



# **Re-Designing** **AUTOMATIC TICKET VENDING MACHINE**

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# Overview

- Need of project
- Research
- Problem identification
- Explorations
- Final concept



## Need of project

- Wastage of time because of long queue at ticket counters.
- Trains being cheapest and fastest mode of transport so more and more people turning towards it.
- Everyday increasing population, but inadequate number of ticket counters.
- Money change problems
- Varied range of users, training is impossible so simple and easy interface.



# Research



## Study of Existing System



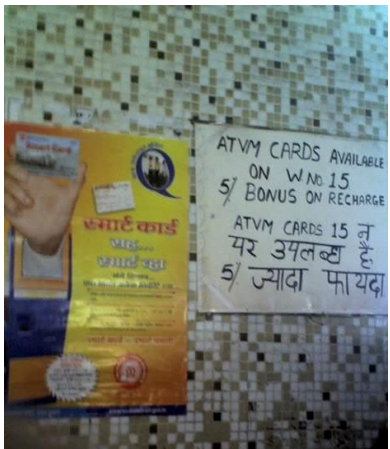


# Research

## Field Study



- Commuters are not comfortable booking ticket using machines.
- Route maps are not properly positioned.
- Overcrowded stations and long queue hides the ticketing machines.



# Research

## Map Study



Existing map on machine

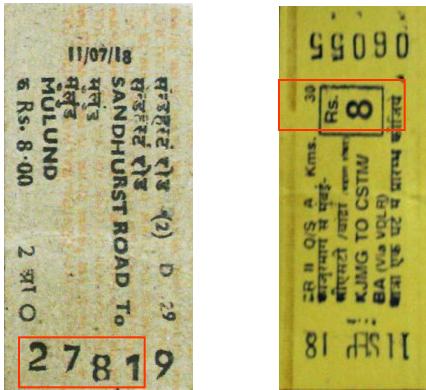
- LOCATE YOUR ZONE : bad readability because of shadow.
- Zones (Z1,Z2,Z3...) are unrecognizable.
- Tracks looks very complicated and chaotic .
- No bullet or marking of station on tracks because of which it feel as if there is no relation between the two.
- Stations are not properly aligned, haphazardly arranged.
- The cursor on screen is confusing.
- Because of small screen size, stations are very closely placed which gives feeling of selecting two stations by mistake.
- Small font size therefore low clarity.
- No. stations in zone are very random (like some zone has 20 station and some has 4 stations)





Further study of map revealed that the complete Mumbai metro route is divided into three routes (central, western and harbor). Which itself is the differentiating characteristics and can be considered while redesigning map.

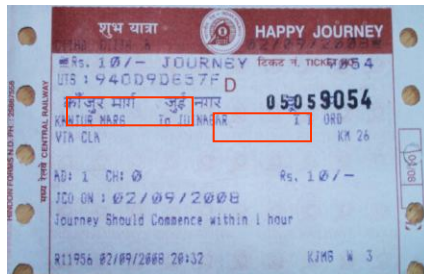
# Research



## Ticket Study:

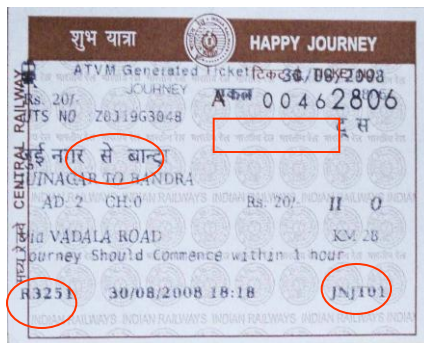
Ticket study reveals that there are some information on the ticket which is not useful for the commuter.( marked on ticket images)

To reduce printing time some fixed information which may or may not be important for user can be pre-printed



Pre- printed:

- ATVM generated ticket
- Journey should commence within 1hr.
- Central railway and western railway.
- Happy journey
- Railway logo.
- Logo printed all over the ticket area as back ground.



Problems:

- Date printed twice on ticket.
- Printing over problem.
- Readability problem because of pre printed background.

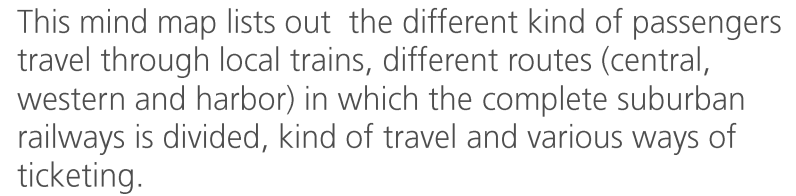




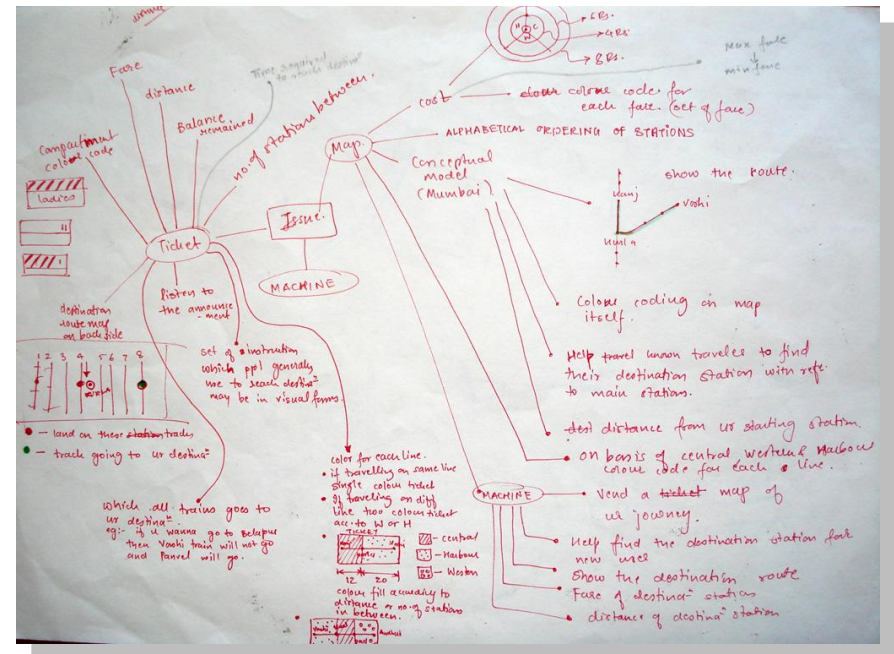
# Problem identification

## Problem definition:

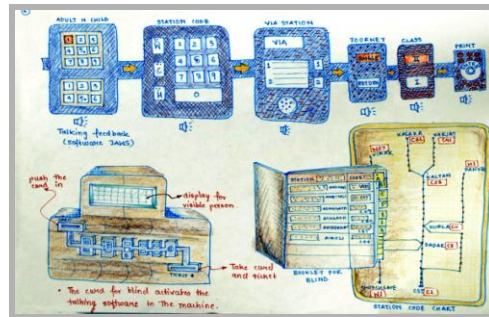
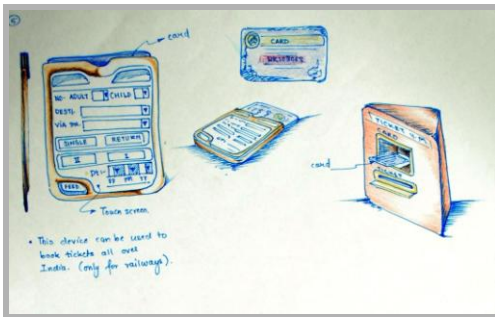
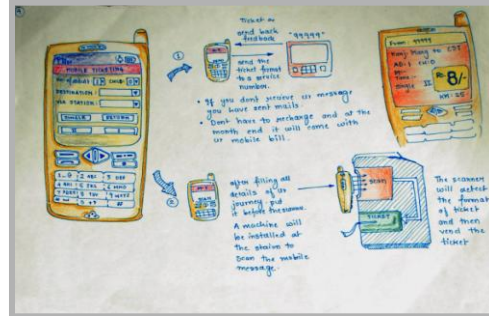
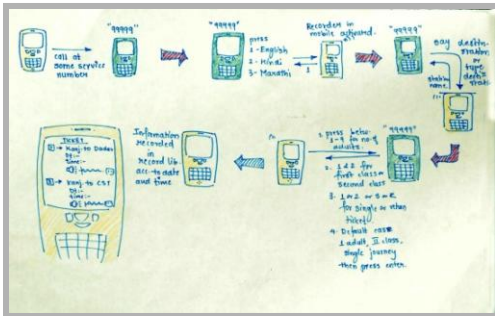
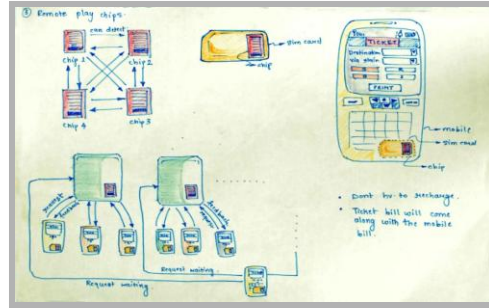
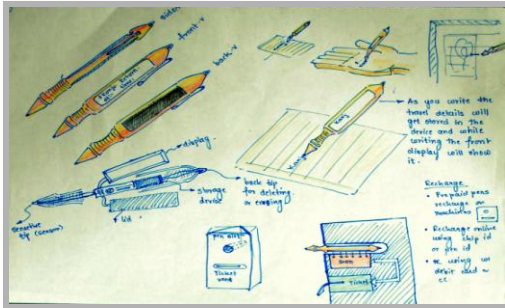
The project aim to provide easy and fast ticketing to familiar/unfamiliar, multilingual and handicap commuters.



