

PASSENGER INFORMATION DISPLAY SYSTEM FOR MUMBAI LOCAL FOR A FUTURISTIC SCENARIO

VISUAL COMMUNICATION PROJECT II

BY

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156250010

GUIDE

PROF. MANDAR RANE



**INDUSTRIAL DESIGN CENTRE
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
2017**

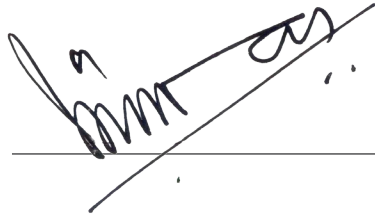
APPROVAL SHEET

The Visual Communication Project 2, entitled
**“Passenger Information Display System for
Mumbai local for a futuristic scenario”** by
Kalagouda Patil, 156250010, is approved in
partial fulfilment of the requirement of the
Master of Design in Visual Communication.

Project Guide 

Chair Person 

Internal Examiner 

External Examiner 

DECLARATION

I declare that this written submission 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 misinterpreted or fabricated or falsified any idea/data/fact/source in my submission. I understand that the 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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ACKNOWLEDGMENT

My sincere thanks to **Prof. Mandar Rane** for his guidance and encouragement.

I am grateful to all my faculty and friends at Indian Institute of Technology Bombay for their support in the thought process for the project.

A handwritten signature in black ink, appearing to read 'Mandar Rane', is positioned between two horizontal lines.

ABSTRACT

When I was travelling for the first time in Mumbai Local I noticed something unexpected. The orientation of platforms to get down from train, is different at different stations. For one station the crowd faced left and for the next faced right. Being novice this annoyed me as there were no means by which I could know my station and the direction of platform other than asking.

*This experience led to the inception of thought behind this project – **“How the real time information would be designed for Futuristic Mumbai local trains, served inside the high-tech compartments for the future passengers”**. The real time information is usually conveyed by Passenger Information Display System (PIDS). The project doesn't aim to solve any current problems but will take inspirations from same problems and visualise the future of info design for PIDS, specially catered to the Indian situations (multilingual; language barrier; chaos and crowd inside trains; lack of information system)*

The first part of the project introduces the Passenger Information Display System (PIDS), its role in the public transport and my area of focus in this design project.

The second part looks at the main conditions that shape this project, such as current scenario of Mumbai local compartments, needs of the user from the novice perspective and the necessary information.

The final part discusses the design & decisions(both visual design and motion design) performed to accomplish the project.

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Introduction

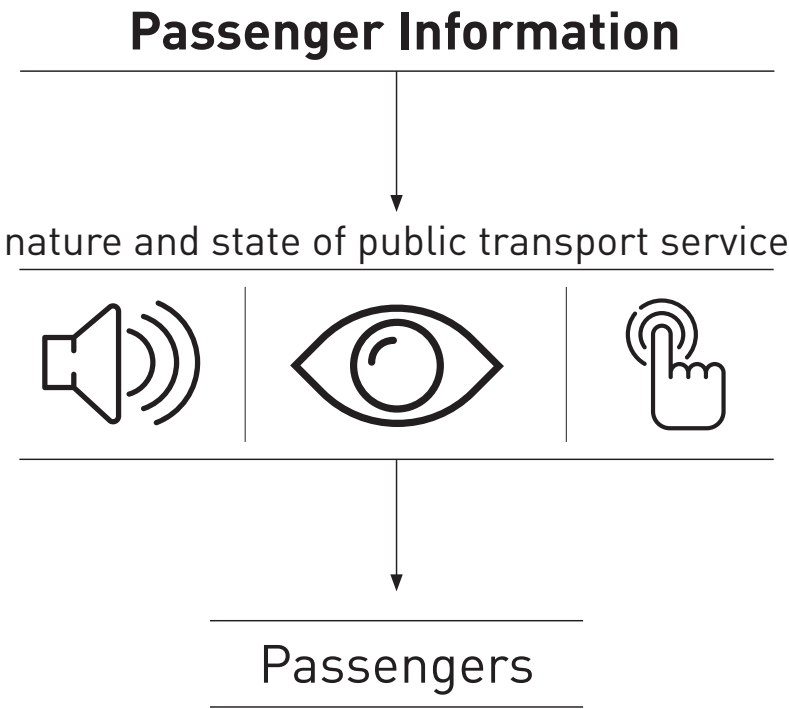
PASSENGER INFORMATION

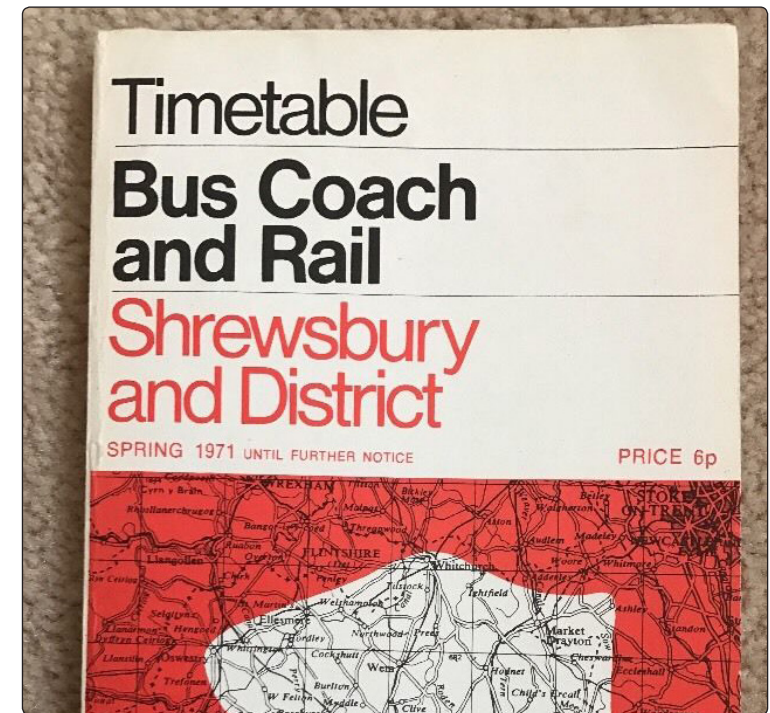
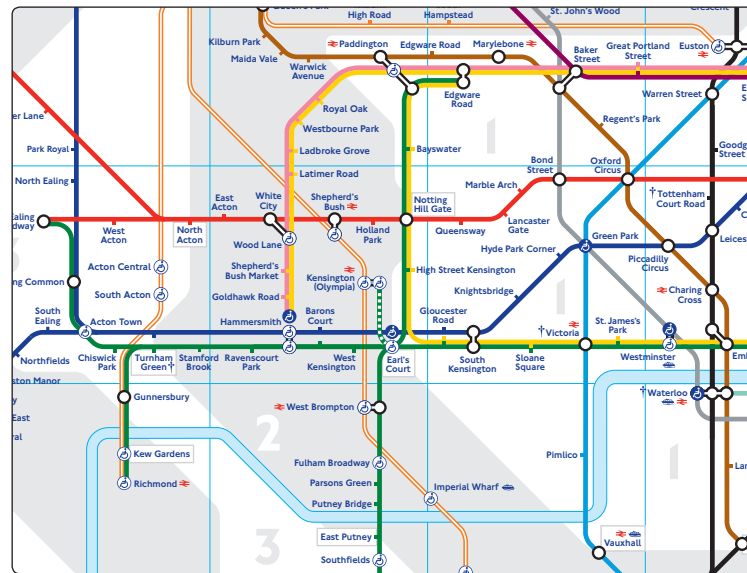
What is Passenger Information?

Passenger information is information provided to public transport users about the nature and state of a public transport service, though visual, voice or interactive media.

Examples

- Route Network Maps (Figure 1)
- Timetable Booklets, Charts (Figure 2&3)
- Signages (Figure 4)
- Kiosks (Figure 5&6)
- Public Information Display System (Figure 7–31)





MUMBAI C.S.T. TERMINUS (CENTRAL RLY.)						
DEP.	T.DN	Days	TRAIN NAME	Days	T.UP	ARR.
22.55	51029	M,Tu,W,Su	Bijapur Pass.	Tu,W,Th,F	51030	04.10
22.55	51033	Daily	Shirdi Pass. (Via Daund)	Daily	51034	04.10
23.25	12141	Daily	Rajendranagar Exp.	Daily	12142	15.30
23.45	11027	Daily	Chennai Mail	Daily	11028	03.45
00.10	11093	Daily	Mahanagari Exp.	Daily	11094	14.15
DADAR TERMINUS (CENTRAL RLY.)						
DEP.	T.DN	Days	TRAIN NAME	Days	T.UP	ARR.
20.30	12163	Daily	Chennai Exp.	Daily	12164	06.00
21.30	11017	Exc. Tu	Chalukya Exp.	Except F	11018	05.50
21.30	11035	Tu	Mysore Sharavathi	F	11036	05.50
21.45	12131	M,W,S	Sainagar Shirdi (S.F.)	Tu,Th,Su	12132	16.05
23.45	11057	Daily	Amritsar Exp.	Daily	11058	04.00
00.35	12167	Daily	Varanasi Supertast Exp.	Daily	12168	12.30



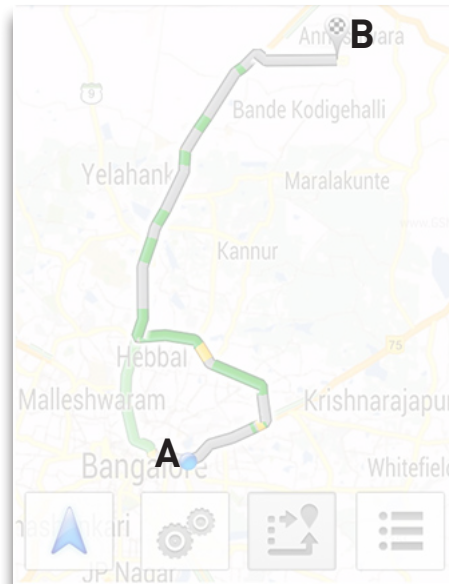
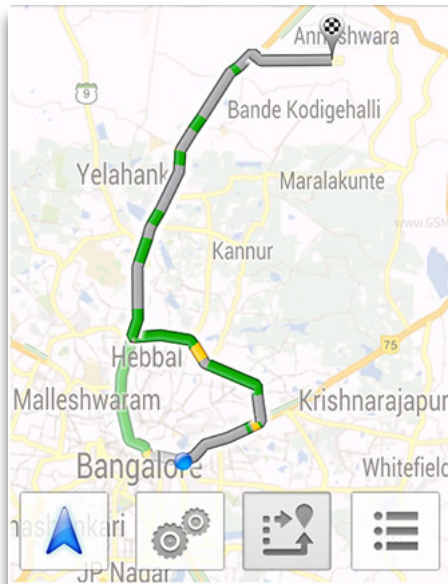
TYPES OF PASSENGER INFORMATION

Based on the nature of information, Passenger Information can be categorised into two type

Static or Planned information, which changes only slowly and is typically used for journey planning prior to departure (stations and stops, routes, service numbers, times, trip durations, fares, etc.)

