PASSENGER INFORMATION DISPLAY SYSTEM FOR MUMBAI LOCAL FOR A FUTURISTIC SCENARIO

VISUAL COMMUNICATION PROJECT II

BY

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GUIDE

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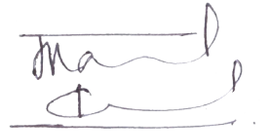
2017

ACKNOWLWGMENT

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.



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1

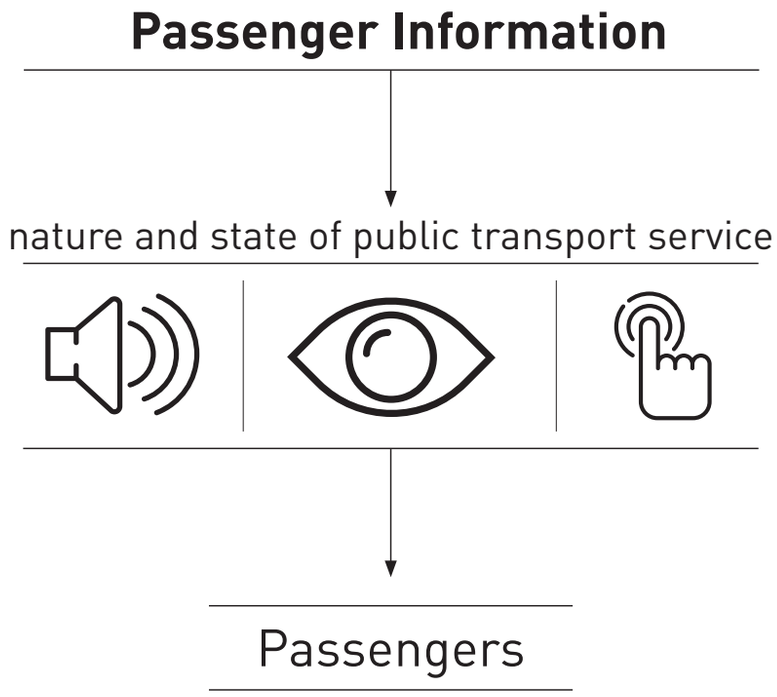
Introduction

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)



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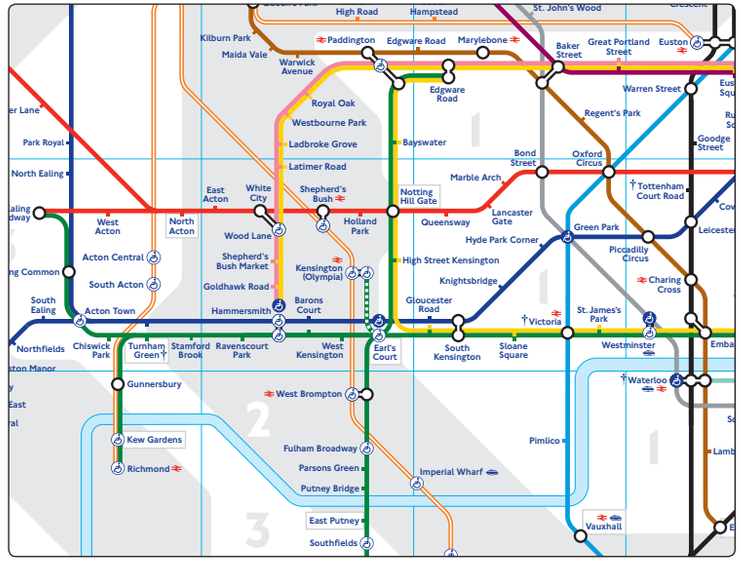

MUMBAI C.S.T. TERMINUS (CENTRAL RLY.)						
DEP.	T.DN	Days	TRAIN NAME	Days	T.UP	ARR.
22.55	51029	M,Tu,W,Su	Bijapur Pass.	Tu,W,Th,F	51030	04.10
22.55	51033	Daily	Shirdi Pass. (Via Daund)	Daily	51034	04.10
23.25	12141	Daily	Rajendranagar Exp.	Daily	12142	15.30
23.45	11027	Daily	Chennai Mail	Daily	11028	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 Supefast Exp.	Daily	12168	12.30

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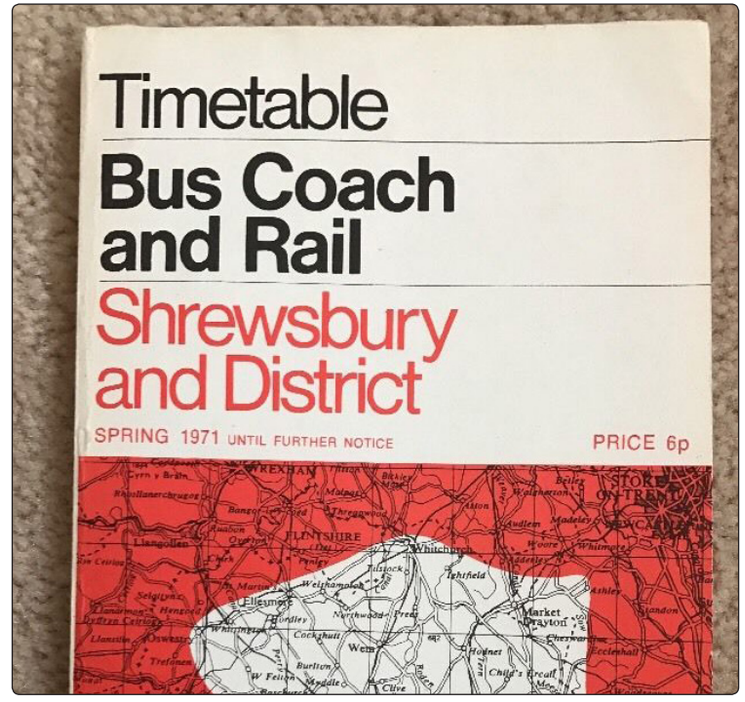


TYPES OF PASSENGER INFORMATION

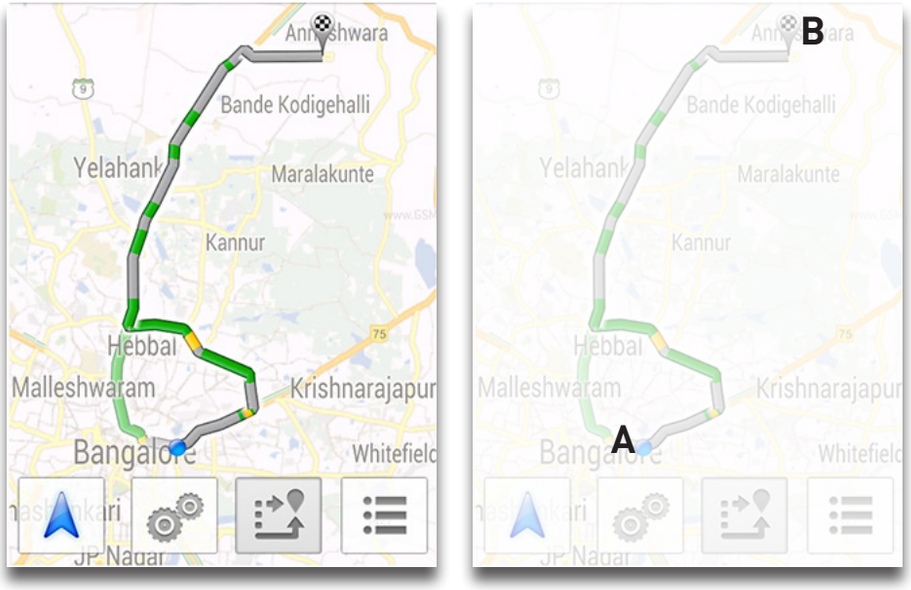
Based on the nature of information, Passenger Information can be categorised into two type

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.)

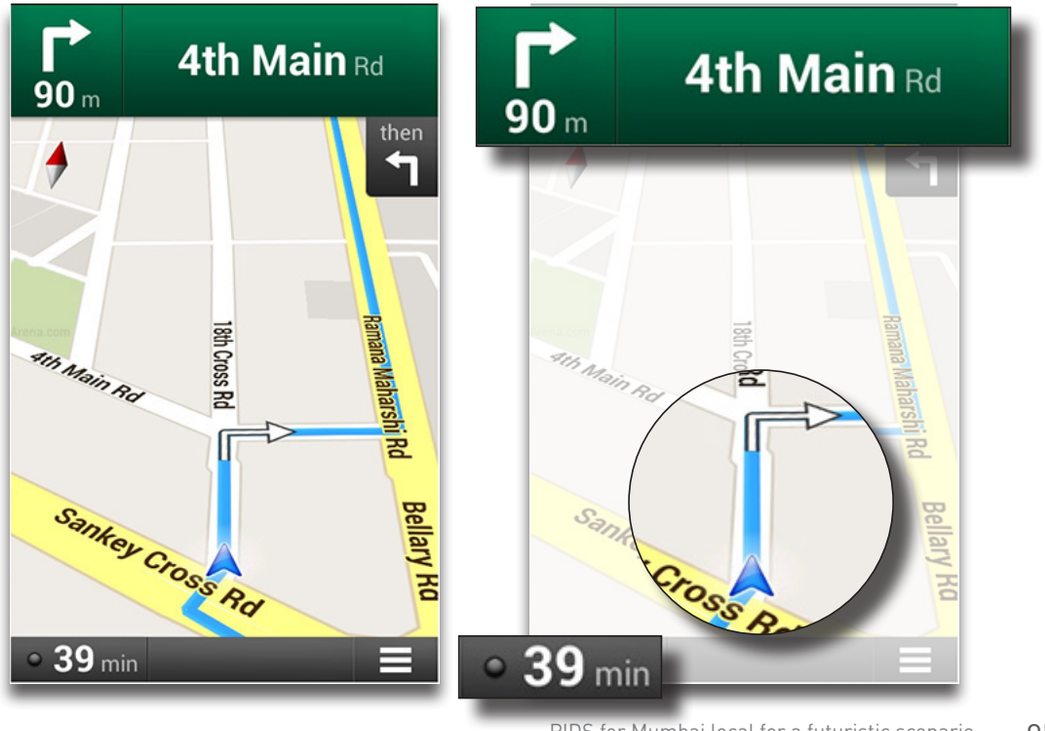
Real time information, which changes continuously as a result of real-world events and is typically used during the course of a journey (primarily how close the service is running to time and when it is due at a stop, but also incidents that affect service operations, platform changes etc.).

Passenger Information

	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.

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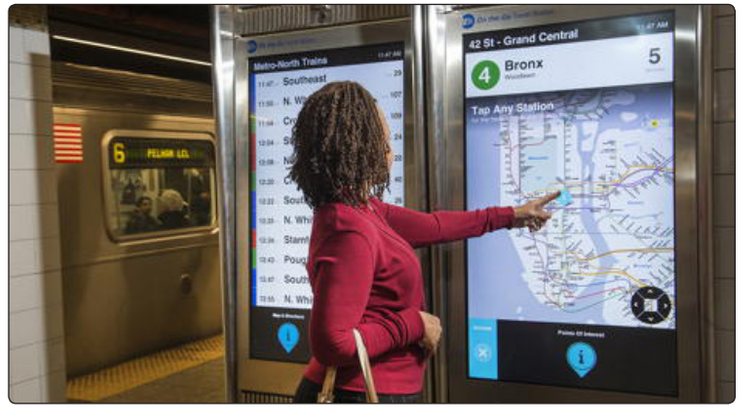

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Figure 5 Interactive Kiosk at New York City Subway station.

Figure 6 Interactive Kiosk at a Bus stop.