In ticket what different information can be added, similarly whether maps could help in any way and how machine can help out commuters is discussed.



# Explorations



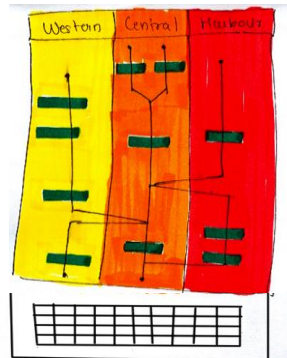
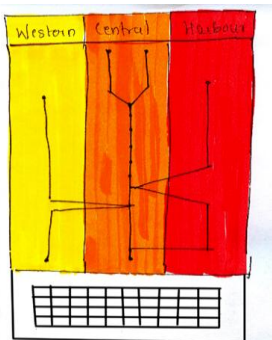
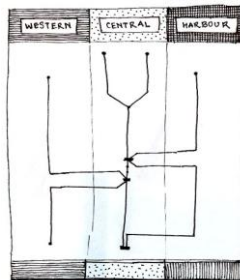
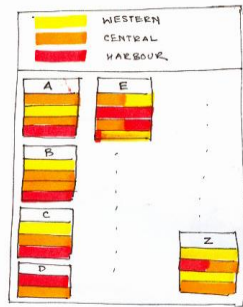
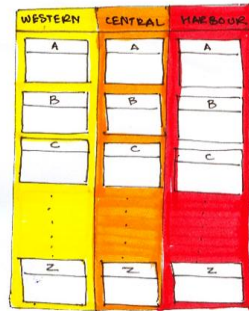
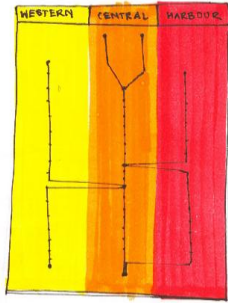
- In all these exploration cash payment for ticketing is avoided and pre paid cards are used

- Placing map behind the machine will help commuters save their time to search for the destination station.

- Using map on screen can solve the different language problem and maintaining consistency between map on wall and on screen will help commuters.



# Exploration

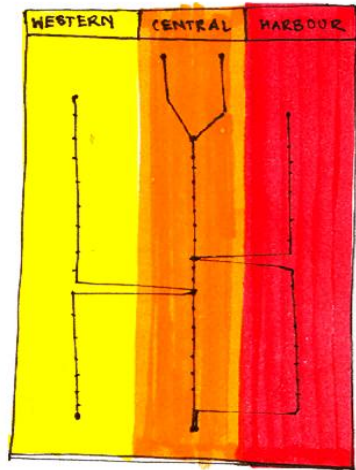


- Color code for each route
- Arranging stations of each route in alphabetical order.
- Arranging all stations in alphabetical order and color code for each route.
- Dynamic map.

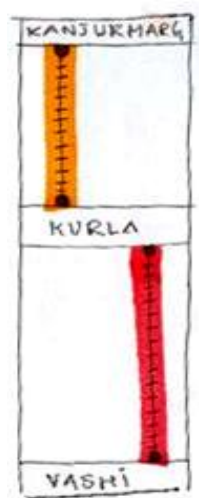
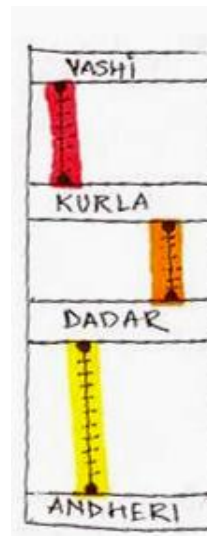
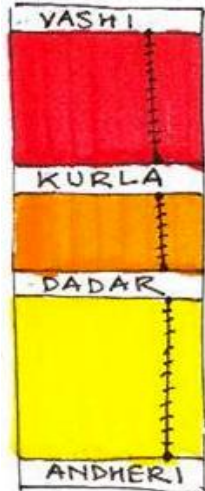
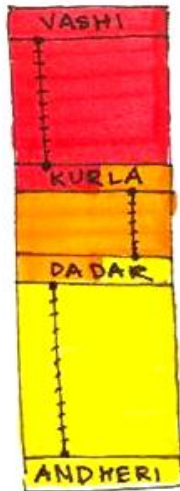
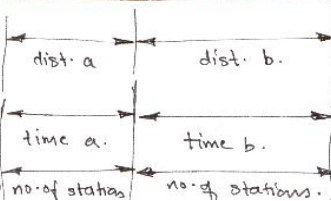
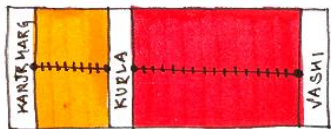




# Exploration



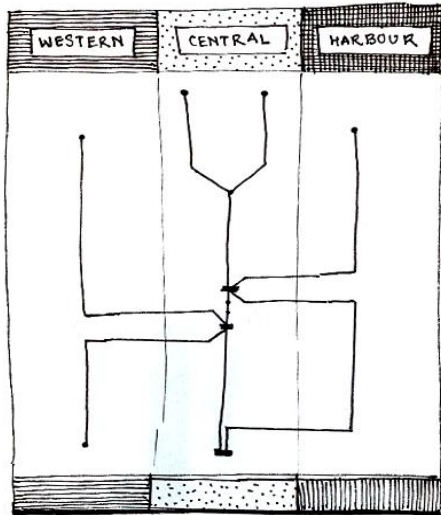
Ticket idea 1:



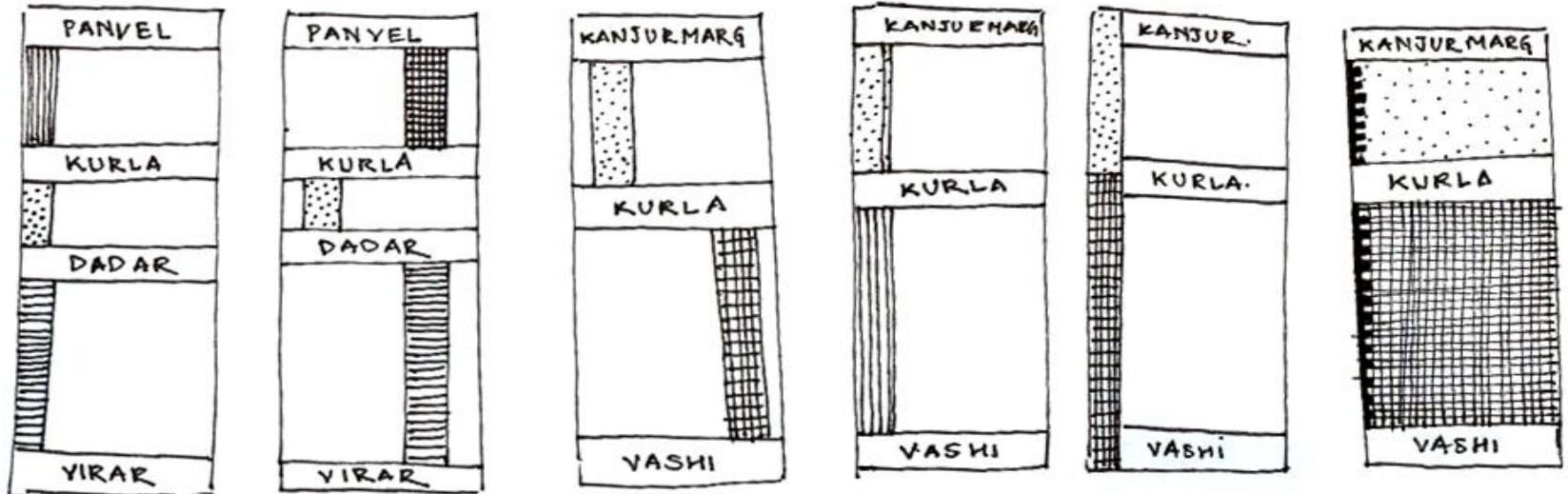




# Exploration



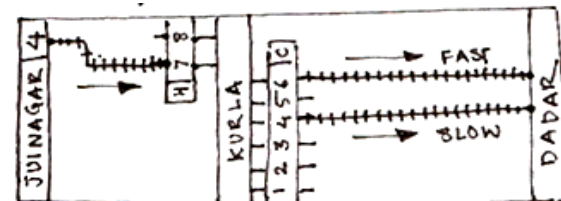
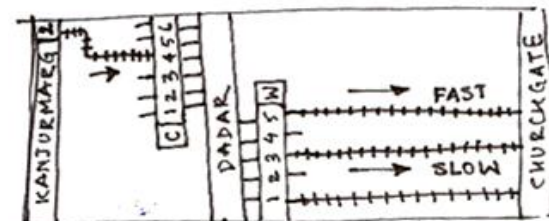
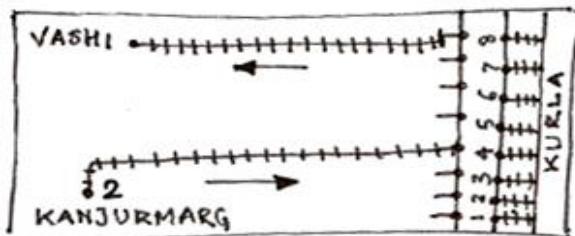
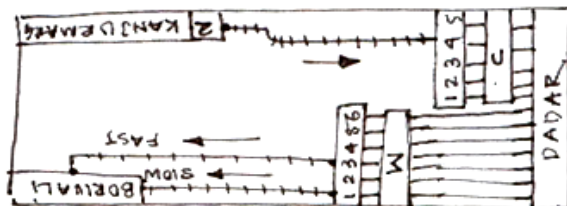
Ticket idea 2:





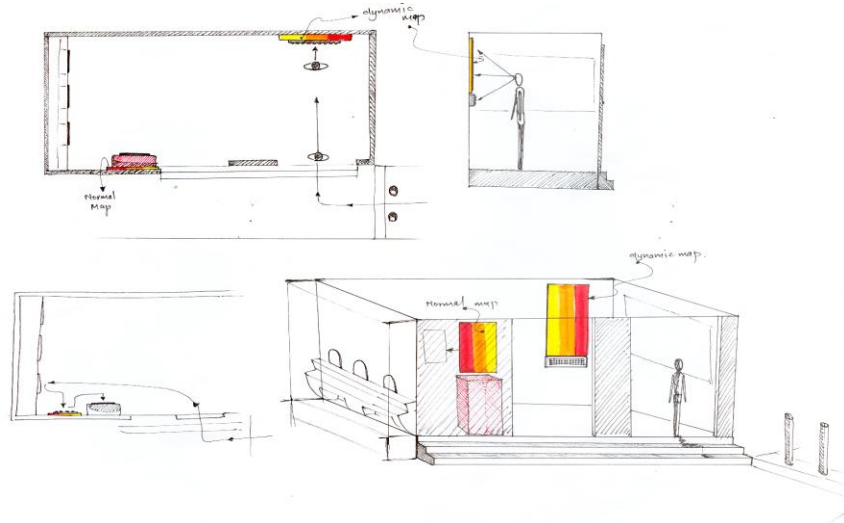
# Exploration

## Ticket idea 3:

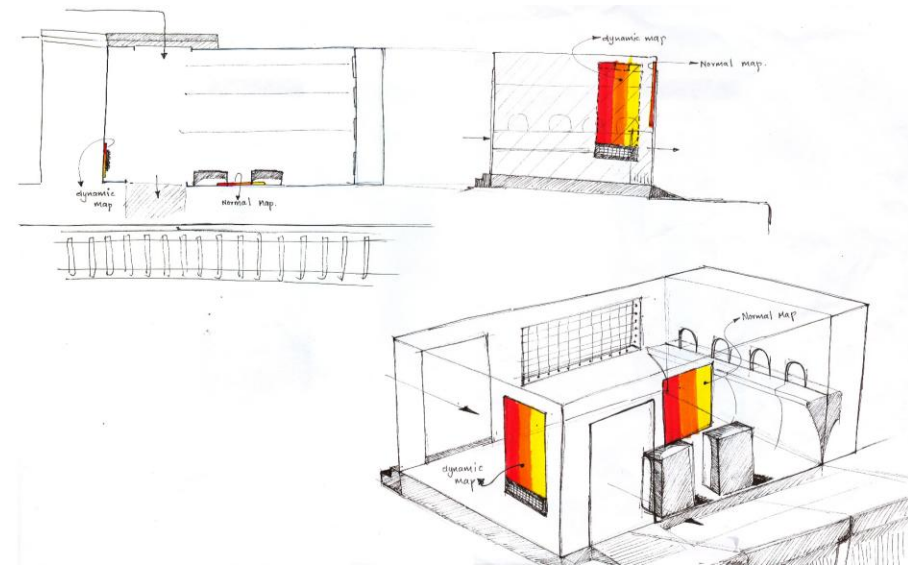




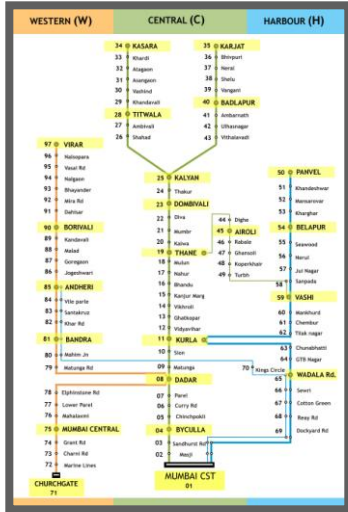
# Exploration



Map and machine placement  
on station :



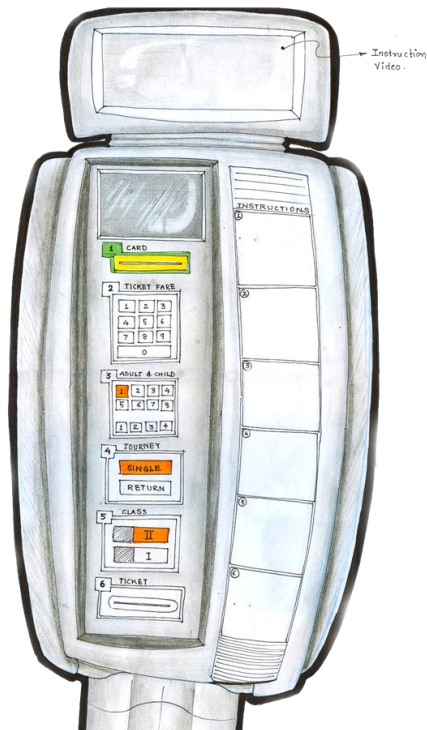
# Exploration



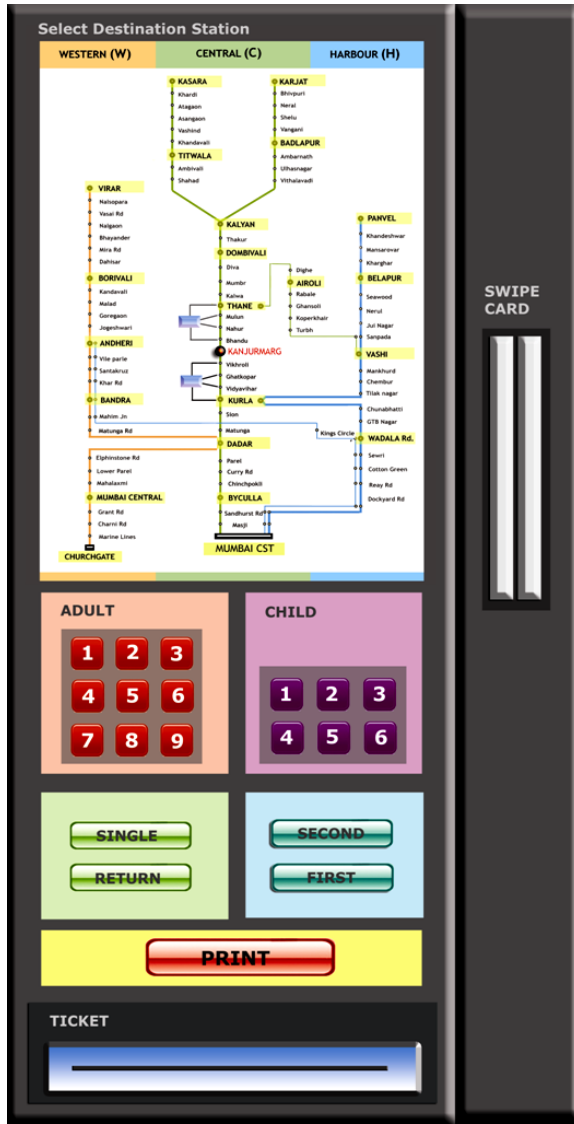
## Machine idea 1:

This idea is based on code of ones destination station.

Each station will be given a code which Commuter have to search and then use on machine.



# Exploration



## Machine idea 1:

In this idea one have to select their destination station on screen and other interface off screen

Map on screen have an advantage of multilingual option in map.