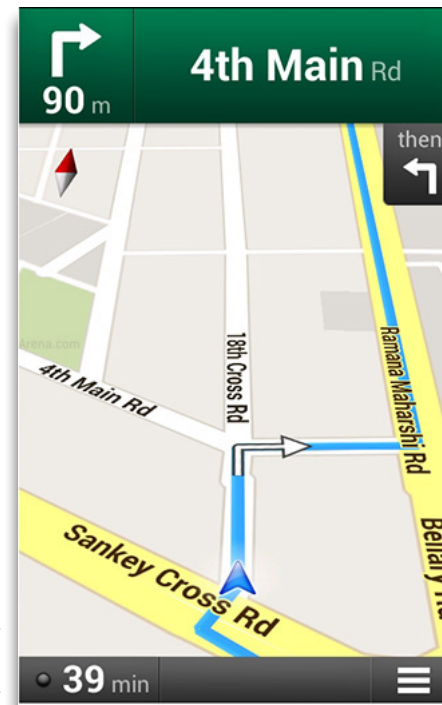
Real time information, which changes continuously as a result of real-world events and is typically used during the course of a journey (primarily how close the service is running to time and when it is due at a stop, but also incidents that affect service operations, platform changes etc.).

	moment of importance	example of information	Medium of information
Static Information	journey planning prior to departure	Stations, Stops, Routes, service nos., etc.	Route network maps, timetable booklets/charts signages, etc.
Real Time Information	During the course of journey	On time, delayed, expected arrival time, platform.	Passenger Information Display System



*Example of Static information
(Google Maps)
The route direction details is being
obtained before the course of journey*

*Example of Real time information
(Google Maps)
The information important at that particular
time is fed and updated time-to-time
during the course of journey*



PIDS

(Passenger Information Display System)

A passenger information [display] system (PIS or PIDS) is an electronic information system which provides real-time passenger information. It may include both predictions about arrival and departure times, as well as information about the nature and causes of disruptions.

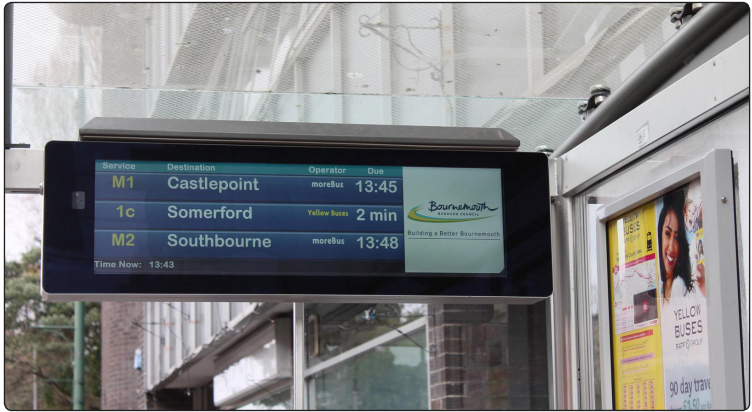


Figure 5 Interactive Kiosk at New York City Subway station.

Figure 6 Interactive Kiosk at a Bus stop.

Figure 7–9 PIDS giving various informations like current time; arrival services and their time.



FOCUS AREA OF DESIGN

This project focuses on the info design for Passenger Information Display System (PIDS) for Mumbai rail network *inside* the compartments for a futuristic scenario. The interest period is *from the moment when a passenger enters the trains until he gets down at his desired station*.

Figure 15–23 shows some examples of (LCD) across the globe.

Figure 15 Wuhan Metro (China)

Figure 16&17 HongKong Metro

Figure 18 Bengaluru Metro

Figure 19 Tokyo Metro



20
21



Figure 20 Washington D. C. Metro

Figure 21 Paris Metro

Figure 22&23 Hyderabad Metro

22
23



The dynamic route map indicators



Figure 24–31 shows some examples of PIDS (LED) across the globe.

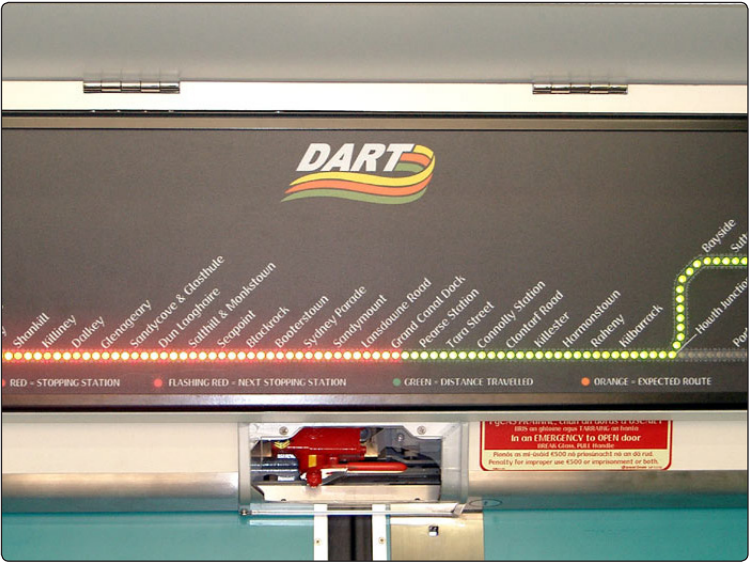


Figure 24 Irish Rail

Figure 25 Washington D. C. Metro

Figure 26 Hong Kong Metro

Figure 27 Singapore Metro

28
29



Figure 28 Singapore Metro

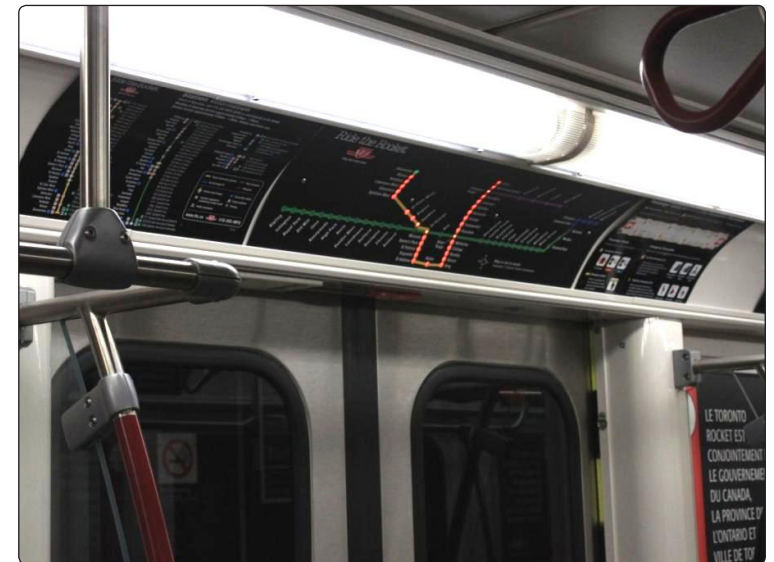
Figure 29 New York City Subway

Figure 30 Toronto Metro

Figure 31 unknown



30
31



2

Background

CURRENT SCENARIO

Mumbai suburban rail is one of the busiest rapid transit systems in the world — operating more than 2000 train services and carrying more than 7 million passengers every day.

The suburban fleet consists of 12 and 15-coach rakes. There are different types of accommodation, termed 'compartments':

1. General
2. General First Class
3. Ladies
4. Ladies First Class
5. Handicap and Cancer patients
6. Senior Citizens
7. Luggage

The existing and working compartments are quite old and the new one being manufactured too are in the same fashion (figure 33). The interest area for mounting of PIDS is usually above the exit door. Above the head level of the area of exit pathway is provided with grab handles, which obstructs the display space (or any information at that location) (Figure 32).

32

Safety handle obstructing the safety instruction

Left **33**

*Mumbai Local Coach
door from inside*

Right **34**

Safety handle obstructing the information of a line map pasted above the door from inside





35 Left
Crowd of passengers
inside a Mumbai
local coach



36 Right
Passengers hanging at
the train door



37
Crowd of passengers
on a station platform

Due to its extensive reach across the Mumbai Metropolitan Region, and its intensive use by the local urban population, the Mumbai Suburban Railway suffers from some of the most severe overcrowding in the world. Over 4,500 passengers are packed into a 9-car rake during peak hours, as against the rated carrying capacity of 1,700. This has resulted in what is known as Super-Dense Crush Load* of 14 to 16 standing passengers per square metre of floor space. This Super-Dense Crush Load is another issue which obstructs the display space. (Figure 35 & 37)

* A crush load is a level of passenger loading in a transport vehicle which is so high that passengers are "crushed" against one another.

USER NEEDS

Essential requirements

+ what primary information* to be delivered?

+ when and how the information to be delivered?

Firstly, lets collect the primary information with the help of our passenger >>>

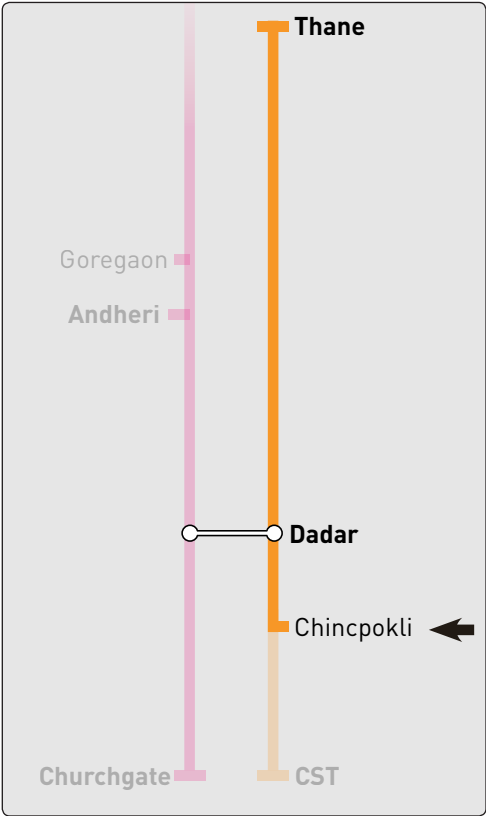
**Necessary Information required by a passenger during travel.*

A novice passenger who is at **Chinchpokli** Station wants to meet his friend at **Goregaon**.

