earning member in her family and both her parents are retired.
- She takes care of the household expenses including monthly grocery. Her other expenses are on travelling and bike maintenance.
- She doesn't keep track of her expenses as her salary is not that big and she knows how much she is spending but she is always afraid to spent money.
- She keeps forgetting things to buy and is worried over her parent's wedding anniversary that is coming up after 2 months.



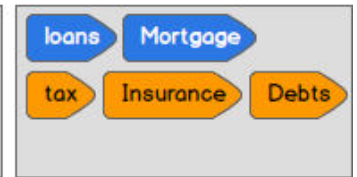
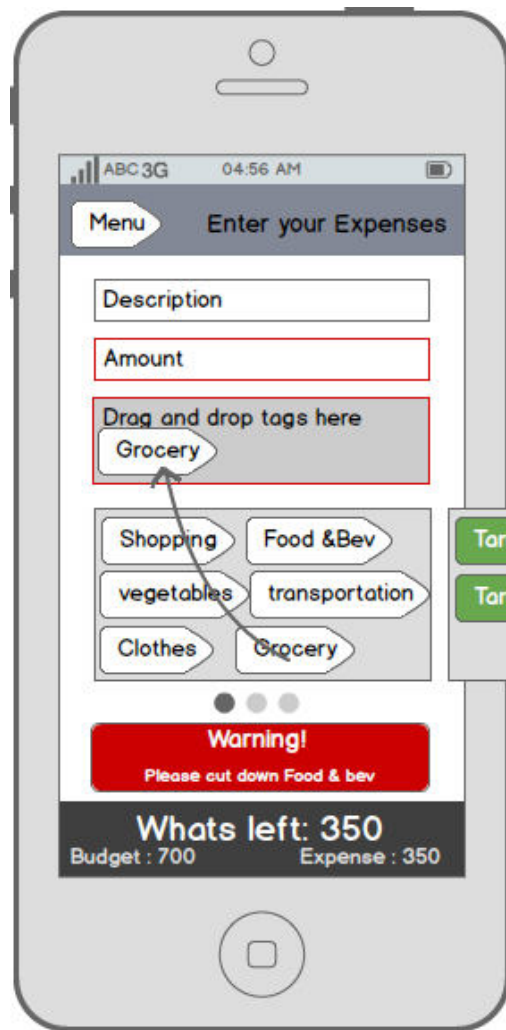
**Radhika:** Spends her money wisely

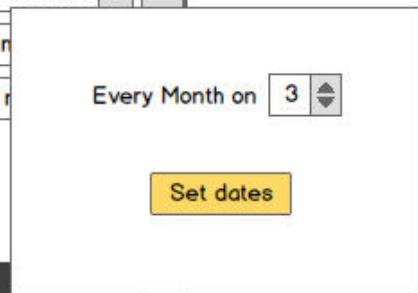
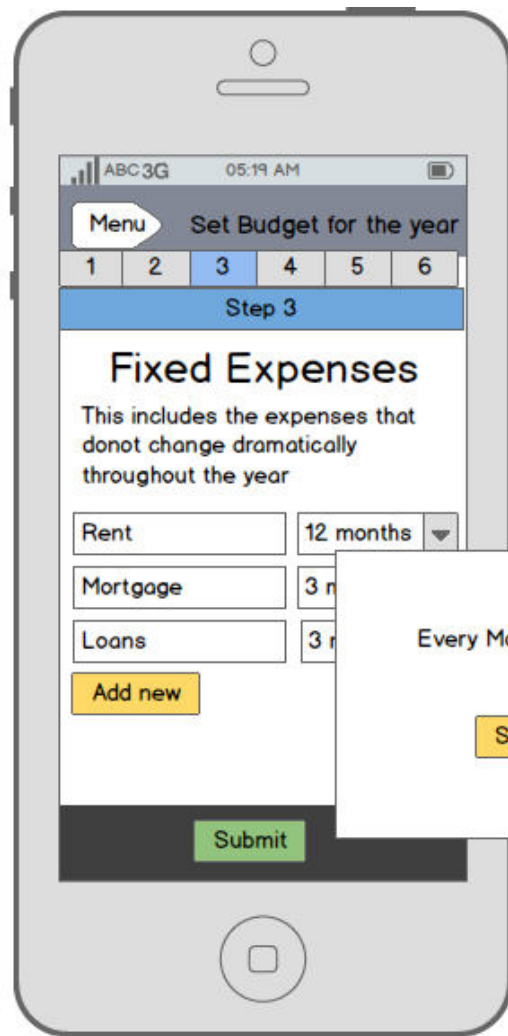
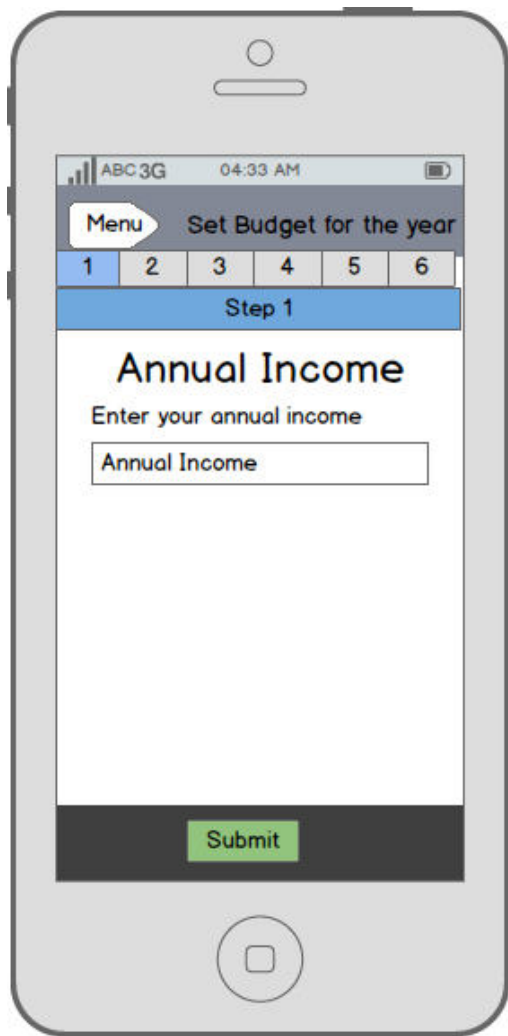


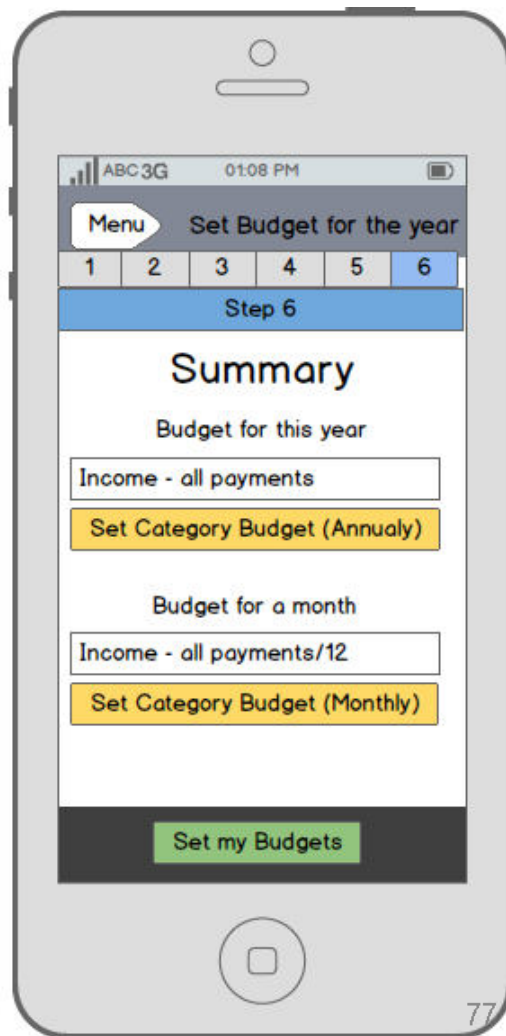
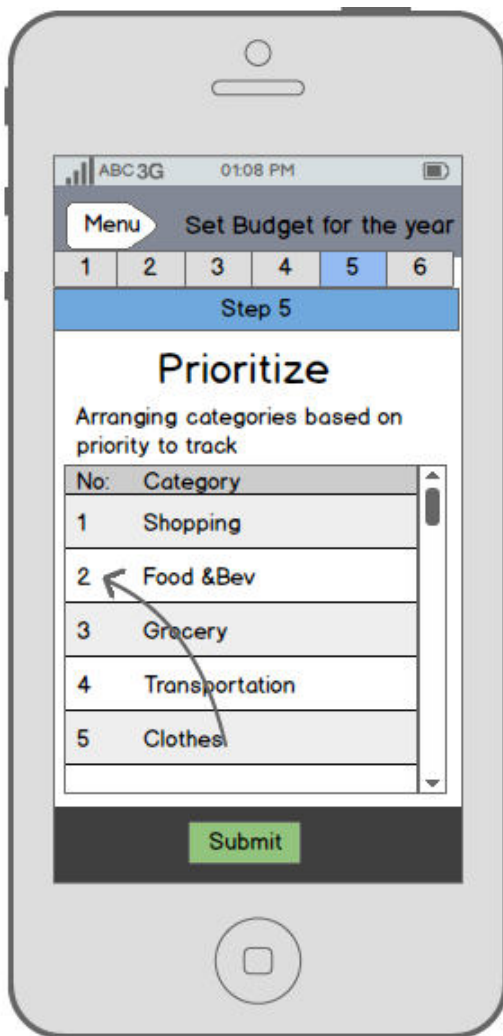
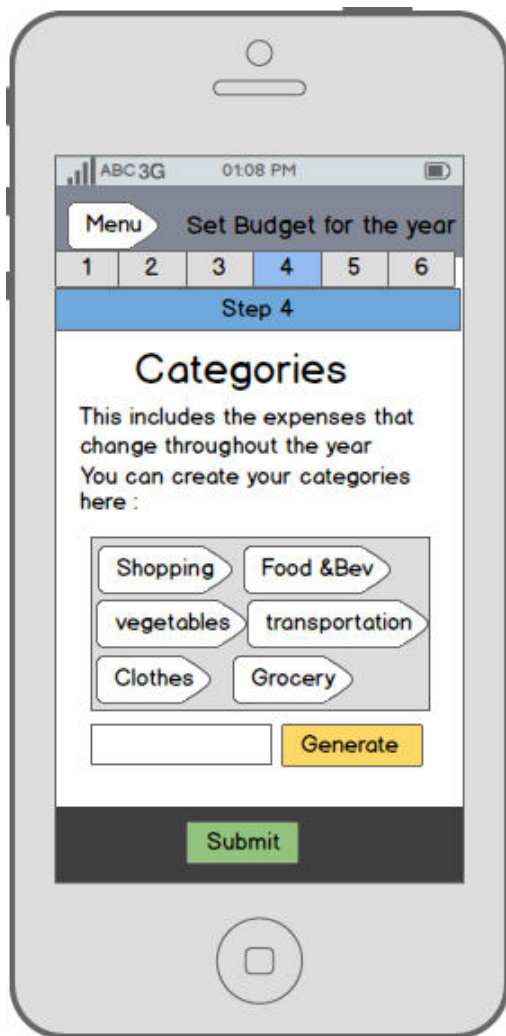
# Design 1

## Saving Money for future expenses

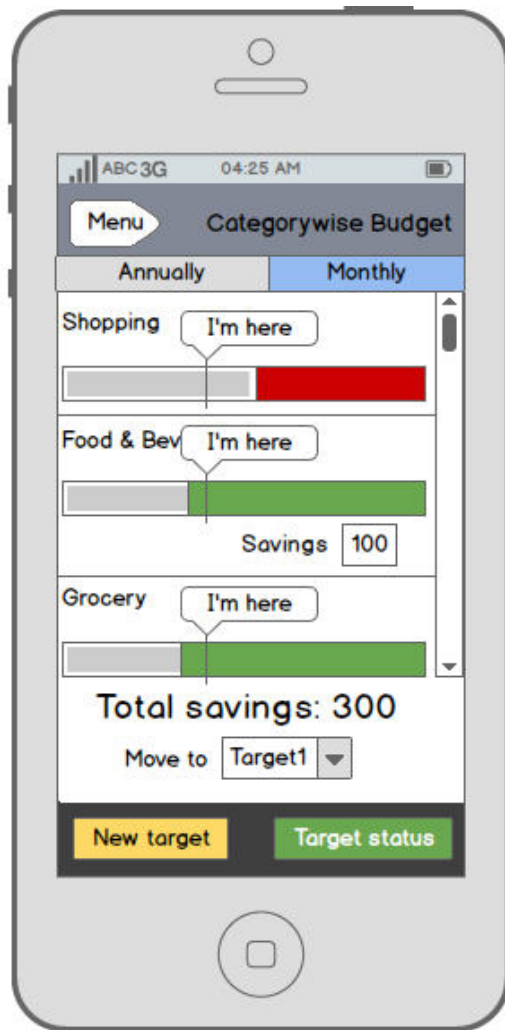
- Help user
  - Input expenses daily
  - Save money
  - Manage his expenses
  - Visualize his expenses

