

# **Design THINKING**

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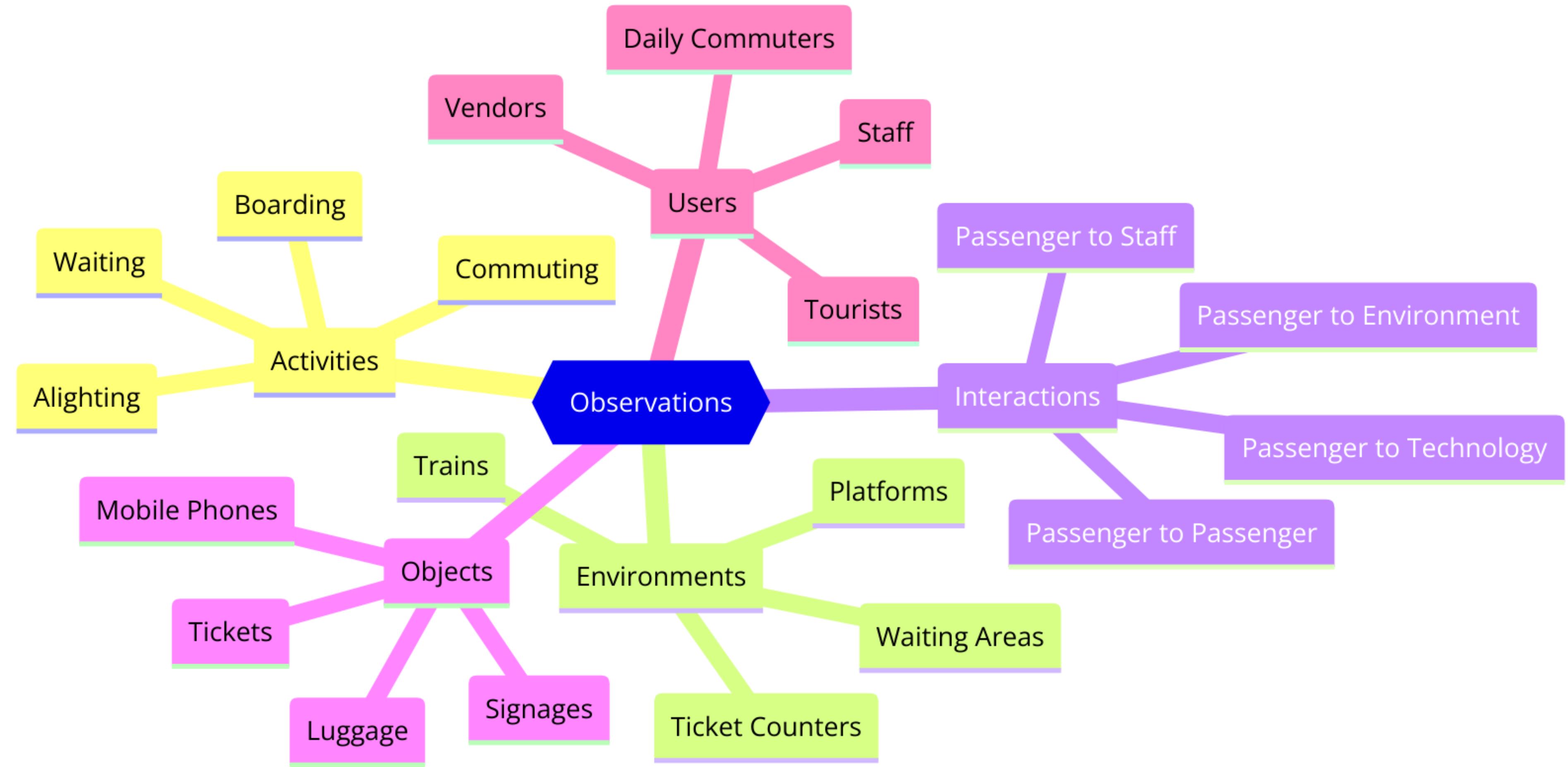


# **Problem STATEMENT**

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How might we design walking aids that allow disabled people to travel safely and independently using public transportation in Mumbai?

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# User HISTORY

Our fellow citizen at Andheri Railway station, an 84 Y/O Divyangjan with limited mobility in legs.

## ● Travel Restrictions

- He cannot travel during rush hours, only in early mornings, late nights, etc.