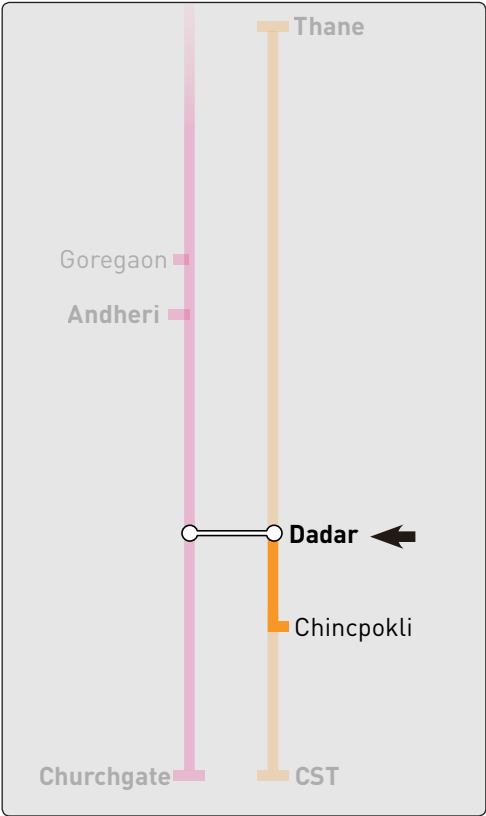


His friend who is resident of Mumbai guides him over phone to reach **Goregaon** by Mumbai Local >>>

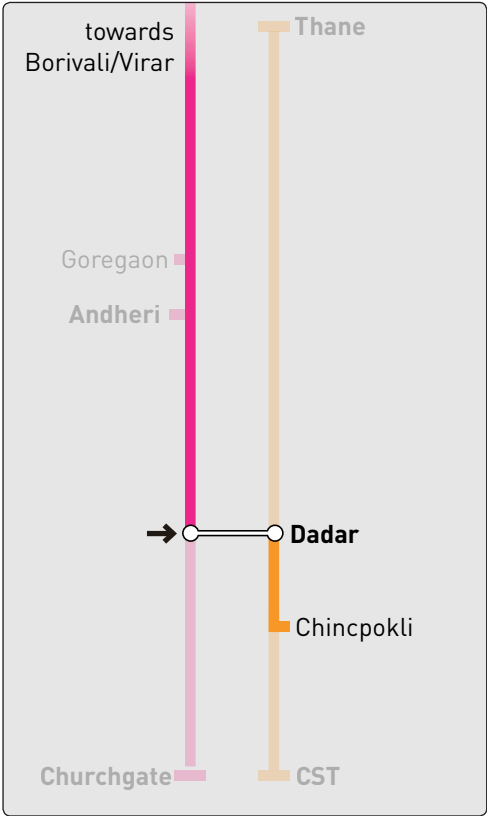
Take a train heading towards THANE.



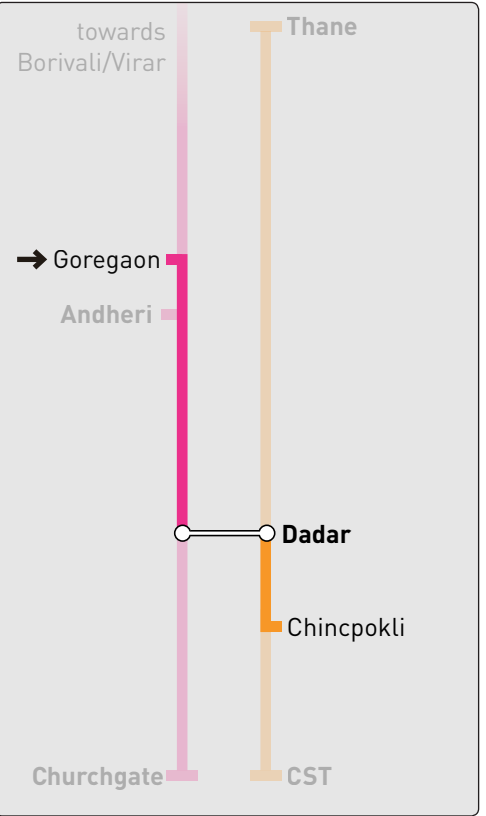
Get down at DADAR interchange and change from Central line to Western line.



At Western line board on a train heading towards BORIVALI/VIRAR.

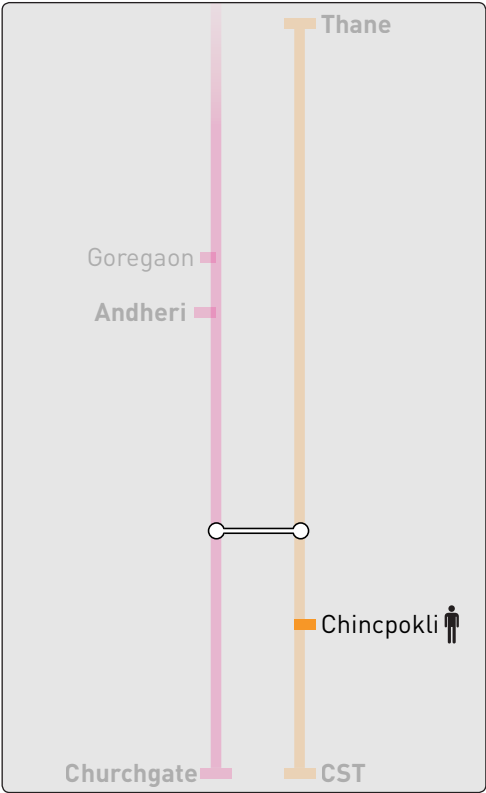


Get down at GOREGAON. I will see you there.

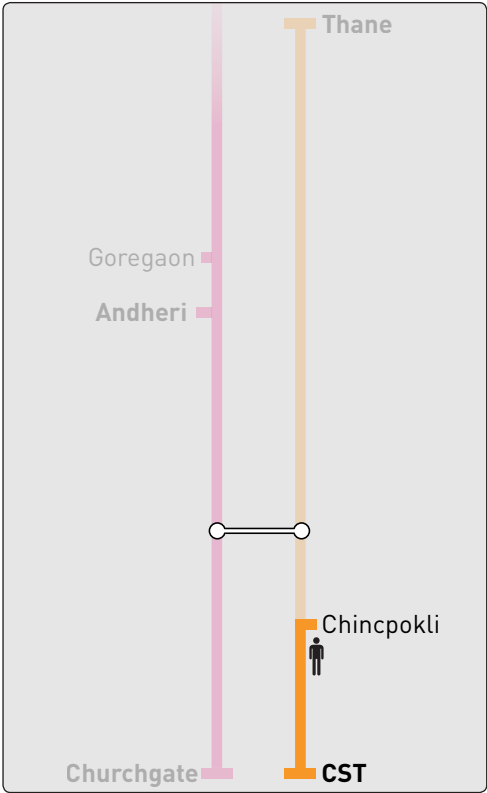


Lets see what
necessary information
he might require
during his journey.

Passenger is at CHINCHPOKLI station,
waiting for a train.



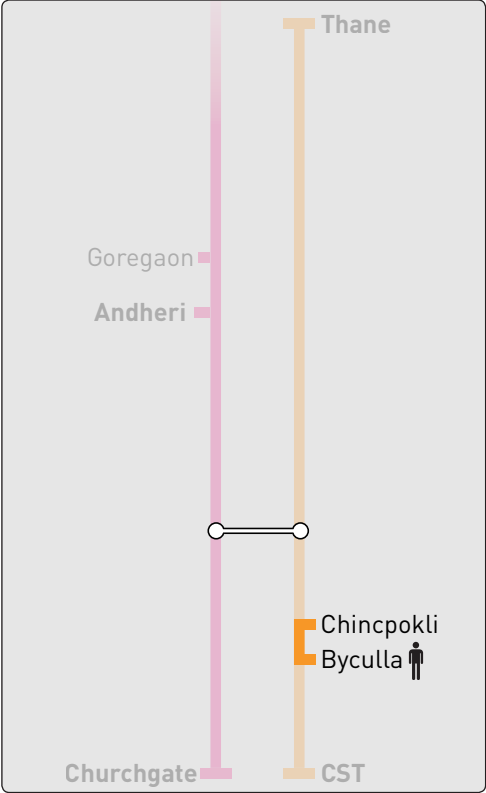
Due to misinformation, he boarded
train towards CST (opposite
direction of his expected journey).



Passenger:
Oops...Wrong direction!

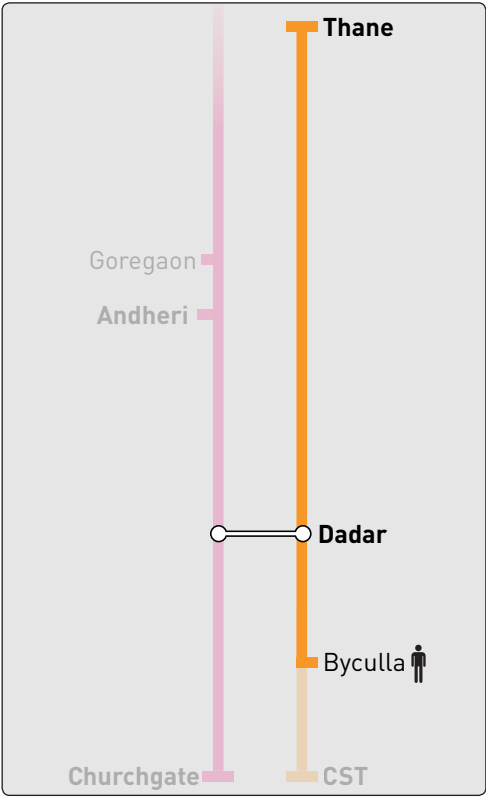
Required information:
END STATION

He had pity on self and gets down
at next station i.e., BYCULLA.

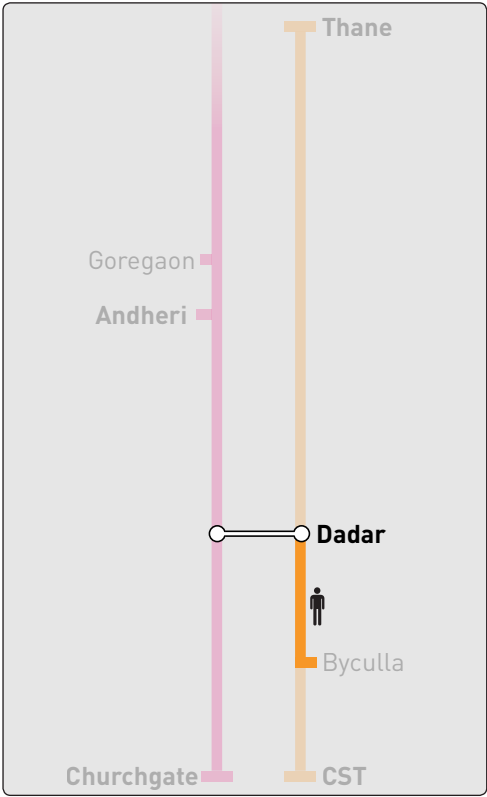


Now the new journey becomes BYCULLA to GOREGAON.

He now takes a train heading THANE.



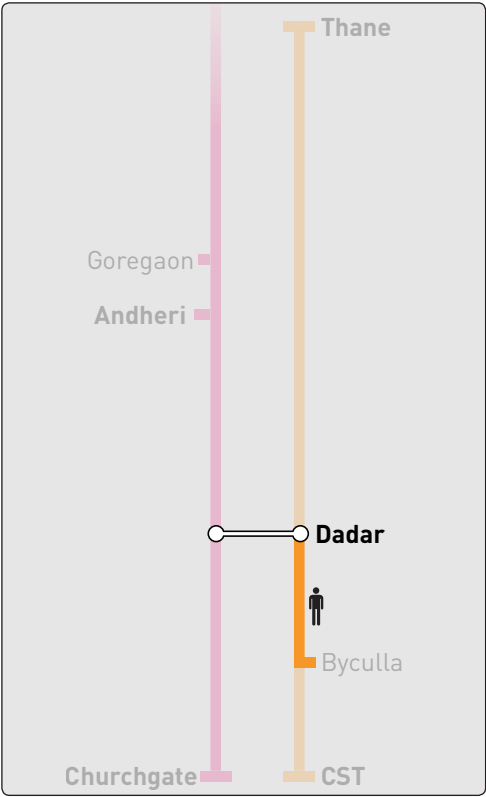
In the journey he is anxious, as he don't want to miss his station i.e., DADAR.



Passenger:
How the hell do I know which is Dadar stn.?