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

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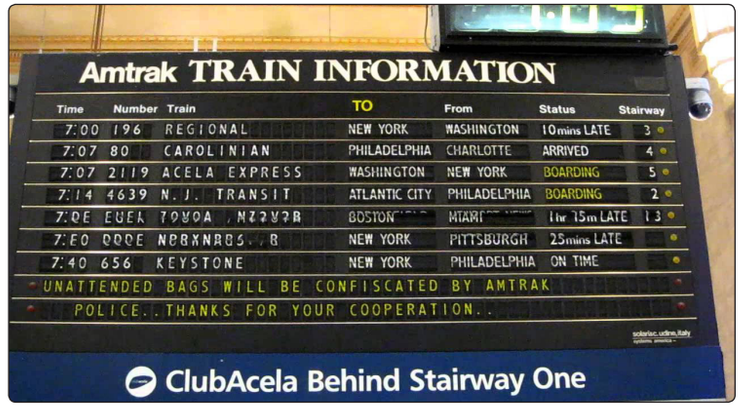

13
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Figure 10 PIDS of a train service at station

Figure 11&12 PIDS inside metro compartment.

Figure 13 PIDS at Mumbai Local Station.

Figure 14 PIDS inside Mumbai local rail compartment.

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.

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Figure 15 Wuhan Metro (China)

Figure 16&17 HongKong Metro

Figure 18 Bengaluru Metro

Figure 19 Tokyo Metro

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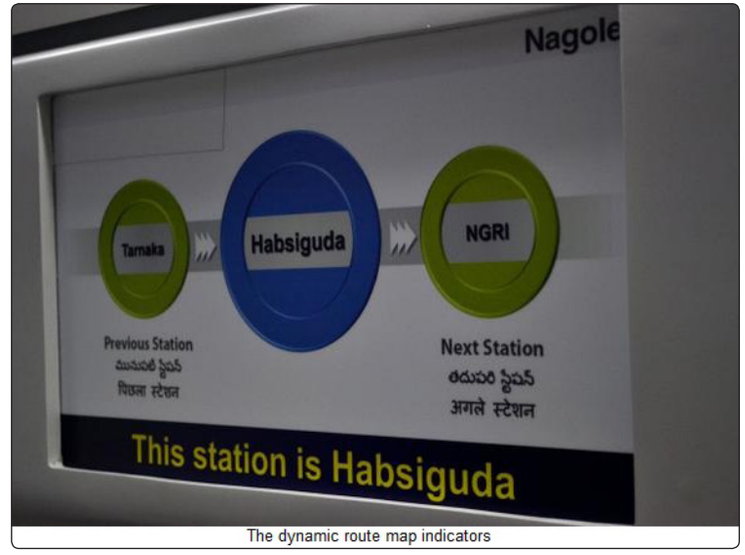

The dynamic route map indicators

Figure 20 Washington D. C. Metro

Figure 21 Paris Metro

Figure 22&23 Hyderabad Metro

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

24
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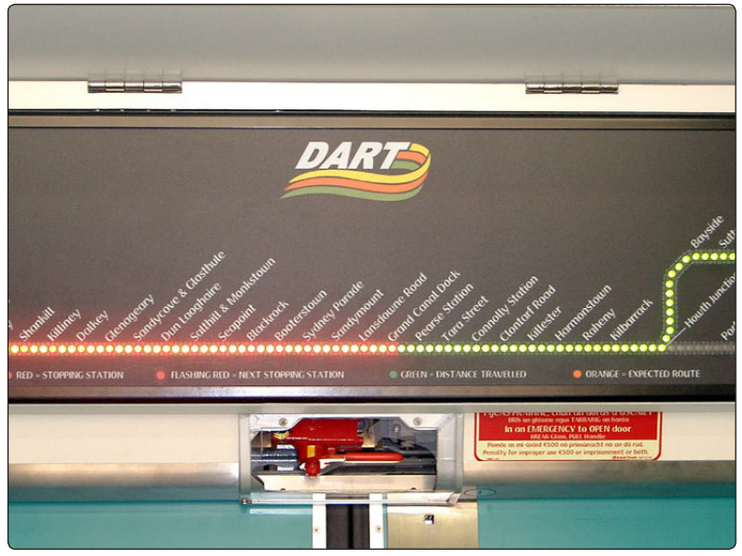

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Figure 24 Irish Rail

Figure 25 Washington D. C. Metro

Figure 26 Hong Kong Metro

Figure 27 Singapore Metro

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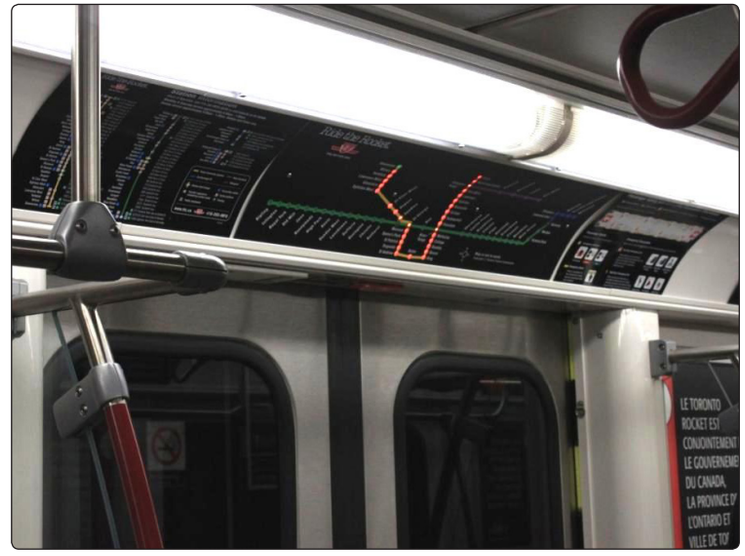


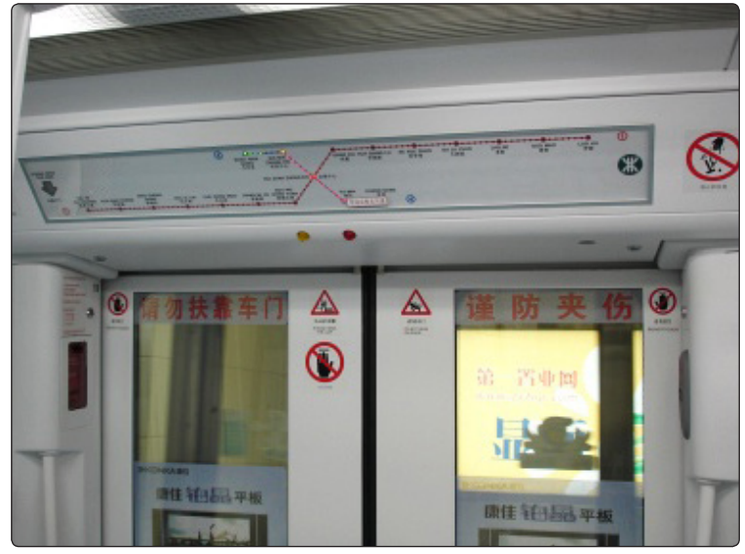


Figure 28 Singapore Metro

Figure 29 New York City Subway

Figure 30 Toronto Metro

Figure 31 unknown

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

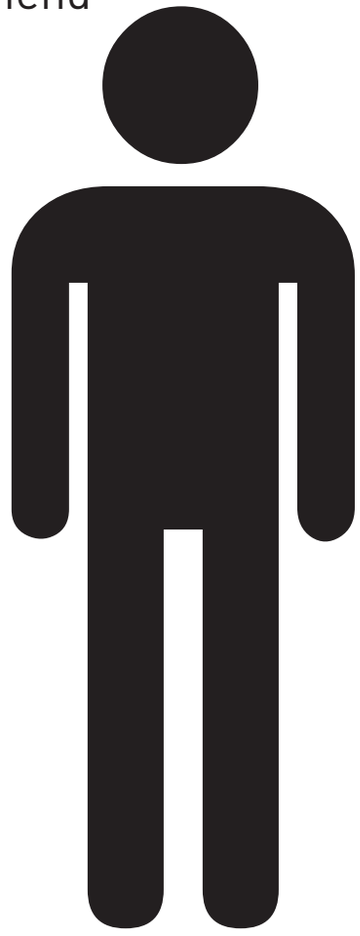
+ what primary information* to be delivered?

+ when and how the information to be delivered?

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

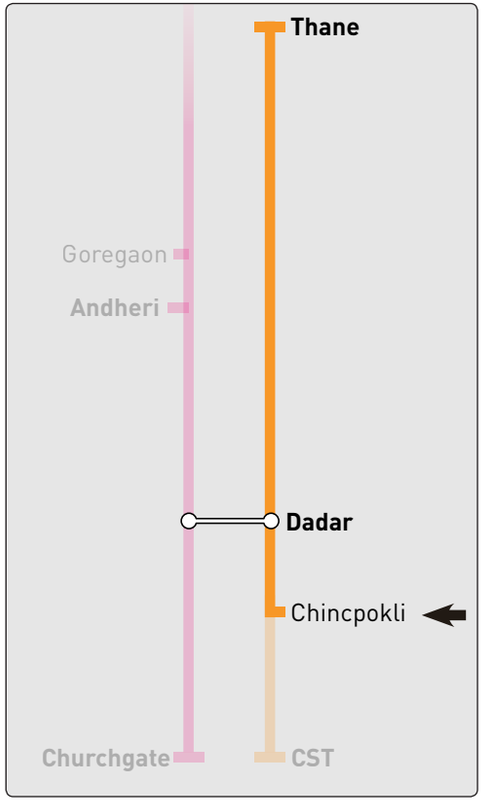
**Necessary Information required by a passenger during travel.*

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

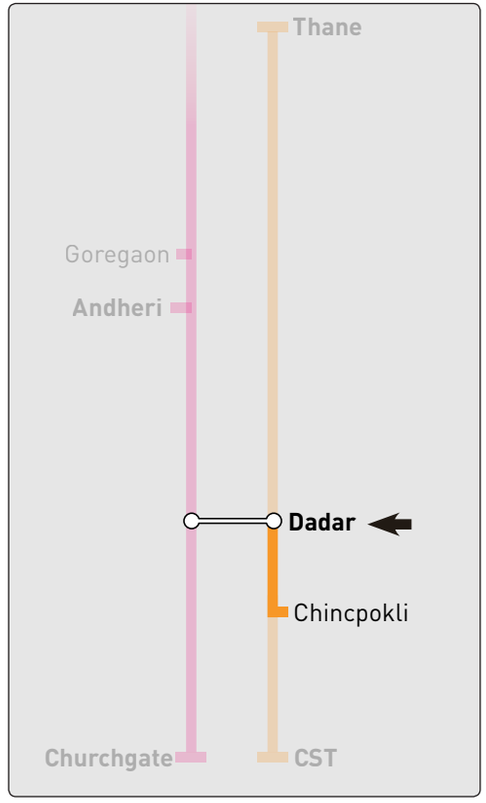


His friend who is resident of Mumbai guides him over phone to reach **Goregaon** by Mumbai Local >>>

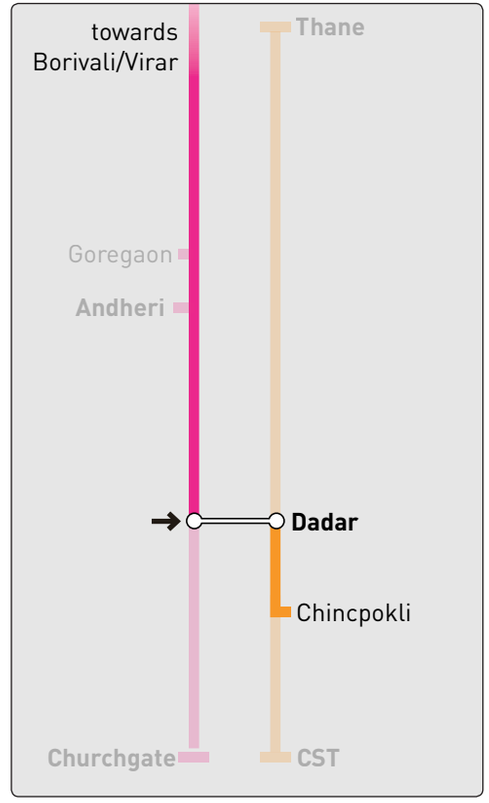
Take a train heading towards THANE.