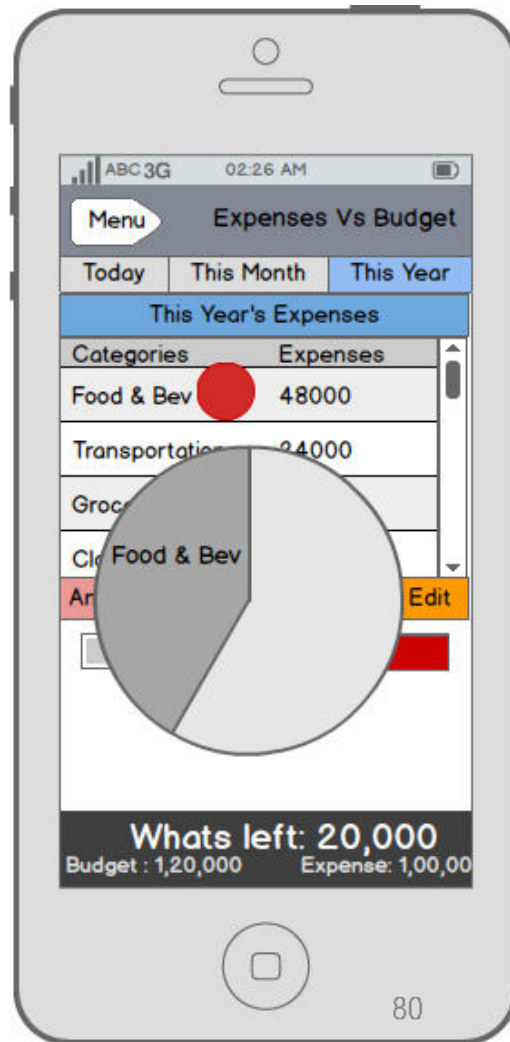
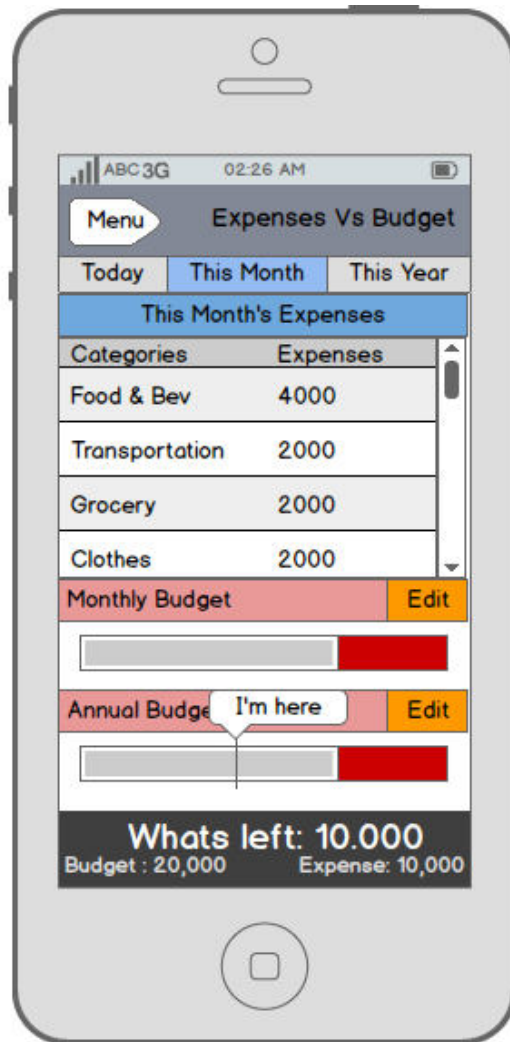
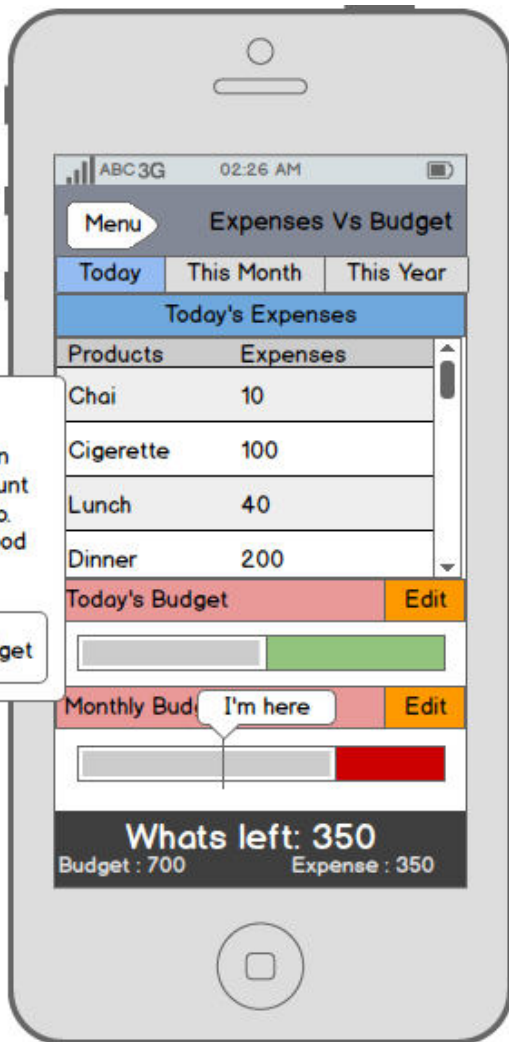












- Advantages:
  - Saving money for expenses
- Disadvantages:
  - Setting up a budget is difficult. Even for once in a year
  - Conscious decision to do everything ~ **too much effort**

# Design 2

## Shopping planner

- Help user
  - Search
  - Find the best product
  - Find whether his requirements are satisfied or not
  - Checklist before user goes for shopping
  - “To think twice before he buy”

User, 25 years old,  
student.

After a tiresome day's  
work, decides to go  
out for a coffee



#1 How can I  
help you?

Step: 1

#2 I would like to have  
a coffee

These suggestions are based  
on my history of user's  
purchases and the best places  
and products, other users  
have voted

#1 What would you like  
to have?  
Caffè Americano,  
Irish Coffee or a  
Cold Brew

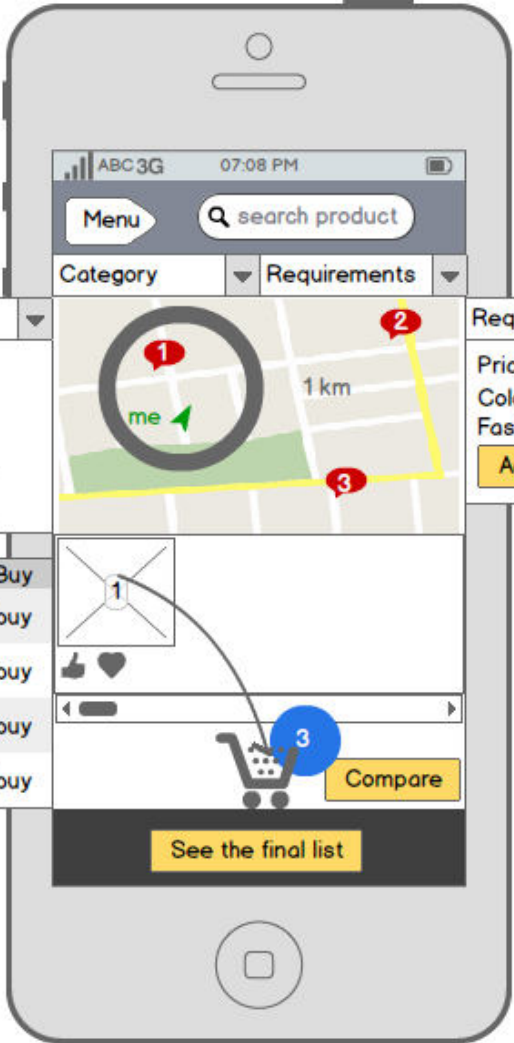
#2 I'll take an  
Irish coffee

Step: 2



These ratings that user is  
giving for a product, will be  
shared with other users

Voice input



Category

- Brand
- Sales
- Shop
- Place

Add new



Requirements

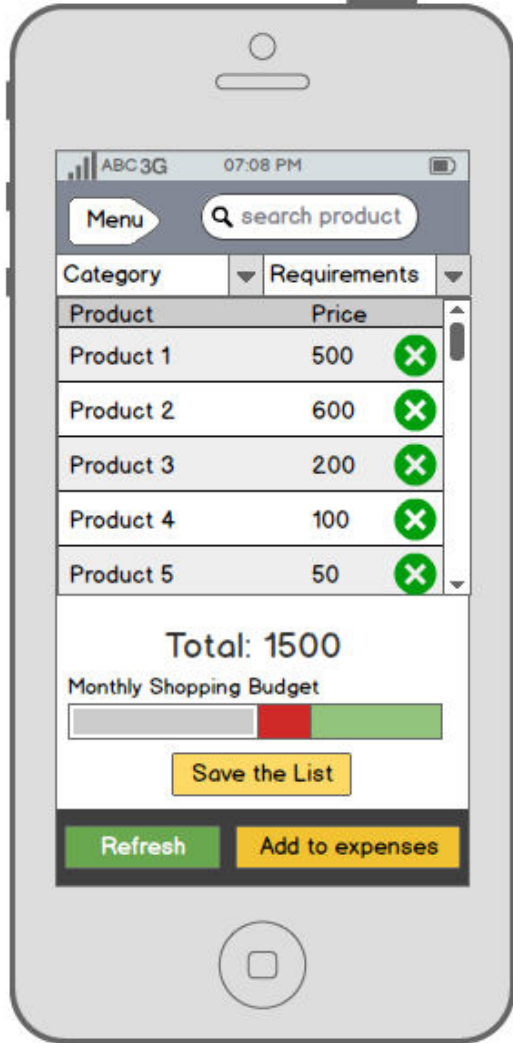
- Price
- Color
- Fashion

Add new

Product	Features	Ratings	Buy
Product 1	4	****	buy
Product 2	3	***	buy
Product 3	2	***	buy
Product 4	1	**	buy

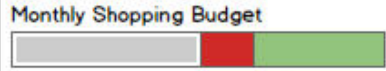
Compare

See the final list



Product	Price	
Product 1	500	✕
Product 2	600	✕
Product 3	200	✕
Product 4	100	✕
Product 5	50	✕

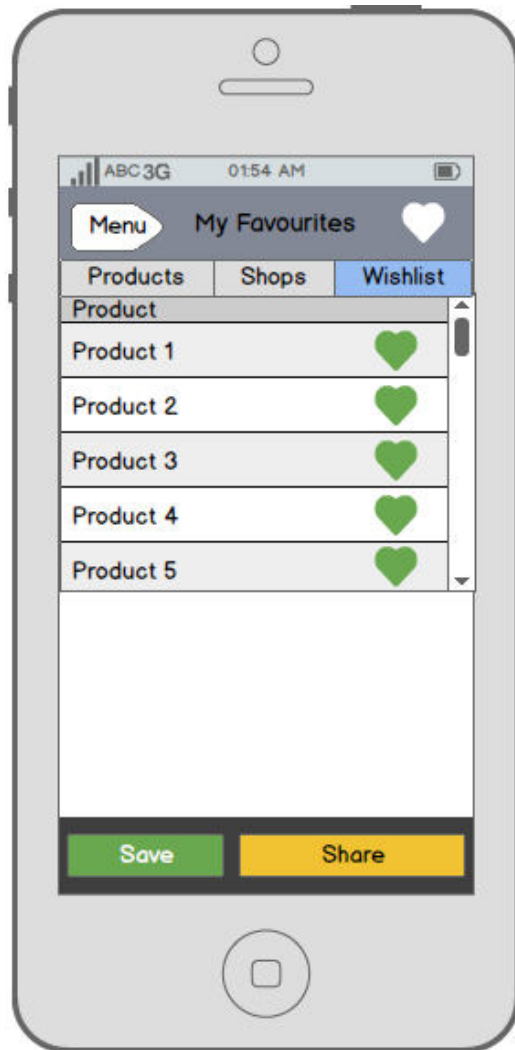
Total: 1500



Save the List

Refresh

Add to expenses



- Advantages:
  - Work with/without a expense tracker
  - Checklist when user goes for shopping
  - Locate best product at its best price
- Disadvantages:
  - Focuses only on large scale shopping, not on small daily expenditures

