

DESIGNING THE MUMBAI RAIL MAP FOR BLIND

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Guide

Why this project?

- Issues of Accessibility
- One of the largest Railway Networks
- Not inclusive

Overview of blind population in India

- 3 crore 90 lakh blind people in the world
- 50 lakh stay in India which is almost 13% of the total blind population
- Largest blind population in the world
- 1 Lakh blind people stay in Mumbai

Overview of Mumbai's Rail Network

3 types of train system:

- Mumbai Suburban Railway or The Local Train
- Mumbai Metro
- Monorail

Problem identification

- Visual maps cannot be accessed by people with vision loss
- No map provides comprehensive information of the layout and the inter-relation of all the routes on the rail network
- No overview of the entire rail network anywhere which can help clear mental model of the system

Ways of communicating with blind people

- Braille text



Ways of communicating with blind people

- Braille text
- Tactile Graphics



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- Audio



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- Braille text
- Tactile Graphics
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- Smell Inductions



Ways of communicating with blind people

- Braille text
- Tactile Graphics
- Audio
- Smell Inductions
- 3D Models



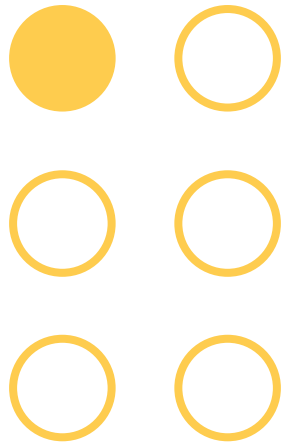
Braille

Braille is a tactile writing system used by blind and visually impaired people

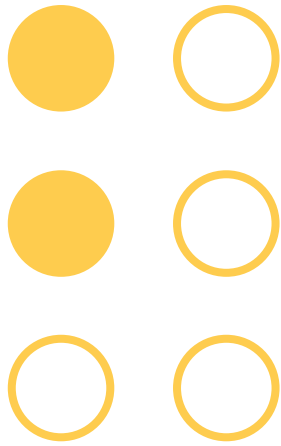
It was devised in 1821 by Frenchman Louis Braille after he lost his eyesight because of an accident

In braille, each character is made up of 6 dots arranged in 2 columns with 3 dots each

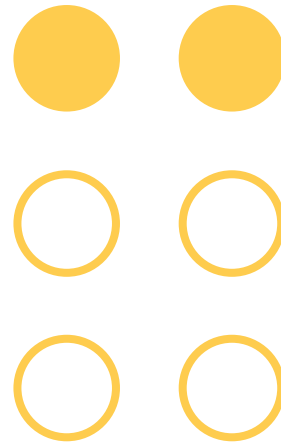
Different combination of dots symbolise different characters