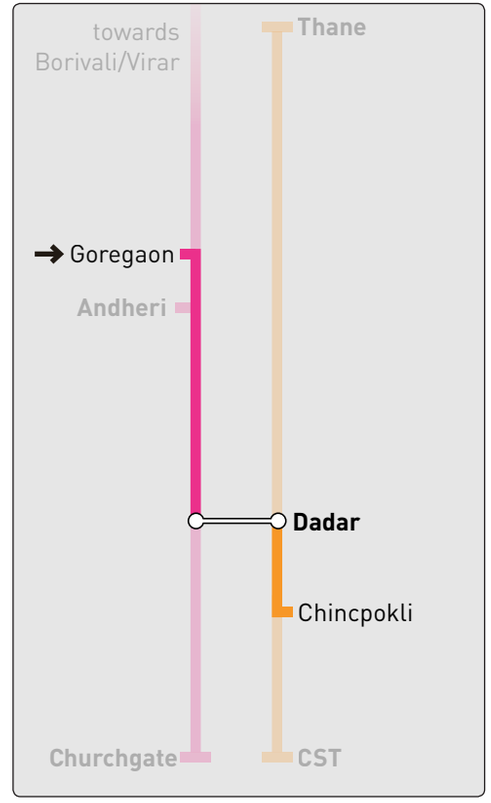
Get down at DADAR interchange and change from Central line to Western line.



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

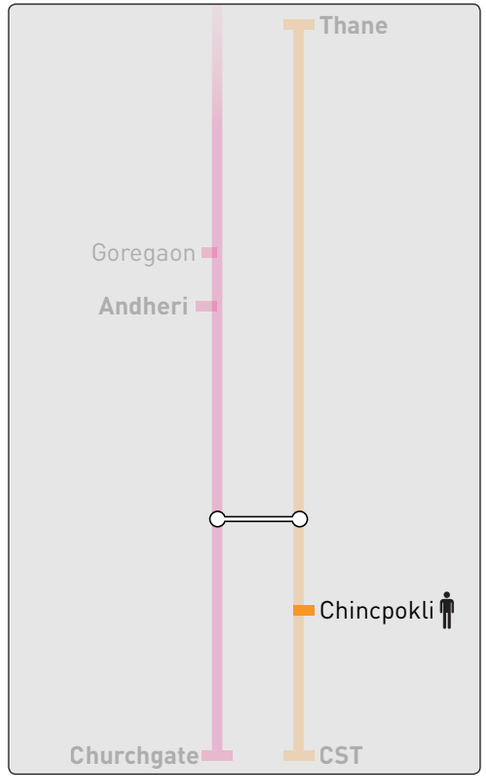


Get down at GOREGAON. I will see you there.

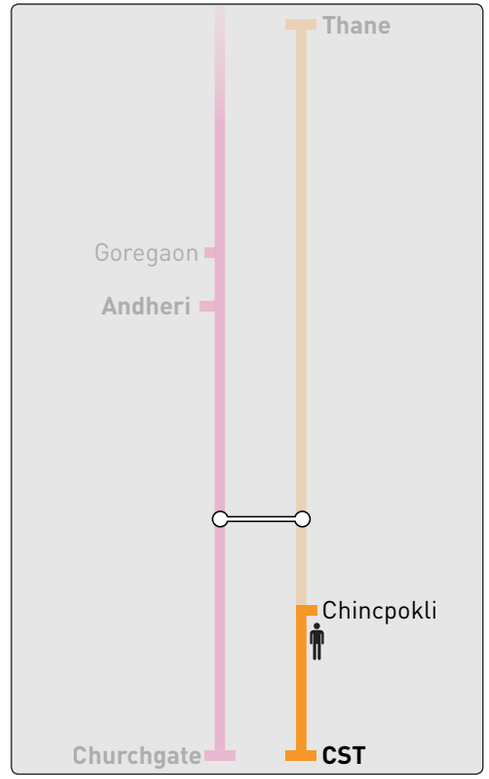


Lets see what necessary information he might require during his journey.

Passenger is at CHINCHPOKLI station, waiting for a train.



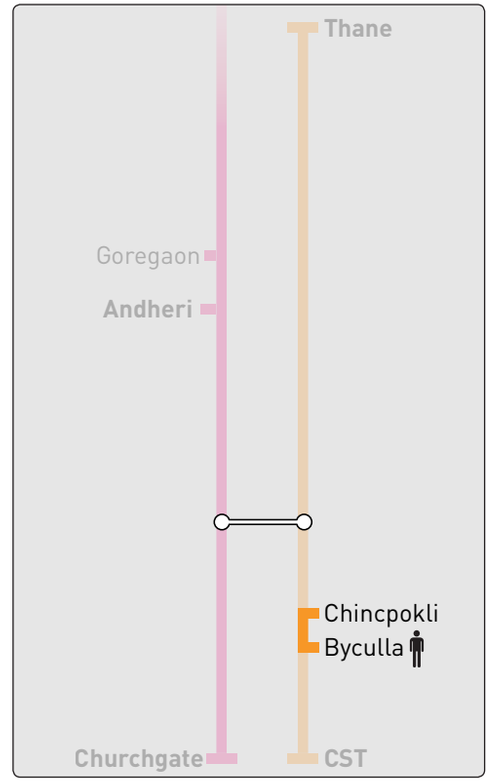
Due to misinformation, he boarded train towards CST (opposite direction of his expected journey).



Passenger:
Oops...Wrong direction!

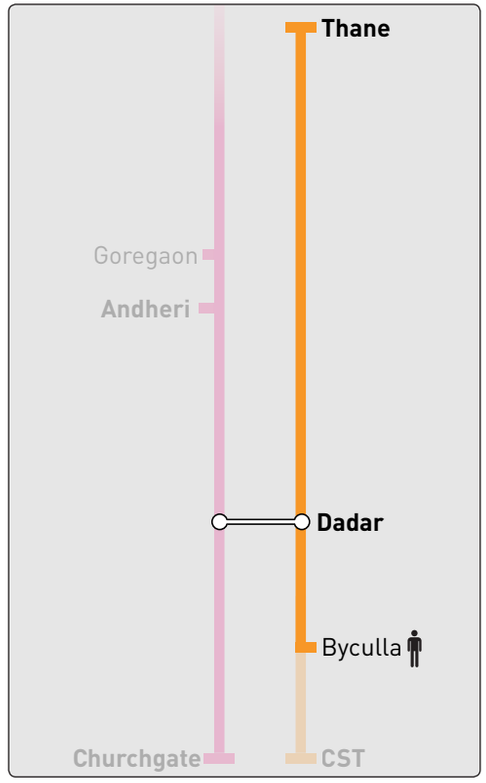
Required information:
END STATION

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

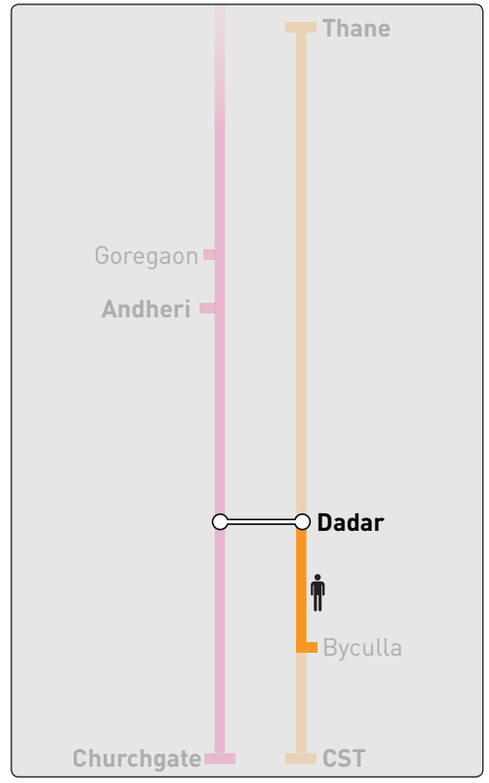


Now the new journey becomes BYCULLA to GOREGAON.

He now takes a train heading THANE.



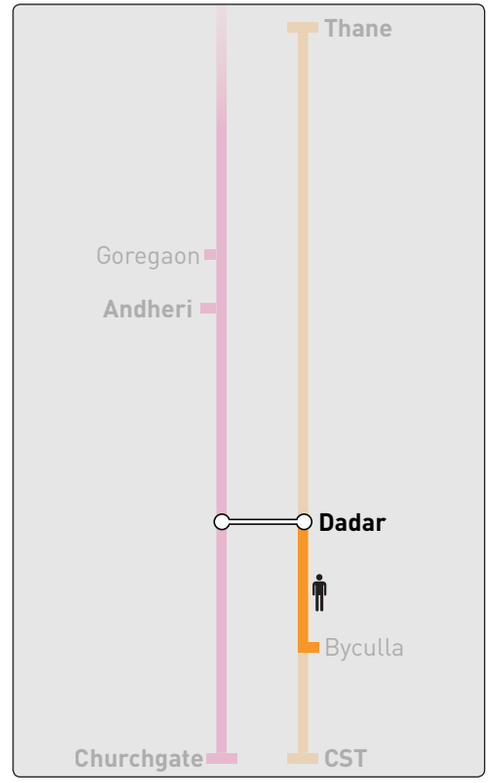
In the journey he is anxious, as he don't want to miss his station i.e., DADAR.



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

Required information:
NEXT STATION

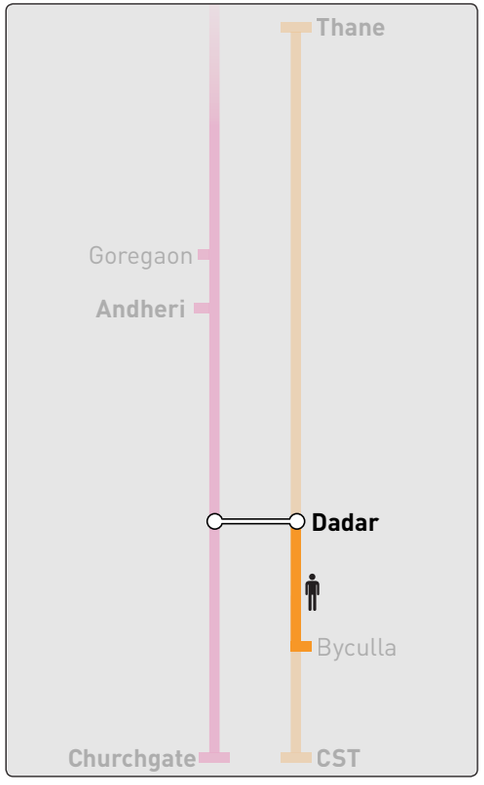
Since he need to change trains at DADAR, he is worried about trains available at other line (Western line).



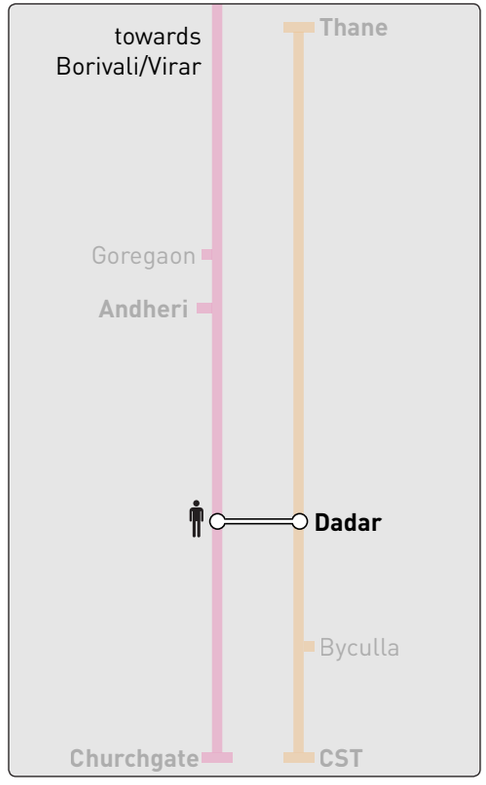
Passenger:
What are the available trains at Dadar?