Required information:
NEXT STATION

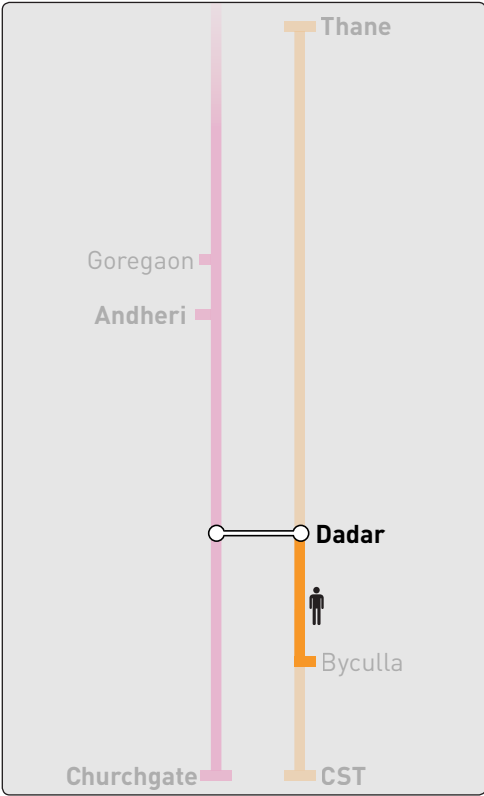
Since he need to change trains at DADAR, he is worried about trains available at other line (Western line).



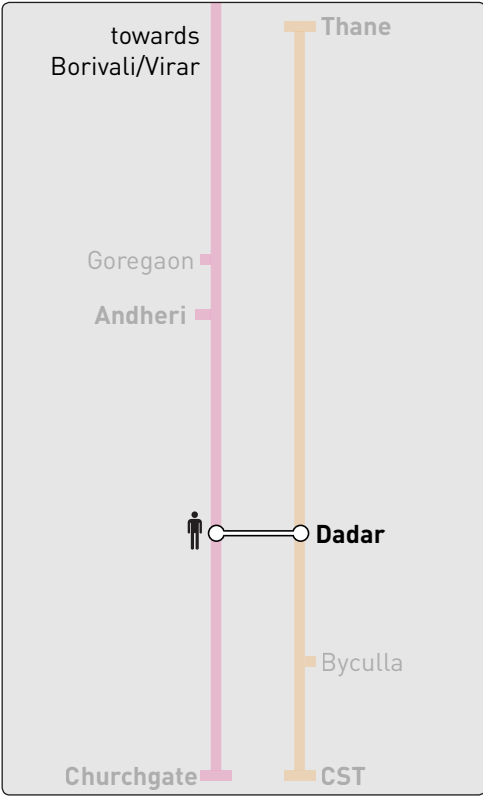
Passenger:
What are the available trains at Dadar?

Required information:
AVAILABLE TRAINS AT INTERCHANGE

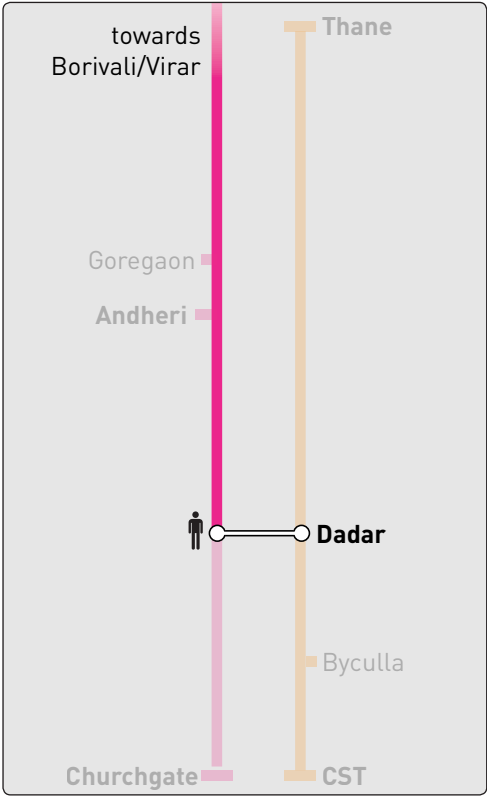
As the arrival of platform is random at each station, he is unsure about DADAR and is nervous about the crowd he is into.



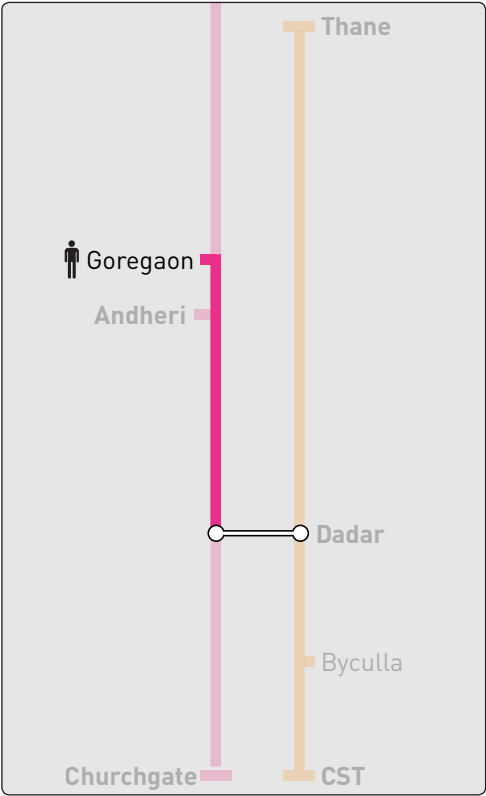
He change the lines at DADAR



He boards a train towards BORIVALI/VIRAR



He gets down at GOREGAON, where his friend was waiting for him. :)



Passenger:
From which side I have to get down?

Required information:
ORIENTATION OF PLATFORM

NECESSARY INFORMATION

From the scenario of user, we can list four necessary information

- 1. End Station
- 2. Next Station
- 3. Trains available at interchange
- 4. Orientation of Platform

Hierarchy of the information changes based on the status/position of the train running on a rail network. For example – Whether the train is at station; proceeded to the next station; about to approach next station/interchange.

Since the information is real time, it can be categorised into tenses of information

- + Past information
- + Present information
- + Future information

Past Info

Previous Station

Start Station

3rd hierarchy

Present Info

Current Station

Orientation
of Platform

1st hierarchy

Future Info

Next Station

End Station

Available trains
at interchange

2nd hierarchy

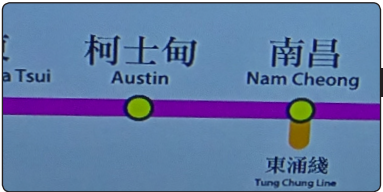
VISUAL LANGUAGE

38

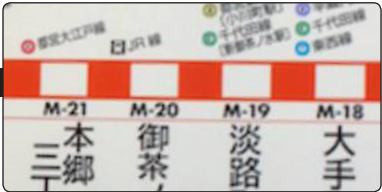
The existing PIDS (both LCD & LED) were considered to study the visual language used to communicate the information such as line symbols, station markers and direction of travel.

Line Symbols

Singapore
Metro



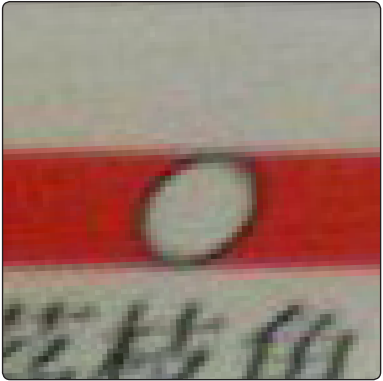
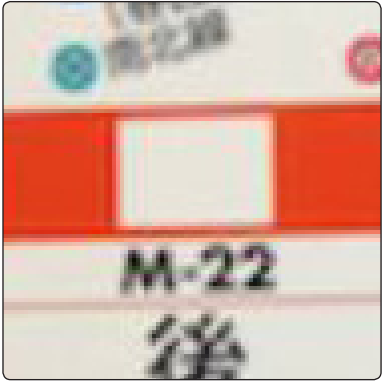
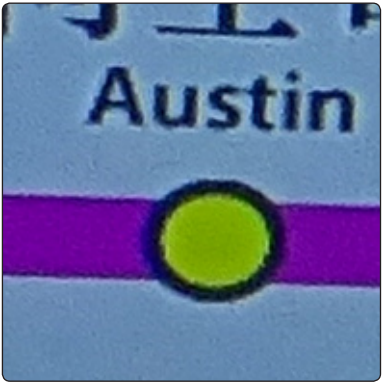
Tokyo
Metro



Hong Kong
Metro



Point symbols/ Station markers



Direction/Status of Travel

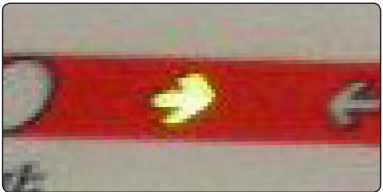
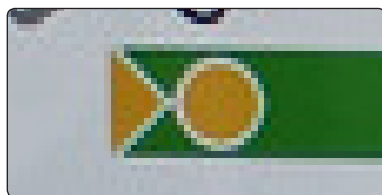
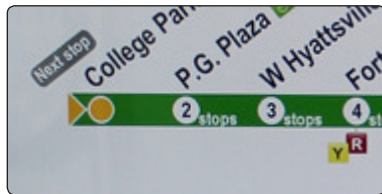
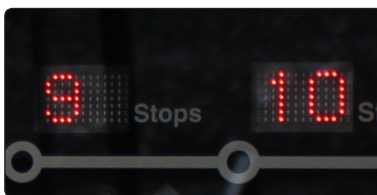


Figure 38 A table showing visual languages of transit maps used to communicate specific information through PIDS.

Washington D. C.
Metro



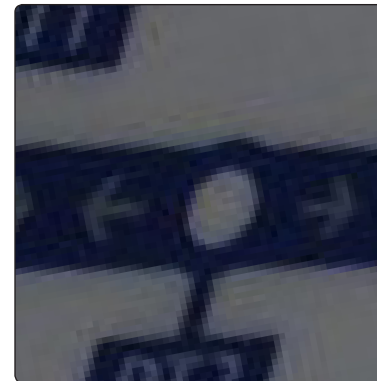
Washington D. C.
Metro



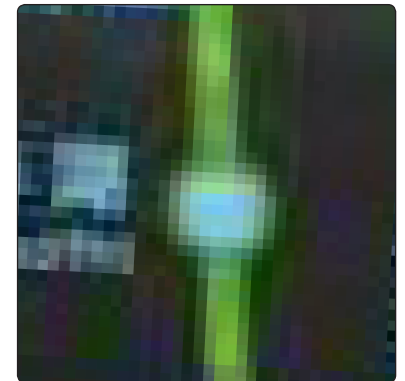
Singapore
Metro



Singapore
Metro



Wuhan (China)
Metro



TYPOGRAPHY AND COLOUR

Typography

The quality of a good font to be legible at smaller sizes is large x-height and open counters. The fonts used in Mumbai Railway Map (MRM) – *Myriad Pro* (English) and *Kohinoor Devanagari* (Hindi and Marathi) satisfy the requirements.

Colour

The transit lines are always colour coded for the ease of identification. The colours used in MRM are colour blind friendly which helps them to distinguish the colours clearly.

Figure 39 MRM.