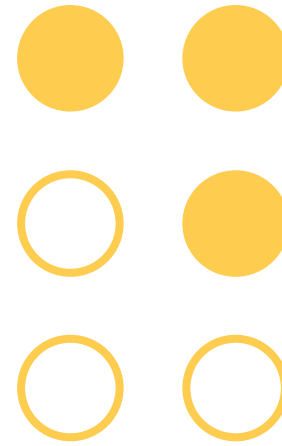
A



B



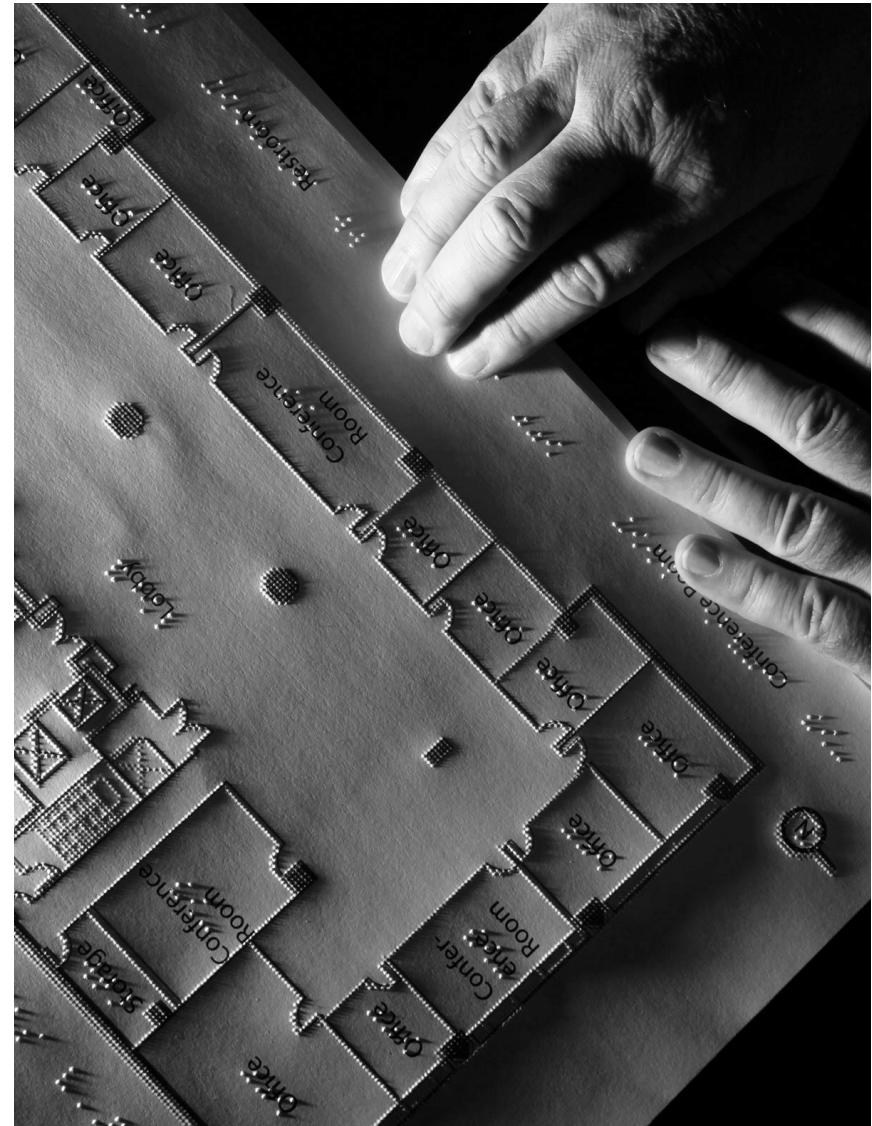
C



D

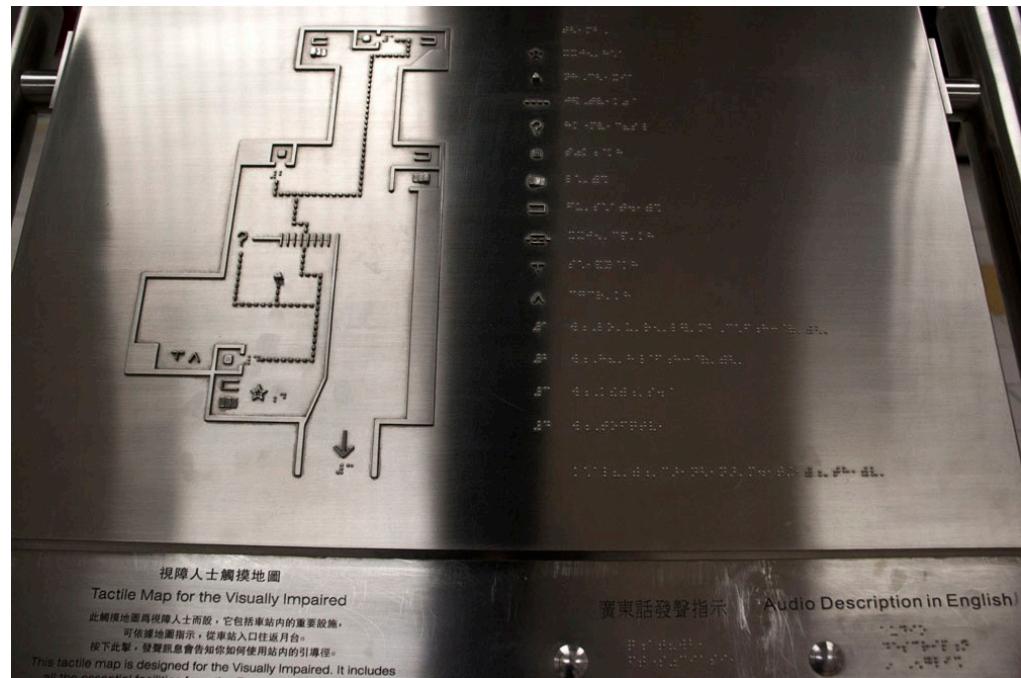
Tactile Graphics

Tactile Graphics are relief drawings made on a 2-Dimensional surface



Navigational tools across the world

- Hong Kong



Navigational tools across the world

- Hong Kong
- San Francisco



Navigational tools across the world

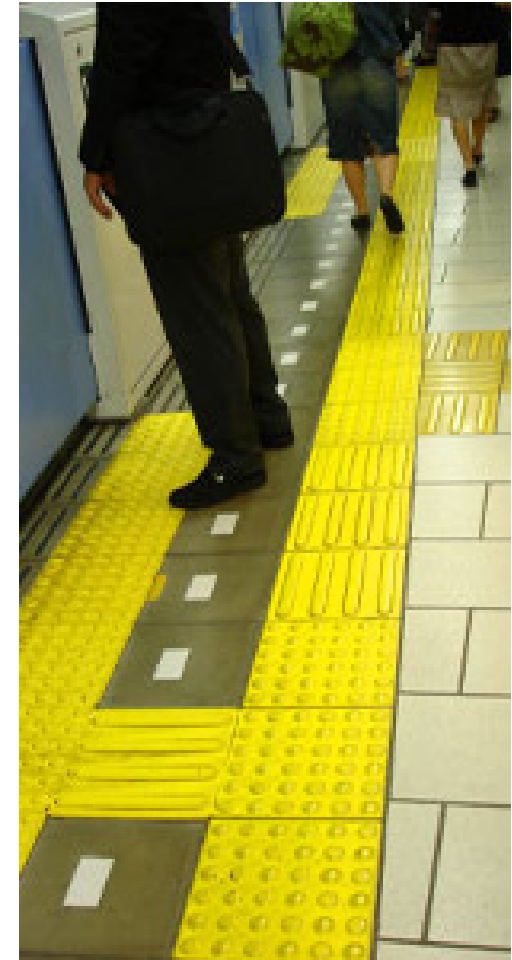
- Hong Kong
- San Francisco
- London

Navigational tools across the world

- Hong Kong
- San Francisco
- London
- New York