# Design 3

## “Responsive Money Management”

- Help user
  - Capture his data with less effort
  - Track his expenses and derive a pattern of his spending habits
    - Make sense of it and use it for betterment
  - Predict his future expenses
    - Initiate habit of saving for future
  - Sets budget automatically, modes to prevent “**I’m broke** 😞”

## User concerns\*

- “My expense wont be the same everyday”
- “I need freedom to spent my money”

\*anxiety; worry

- Predict user's future expenses
- Alert user when there is a need (user's shopping pattern)
- Automatically sets budget
- Freedom to the user: **embrace user habits**, intervene only when needed

# Experiment: predicting the list

Day 1		Day 2		Day 3		Day 4		Day 5	
Restaurant	400	Lunch	38	Brewberries	20	Cake	350	Attar	260
Brewberries	20	Brewberries	38	Lunch	44	Brewberries	20	Food	140
Cigarettes	20	Ice cream	35	Dinner	31	Camera	1500	Brewberries	42
		Recharge	111					Taxi	60
								Train	28
		Restaurant	400	Lunch	38	Brewberries	20	Brewberries	20
		Brewberries	20	Brewberries	20	Lunch	44	Lunch	44
		Cigarettes	20						

- E.g.  $P(\text{Brewberries}) = 1$



# Mode switching(an example)

Day	Money left	Days left	Daily spending	Average for day	Mode
1	8000	30	800	200 per day (M3)	M1
..	..	..	..	(based on user's pattern)	M1
..	..	..	..	..	M1
..	..	..	..	..	M1
10	4000	20	300	..	M2
..	..	..	..	..	M2
..	..	..	..	..	M2
..	..	..	..	..	M2
20	2000	10	200	200 per day	M3
..	..	..	..	..	M3
..	..	..	..	..	M3
..	..	..	..	..	M3
30	0	0	0	200 per day	M3

# Mode 1



- No restrictions at this mode.
- User should always try to maintain Mode 1 (“safe zone”)

# Mode 2

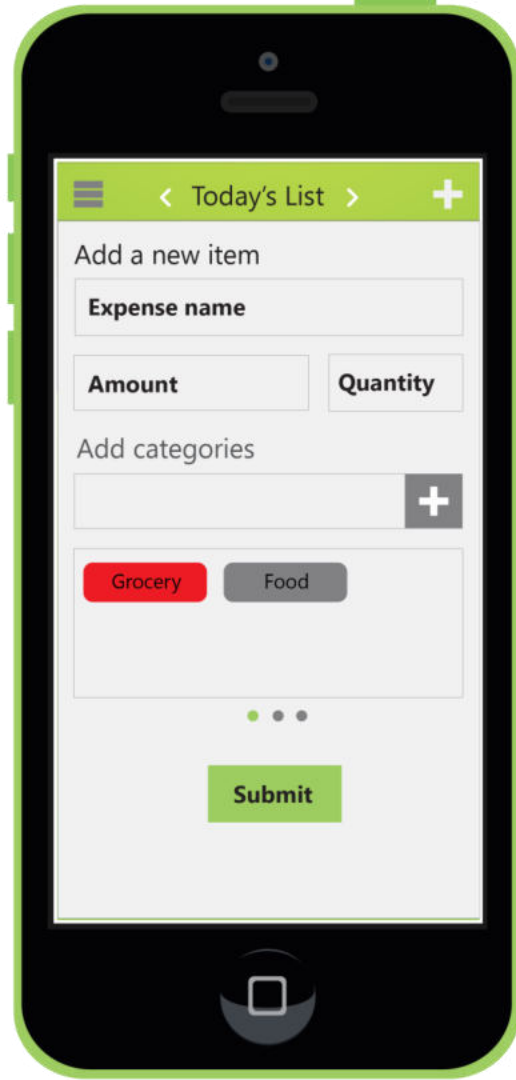
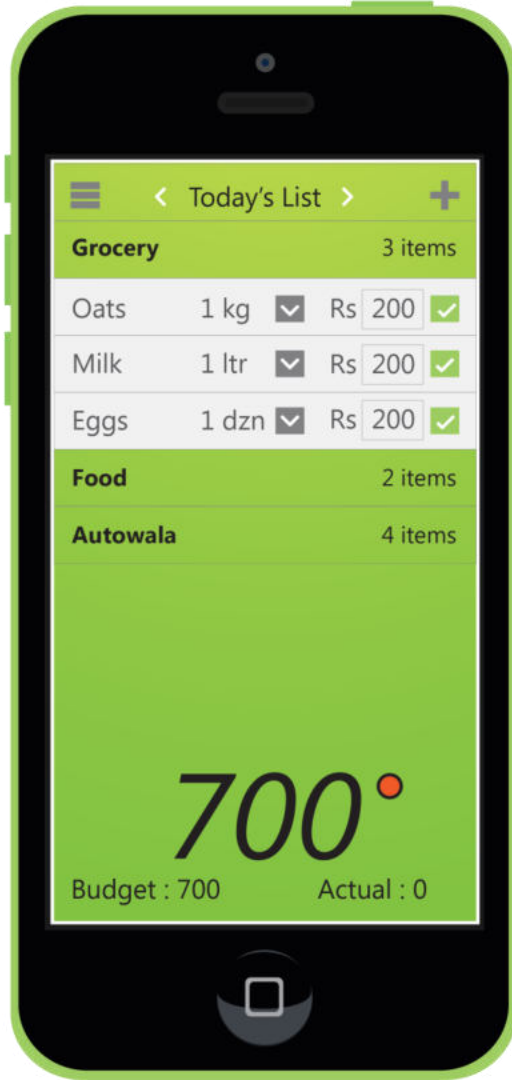
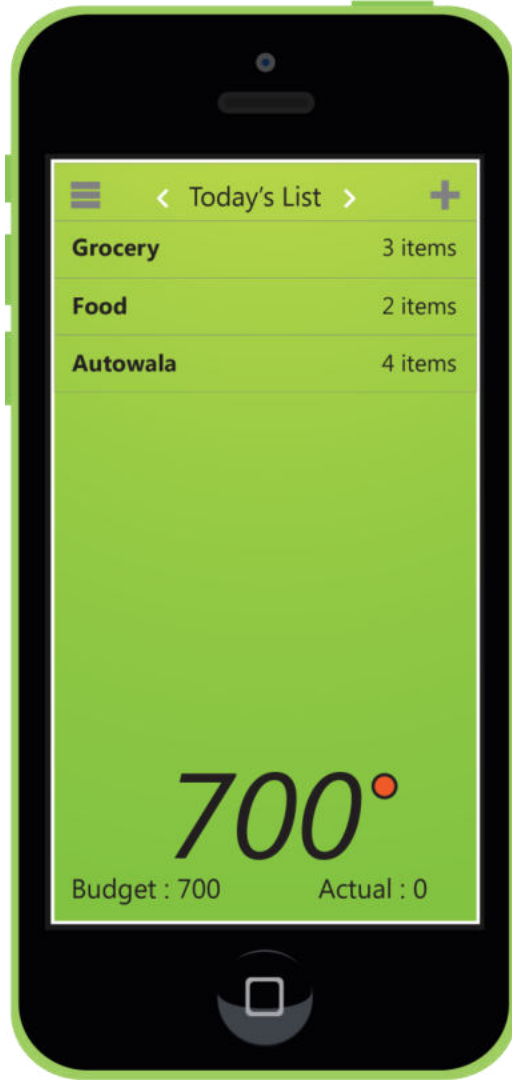


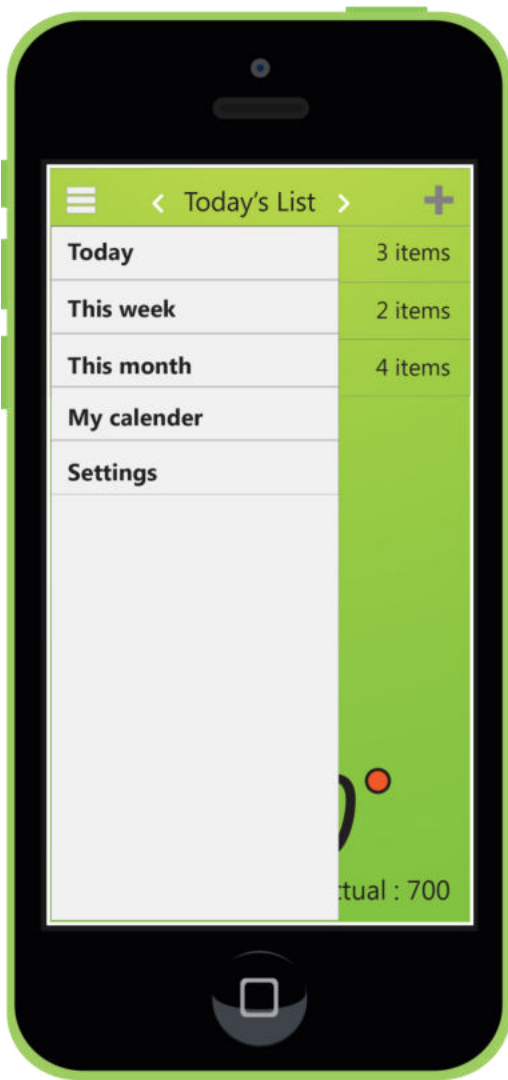
- “Alert”
- User should start controlling his expenses to go back to Mode1