**This machine based on fare  
of the destination station.**

# Final concept

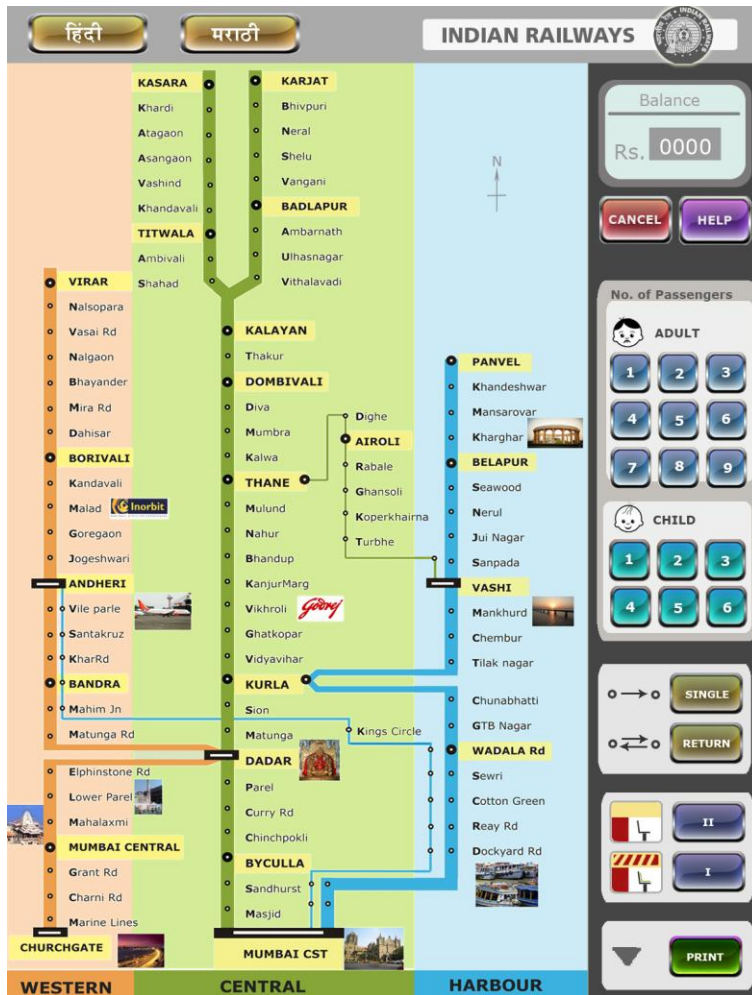


## Final map concept:

### Features of the map

- Bold and highlighted main stations. Which can help people to find there destination by taking it as a reference.
- left aligned stations. People generally have tendency to search the initial alphabet if they are unfamiliar with the route. So this arrangement can help commuters.
- Bold initial alphabet. This will emphasize more on initial alphabet which helps in searching.
- color code for each route . If unfamiliar commuter knows address like the destination station lies on central, western or harbor line then he or she just need to search within that line.
- photographs of monuments or landmarks besides that station.

# Final concept



## Final interface :

### Features:

-A 20" touch screen is used in vertical form (total active area is 308mm x 406mm with aspect ration of 4:3)

-Hindi and Marathi options for commuters who don't know English

-Balance display shows the current balance and at the end after pressing print will show the remaining balance. If the balance goes below Rs.10 then the balance box flashes

-Cancel button is to stop printing and help button if one faces problem with machine.

-Symbols are for each feature to help illiterate commuter.