Required information:
AVAILABLE TRAINS AT INTERCHANGE

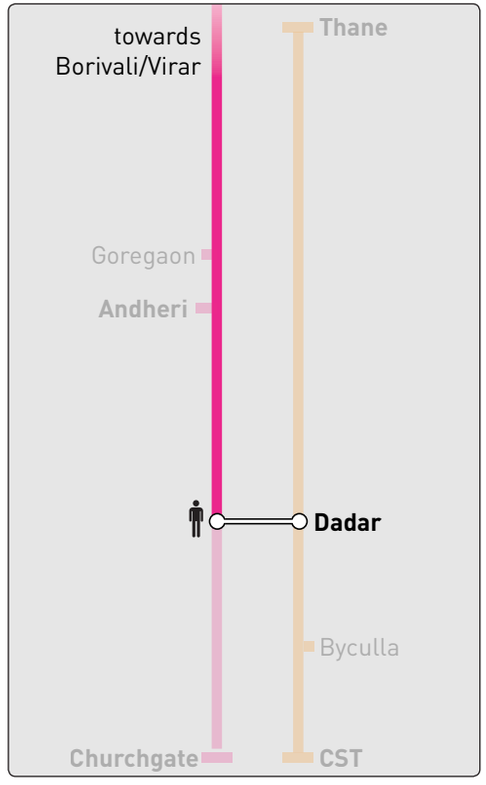
As the arrival of platform is random at each station, he is unsure about DADAR and is nervous about the crowd he is into.



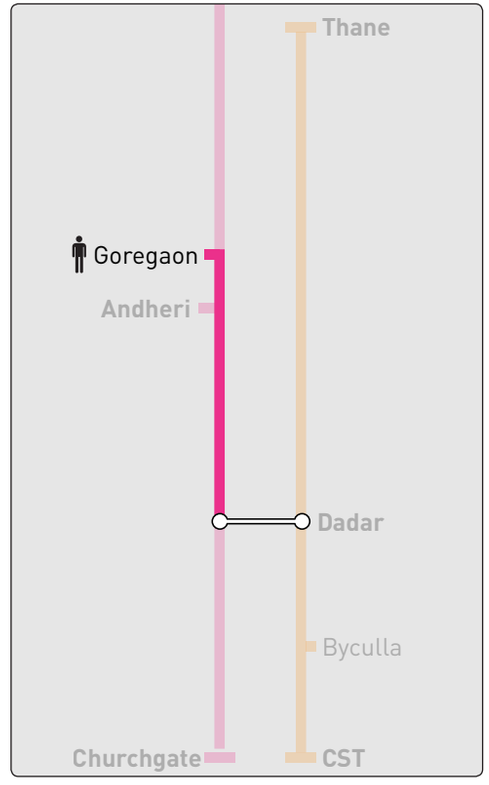
He change the lines at DADAR



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	**Present Info**	**Future Info**
Previous Station	Current Station	Next Station
Start Station	Orientation of Platform	End Station
		Available trains at interchange
3rd hierarchy	*1st hierarchy*	*2nd hierarchy*

VISUAL LANGUAGE

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.

38

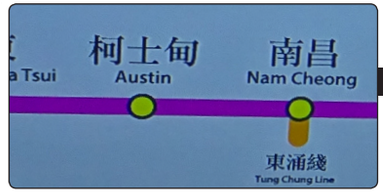
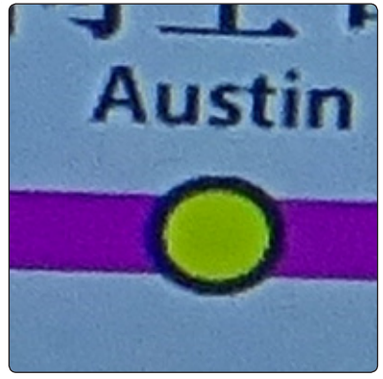
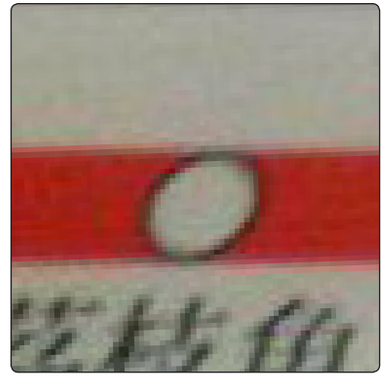
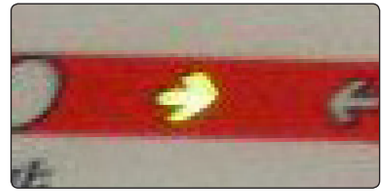
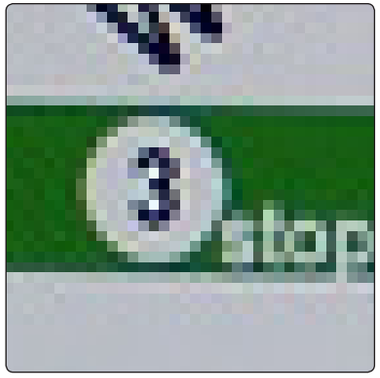
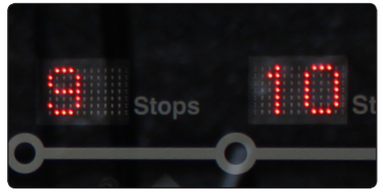
	Singapore Metro	Tokyo Metro	Hong Kong Metro
Line Symbols			
Point symbols/ Station markers			
Direction/Status of Travel			

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

Washington D. C.
Metro



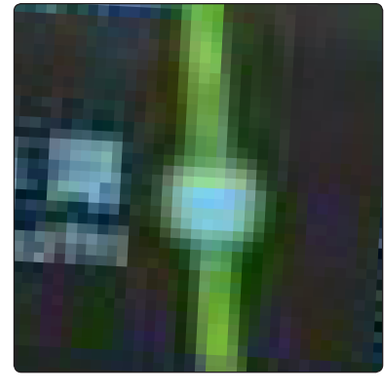
Washington D. C.
Metro



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.

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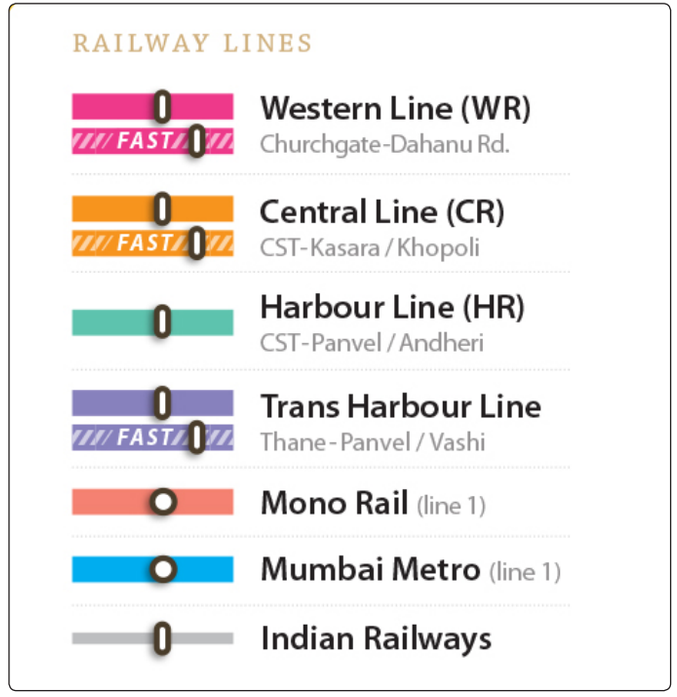


Figure 39 MRM.

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.