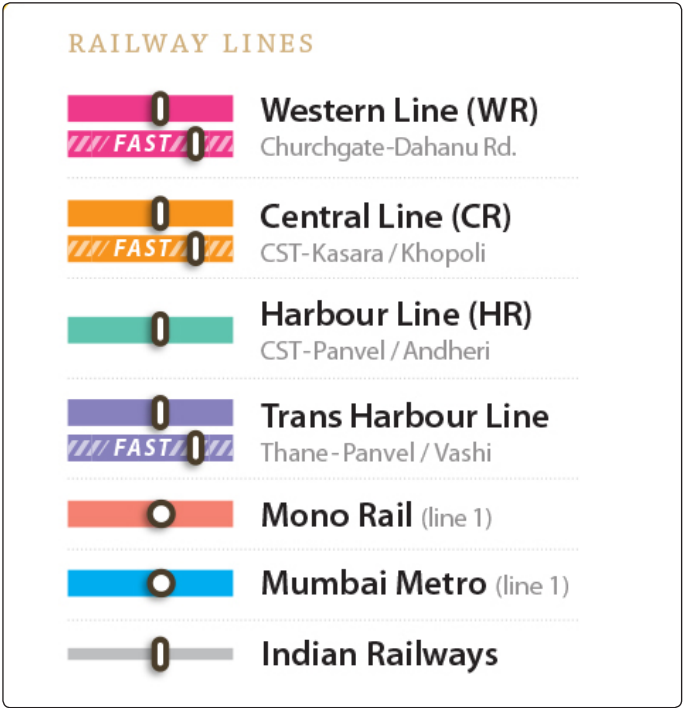
Figure 40 Myriad Pro typeface used in MRM English.

Figure 41 Kohinoor Devanagari typeface used in MRM Hindi and MRM Marathi

Figure 42 Colour codes used in MRM for the identification of line.



39



40
41
42

The Myriad Pro is a font designed for print. When used for digital devices, its legibility reduces due to close placement of each letters. Hence the legibility is improved by adjusting the tracking. Same is applied to Kohinoor font wherever applicable.

Kanjur Marg

कांजुर मार्ग



3

Design & Decisions

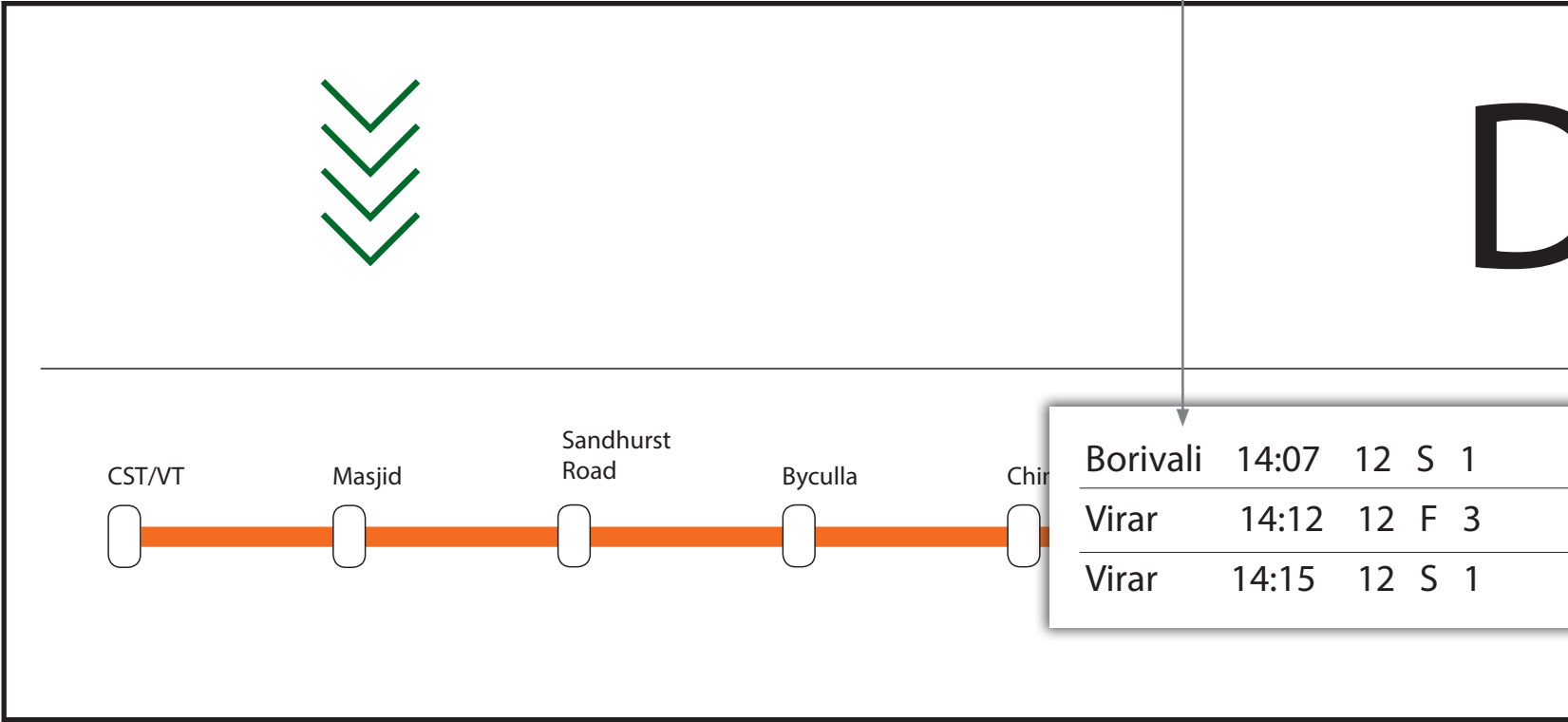
DESIGN & DECISIONS

The doors of the metro are usually big and wide for easy exchange of the passengers at the station. Considering the size of smallest door through which a single healthy man can pass is not smaller than 1 metre. As seen from existing designs, the displays are usually wider as it is the optimum shape which accommodates in the space available above the door.

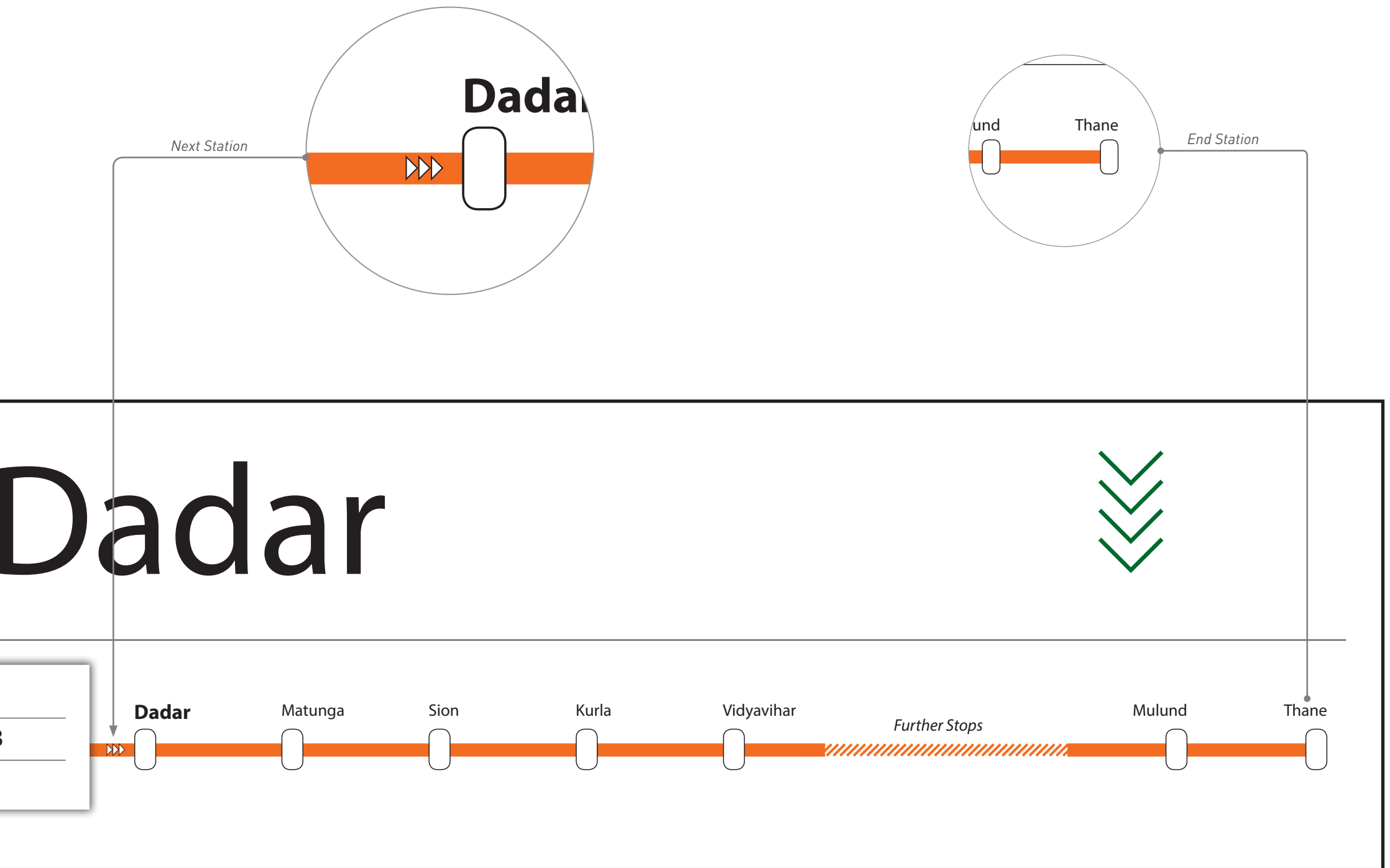
Before proceeding to any further design, screen size was locked to 750mmx150mm. The *necessary information* obtained from the *user needs* were mapped on the layout of the screen to get the idea of how visual elements interacts with the space. This led to the very first iteration of the design.

Borivali	14:07	12	S	1
Virar	14:12	12	F	3
Virar	14:15	12	S	1

Trains available
at interchange



Dadar

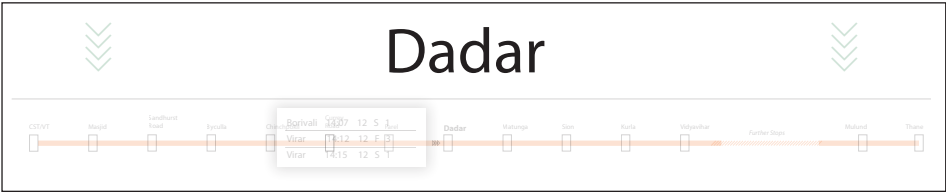


NEXT
STATION

India is a multilingual country. The information to be delivered have to serve most kind of people. In this kind of scenario, three information is communicated by three languages – English, Hindi and Regional i.e., Marathi in this scenario.

The priority of the information *Next Station* is high and hence it is big and bold so that this is the first visible thing.

Usually the multilingual display shows the text of different languages only one at once and then next language follows and the another and the cycle repeats. The rest are invisible when one language is being displayed and they come live on-screen only after completing their cycle. To overcome this so that all three languages are displayed at the same time few iterations were explored and opted for motion design.