## ● Assistance Required

- Needs two people to help him get up and down from the platform.
- Requires help to sit and stand from the floor as he cannot stand by himself on crutches.

## ● Pain and Discomfort

- Cannot stand on crutches for long due to shoulder pain.
- Cannot sit straight due to hip problems.
- Experiences back and hip pain from prolonged standing on crutches.

## Quotes & STATEMENTS

A fellow citizen walking on crutches we met at Andheri Station had this to say:

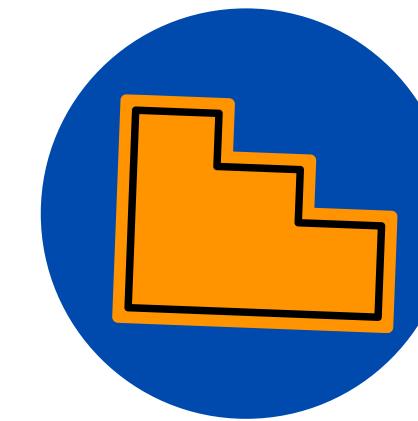
- आभार है सब मदद कर देते हैं
- ज्यादा देर खड़ा नहीं रह सकता, कंधे में दर्द होने लगता है, पीठ में दर्द होने लगता है
- ऑपरेशन के लिए ३ लाख मांगे हैं हॉस्पिटल वालो ने, पर मेरे पास नहीं हैं
- कुछ सालों की बात है, एक दो साल बाद तो हम नहीं रहेंगे
- उठने बैठने के लिए भी मदद चाहिए होती है, आभार है मदद कर देते हैं लोग
- भीड़ में नहीं जा सकता, गिर जाएगा, चढ़ने उठाने को 2 लोग की मदद चाहिए होती है

# INSIGHTS

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Differently-abled individuals rely heavily on the goodwill of others for daily activities.



Station & Train design is not conducive to Divyangjan travel



Signals, Maps, Queues are not accessible equally (Visual, Auditory, Sensory)

## **What does he think and feel?**

- Feels grateful for the help and support of fellow passengers and the community.
- Feels pain and discomfort in his shoulders, back, and hips due to his physical limitations.
- Feels helpless and dependent on others for daily activities and mobility.
- Feels anxious and overwhelmed in crowded environments.

## **What does he hear?**

- Occasionally hears remarks about his disability or offers of assistance from kind strangers.
- The bustling noise of a busy train station: people talking, vendors shouting, trains arriving and departing.



## **What does he see?**

- Map of city/railway lines
- Map of railway station
- Platform Signage
- Train Timings on phone/visual board
- Coach markings
- Ticket markings
- Seats within the coach
- Ticket checker inspections
- Crowds for each coach

## **What does he do?**

- Get to access point (Elevator or Stairs)
- Get a ticket
- Go through Security, walk up the bridge to the platform
- Get to the platform part with required coach/entry
- Check for announcements
- Get off the vehicle & get to access point off the platform
- Decide side of the station to exit (Visual maps, signs)
- Get off the station & onto the destination street

# User's POINT OF VIEW

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We tried to distill the quotes into a single statement which defines our user, their needs and our insights about them.

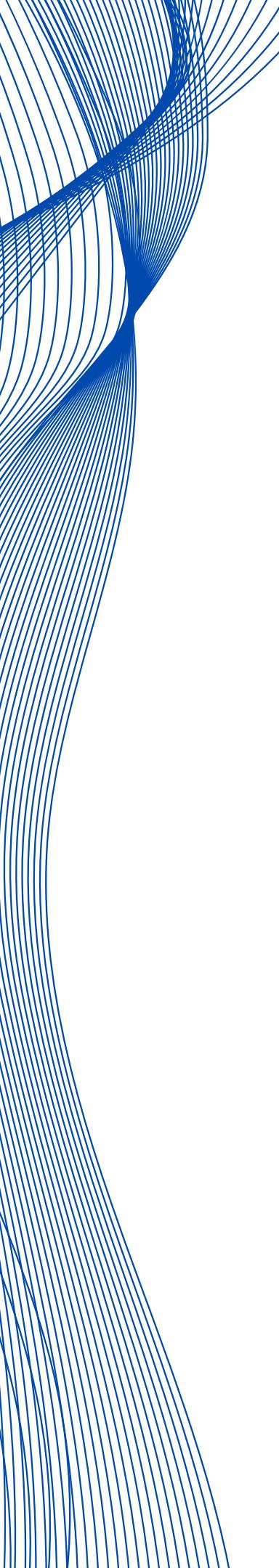
- A disabled person using public transportation to travel alone, as independence is key to self confidence.