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

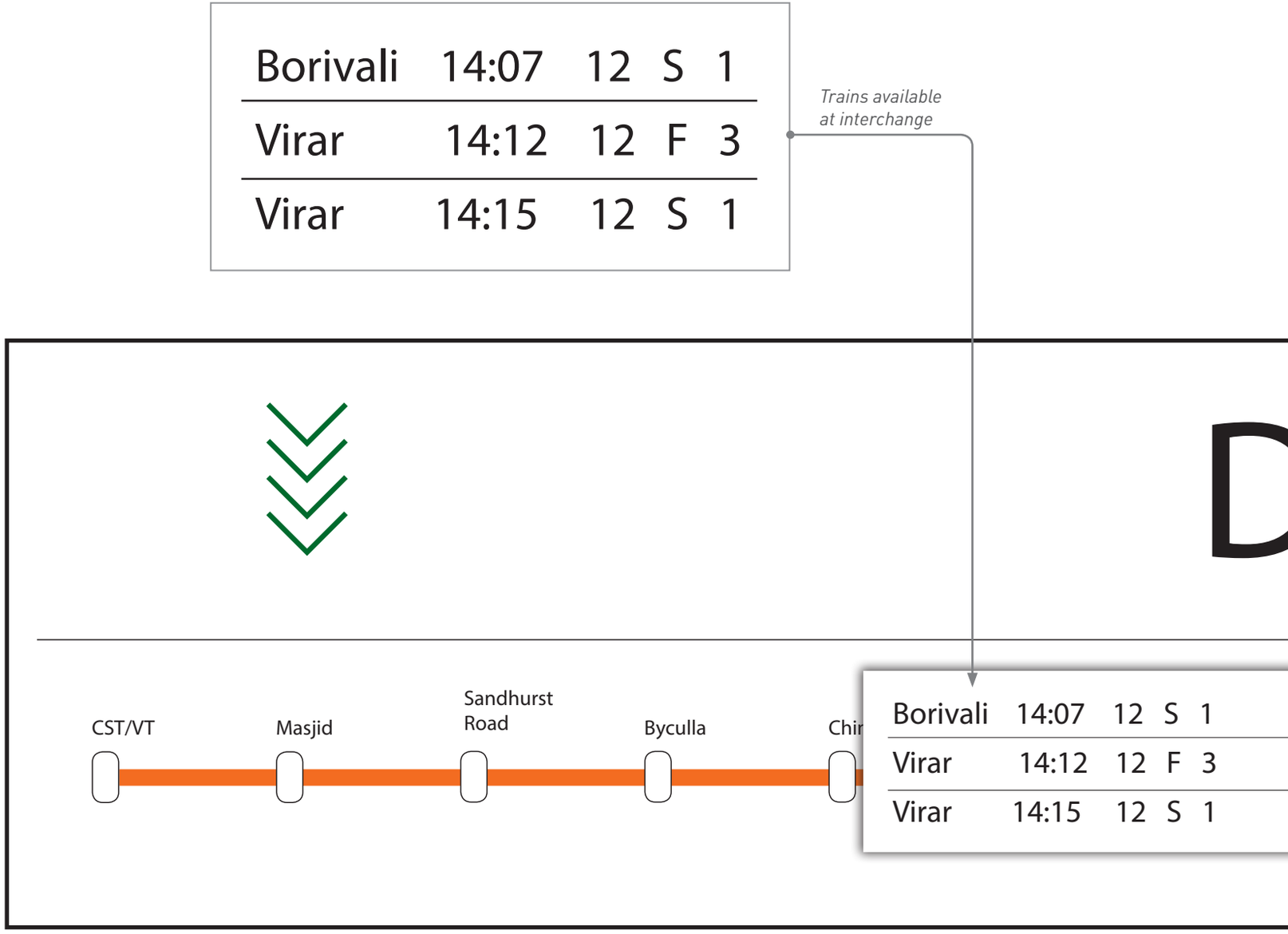
3

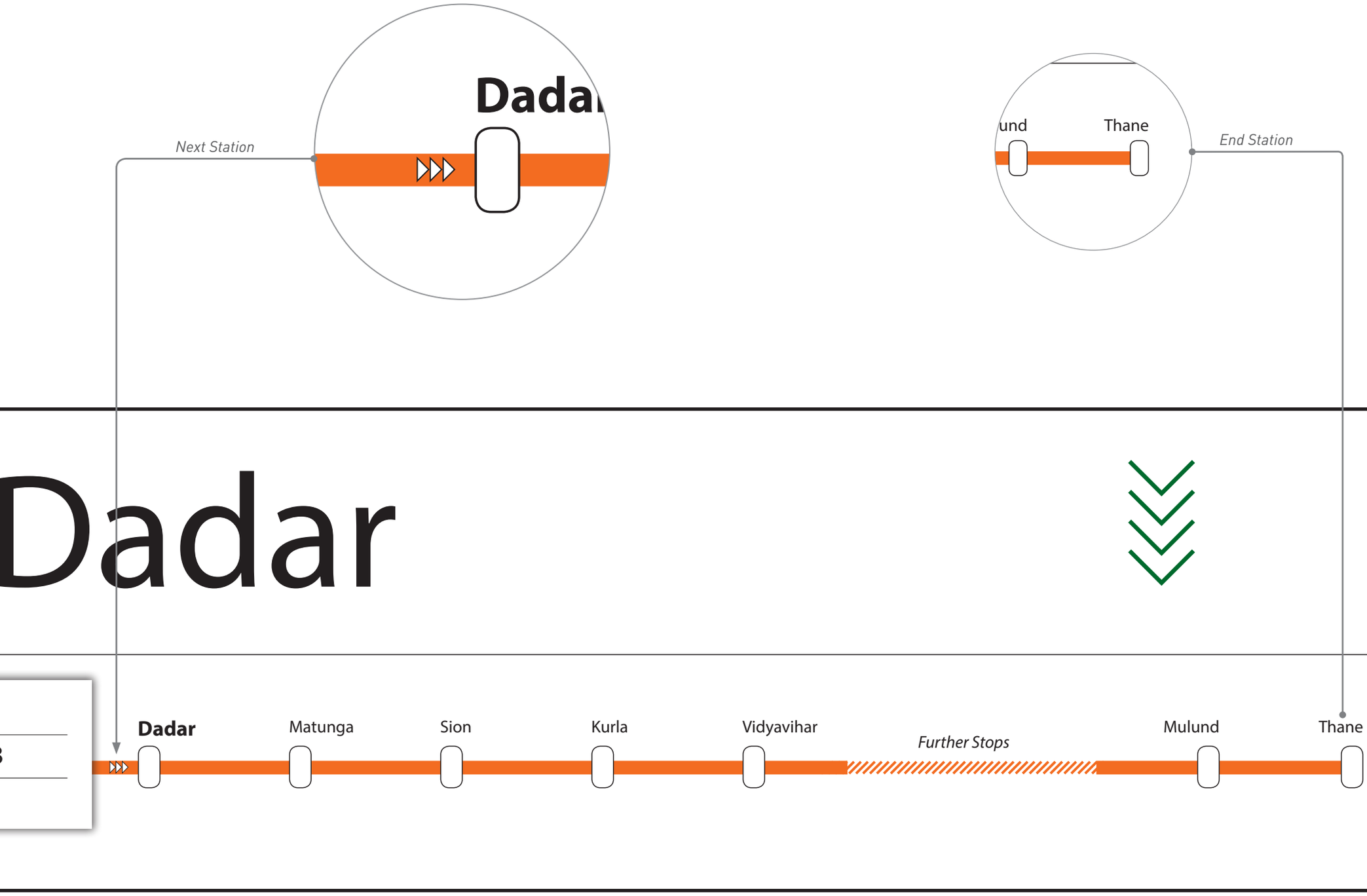
Design & Decisions

DESIGN & DECISIONS

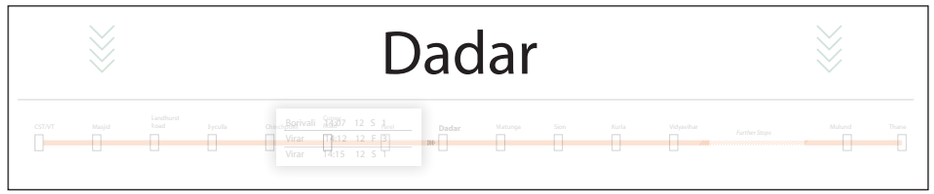
The doors of the metro are usually big and wide for easy exchange of the passengers at the station. Considering the size of smallest door through which a single healthy man can pass is not smaller than 1 metre. As seen from existing designs, the displays are usually wider as it is the optimum shape which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




Dadar
Next Station
und
Thane
End Station
Dadar
Dadar
Matunga
Sion
Kurla
Vidyavihar
Further Stops
Mulund
Thane

NEXT STATION



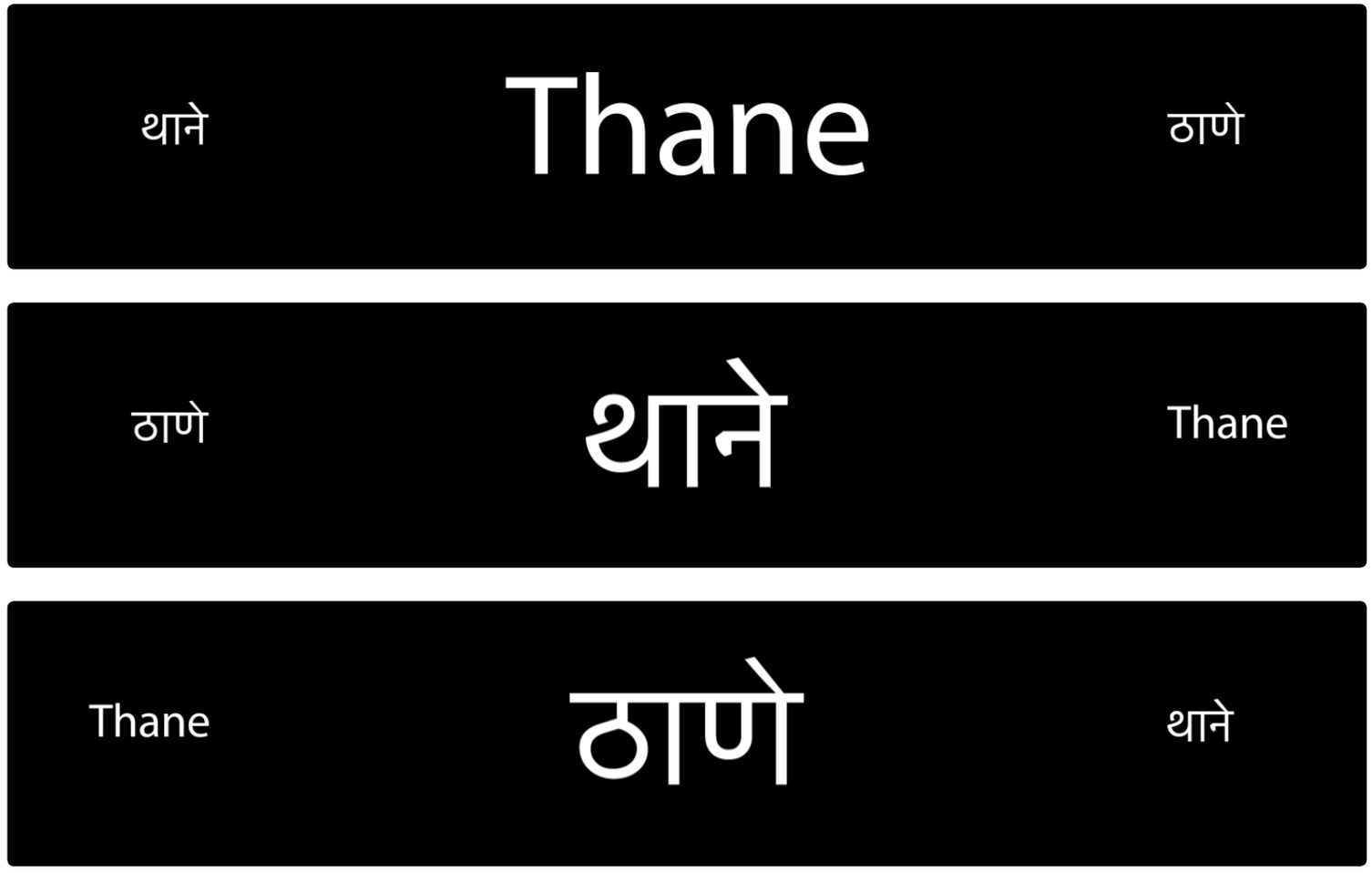
Visual Design

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.

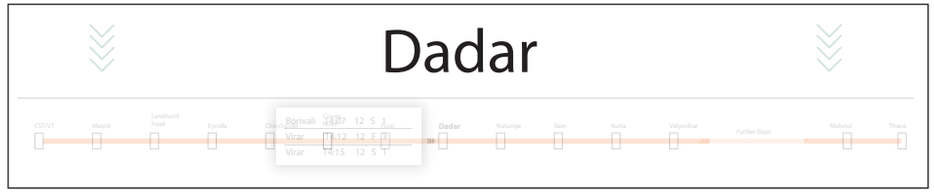
The priority of the information *Next Station* is high and hence it is big and bold so that this is the first visible thing.

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 explores and opted for motion design.


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



Visual Design + *Motion Design*

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.

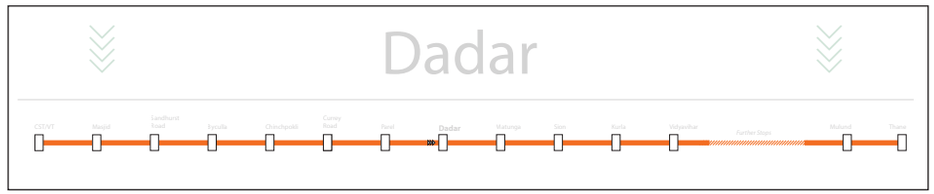
Interchange housing more than one line are individually colour coded. Indicating this colour change during the arrival of interchange station would help to recognize the interchange and also the other line it houses by the colour.