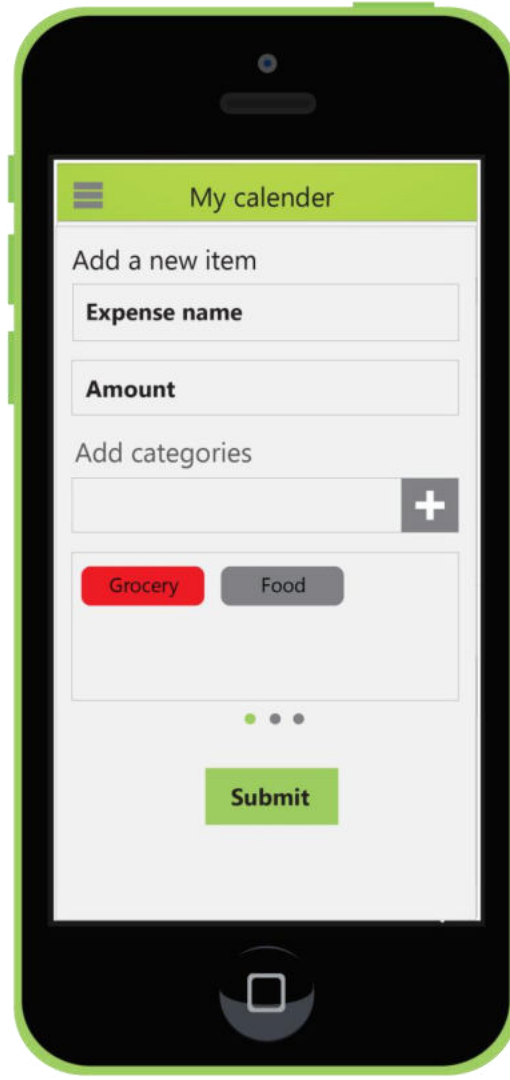
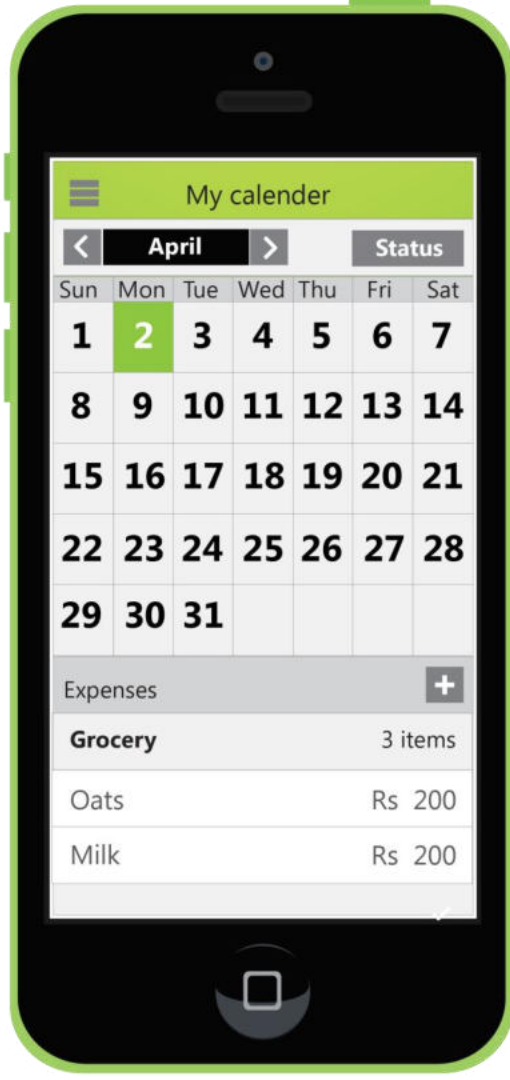
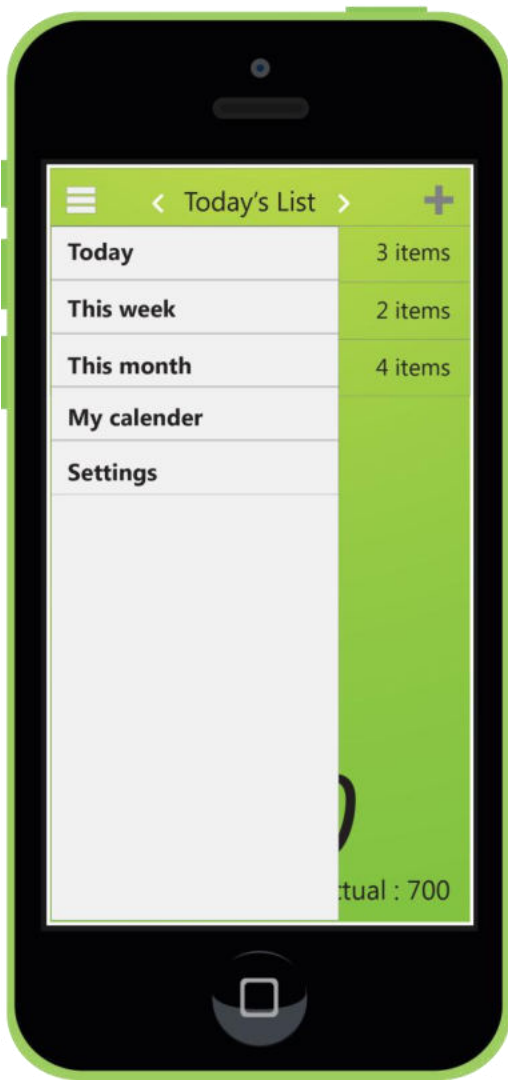
# Mode 3

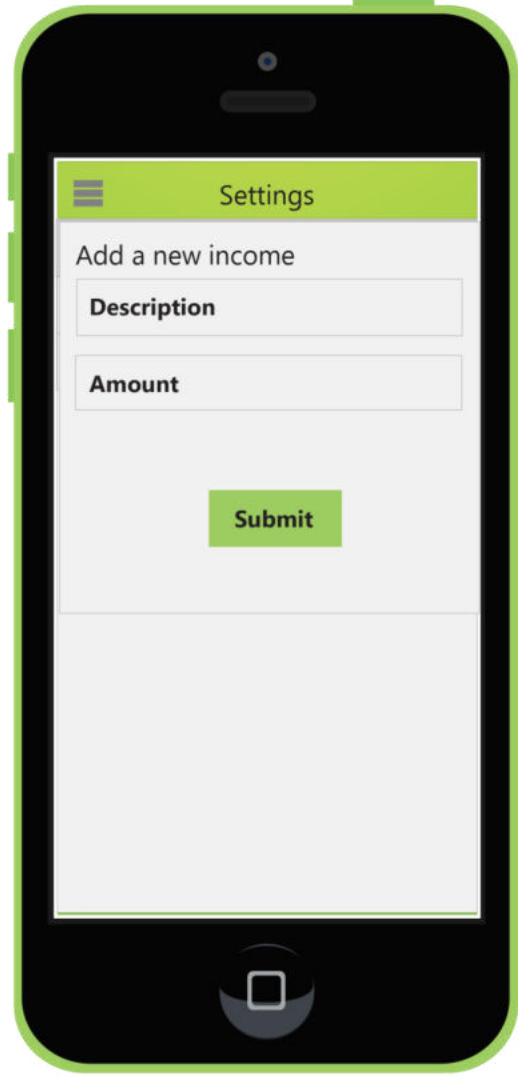
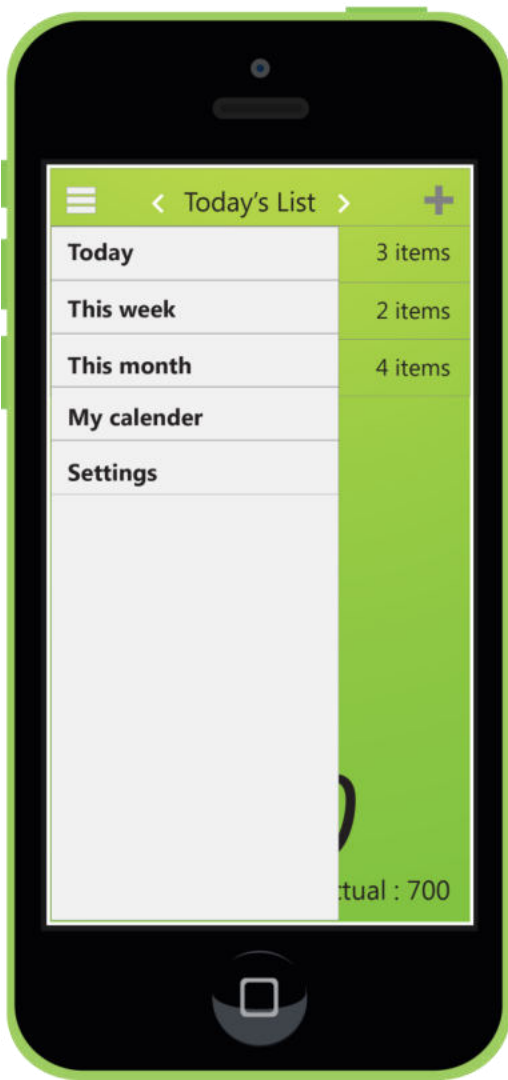


- “Warning”
- User has only enough money to support the remaining days









# Possible errors

- The list prediction is not accurate in the beginning, user should consider it as suggestions
- Takes time to learn & identify patterns
- Fails if user inputs expenses that are higher than income

# Advantages

- Spent money freely
- “Stay green”
- Can predict accurately once it learns user
- Identifies how frequent a product & reminds
- Modes can be switched backwards: acts like a buffer
- Even in mode3, user can meet his daily needs
- “like a plan B”

# Disadvantages

- Takes time to learn user's spending habits



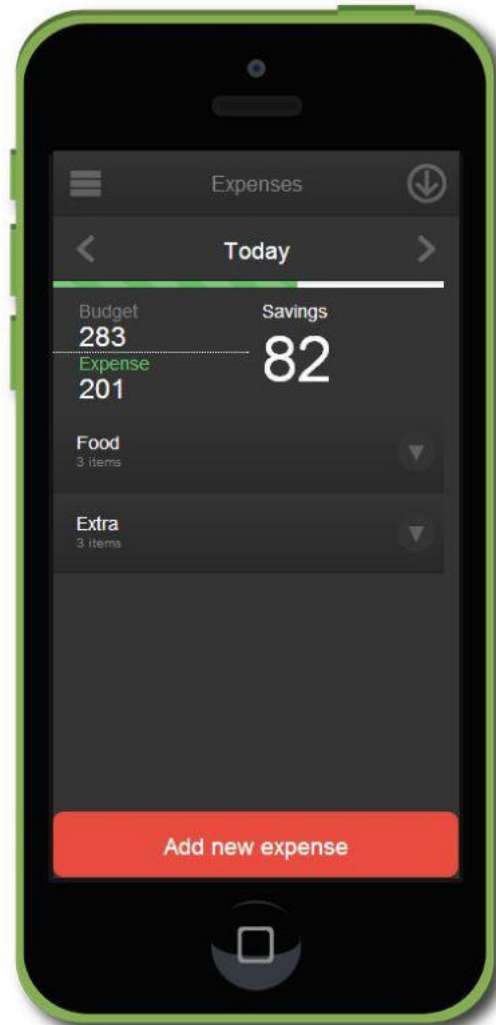
**FINAL DESIGN**

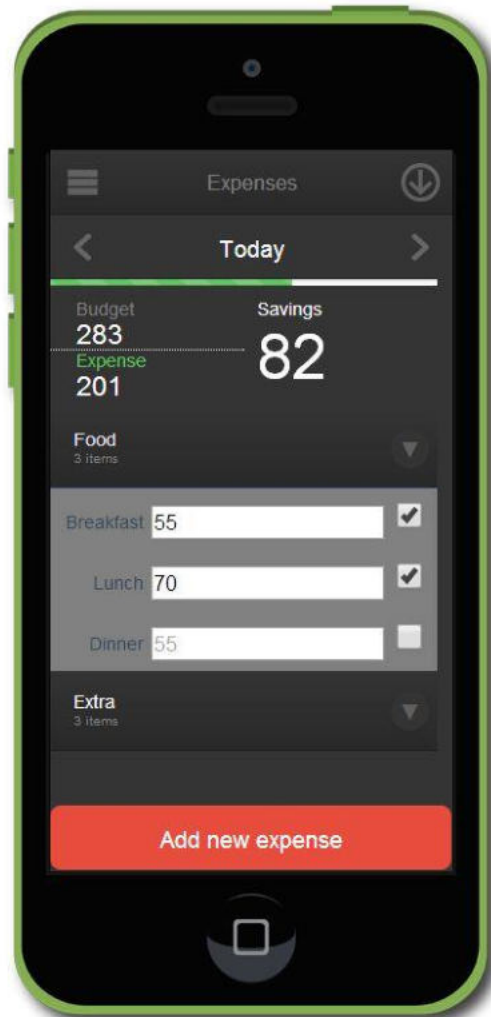
# Final design

## “Responsive Money Management”

- Support input using prediction
- Prediction list can also be used like a checklist for shopping
- Save money (targets)
- Visualization
- Enhance shopping experience ~ personalized offers
- Record user satisfaction

# Prediction





# Input

The image shows a smartphone screen with a dark-themed application titled "Daily expenses". At the top left is a hamburger menu icon, and at the top right is a download icon. Below the title bar is a close button (X). The main content area is titled "Add a new item" and contains two text input fields: "Expense name" and "Amount". Below these is a section titled "Add categories" with a text input field and a plus sign (+) button. Underneath are two buttons labeled "Travel" and "Food". At the bottom of the screen is a large red "Submit" button. The phone's home button is visible at the very bottom.

# Input

Daily expenses

Add a new item

Expense name

Amount

Add categories

Travel +

Travel Food

Submit

# Input

The image shows a smartphone screen with a dark-themed application titled "Daily expenses". The interface includes a hamburger menu icon on the top left, a close icon (X) on the top right, and a refresh icon (downward arrow) on the top right. Below the title, there is a section titled "Add a new item" containing two text input fields: "Expense name" and "Amount". Below this is a section titled "Add categories" with a text input field containing "Travel, food" and a plus sign (+) on the right. Underneath the input field are two blue buttons labeled "Travel" and "Food". At the bottom of the screen is a large red button labeled "Submit". The phone has a green case and a home button at the bottom.