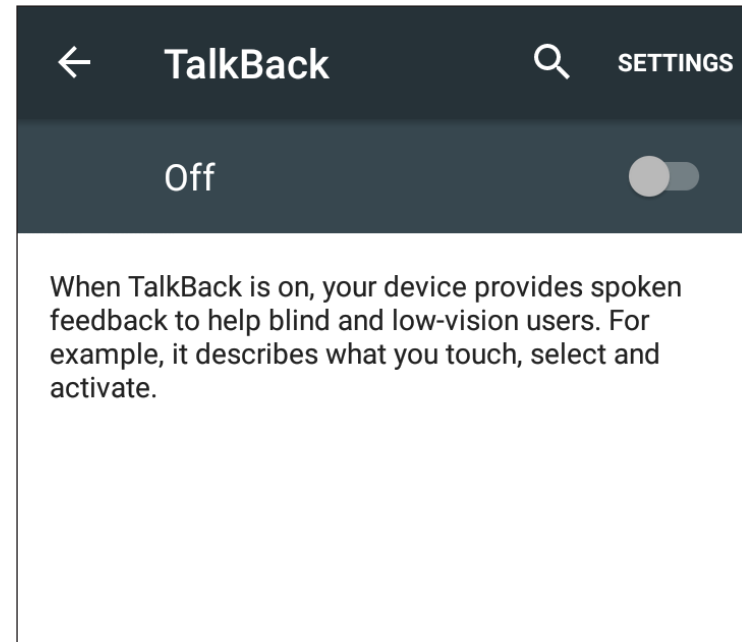
Navigational tools across the world

- Hong Kong
- San Francisco
- London
- New York
- Japan



Technology and apps

- TalkBack/VoiceOver
- BlindSquare app



Navigational Tools in India

At the railway station:

- Separate compartment for physically handicapped and cancer patients in the Mumbai Local train



Navigational Tools in India

At the railway station:

- Separate compartment for physically handicapped and cancer patients in the Mumbai Local train
- Buzzer on the platform
- Special seats reserved on Metro and Monorail