थाने Thane ठाणे

थाने Thane ठाणे

थाने Thane ठाणे

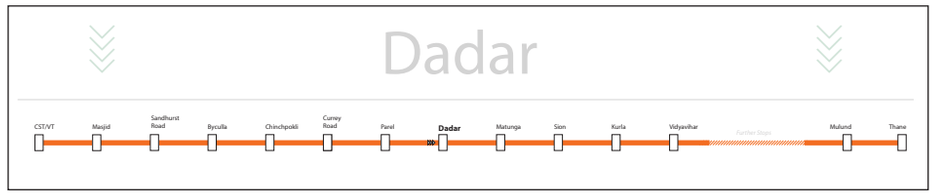
LINE MAP



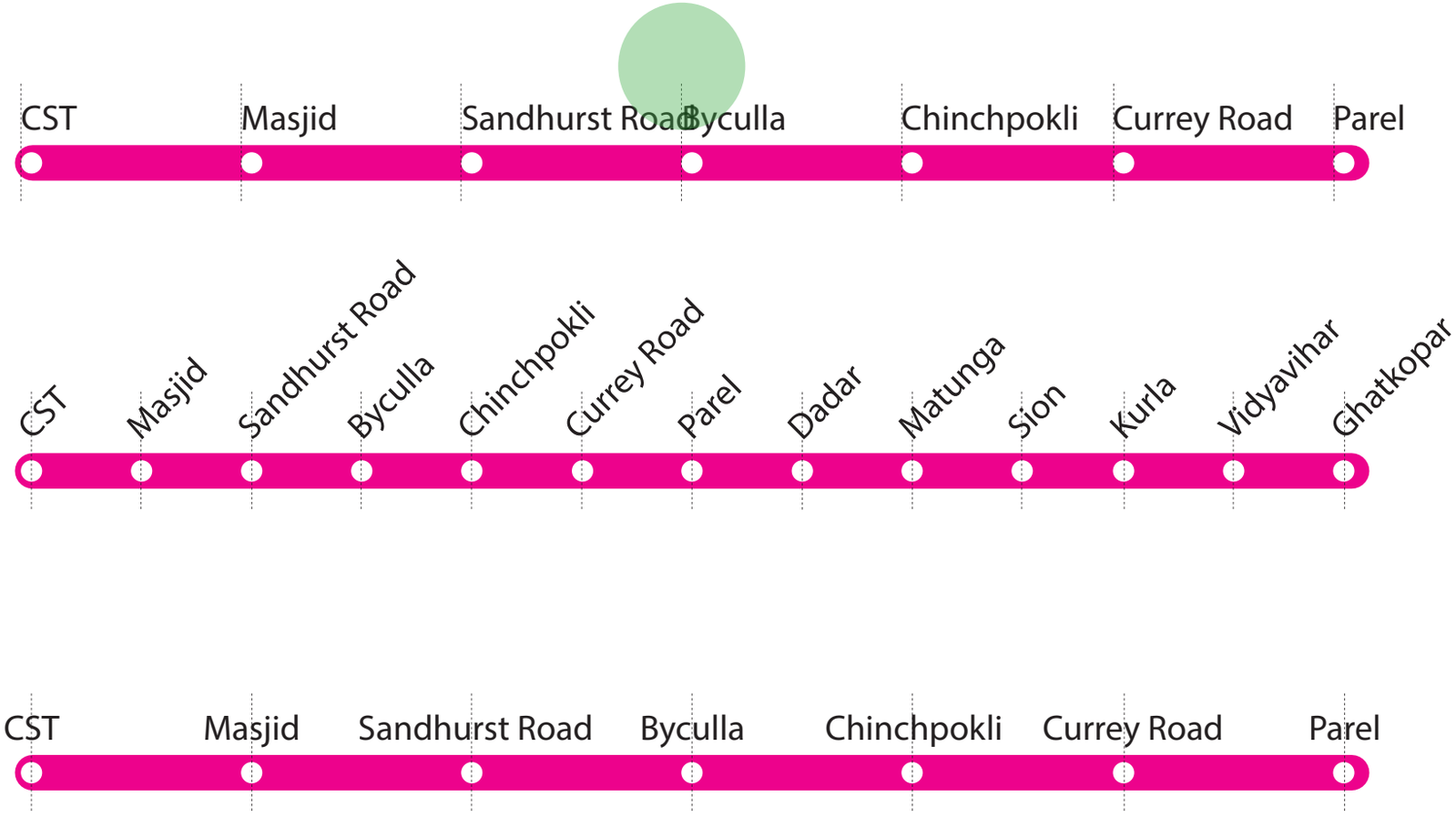
Visual Design

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.

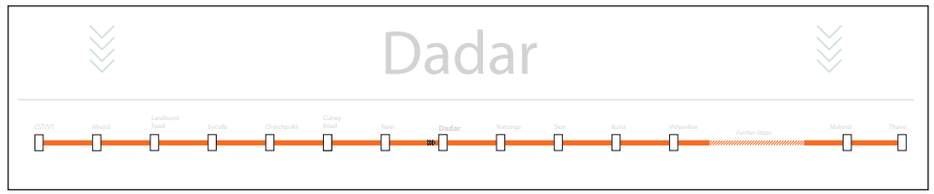
TEXT ORIENTATION



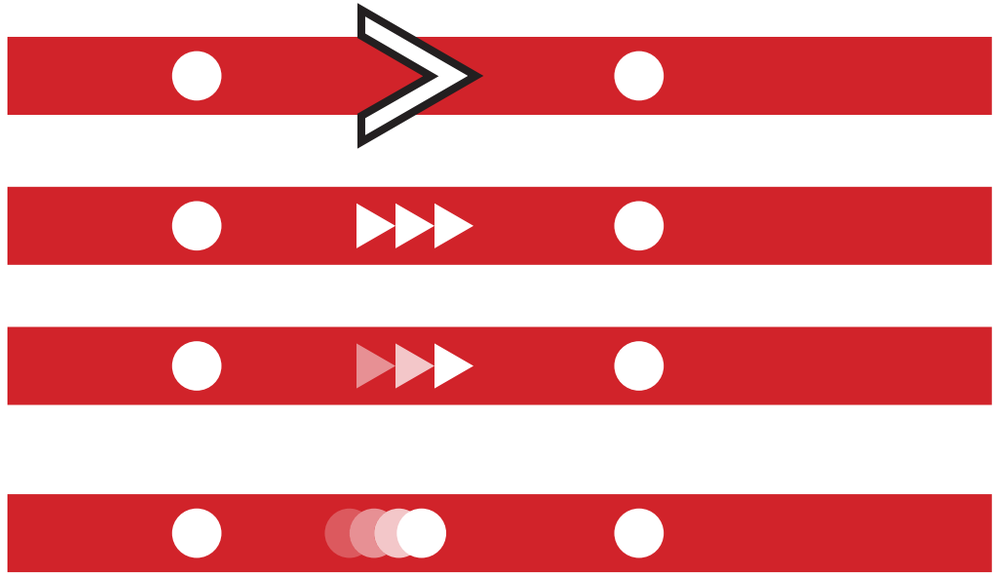
Visual Design

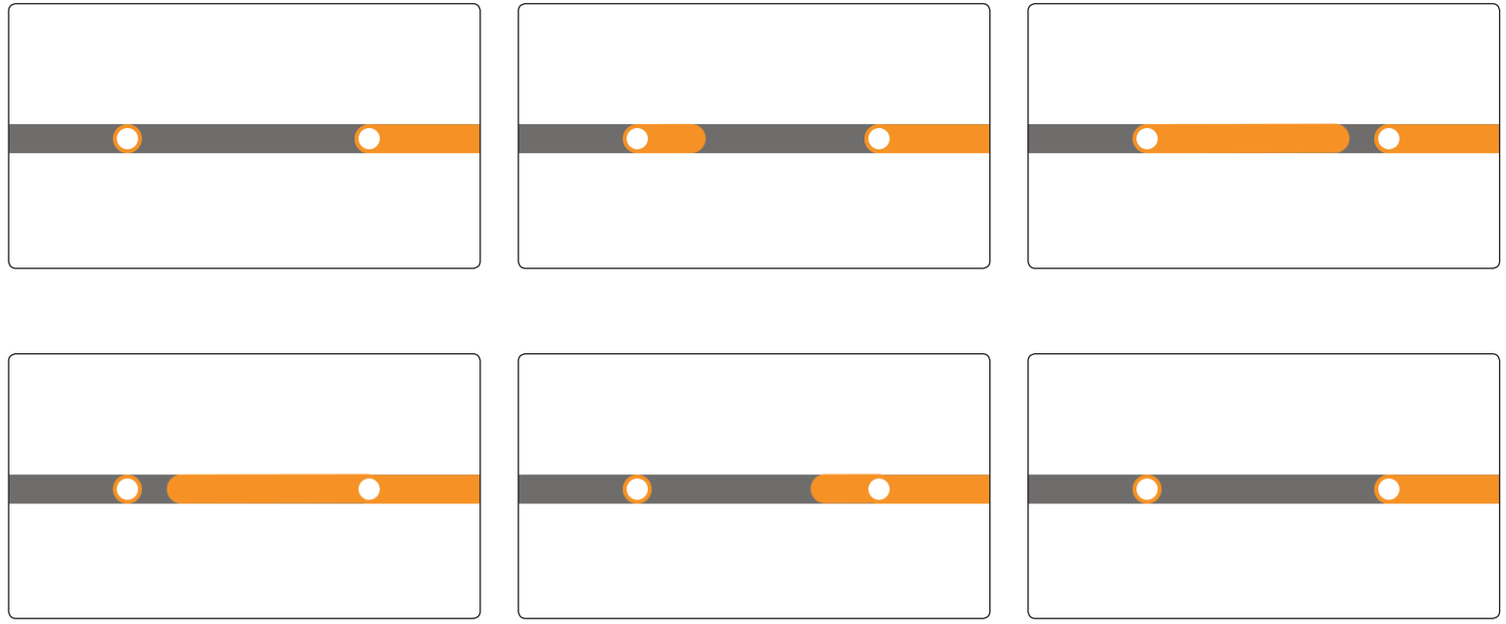


TRAVELLING

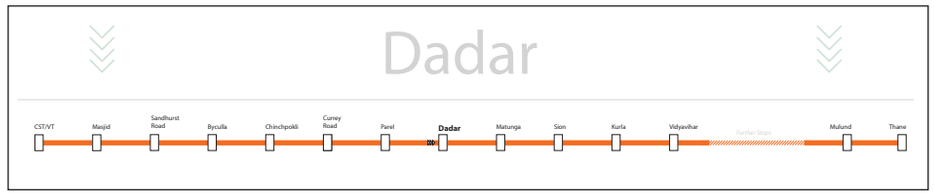


This visual clue indicates the status of the journey indicates the train is travelling from one station to the next station.