# Final concept

## FINAL INTERFACE

Display or touch screen space

Instruction space

Card and ticket space

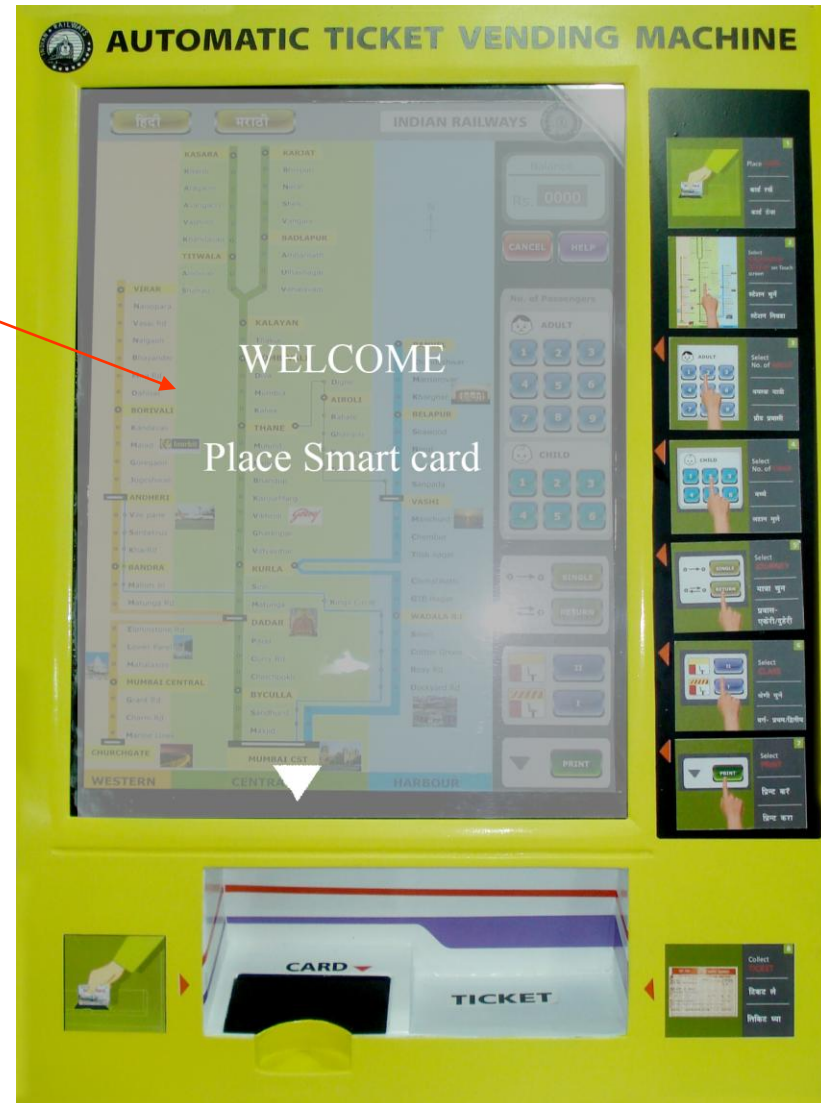




# Final concept

## FINAL INTERFACE

Normal machine screen





# Final concept

## FINAL INTERFACE

Place smart card to activate screen

1

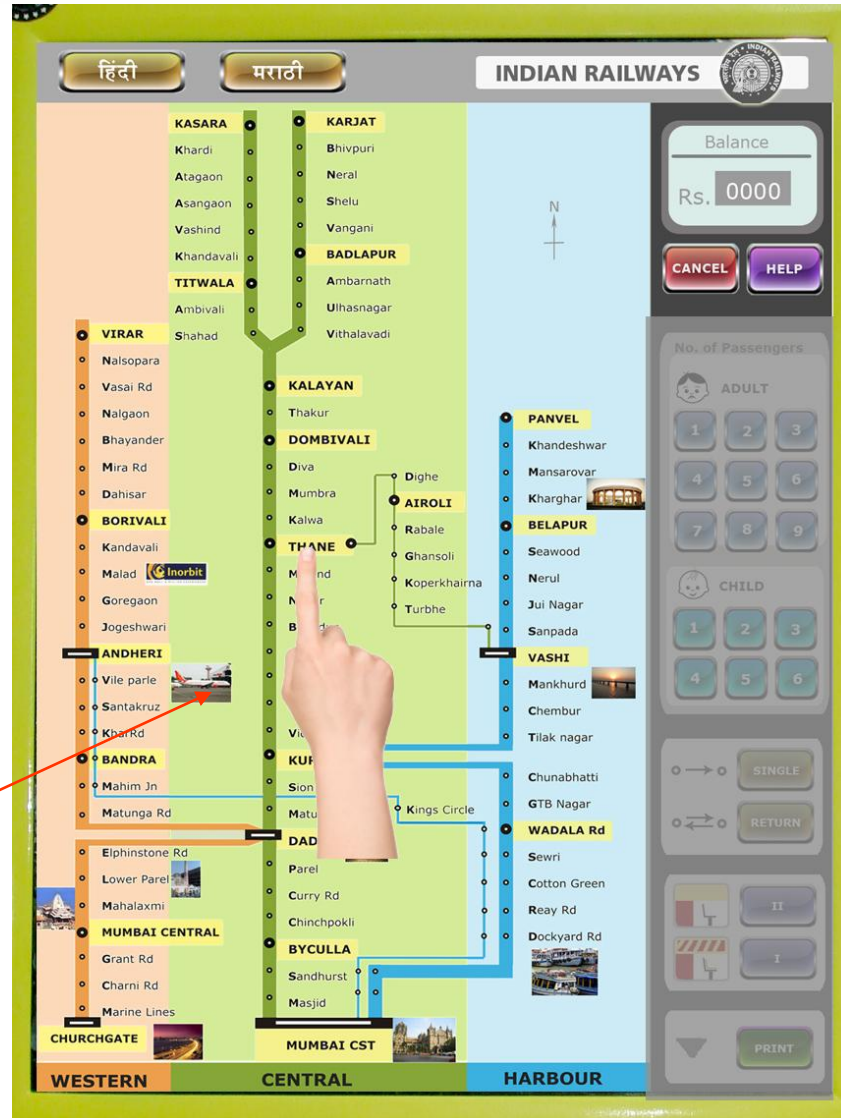


# Final concept

## FINAL INTERFACE

SELECT YOUR  
DESTINATION STATION

2

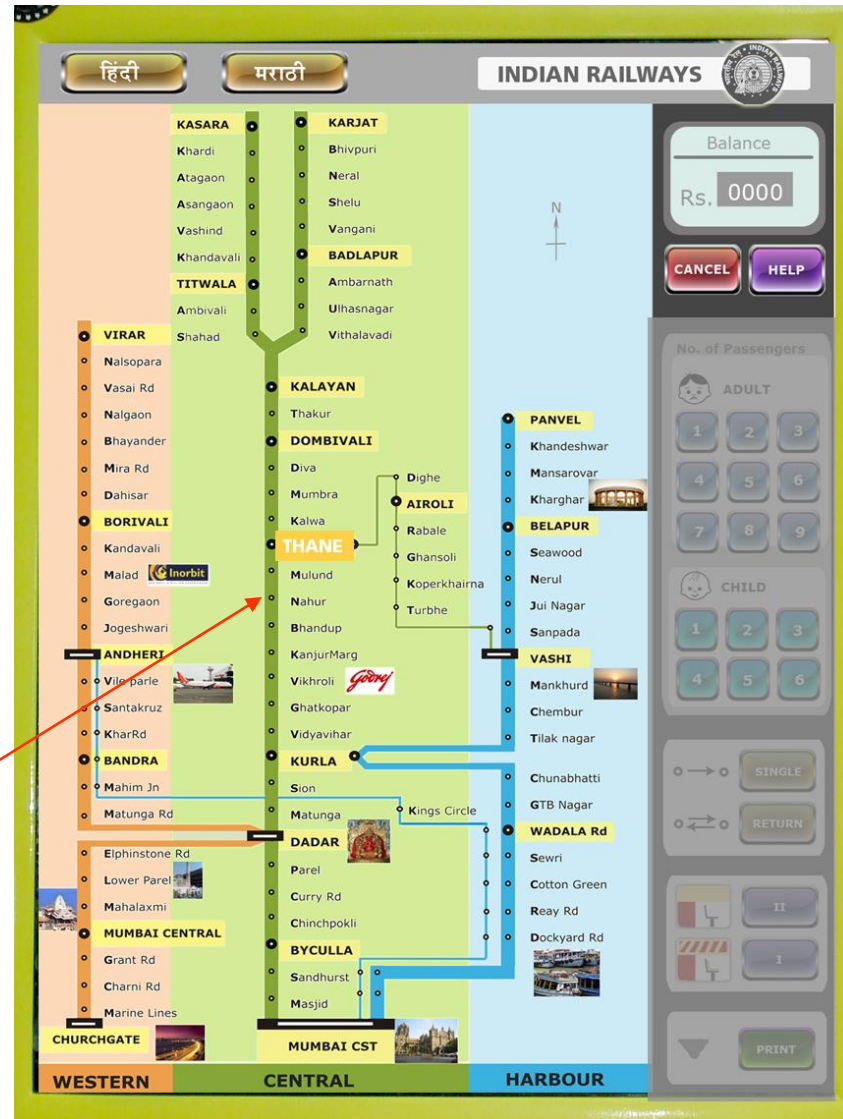


# Final concept

## FINAL INTERFACE

DESTINATION STATION

3

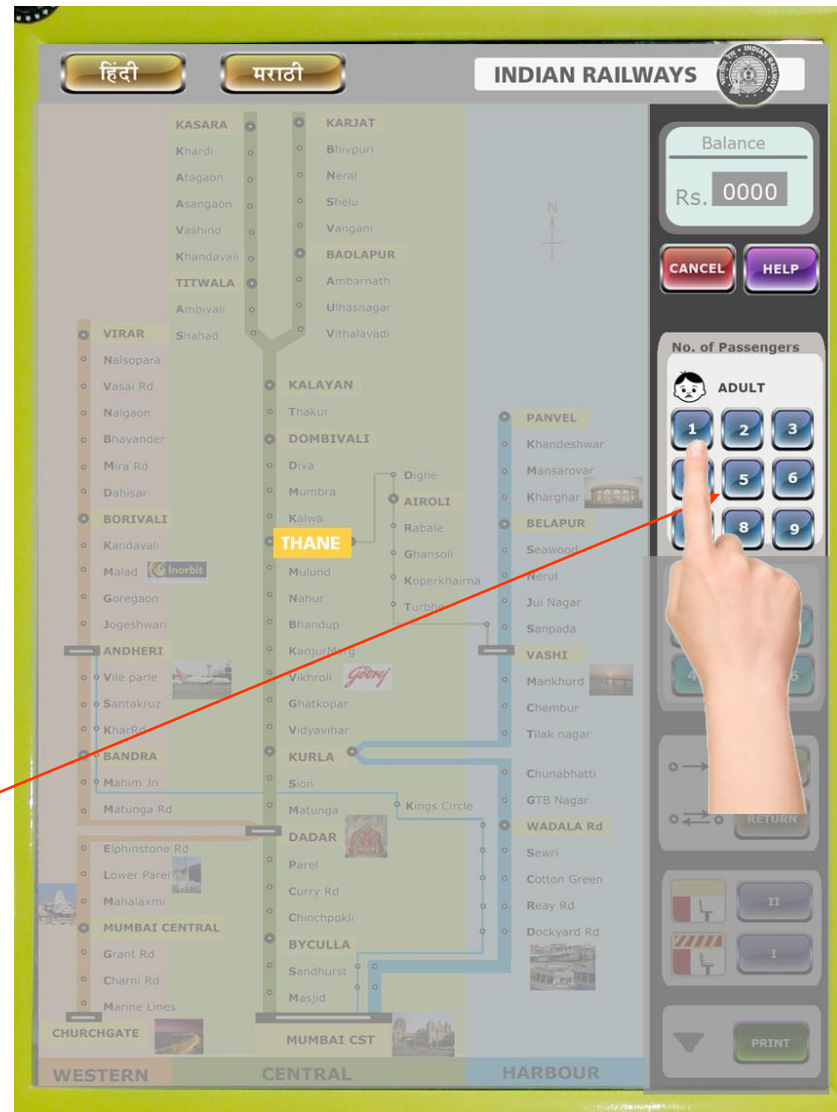


# Final concept

## FINAL INTERFACE

SELECT  
NO. OF ADULT

4





# Final concept

## FINAL INTERFACE

SELECT  
NO. OF ADULT

5

The interface displays a map of Mumbai with various station names listed around it. The stations are categorized into three regions: WESTERN, CENTRAL, and HARBOUR. The WESTERN region includes stations like KASARA, KARJAT, VIRAR, BORIVALI, ANDHERI, BANDRA, and CHURCHGATE. The CENTRAL region includes stations like KALAYAN, DOMBIVALI, THANE, KURLA, DADAR, and MUMBAI CST. The HARBOUR region includes stations like PANVEL, BELAPUR, VASHI, and WADALA Rd. The interface also features a balance display (Rs. 0000), a cancel button, a help button, and a section for selecting the number of passengers (Adult and Child). The number of adults is currently set to 1, and the number of children is set to 0. The interface is in Hindi and includes a language selection button (हिंदी).