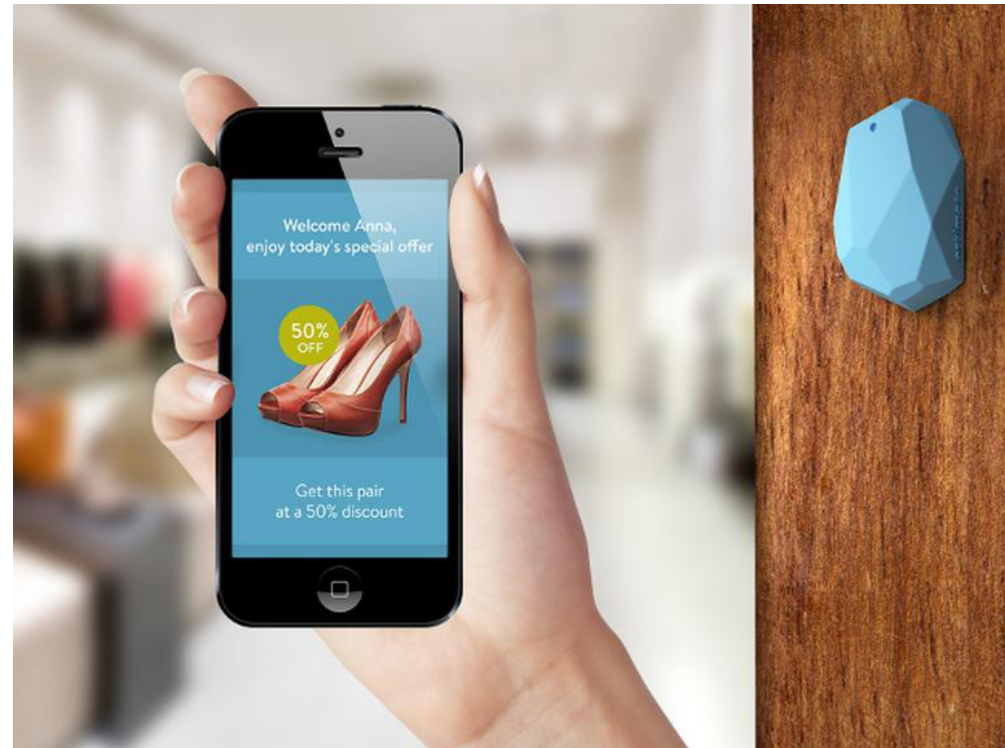


Technology & apps

- OnBoard

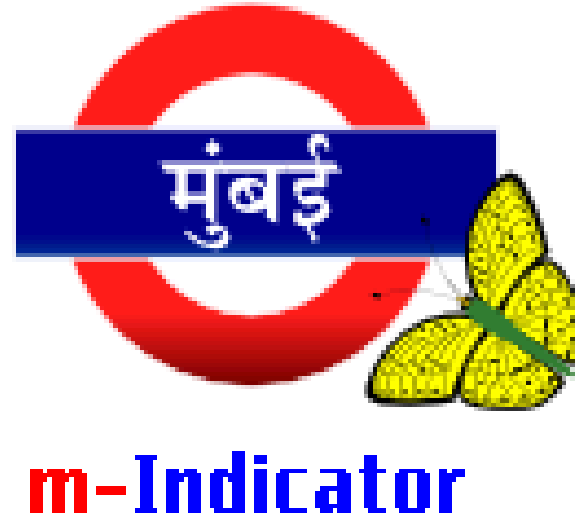
Technology & apps

- OnBoard
- Beacon Technology



Technology & apps

- OnBoard
- Beacon Technology
- M-indicator



Key Issues

- Complexity of the network
- Travelling across lines
- Different routes to reach a place
- Maps on apps are not accessible

First visit to XRCVC

Meeting Prof. Sam Taraporevala, his staff and students

Questions:

- Demographic details
- Travel related questions
- Map related questions

Findings and learnings

- Familiar with the route they travel on everyday
- At the station, a buzzer is placed where the handicapped compartment arrives
- Announcements in the train
- Announcements on the station
- Ask fellow passengers to inform them when their station arrives

Findings and learnings

- While travelling to a new place or on a new route they ask friends or relatives for detailed information about it or ask them to accompany
- Use apps like m-indicator

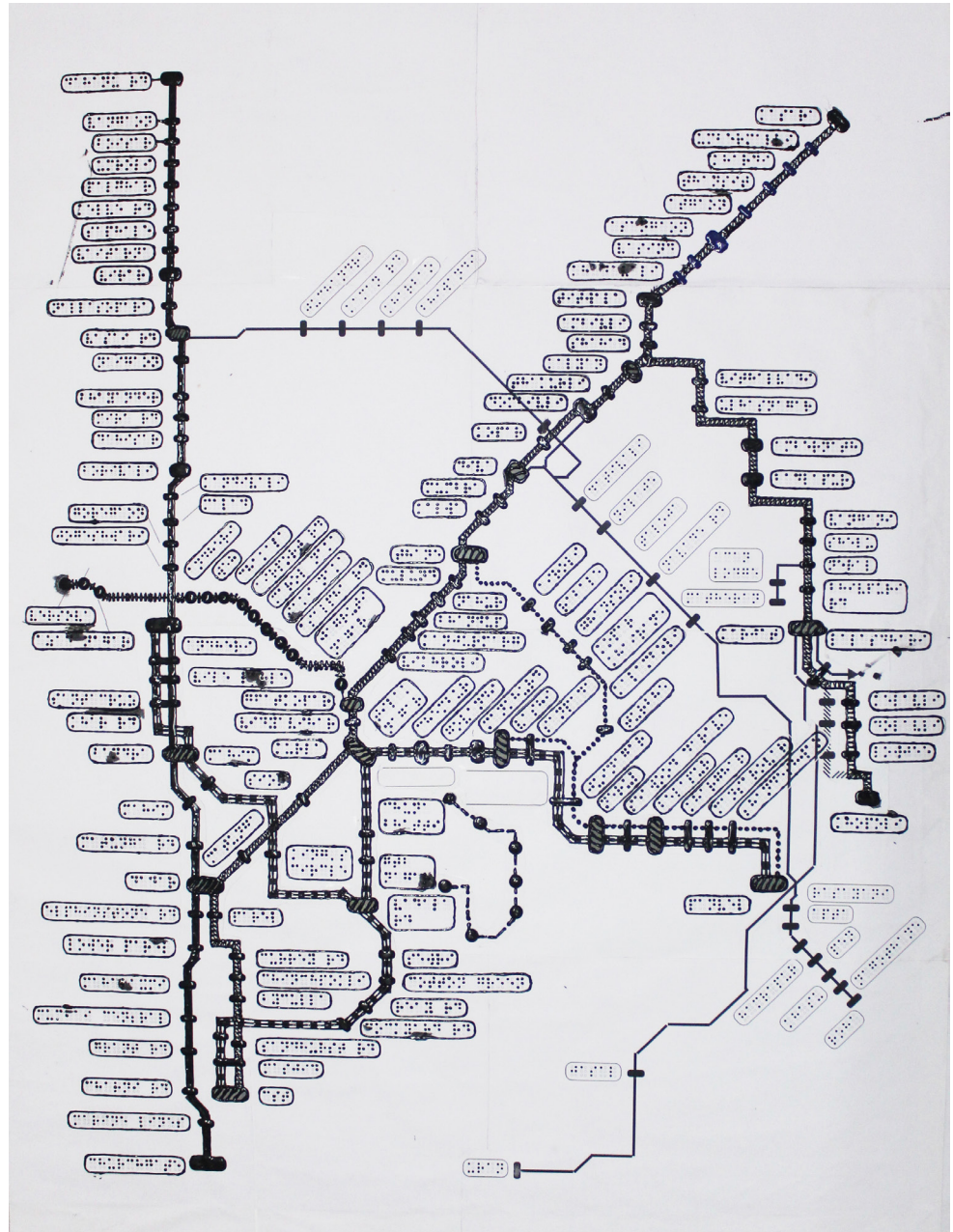
About the map

- Prefer pocket map as the information will be at their disposal
- Agreed that understanding the network is important