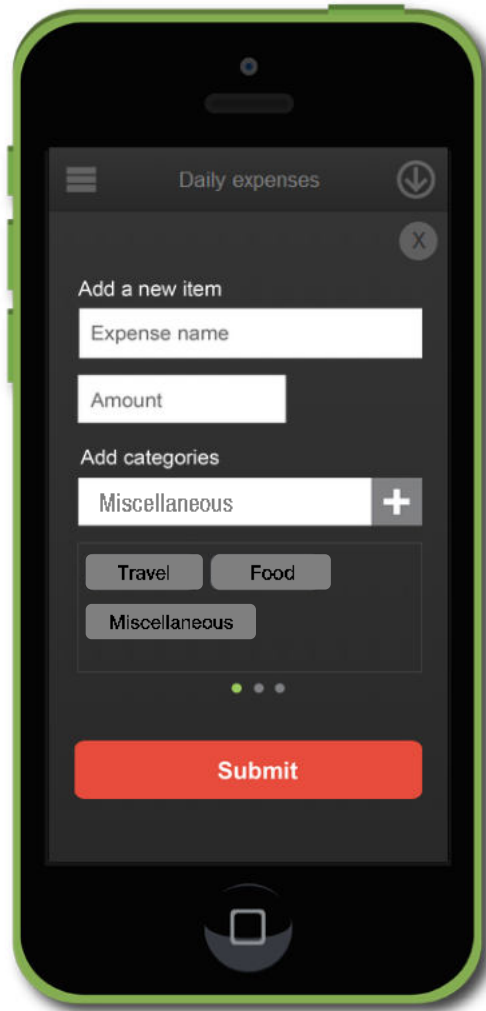
# Input

The image shows a smartphone screen with a dark-themed application titled "Daily expenses". The interface includes a hamburger menu icon on the top left, a close icon (X) on the top right, and a refresh icon (downward arrow) on the top right. Below the title, there is a section titled "Add a new item" containing two text input fields: "Expense name" and "Amount". Below these fields is a section titled "Add categories" with a text input field and a plus sign (+) on the right. Underneath the category input field are two buttons labeled "Travel" and "Food". At the bottom of the screen, there is a red "Submit" button. The phone's home button is visible at the very bottom.

# Input

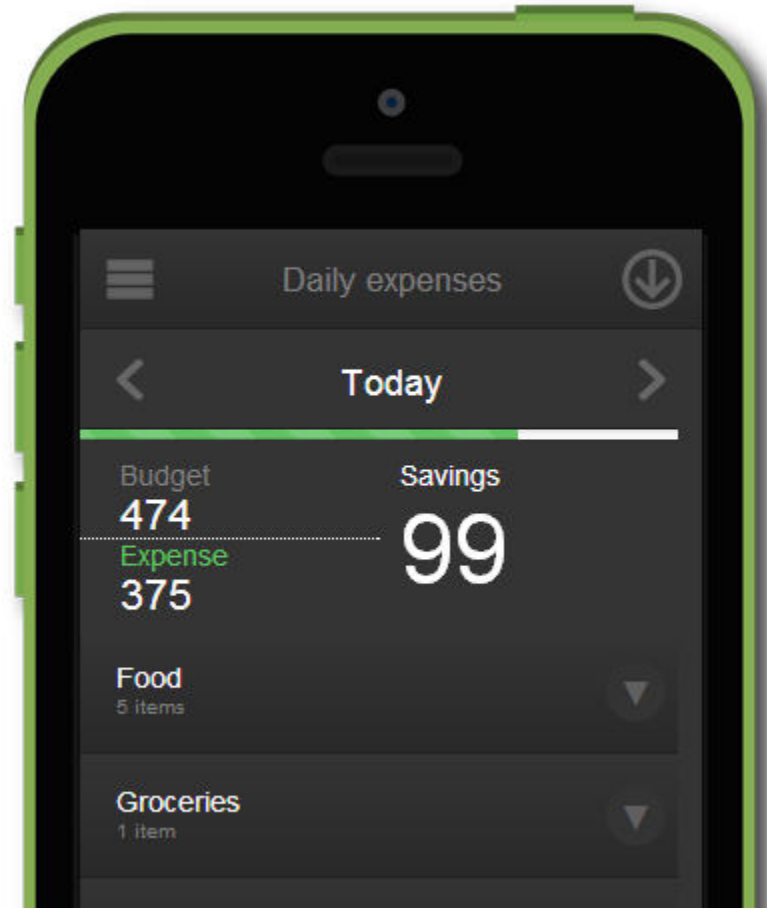
The image shows a smartphone screen with a dark-themed application titled "Daily expenses". At the top left is a hamburger menu icon, and at the top right is a download icon. Below the title bar is a close button (X). The main content area is titled "Add a new item" and contains two text input fields: "Expense name" and "Amount". Below these is a section titled "Add categories" with a text input field containing "Miscellaneous" and a plus sign button. Underneath are two buttons labeled "Travel" and "Food". At the bottom of the screen is a large red "Submit" button. The phone's home button is visible at the very bottom.

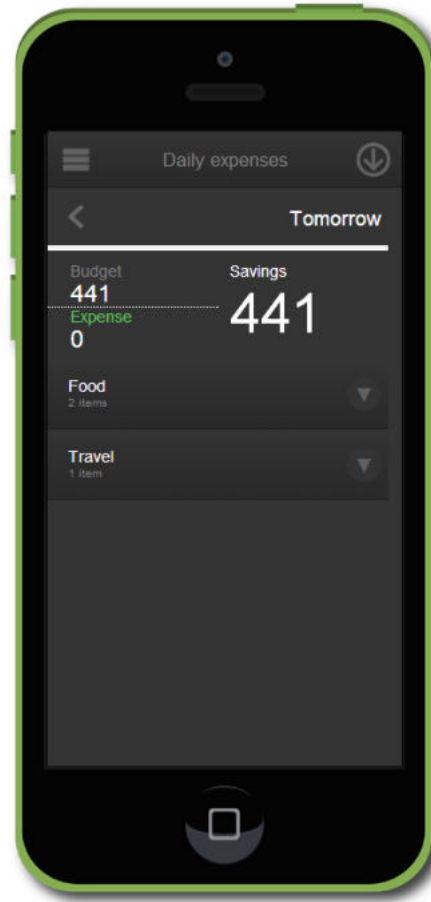
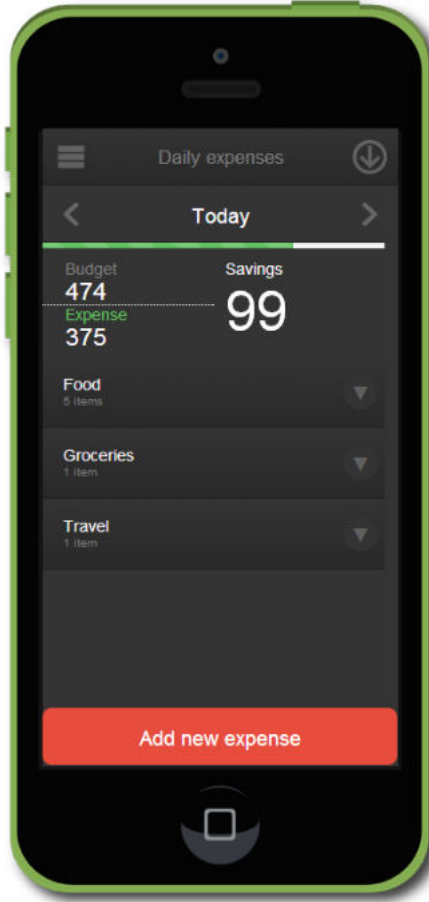
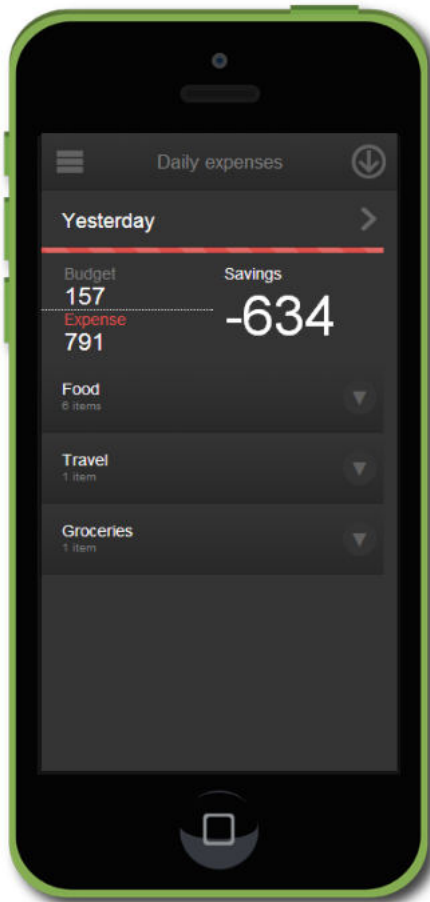
# Input

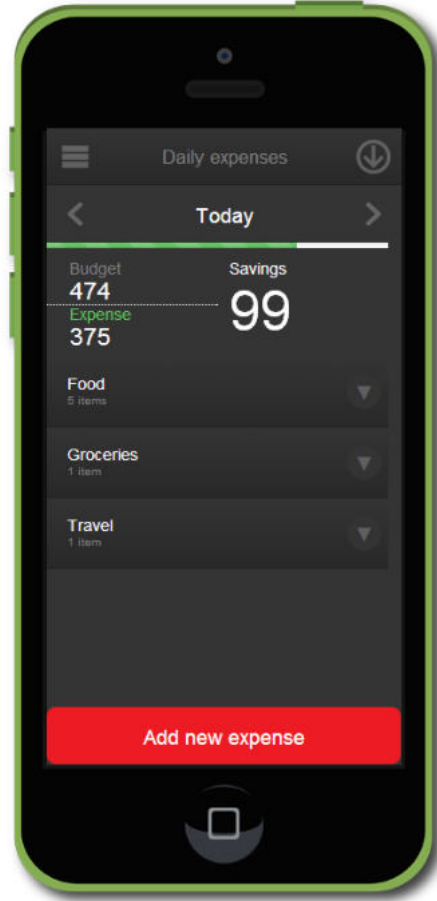
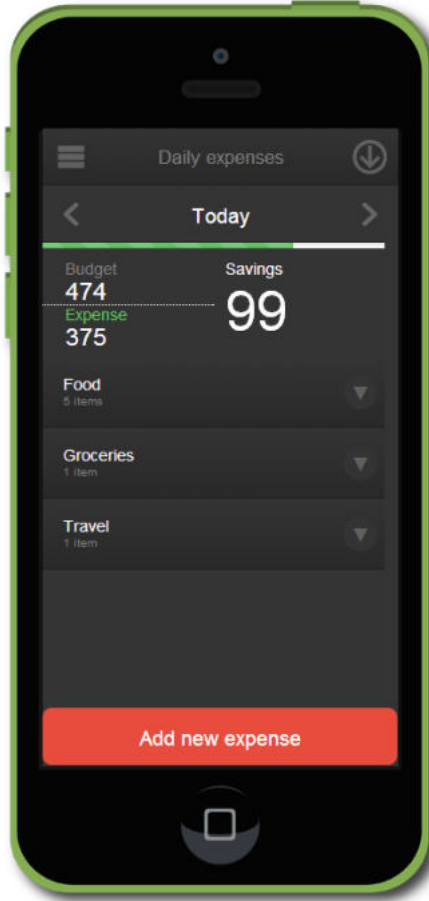
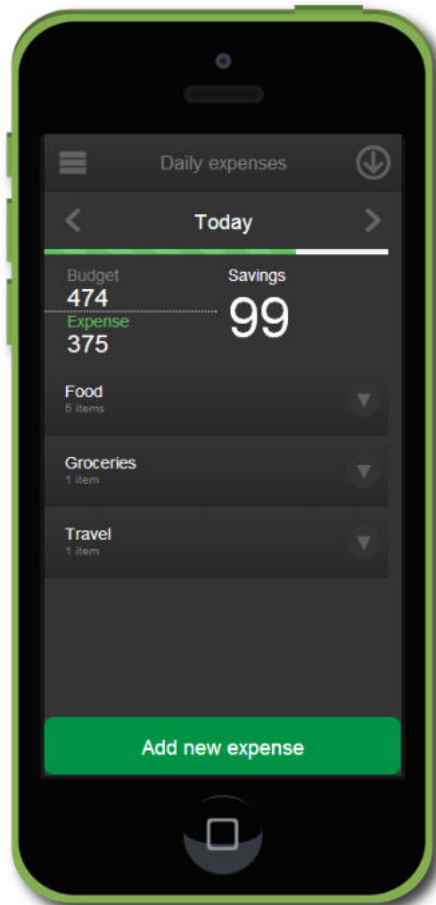


# Visualization

- Why progress bar for visualization?
- Why savings is given more preference?