हिंदी

मराठी

INDIAN RAILWAYS

Balance

Rs. 0000

CANCEL HELP

No. of Passengers

ADULT

1 2 3

4 5 6

7 8 9

CHILD

1 2 3

4 5 6

SINGLE RETURN

PRINT



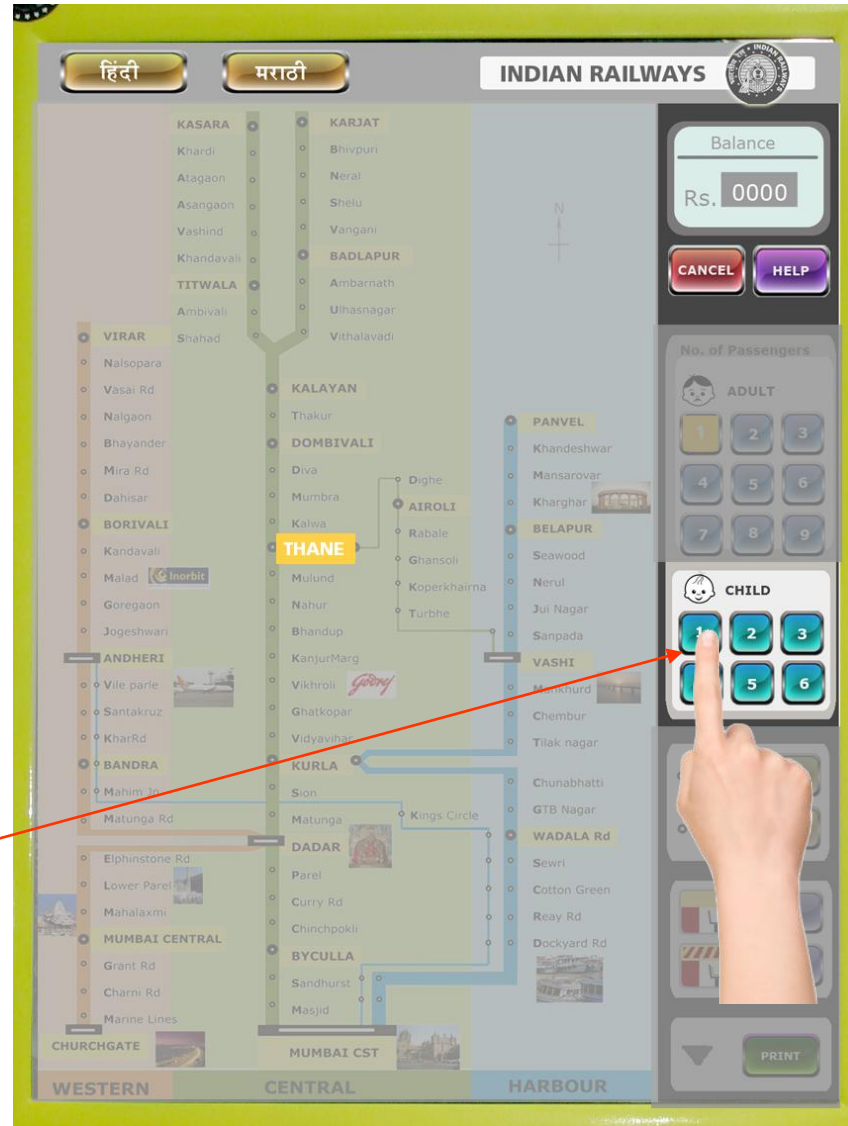


# Final concept

## FINAL INTERFACE

SELECT  
NO. OF CHILD

6



# Final concept

## FINAL INTERFACE

NO. OF ADULT

7

The screenshot displays the 'FINAL INTERFACE' for the Indian Railways system. It features a map of Mumbai with various stations labeled, including KASARA, KARJAT, VIRAR, BORIVALI, ANDHERI, BANDRA, MUMBAI CENTRAL, CHURCHGATE, KALAYAN, DOMBIVALI, THANE, KURLA, DADAR, BYCULLA, PANVEL, BELAPUR, VASHTI, and WADALA Rd. The interface includes a language selector (Hindi, Marathi), a balance display (Rs. 0000), and a passenger selection panel. The passenger selection panel has buttons for 'CANCEL' and 'HELP', and a numeric keypad for selecting the number of passengers. The 'No. of Passengers' section shows 'ADULT' and 'CHILD' categories, each with a numeric keypad. The 'ADULT' category has a yellow button with the number '7' selected. The 'CHILD' category has a yellow button with the number '1' selected. The interface also includes a 'PRINT' button and a 'RETURN' button.

INDIAN RAILWAYS

Balance  
Rs. 0000

CANCEL HELP

No. of Passengers

ADULT

1 2 3 4 5 6 7 8 9

CHILD

1 2 3 4 5 6

SINGLE RETURN

PRINT

# Final concept

## FINAL INTERFACE

SELECT  
JOURNEY

8

The interface is titled "INDIAN RAILWAYS" and features language options in Hindi and Marathi. It displays a map of Mumbai with stations categorized into Western, Central, and Harbour regions. The "SELECT JOURNEY" screen includes a balance display (Rs. 0000), a "CANCEL" button, and a "HELP" button. The "No. of Passengers" section allows selection for ADULT and CHILD, with a numeric keypad. The "JOURNEY" section has "SINGLE" and "RETURN" options. A red arrow points from the number "8" to the "RETURN" button, which is being pressed by a hand.

WESTERN	CENTRAL	HARBOUR
KASARA Khardi Atagaon Asangaon Vashind Khandavali TITWALA Ambivali Shahad	KARJAT Bhivpuri Neral Shelu Vangani BADLAPUR Ambarnath Ulhasnagar Vithalavadi	PANVEL Khandeshwar Mansarovar Kharghar BELAPUR Seawood Nerul Jui Nagar Sanpada VASHI Mankhurd Chembur Tilak nagar Chunabhatti GTB Nagar WADALA Rd Sewri Cotton Green Reay Rd Dockyard Rd

# Final concept

## FINAL INTERFACE

SELECT  
JOURNEY

9

**हिंदी** **मराठी** **INDIAN RAILWAYS**

**Balance**  
Rs. 0000  
**CANCEL** **HELP**

**No. of Passengers**  
**ADULT**  
1 2 3  
4 5 6  
7 8 9  
**CHILD**  
1 2 3  
4 5 6

**SINGLE** **RETURN**  
**PRINT**

**WESTERN** **CENTRAL** **HARBOUR**

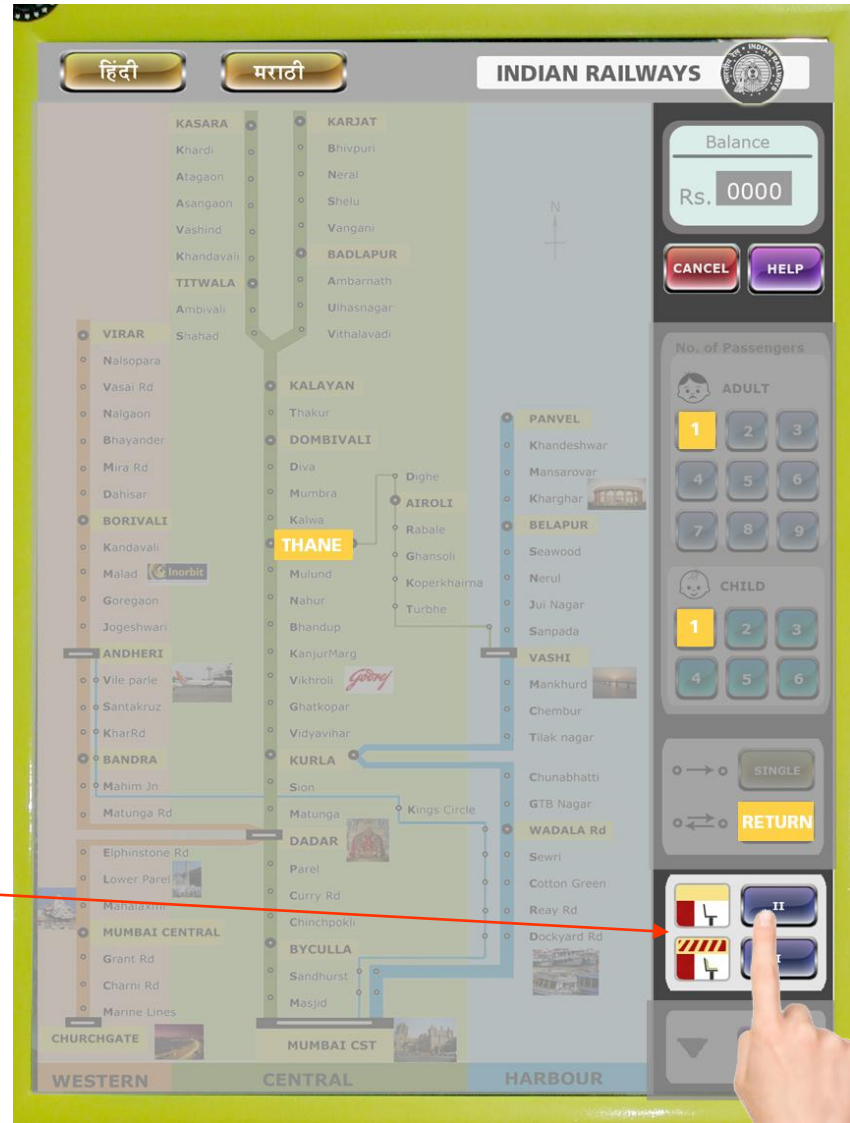
**STATIONS:**  
KASARA, KARJAT, KALAYAN, DOMBIVALI, PANVEL, BELAPUR, VASHI, WADALA Rd, BYCULLA, CHURCHGATE, MUMBAI CST.