Sonic Labeller



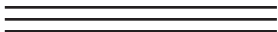

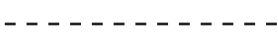



First Prototype



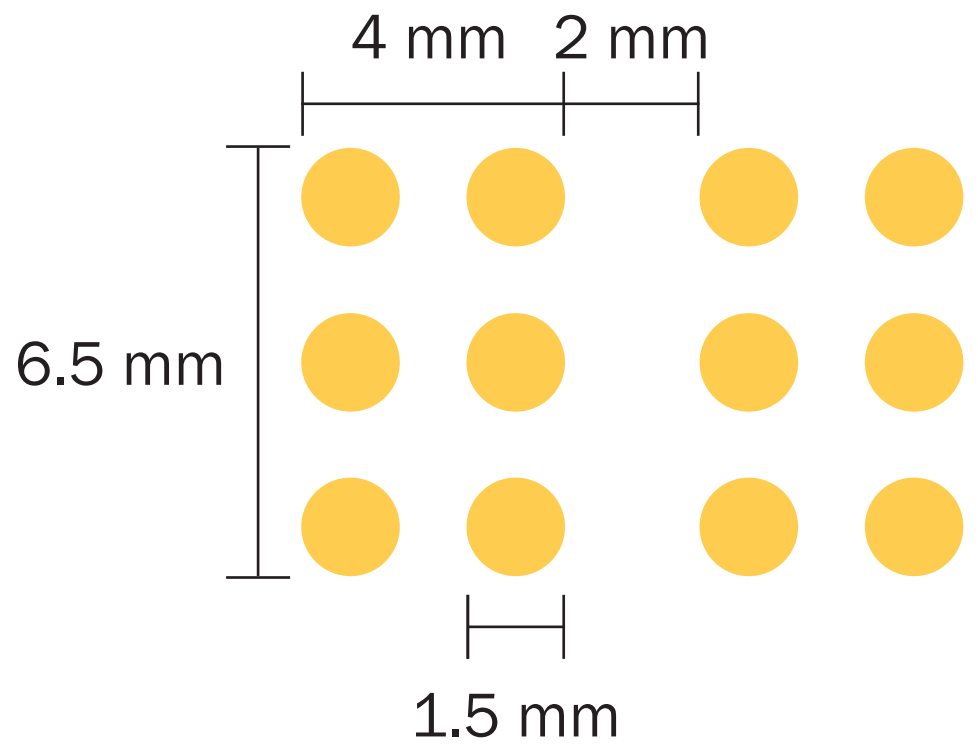
Features of the first prototype

Textures to differentiate between lines

	Western Line
	Central Line
	Harbour Line
	Trans Harbour Line
	Monorail
	Mumbai Metro