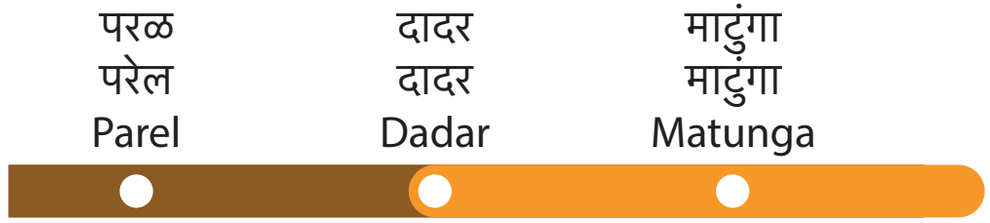


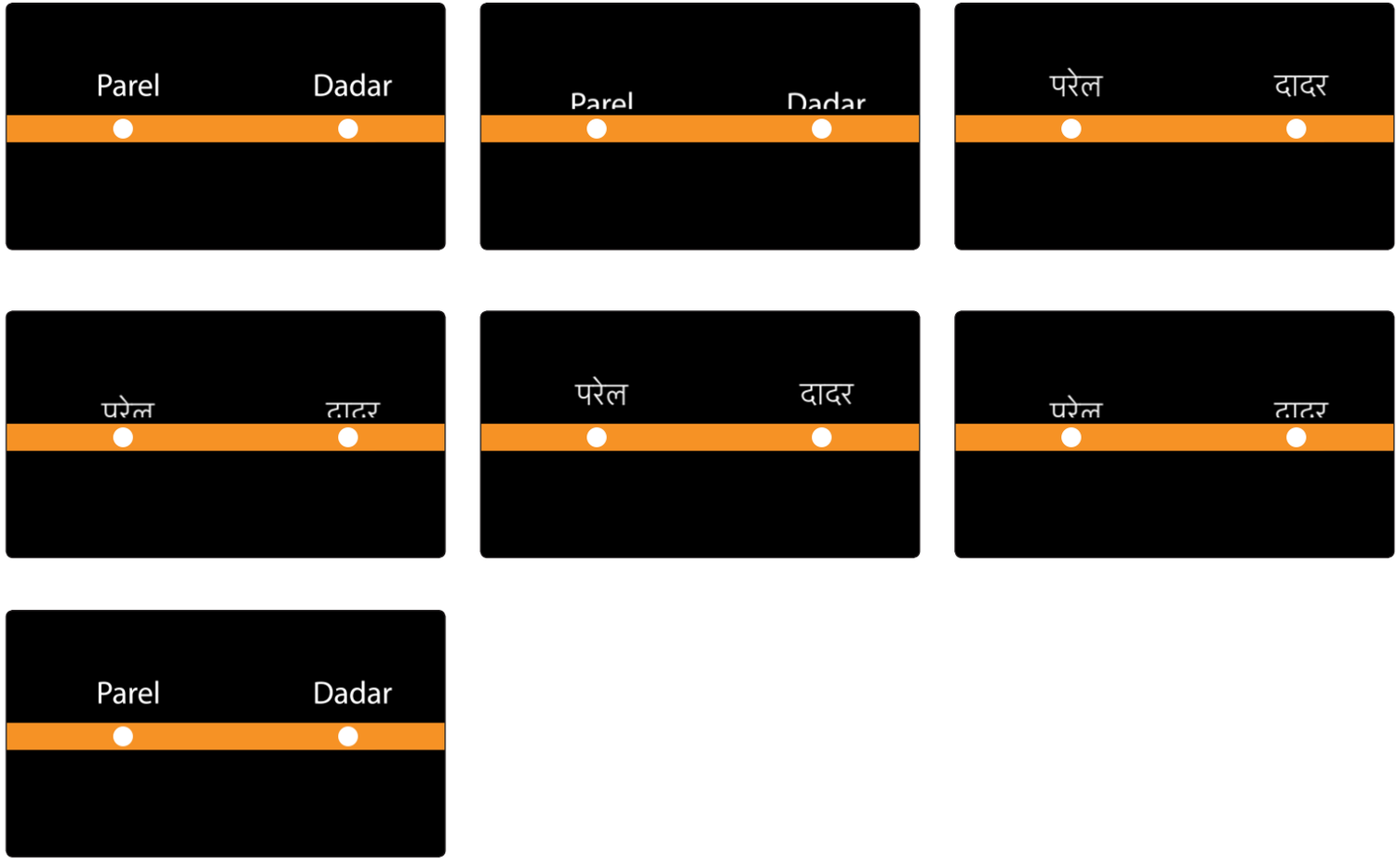
STN. NAMES & LANGUAGES



Visual Design

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




Parel
Dadar
Parel
Dadar
परेल
दादर
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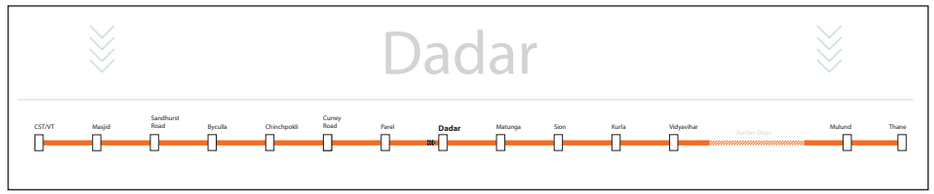
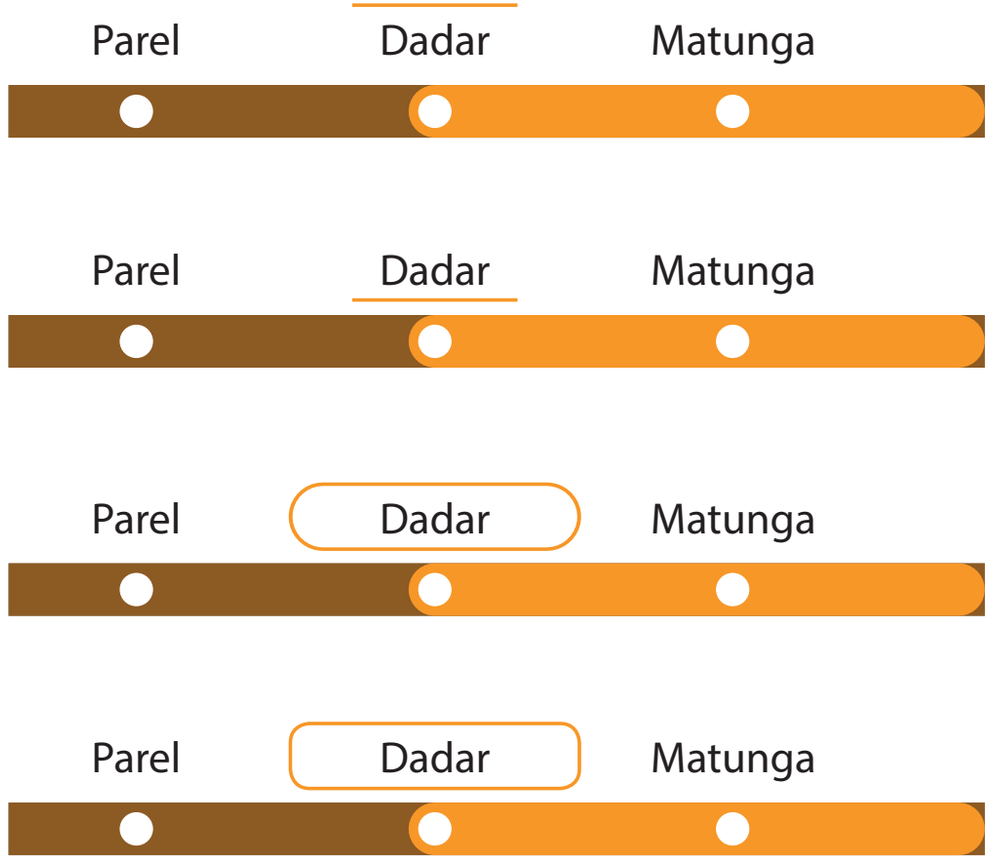
परेल
दादर
Parel
Dadar

HIGHLIGHTER



Visual Design

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




Vidyavihar
Vidyavihar
Vidyavihar
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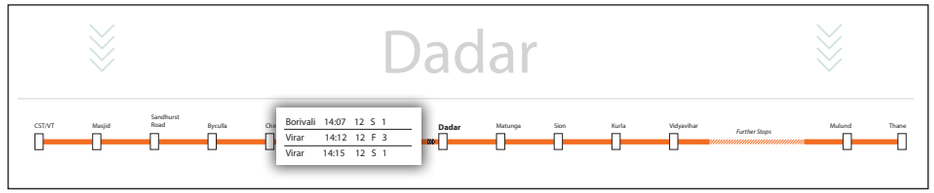
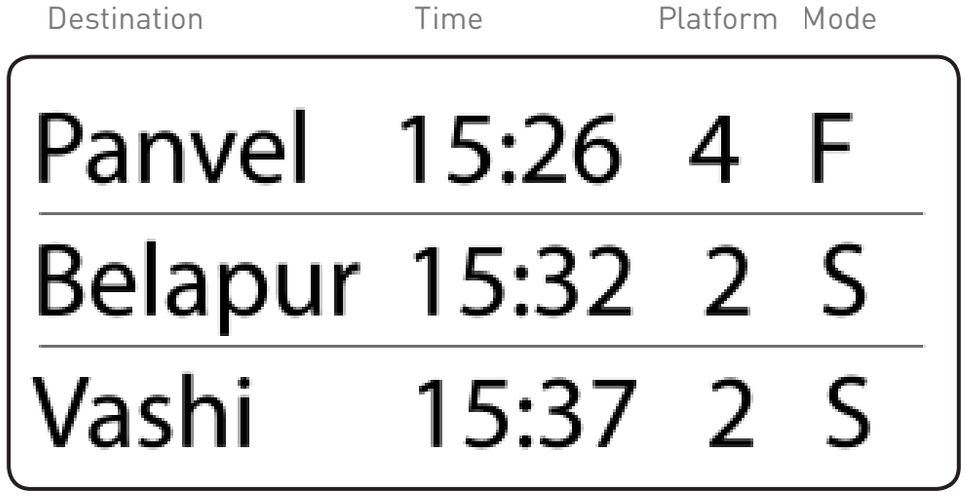
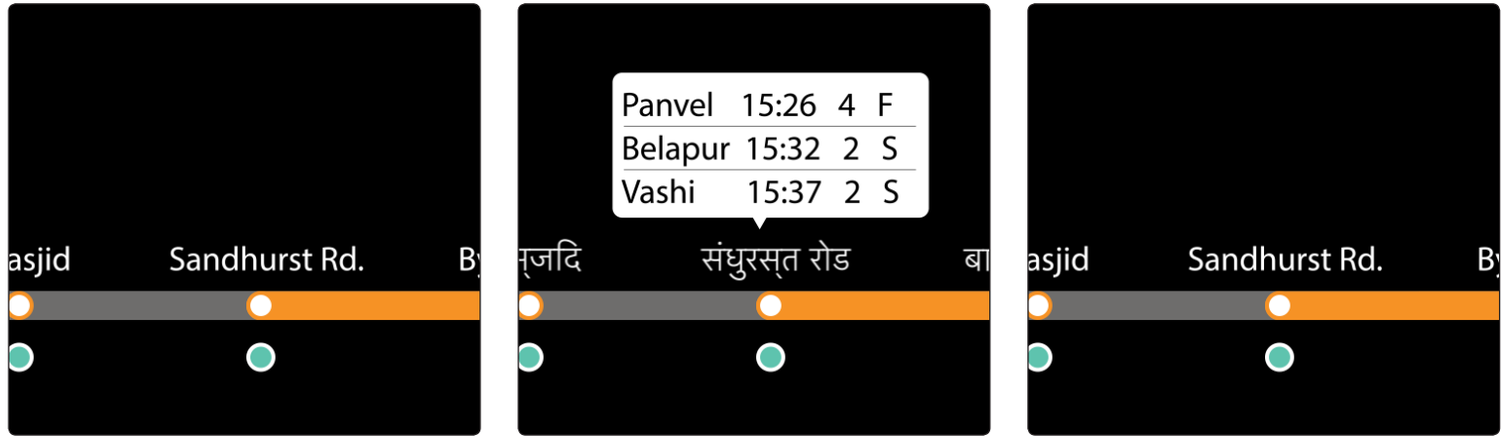
TRAINS AVAILABLE AT INTERCHANGE

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

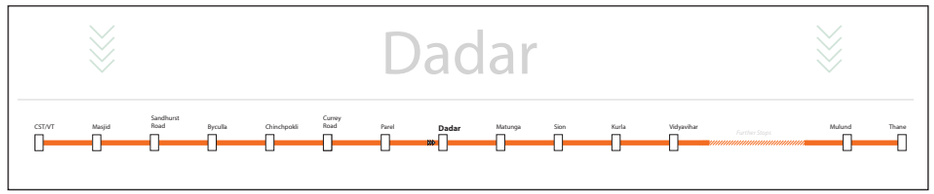


Visual Design + *Motion Design*



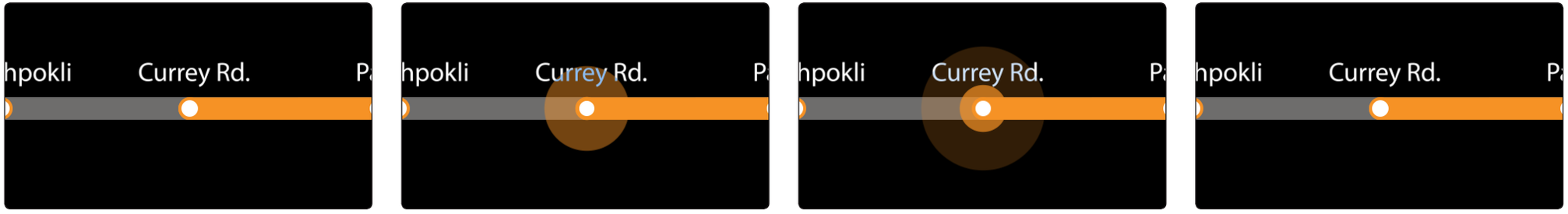


CURRENT STATION

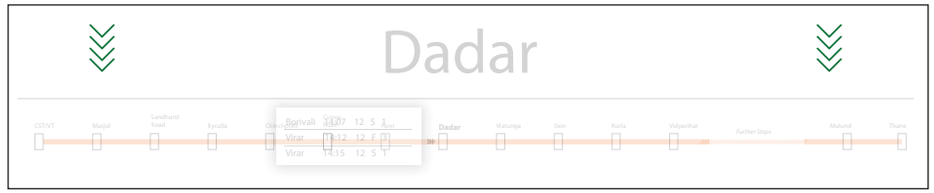


Motion Design

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



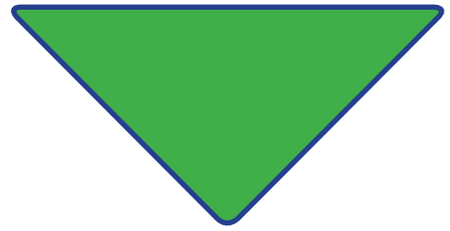
ORIENTATION OF EXIT



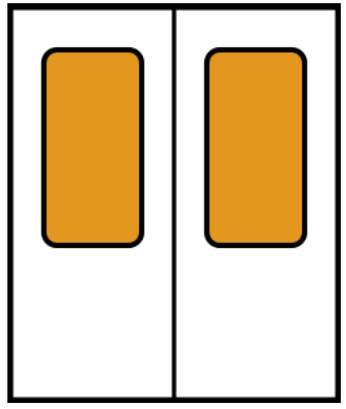
Visual clue about the direction of exit. Green signifies the door opens at that side and red signifies the door doesn't open at that side.