# Final concept

## FINAL INTERFACE

SELECT  
CLASS

10

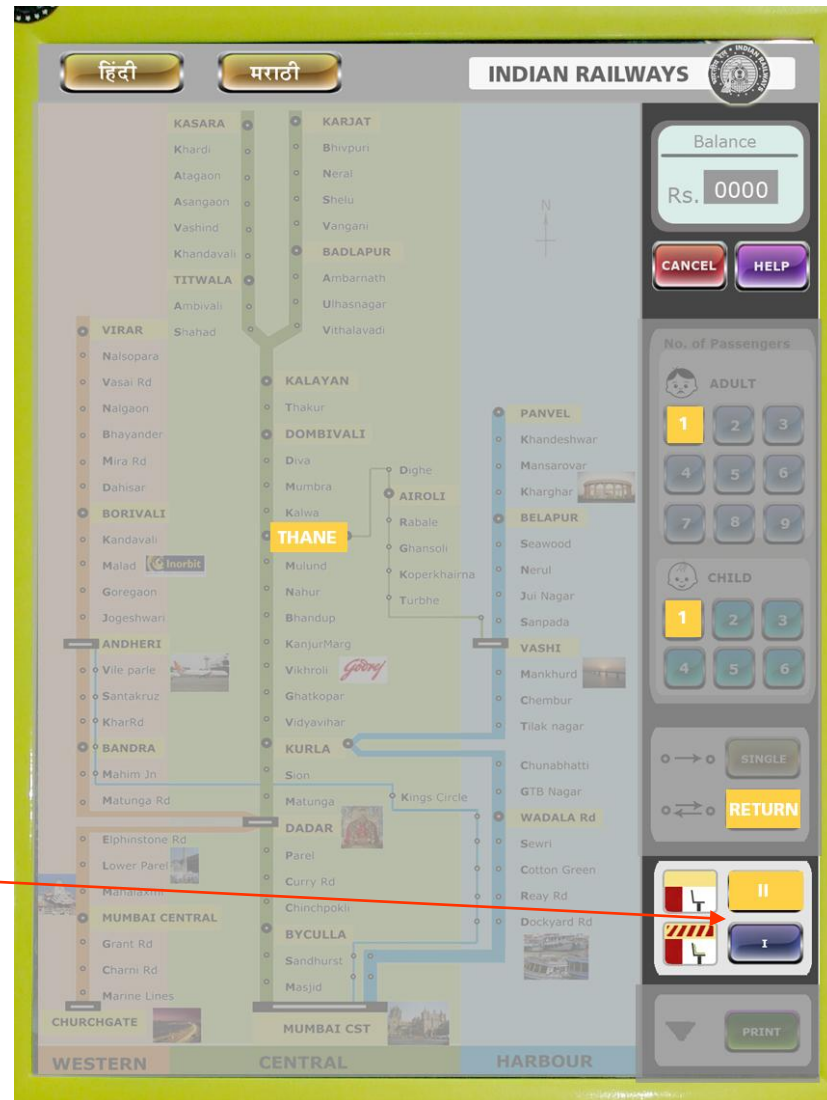


# Final concept

## FINAL INTERFACE

CLASS

11



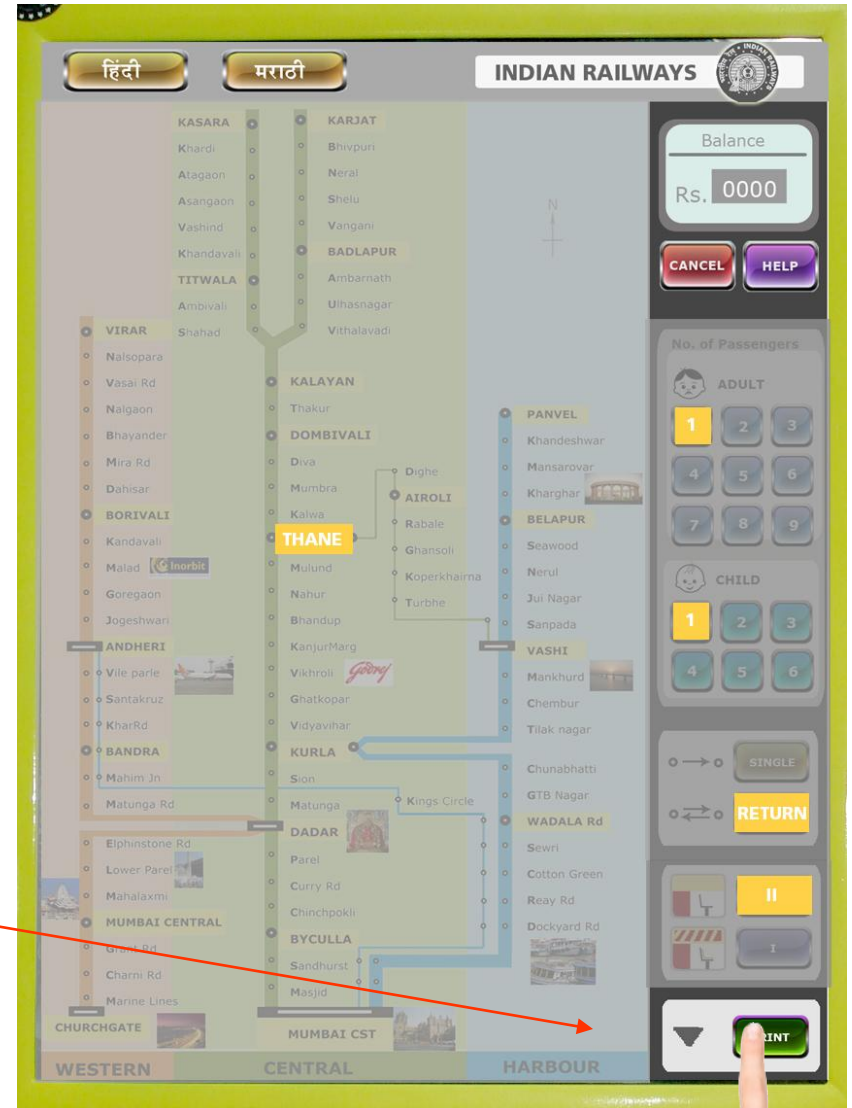


# Final concept

## FINAL INTERFACE

PRESS PRINT

12



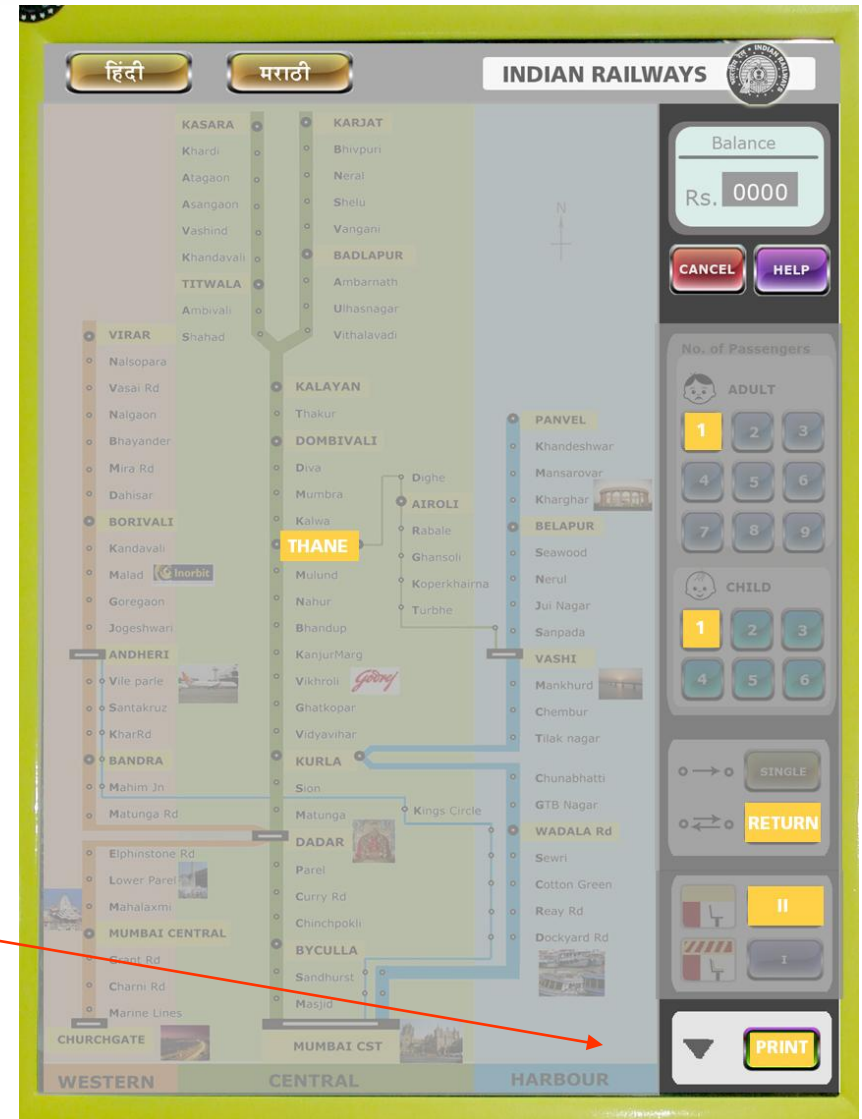


# Final concept

## FINAL INTERFACE

PRINT

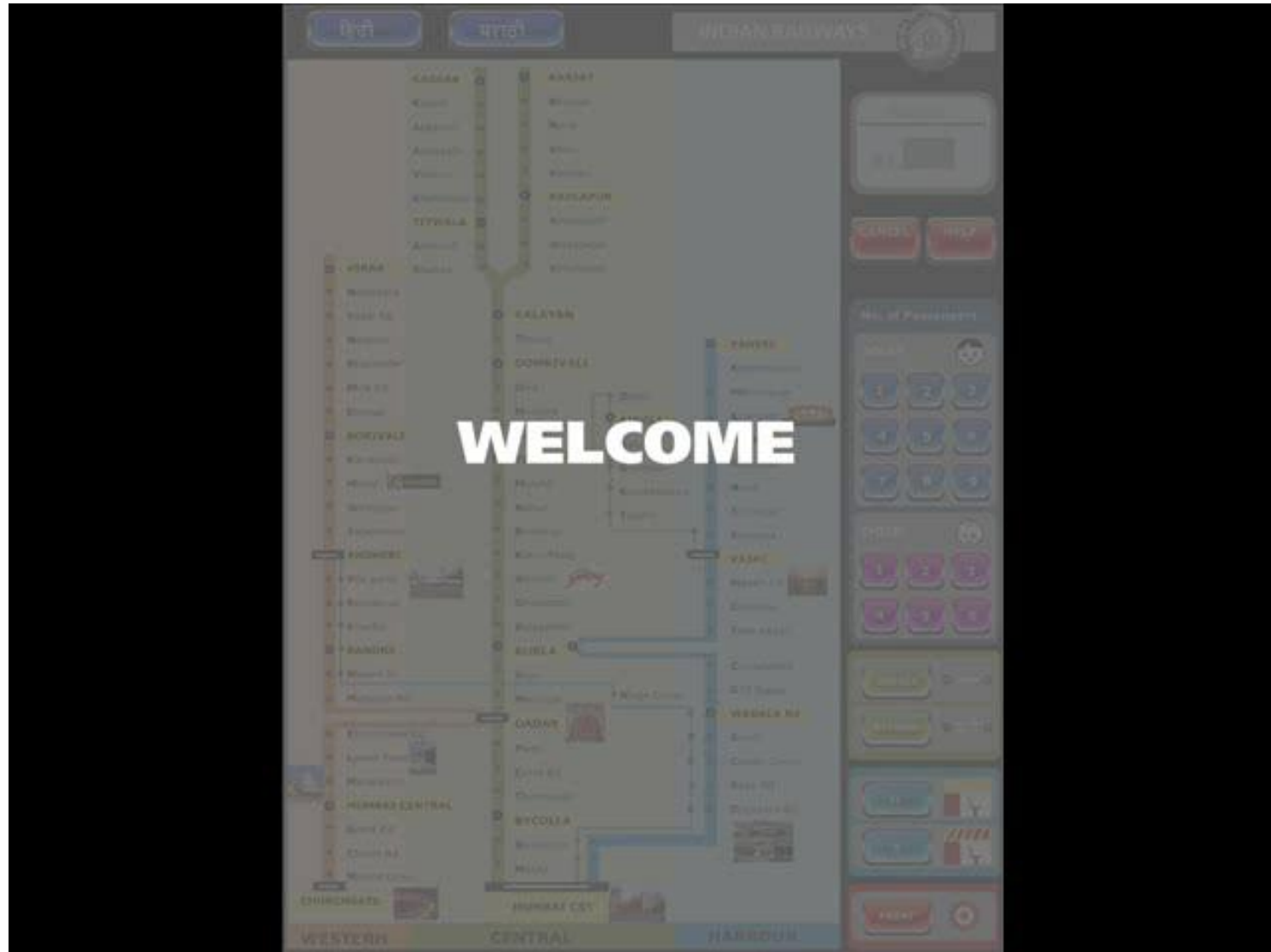
13





# Final concept

## FINAL INTERFACE



# Final concept

## FORM STUDY

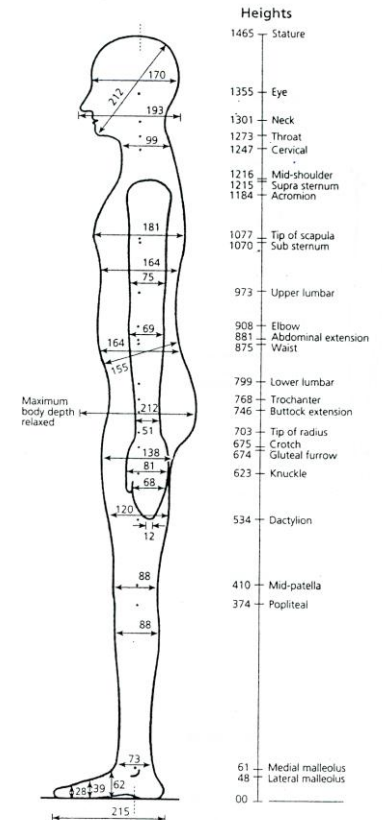
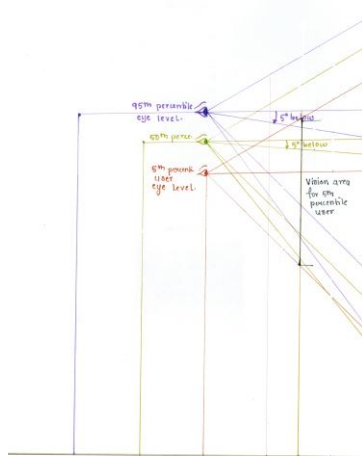
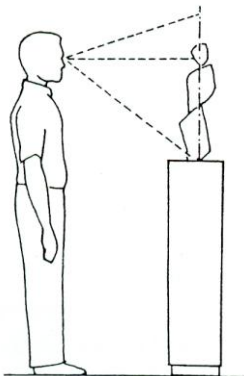
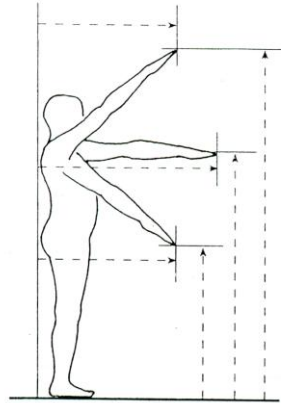
### Ergonomic :

Lower position length  
male 5<sup>th</sup> percentile –  
419mm

Lower position height  
5<sup>th</sup> percentile female –  
619mm

Forward mid position  
5<sup>th</sup> percentile female -  
619  
Eye level height 5<sup>th</sup>  
percentile user

For masses 50<sup>th</sup>  
percentile elbow  
height – 1022mm

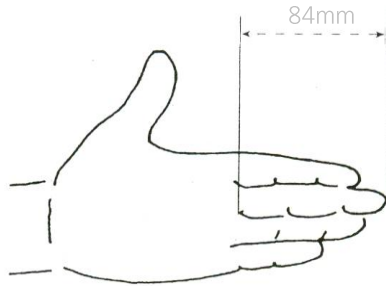




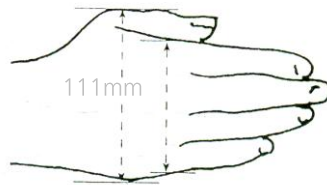
# Final concept

## FORM STUDY

### Ergonomics :



For 95<sup>th</sup> percentile user -  
84mm



Hand breadth with thumb  
for 95<sup>th</sup> percentile user -  
111mm



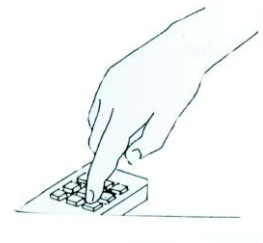
Hand depth at thumb base  
for 95<sup>th</sup> percentile user -  
50mm



17mm

Finger tip breadth for 95<sup>th</sup>  
percentile user - 17mm

Distance between two  
buttons is  $\frac{1}{4}$  of finger tip  
breadth.







# Final concept

## FORM STUDY

### Mockup model 1: Ergonomic testing of model



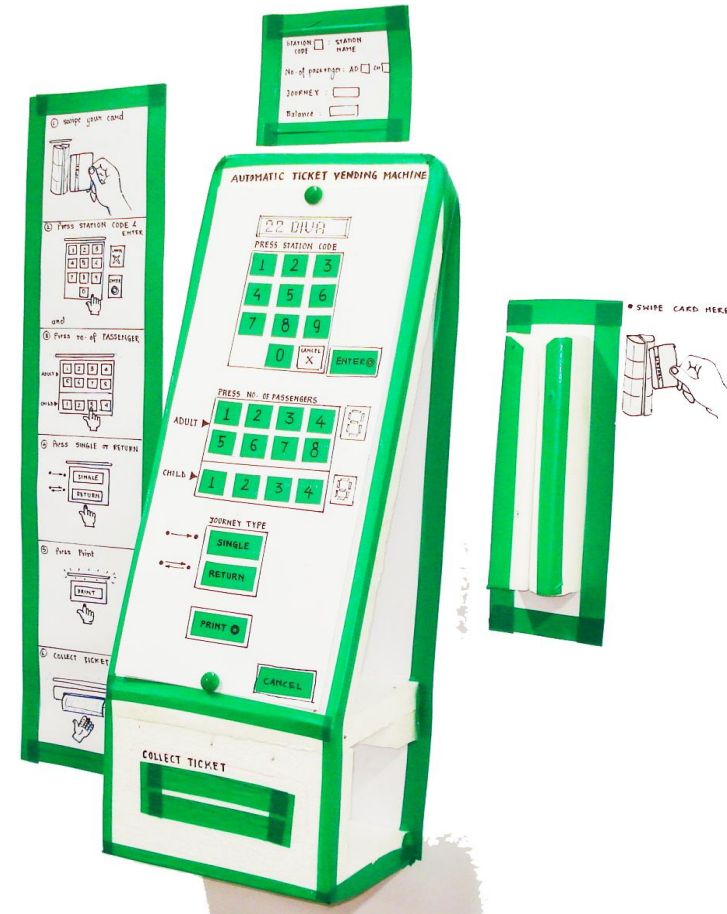