Braille

This is the minimum size of braille in India



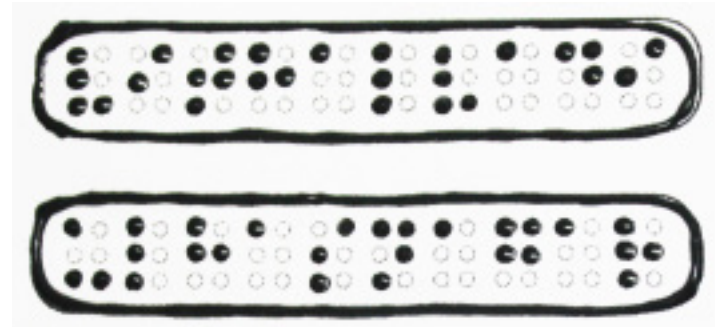
Connectors

between the station names and
the station markers

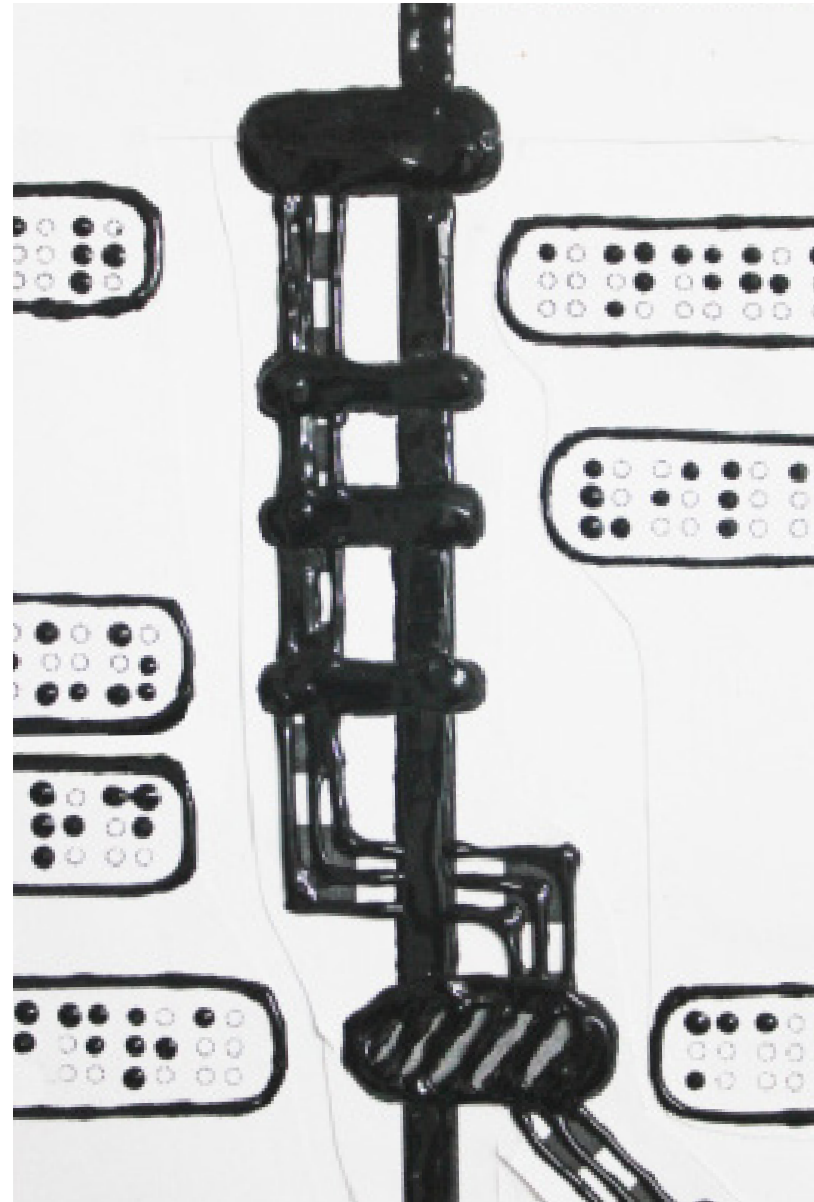


Station markers

Station names and
surrounding frames

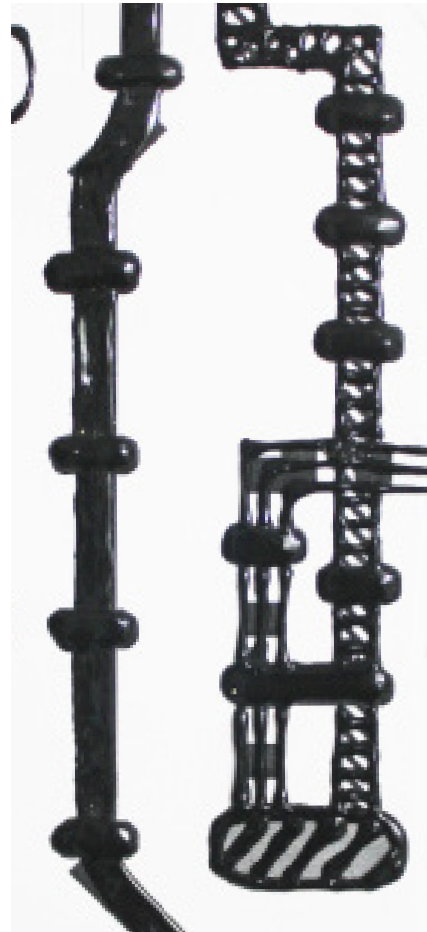


Difference in markers



Problems in the first prototype



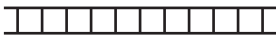





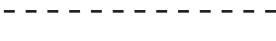
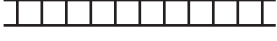
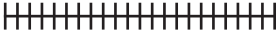

- Some textures are confusing and make the map more complex
- Some elements are too close to each other



Second Prototype



*Change in
line textures*

First prototype	Second prototype	
		Western Line
		Central Line
		Harbour Line
		Trans Harbour Line
		Monorail
		Mumbai Metro