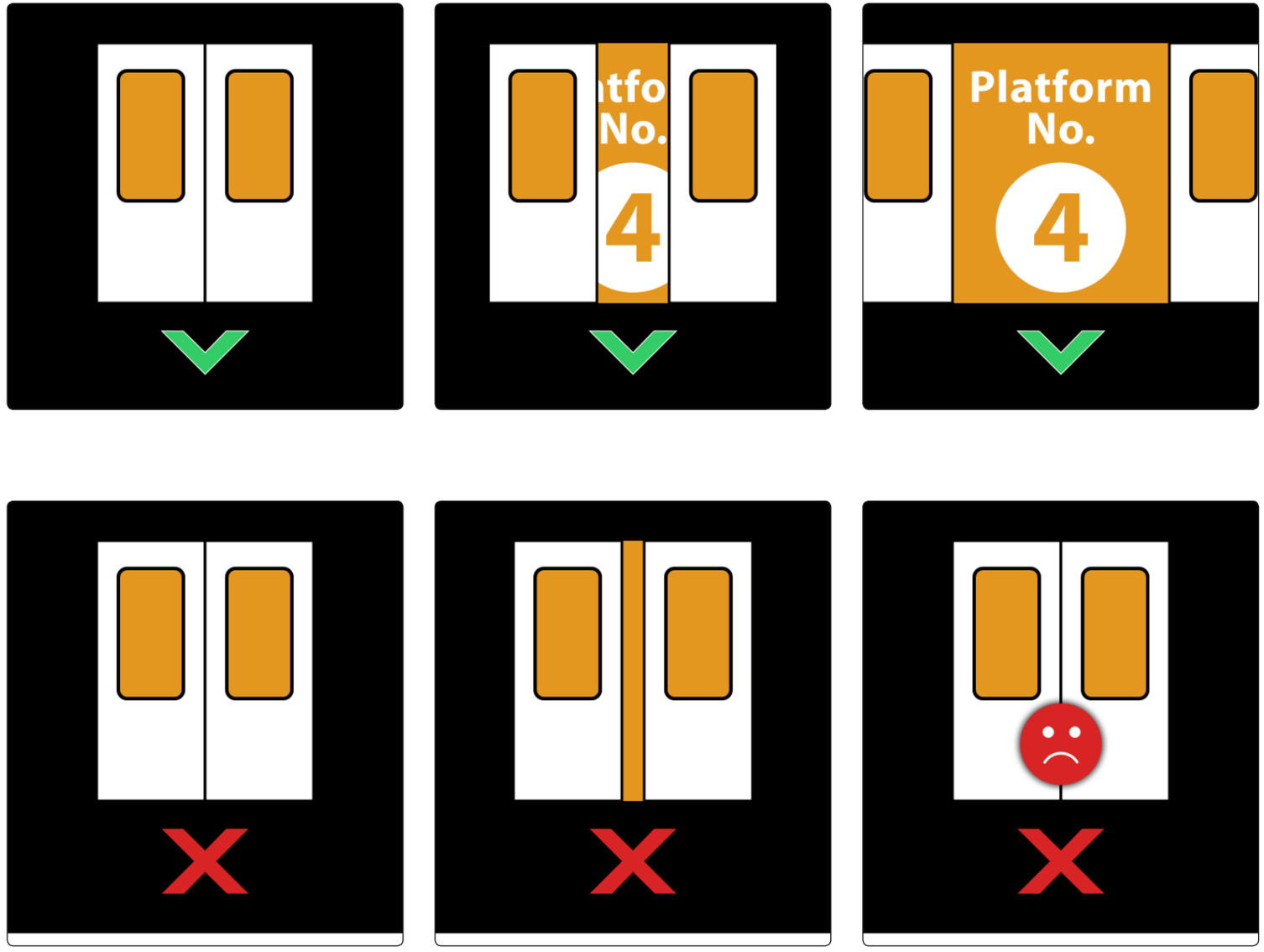
Visual Design

Door opens on this side



Door opens on the other side

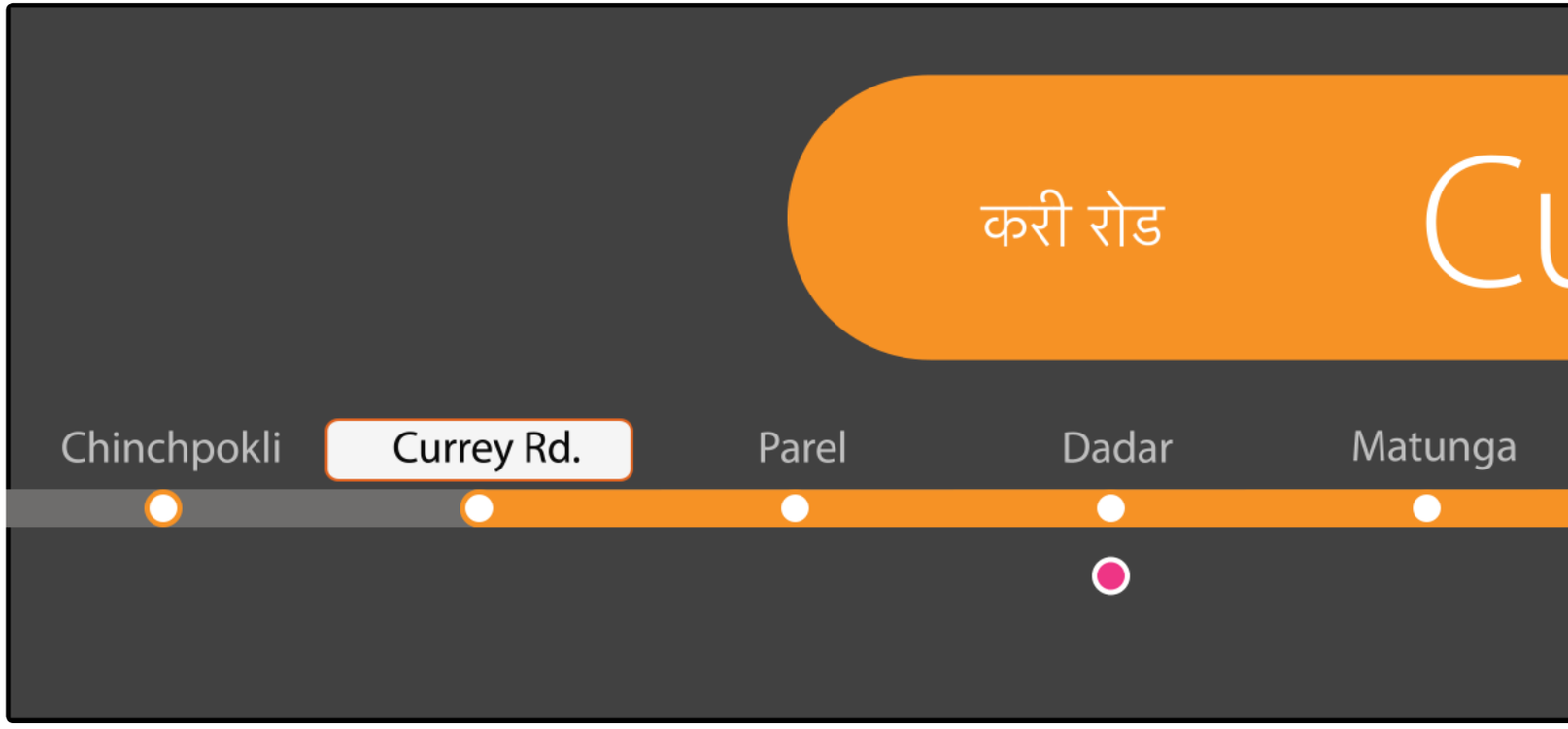


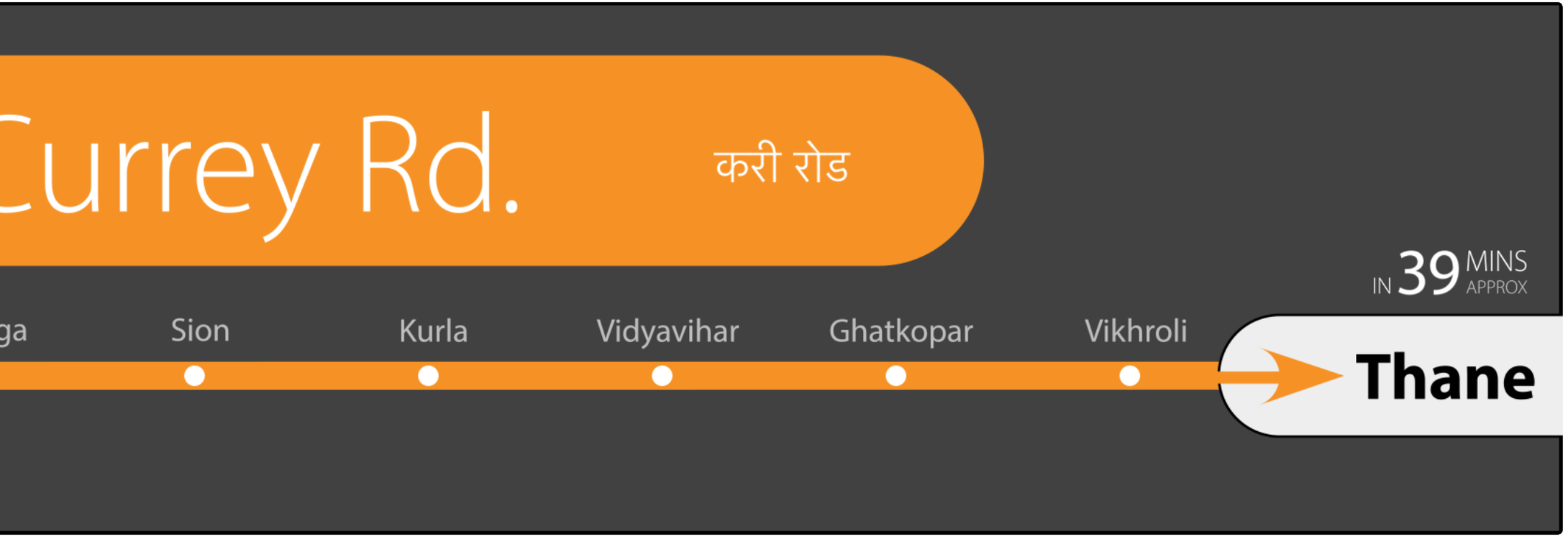

ıtfo
No.
4
Platform
No.
4

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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