95<sup>th</sup> percentile user



75<sup>th</sup> percentile user



5<sup>th</sup> percentile user





## Final concept

## FORM STUDY

### Mockup model 2: Ergonomic testing of model

95<sup>th</sup> percentile user



75<sup>th</sup> percentile user



5<sup>th</sup> percentile user





## Final concept

### FORM STUDY



### FORM FINALISATION :

From observations and user feedback

- dust problem with model 2
- user have to bent neck more than the other model which is not ergonomically good.

so model 1 is finalized.

# Final concept

## FORM STUDY



Mockup model



# Final concept



## User testing and feedback

After completing user testing I got some valuable feedbacks

- Confusion where to place card.
- Number the instructions.
- Confusion because of the line parting ticket slot and card
- Placing card instruction .should be placed in sequence with other instructions
- Colors of button too bright.





# Final concept

3D model



## Final concept

## Final prototype







## Final concept

## Final prototype





# Final concept

## Smart Card with Map





# References

## References :

- <http://www.irtouch.com>
- [http:// www.google.com](http://www.google.com)
- [http:// www.sadamel.ch](http://www.sadamel.ch)
- [http:// www.shutterstock.com](http://www.shutterstock.com)
- [http:// www.helium.com](http://www.helium.com)
- *Indian Anthropometric Dimensions  
for Ergonomic Design Practice-* *Debkumar Chakrabarti, NID*
- *Fitting the task to the Man  
An ergonomic approach-* *E. Grandjean*





**Thank you**