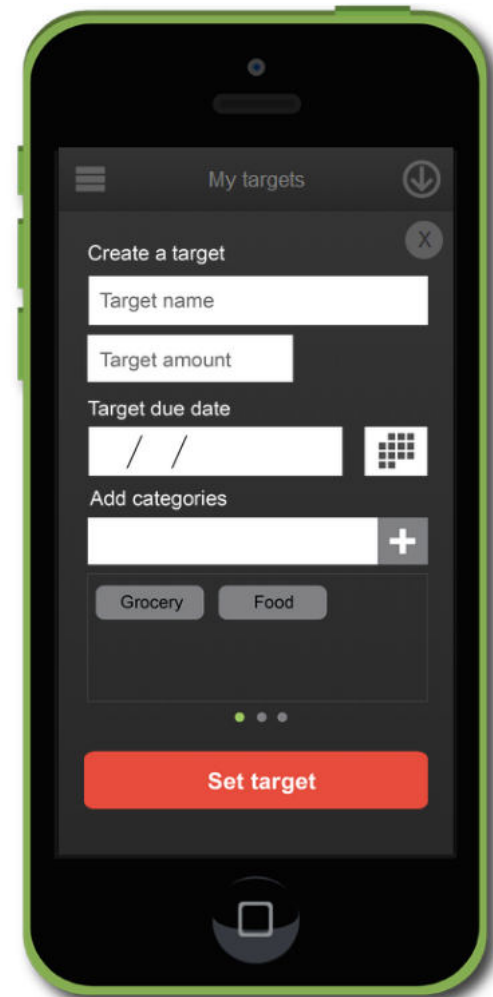
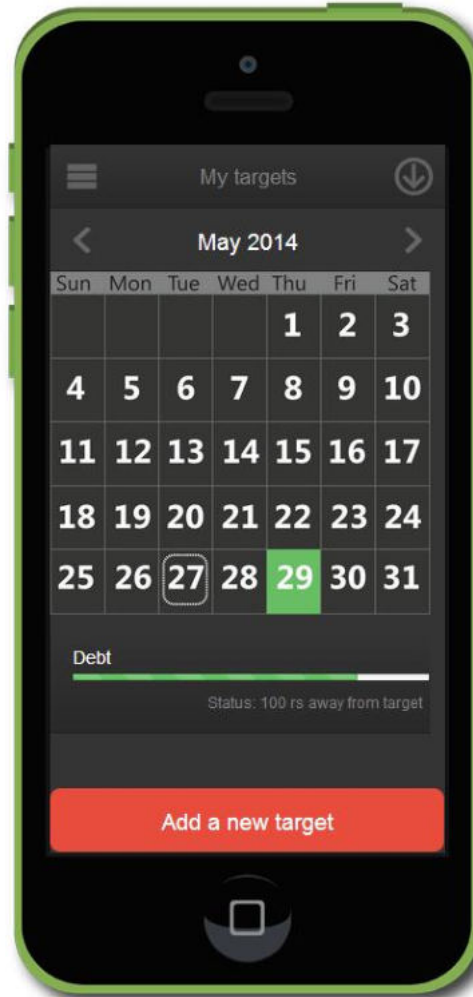






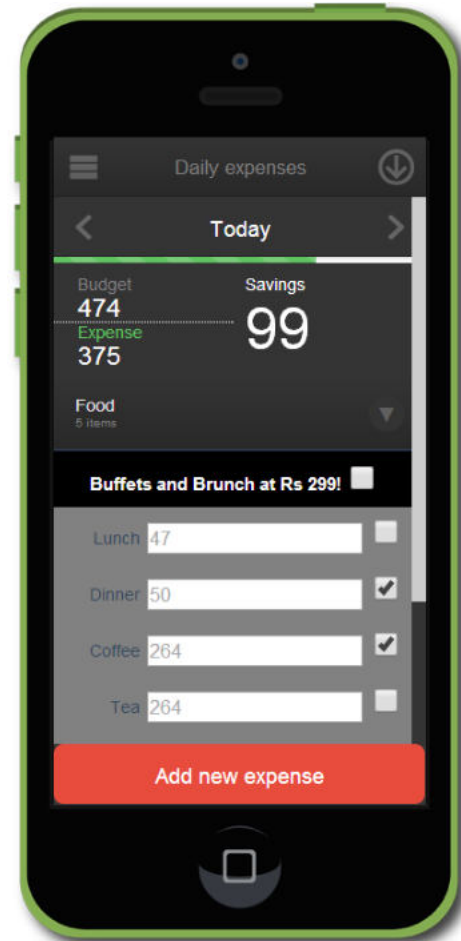
# Saving money

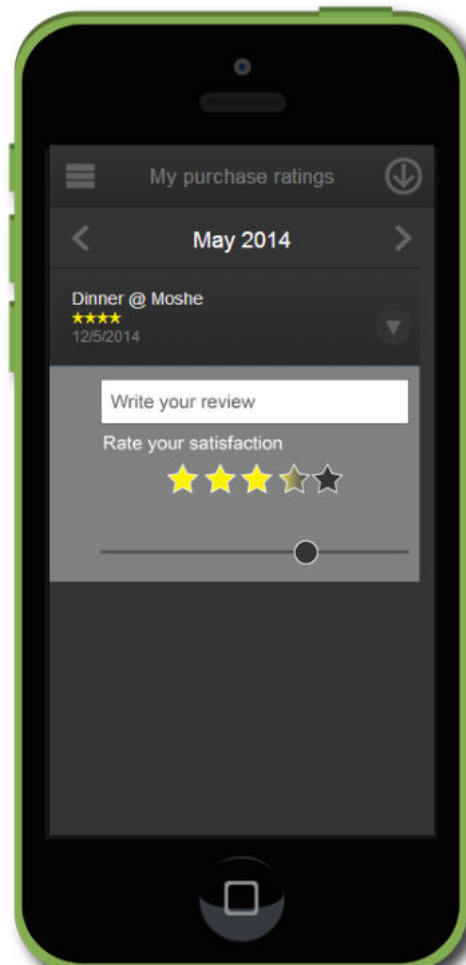
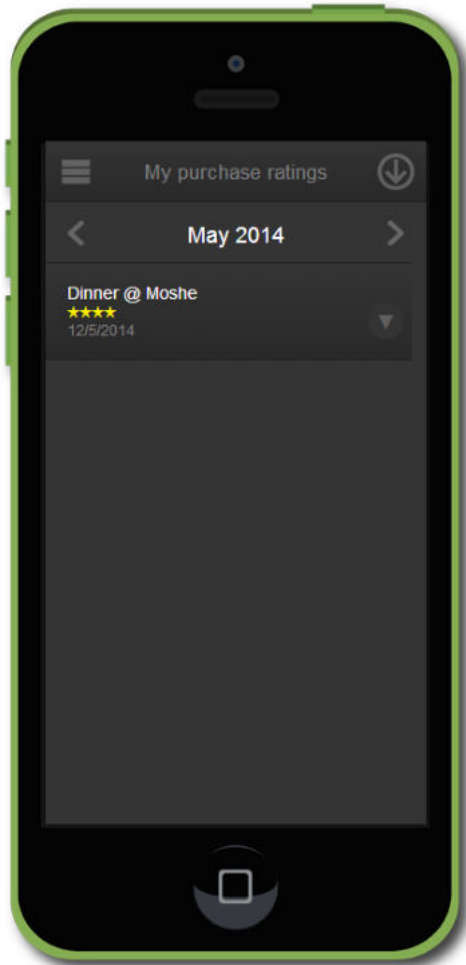
- How to save money?



# Enhancing shopping experience

- Facebook, foursquare
- Filters offers based on how many friends used it
- Reviews based on user experience
- Difference between giving a rating when user buy a product and after using a product





**Scenario 1:** Scenario describing how a user uses prediction mechanism to input his daily expenses.



Rohit is returning home after a tiresome office work



On the way back home, remembered he has to buy some grocery, but forgot what all things he has to buy



Rohit takes out his new mobile application and reads out today's predicted list for category "grocery". He also enters the expenses meantime

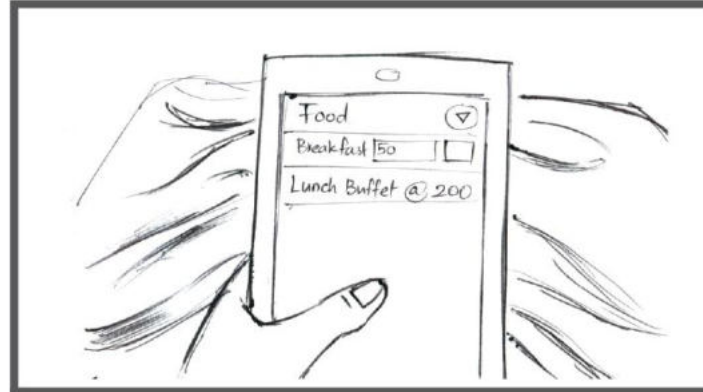


Rohit can see how much did he spend today. Now rohit doesnt have to spend extra time in writing down his shopping list or calculating his daily budget

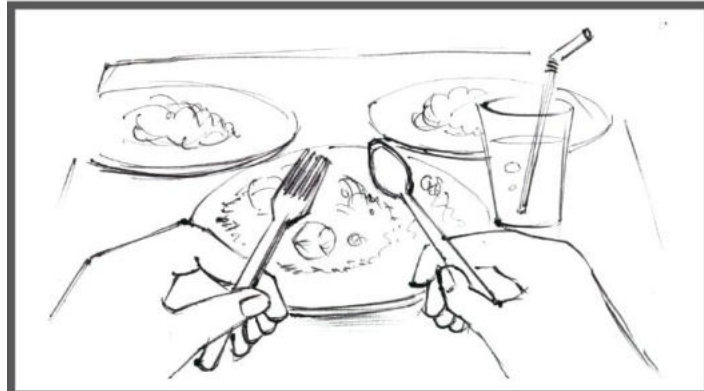
## Scenario 2: Scenario showing how the application can enhance user's shopping experience



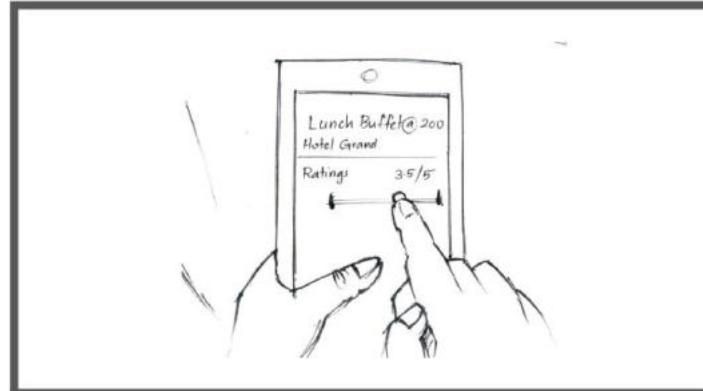
Its Sunday morning, Deepak woke up late. He is hungry and wants to find some place to have his brunch



Deepak opens his new mobile application to see if there are any offers in the locality and finds one



After claiming the offer, Deepak rushes to the restaurant

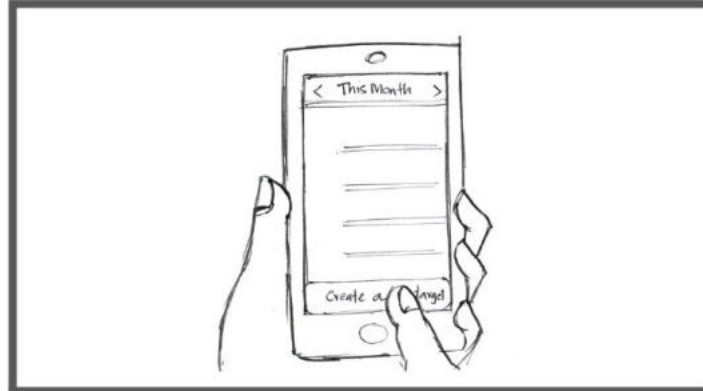


Deepak enjoys his brunch and gives his ratings

**Scenario 3:** How the application can help user save money for her future expenses.



Radhika is at her office, she gets a call from her sister reminding her of their parents' wedding anniversary



Radhika realizes that she hasn't saved any money for the event, she opens her new application and creates a new target with due date