Visual Design

Thane

थाने

ठाणे

Thane
थाने | ठाणे

थाने
ठाणे | Thane

ठाणे
Thane | थाने

Thane
Thane | थाने | ठाणे

थाने
Thane | थाने | ठाणे

ठाणे
Thane | थाने | ठाणे

Thane ठाणे
थाने

थाने Thane
ठाणे

ठाणे थाने
Thane

थाने Thane ठाणे

ठाणे थाने Thane

Thane ठाणे थाने

थाने Thane ठाणे

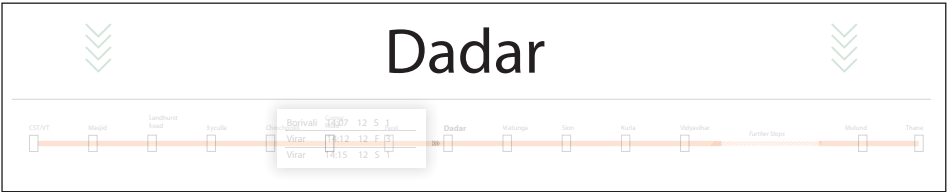
ठाणे थाने Thane

Thane ठाणे थाने

INDICATION OF INTERCHANGE

An interchange station or a transfer station is a train station for more than one railway route in a public transport system that allows passengers to change from one route to another, often without having to leave a station.

Interchange housing more than one line are individually colour coded. Indicating this colour change during the arrival of interchange station would help to recognize the interchange and also the other line it houses by the colour.

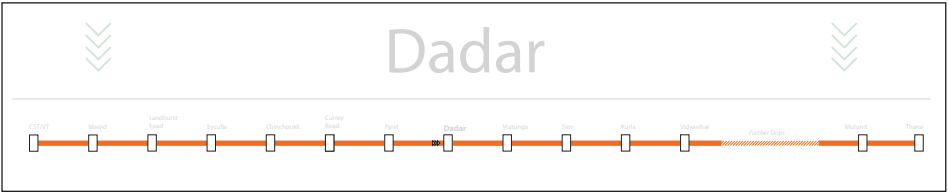


Visual Design + *Motion Design*



LINE
MAP

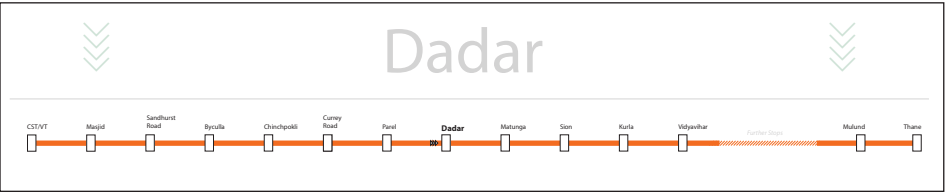
Rail network consists of finite number of stations represented by a dot/markers and These stations are connected by tracks represented by a line. This is the basic idea of how a whole rail network is translated on a small piece of paper.



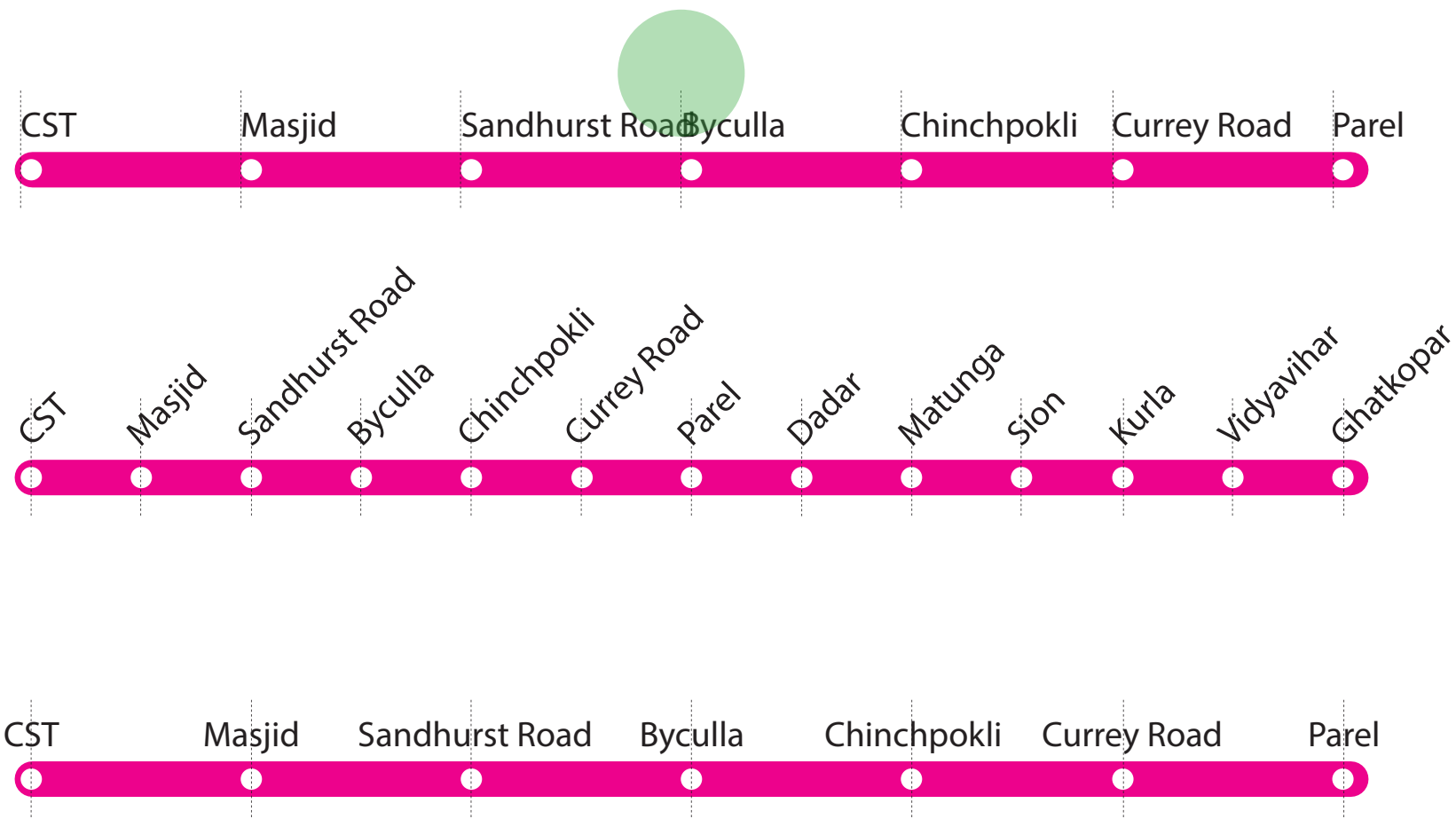
Visual Design



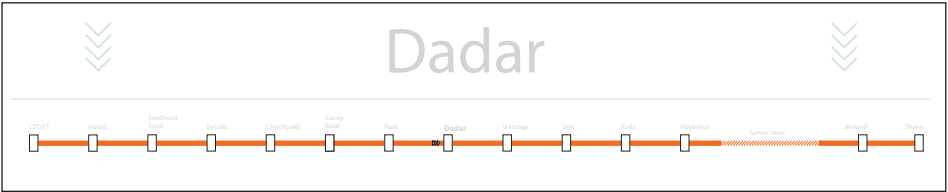
TEXT
ORIENTATION



Visual Design

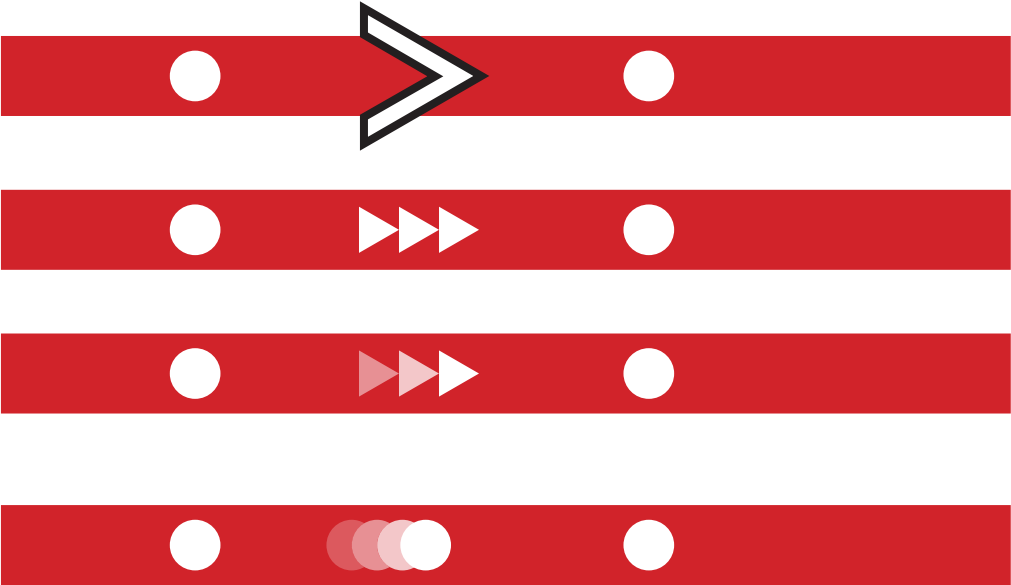


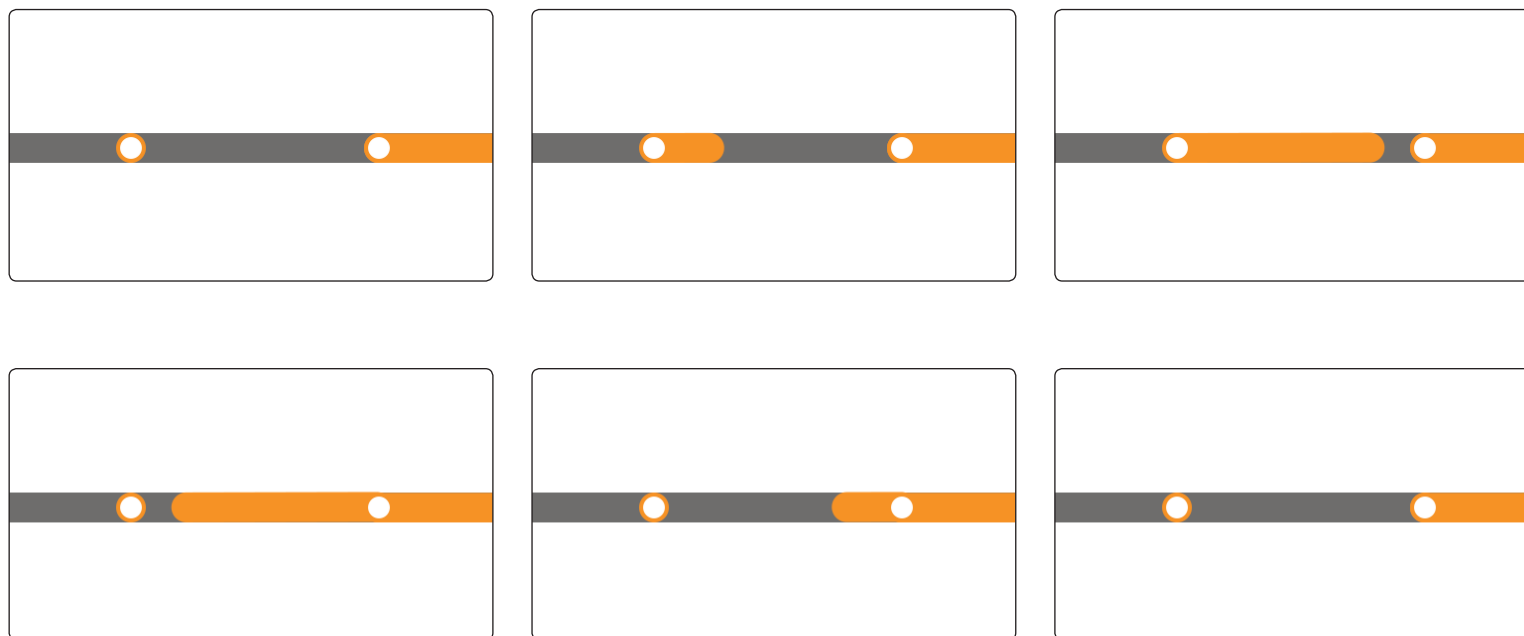
TRAVELLING



This visual clue indicates the status of the journey indicates the train is travelling from one station to the next station.