*Change in
markers*

First prototype

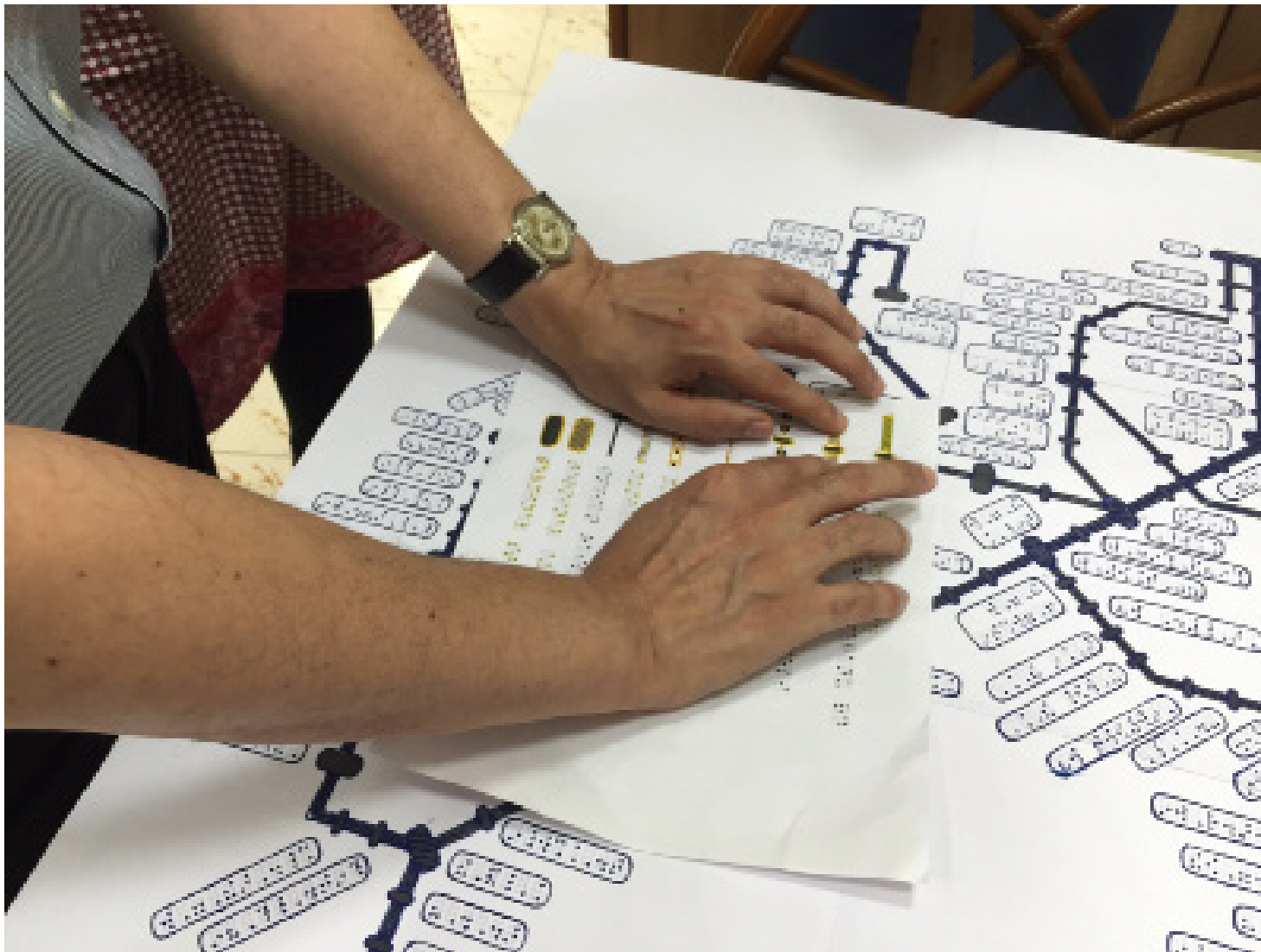


Second prototype



Feedback

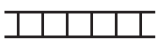





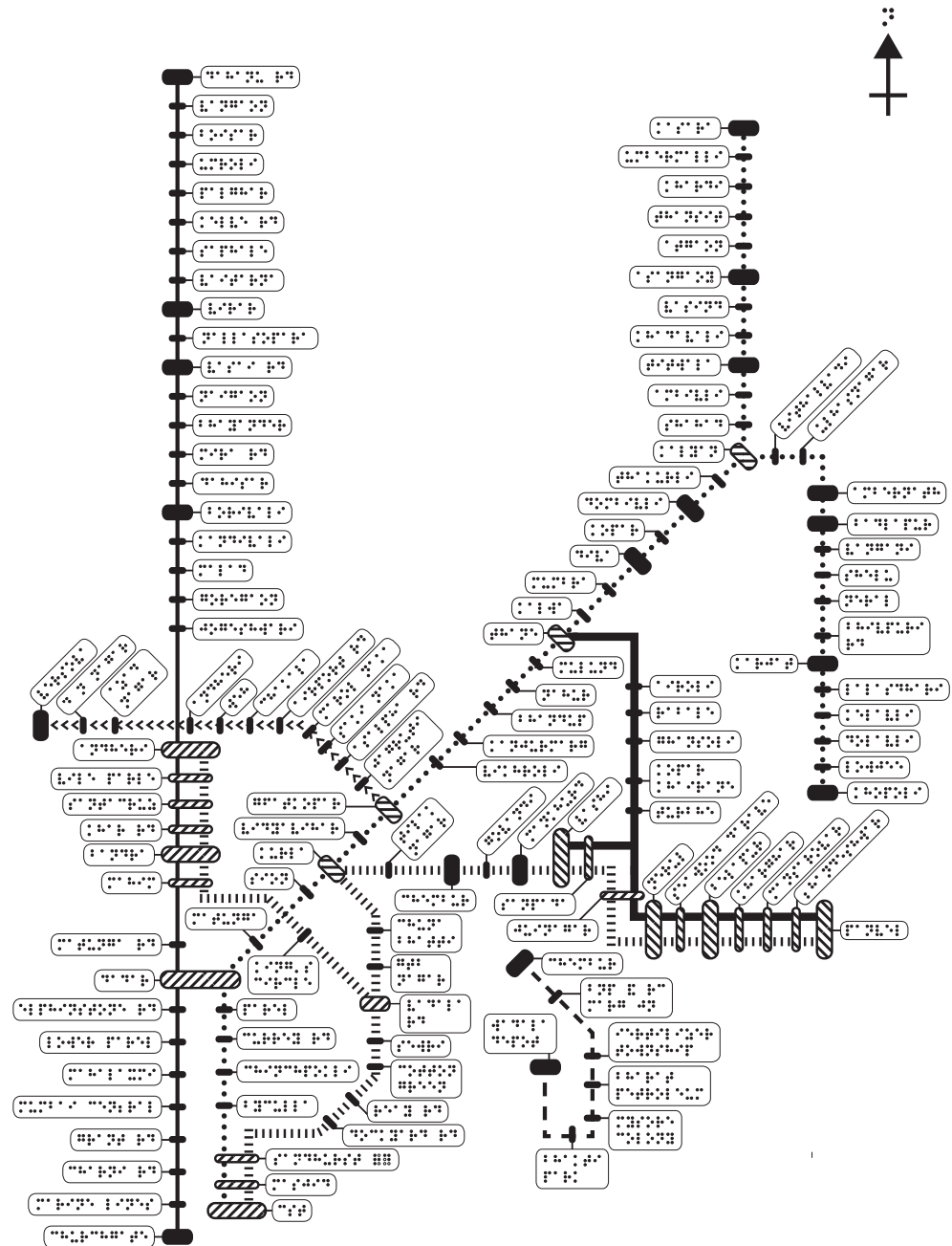
Things that work in the map

- Line differentiation because of the textures
- Frame around the braille words helps when the words are long
- Differentiation between the terminal station markers and interchange station markers
- Filled markers work better than the one with just the stroke
- Connector between the station names and station markers



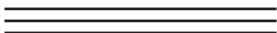









Things that don't work in the map

- Some textures like   seem very busy and thus make the map more complex
- Distance between braille dots and the surrounding frame is less