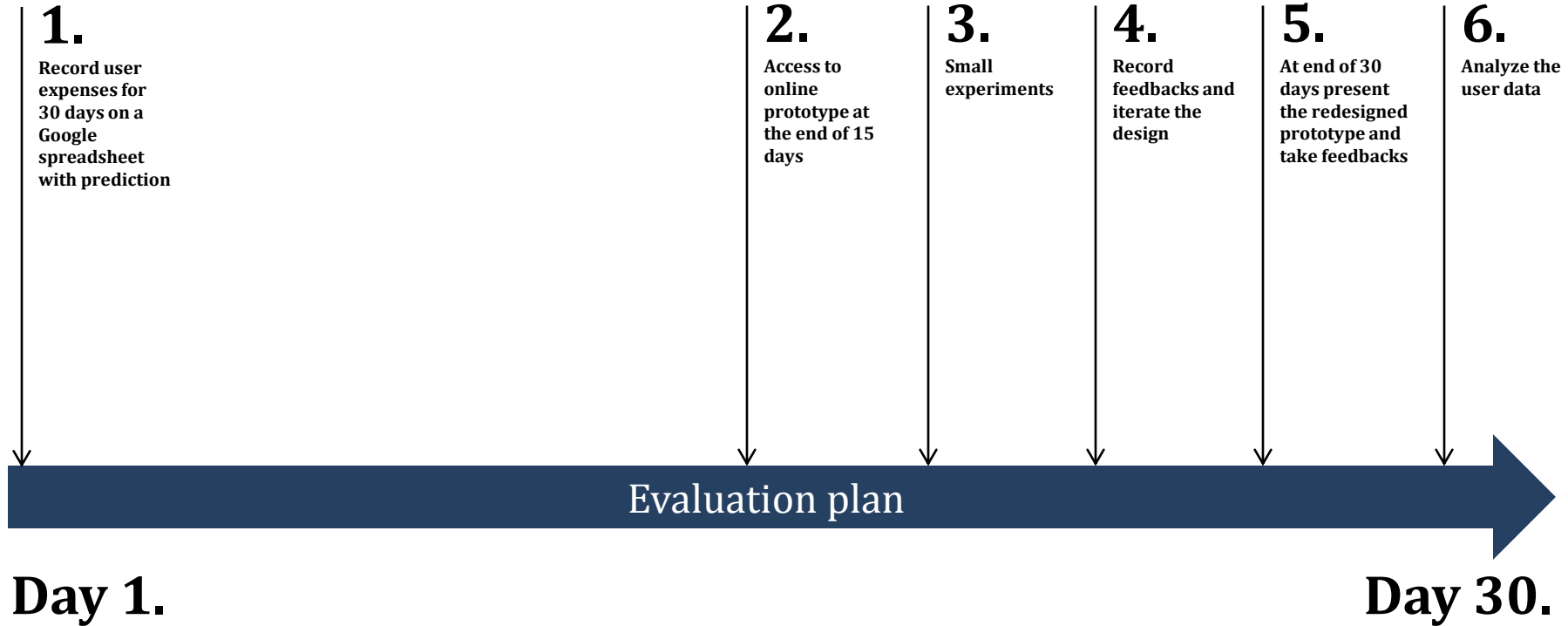
Radhika daily makes sure that she saves enough money for the next two months



Finally the due date is reached, now she has enough money to celebrate and buy loads of gifts for her parents



# **EVALUATION**



**1.**

Record user expenses for 30 days on a Google spreadsheet with prediction

**2.**

Access to online prototype at the end of 15 days

**3.**

Small experiments

**4.**

Record feedbacks and iterate the design

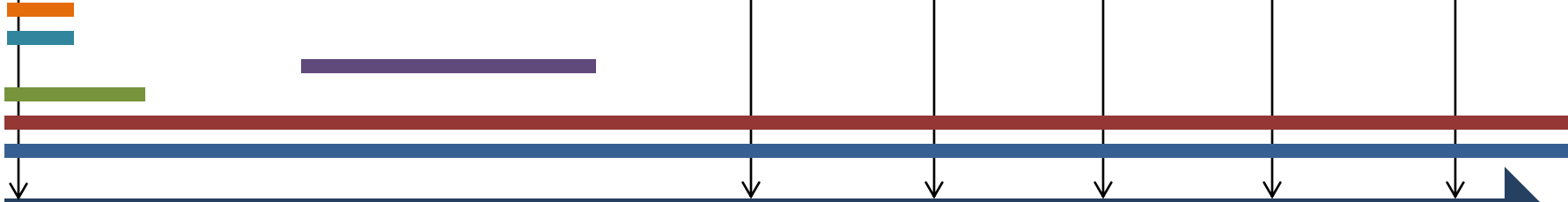
**5.**

At end of 30 days present the redesigned prototype and take feedbacks

**6.**

Analyze the user data

User 1  
User 2  
User 3  
User 4  
User 5  
User 6



**Day 1.**

6 users

**Day 30.**

2 users

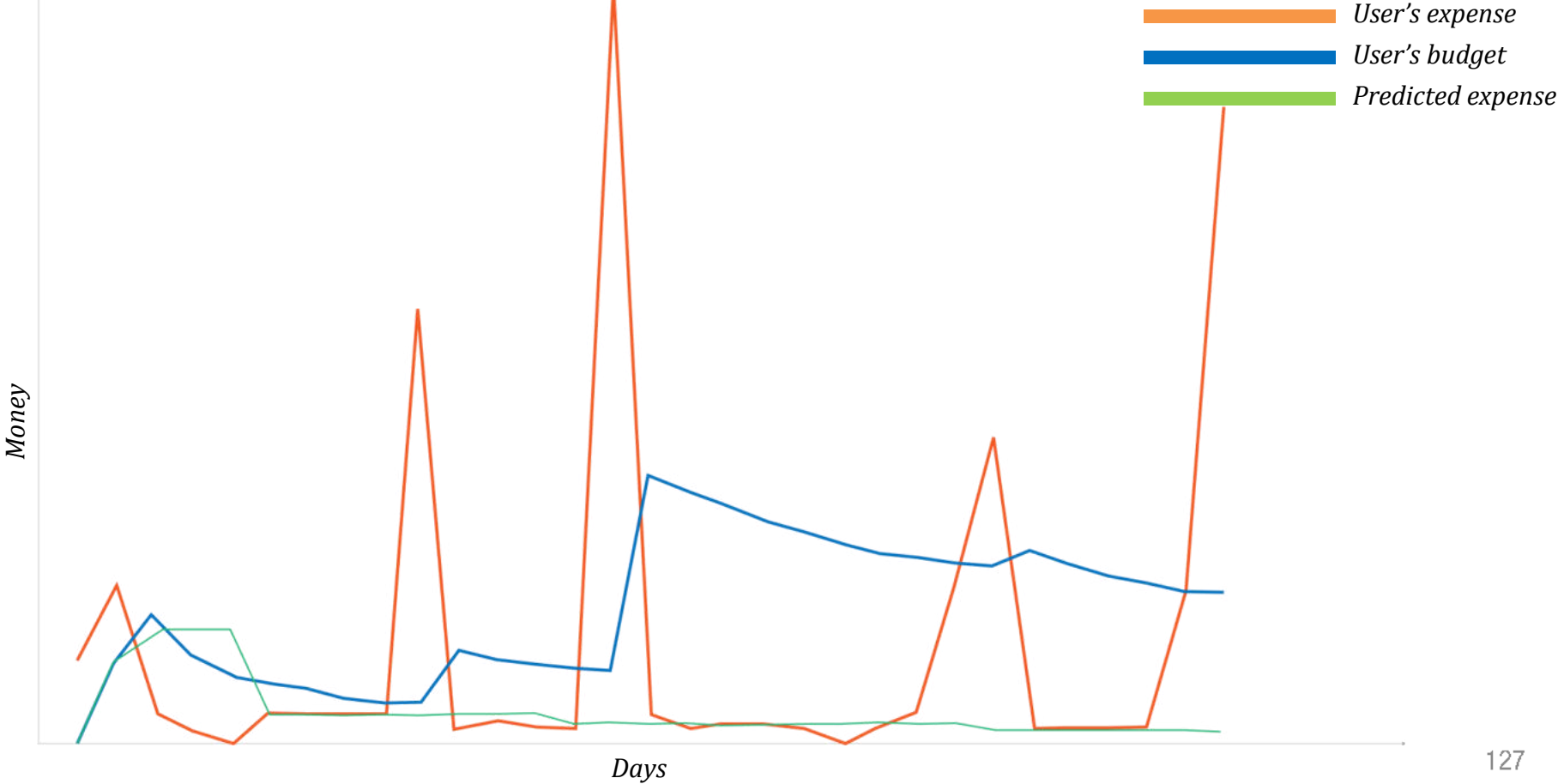
fx

	A	B	C	D	E	F	G	H	I	
1	<b>Day 2 (18/4/14)</b>									
2	<b>Predicted expense</b>			<b>User's original expense</b>			<b>Money left</b>	<b>Days left</b>		
3	Budget for Day 2: Rs. 157			Actual expense (total expense) for Day 2: Rs 791			(for this month)	(for this month)		
4	<b>Category of expense</b>	<b>Name of expense</b>	<b>Amount spent</b>	<b>Category of expense</b>	<b>Name of expense</b>	<b>Amount spent</b>				
5	Food	Tea	30	Food	Lunch	47				
6	Food		77	Groceries	Munchies, stationary, etc.	424				
7	Dinner	Canteen	50	Travel	Auto to and fro	56				
8				Food	Coffee, muffin	264				
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

# What went wrong?

- Average (budget & actual) for predicting next day's expense
  - Used mean of all previous actual expenses to make the prediction instead
- Maximum probability of an expense to occur
  - Habits disappeared quickly but prediction did not
  - Followed 7 day rotating cycle to predict possible daily expenses instead

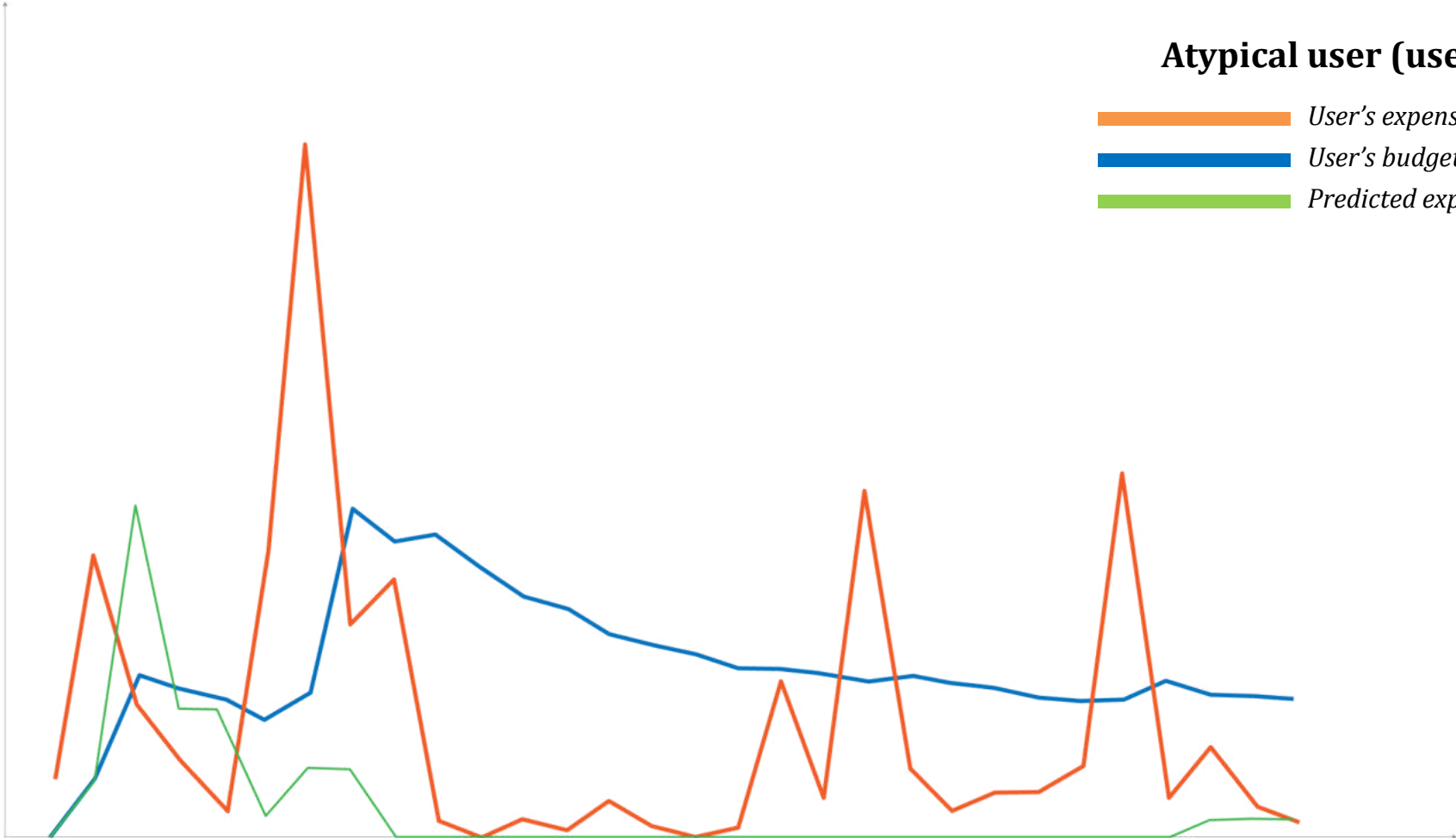
# Typical user (user 1)