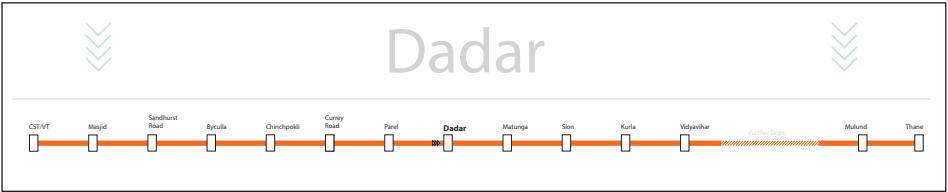
Visual Design



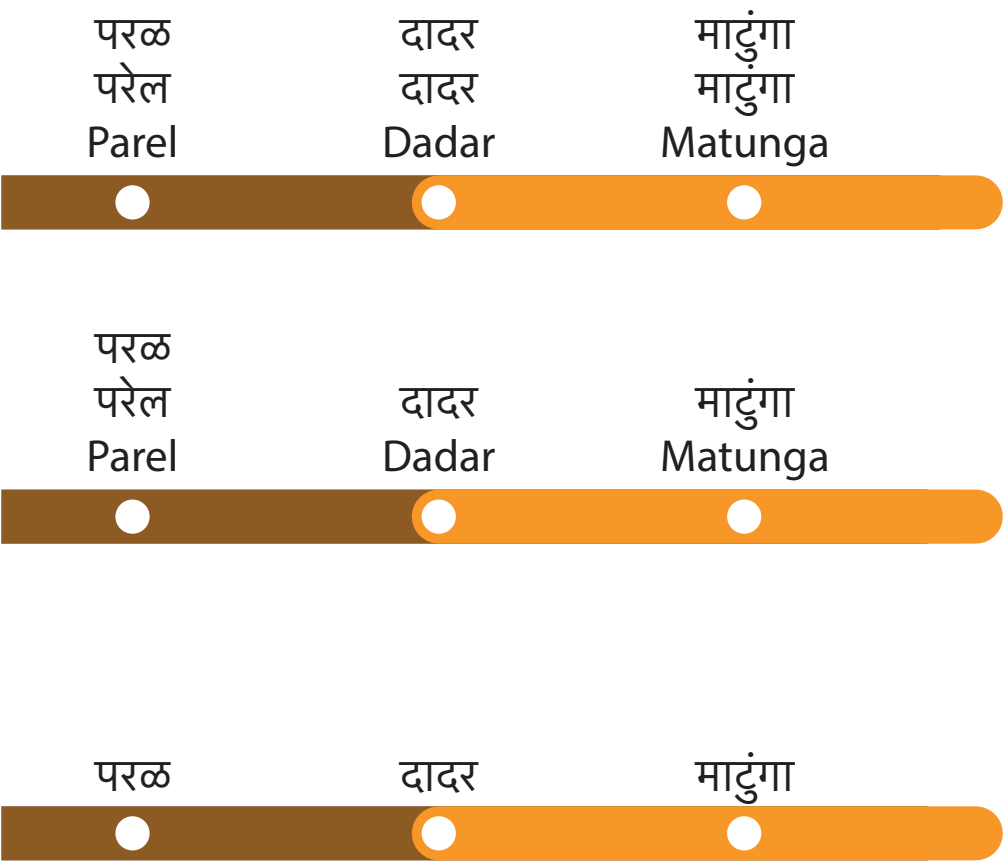


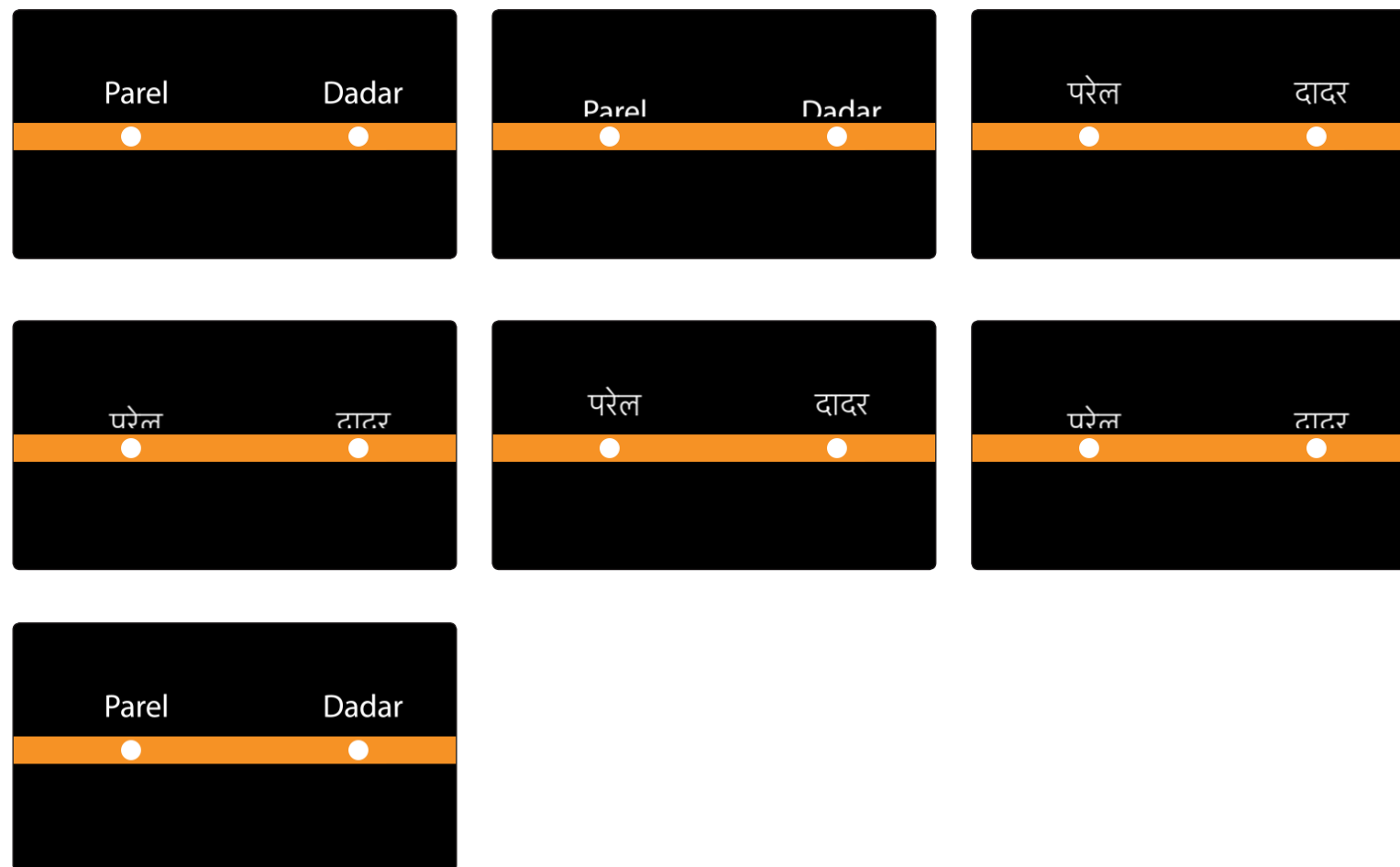
STN. NAMES & LANGUAGES

This part of iteration is about how to display multilingual names on a line map



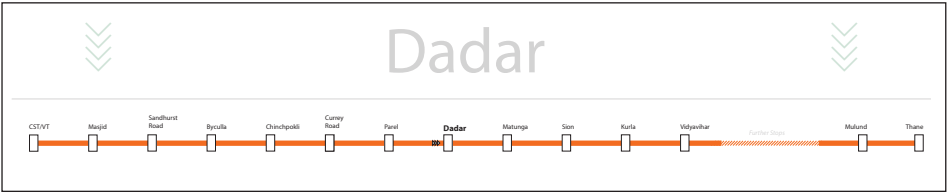
Visual Design



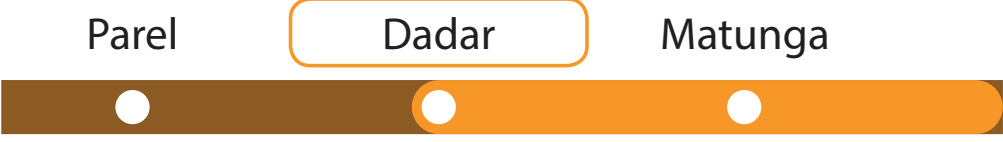
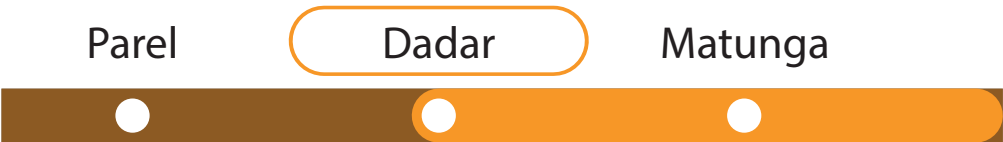


HIGHLIGHTER

These explorations are about emphasising the next station text on a line map.



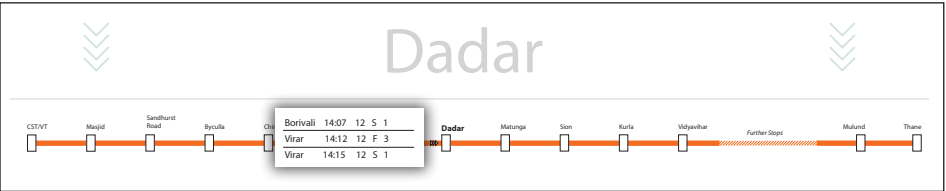
Visual Design





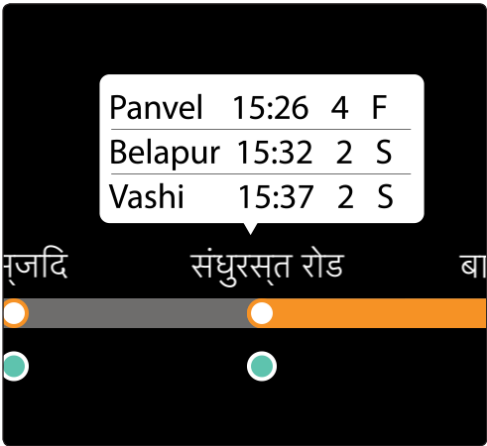
TRAINS AVAILABLE AT INTERCHANGE

This information window pops when the next station is interchange indicating the trains available in the very next minutes.