- Quality of Braille dots needs to be worked on
- Connectors though a good addition make the map more complex

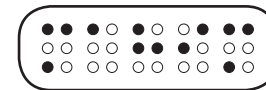
Current Map



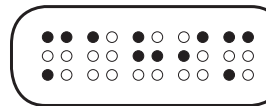
*Change in
line textures*

Second prototype	Current Map	
		Western Line
		Central Line
		Harbour Line
		Trans Harbour Line
		Monorail
		Mumbai Metro

*Change in frame size
around braille*

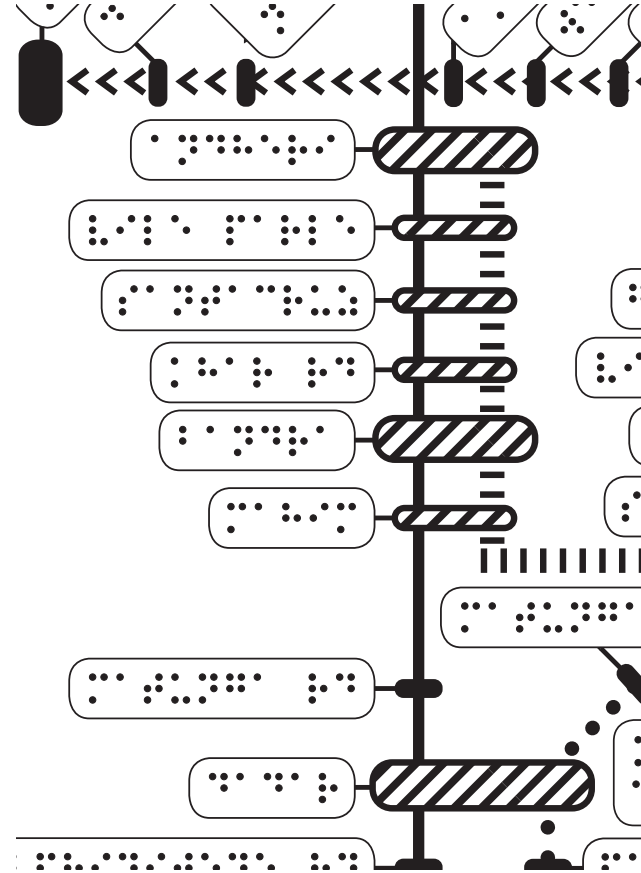


Second Prototype

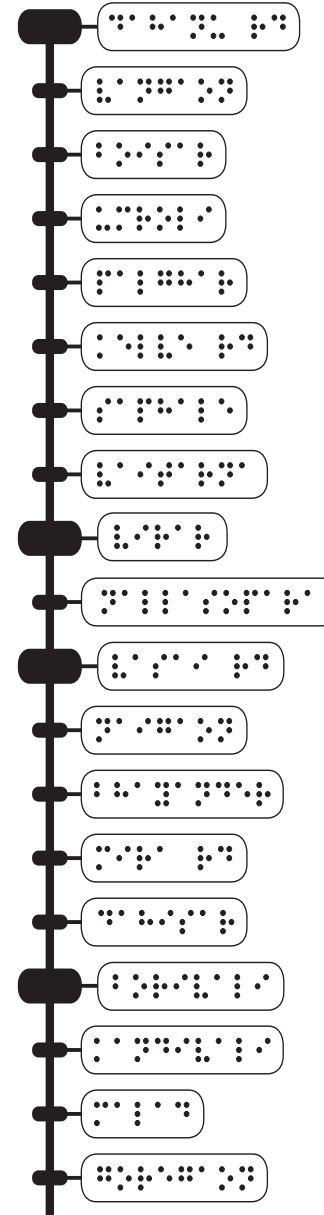


Current Map

*Inclusion of all
interchangable stations*



Connectors retained



Shortcomings of the current map

A major issue of this map is that one has to scan the whole map to find a particular station

Thank you