# Atypical user (user 2)

- *User's expense*
- *User's budget*
- *Predicted expense*

Money



Days

128

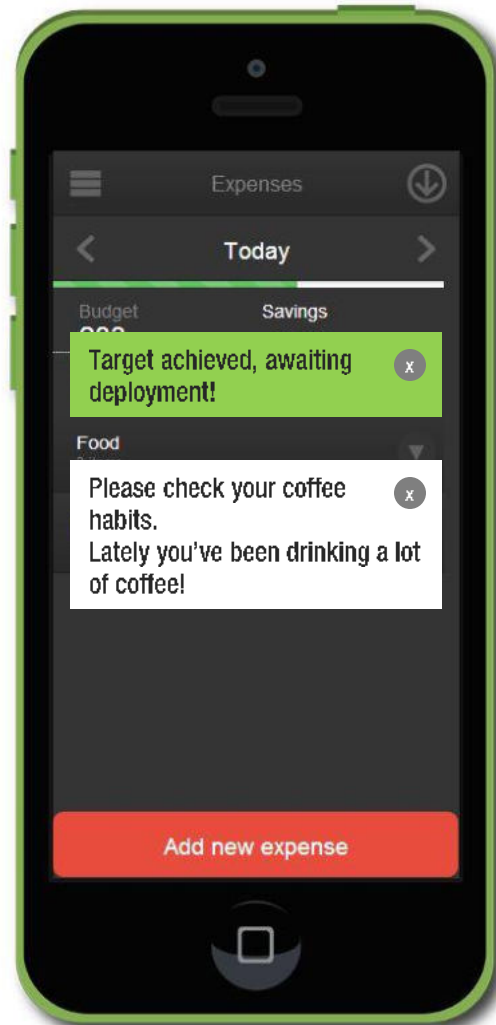
# Results

- Why users left the process?
  - “no reminder”
  - Work pressure, couldn't find time to fill the form
  - “I know I wont spend beyond my salary limit”
  - It wasn't rewarding, lacked motivation
  - “If it was on my phone, It would have been easier to input”

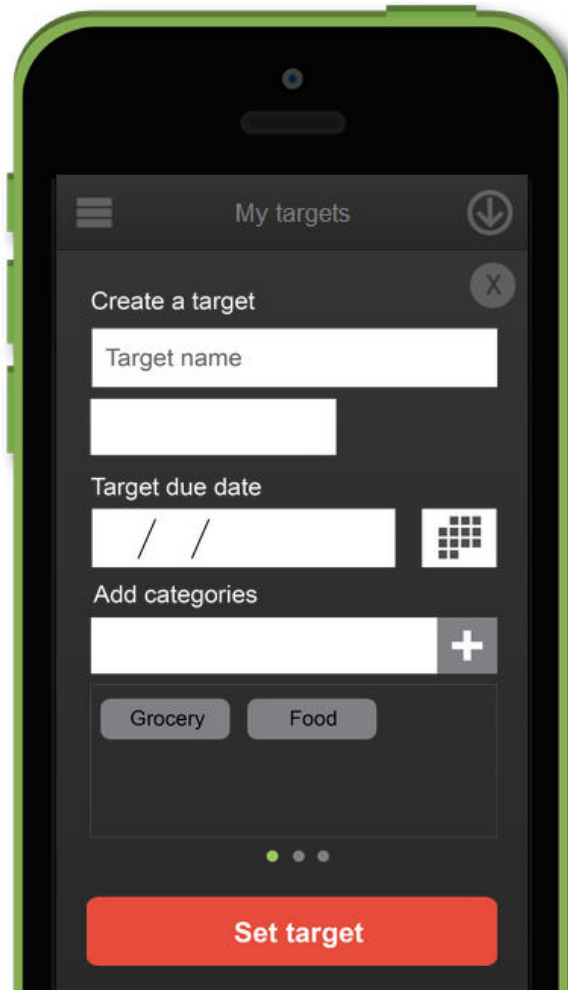
# User feedbacks

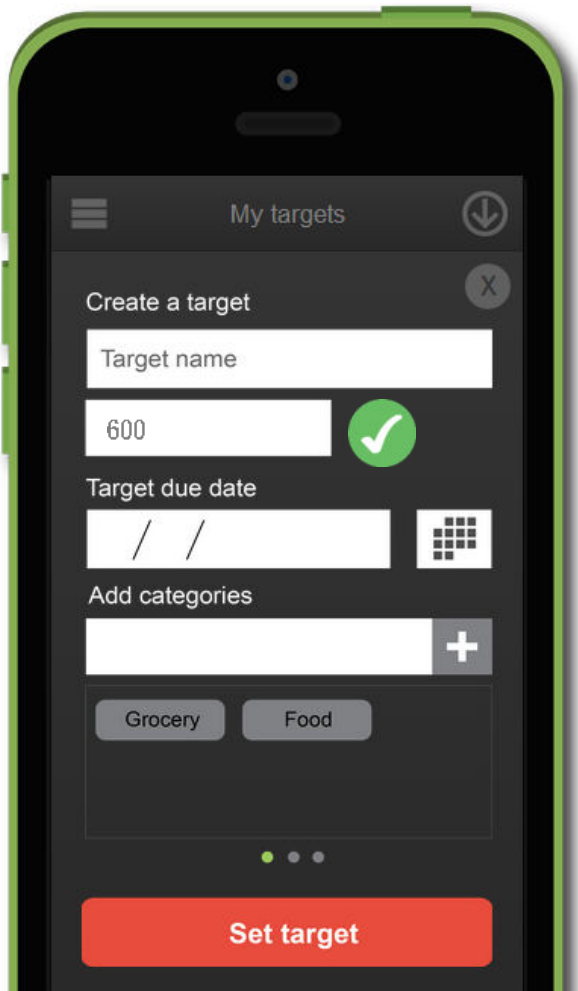
- How will I know the status of my targets?
- What if I've a sudden expense and I want to know whether it fits my budget?
- “I want to know my actual expense.. This is different”

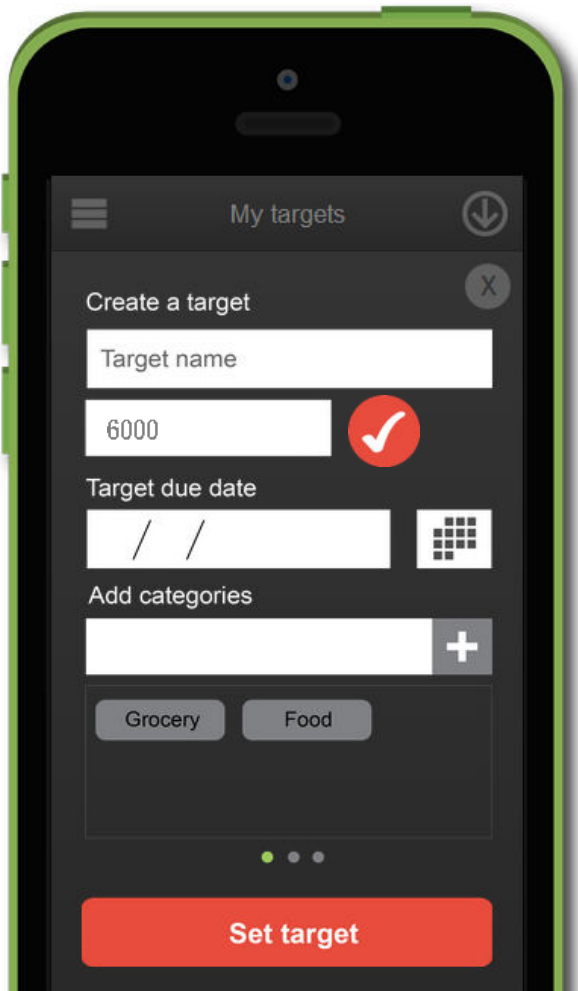
# Target status

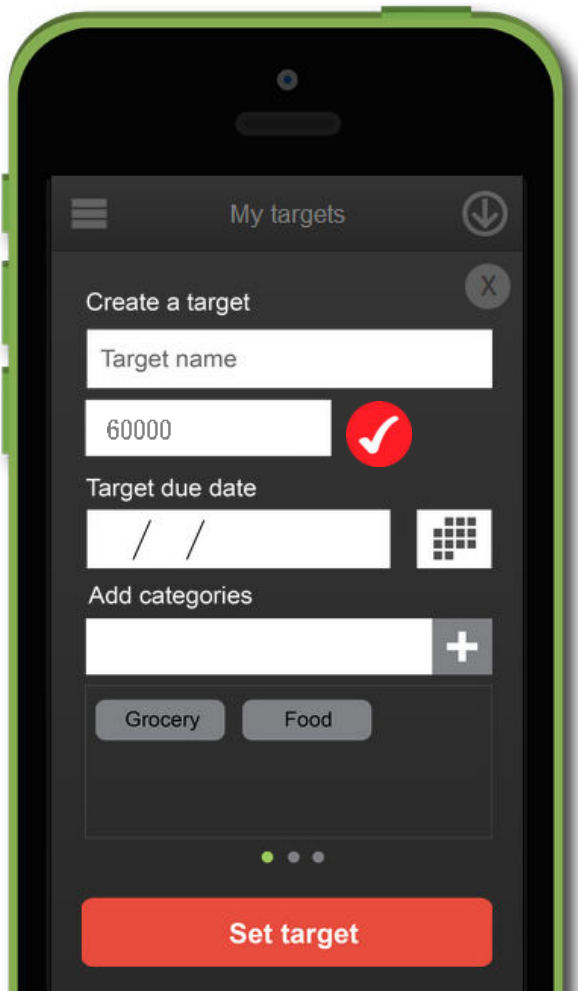


# Input check

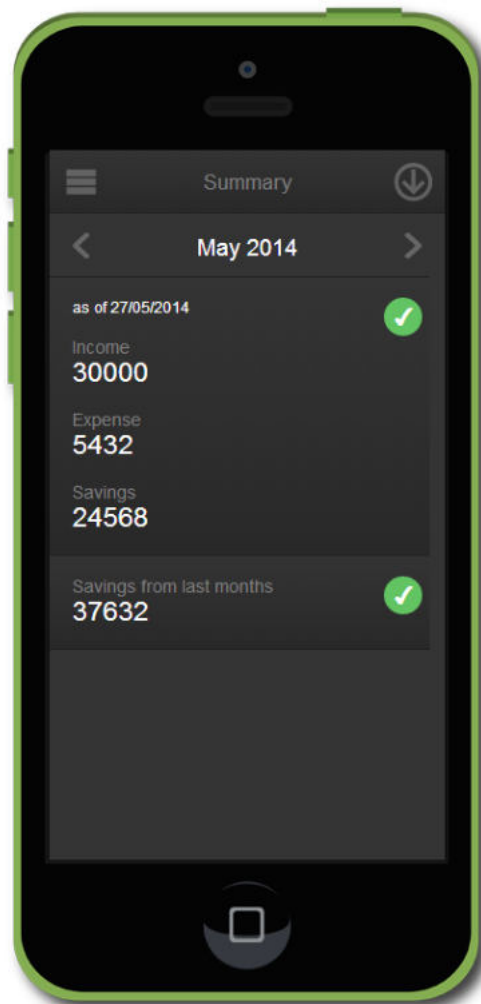








# Summary

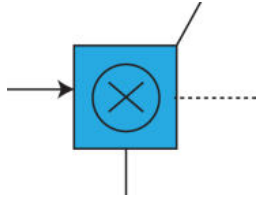


# What did I learn

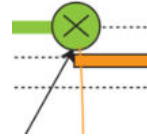
- Budget prediction is responsive but takes time to adapt
- Habits evolve quickly
  - Strong(Typical user): stay over a long period
    - Easy to capture
  - Weak(Atypical user): appear & disappear quickly
    - Hard to capture



# How it works?



Budget and List generating engine



Mode switching engine