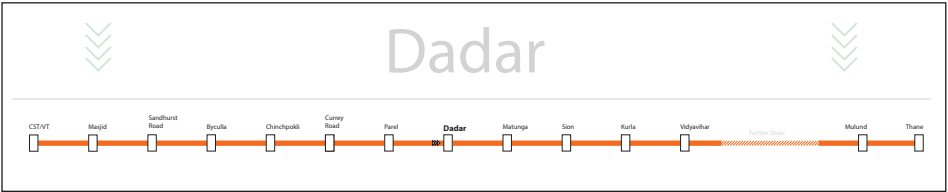
Visual Design + Motion Design

Destination	Time	Platform	Mode
Panvel	15:26	4	F
Belapur	15:32	2	S
Vashi	15:37	2	S

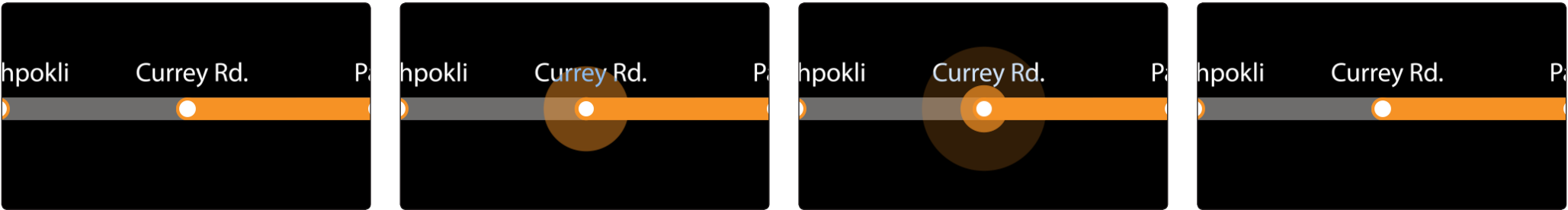


CURRENT
STATION

This visual clue indicated the arrival/halt of train at a station.

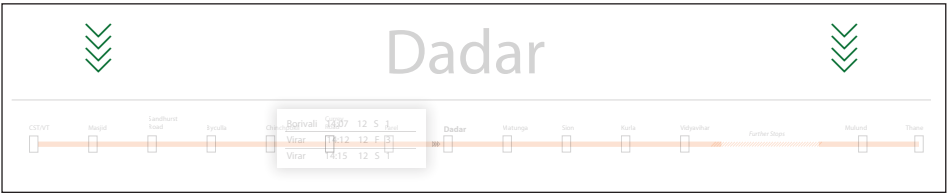


Motion Design



ORIENTATION OF EXIT

Visual clue about the direction of exit.
Green signifies the door opens at that
side and red signifies the door doesn't
open at that side.

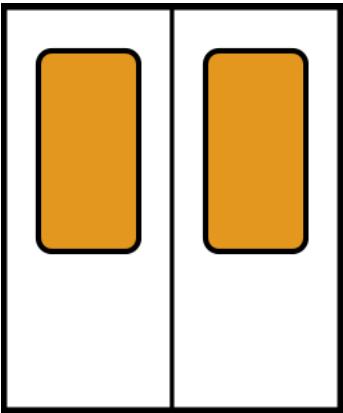
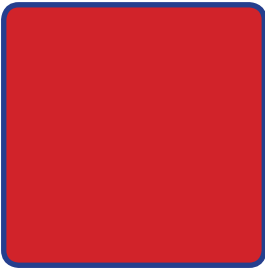


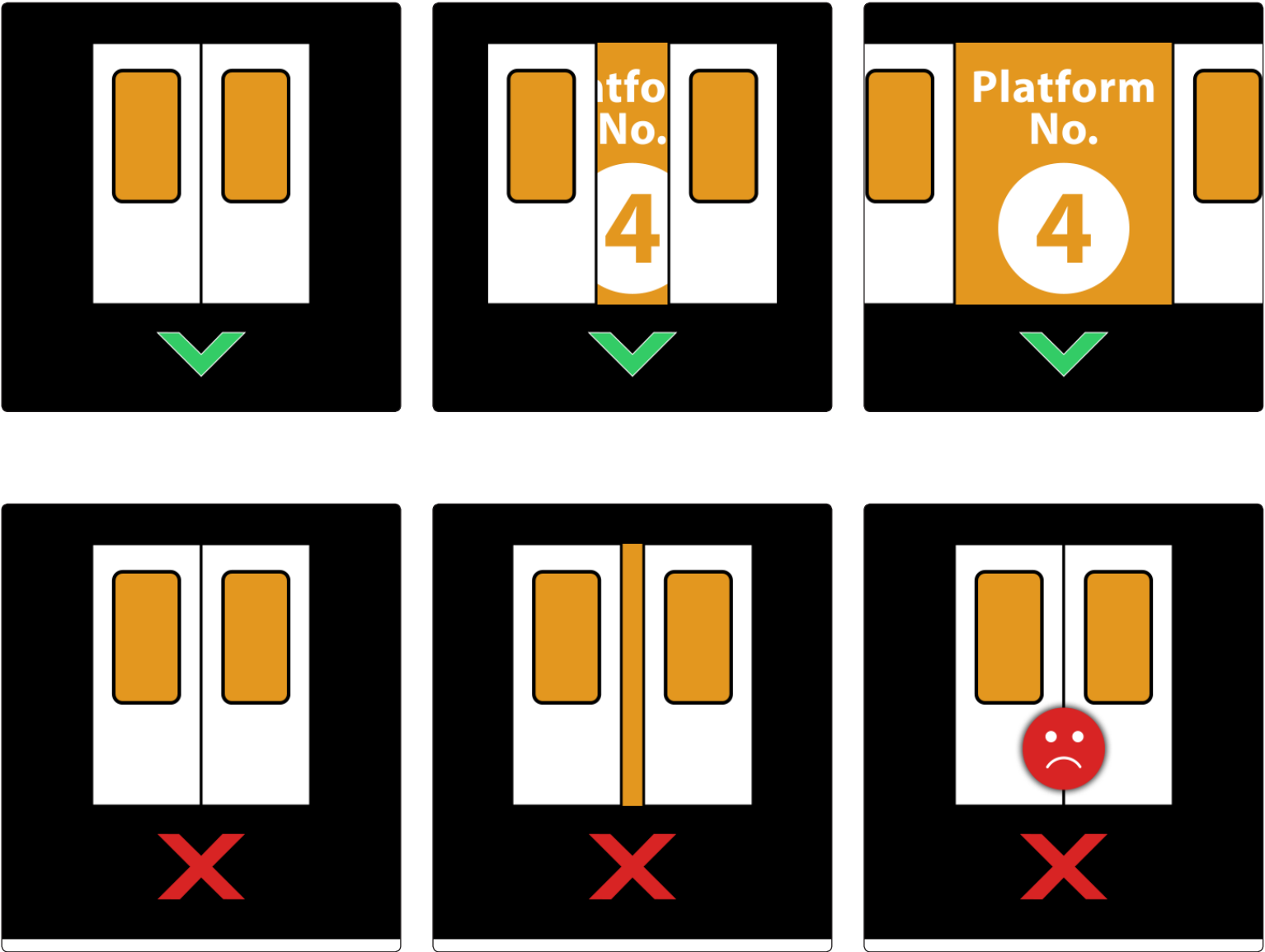
Visual Design



**Door opens
on this side**

**Door opens on
the other side**

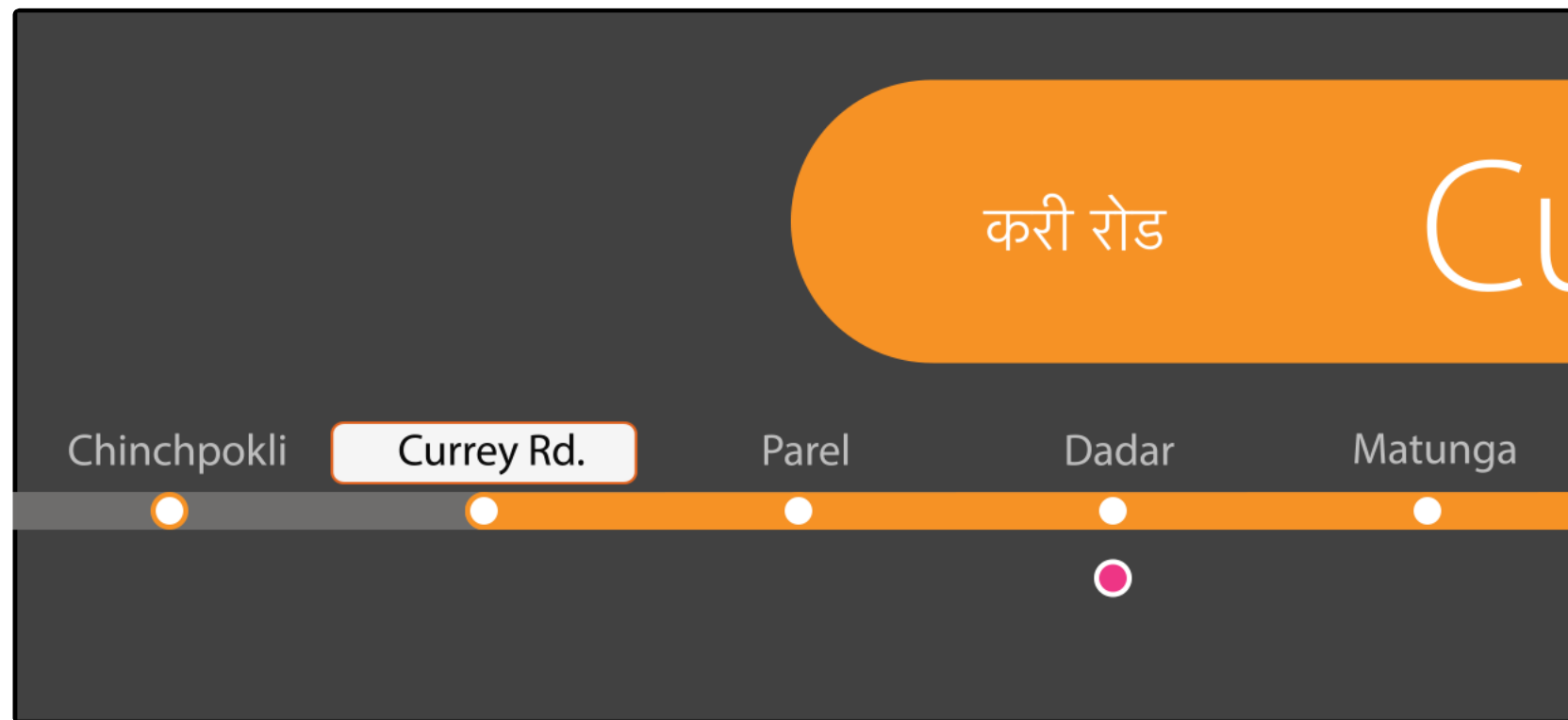




FINAL DESIGN

When all the visual elements are
composed together, the result is this >>>

P.S. Best viewed in motion.



Currey Rd.

करी रोड

IN 39 MINS
APPROX

ga

Sion

Kurla

Vidyavihar

Ghatkopar

Vikhroli

Thane

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