# Challenges IDENTIFIED

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- Limited travel options due to the need to avoid rush hours.
- Dependence on others for basic mobility tasks.
- Physical pain from prolonged use of crutches.
- Lack of suitable seating and standing arrangements.
- Social isolation due to inability to return to his village.



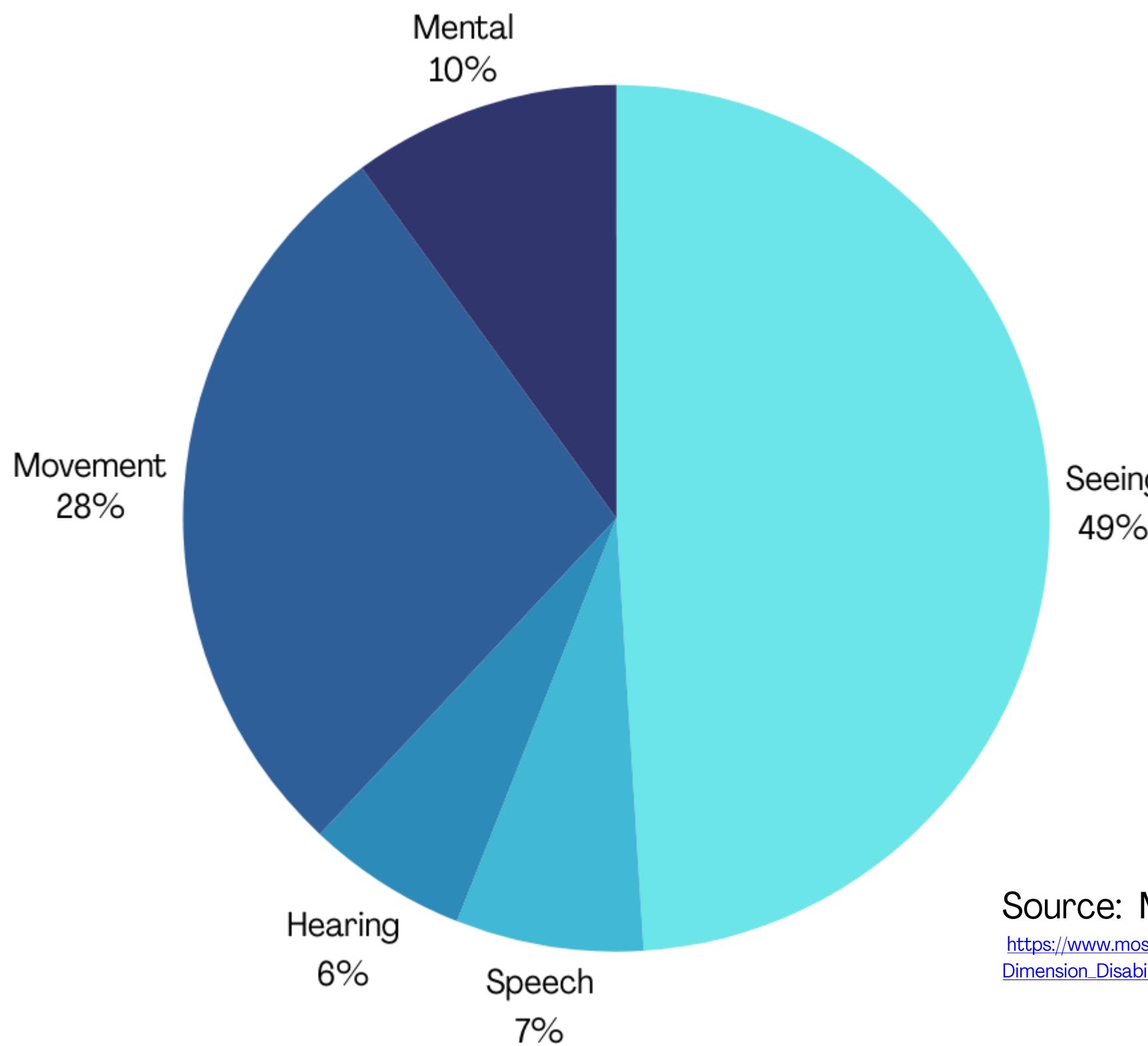


# How Might WE?

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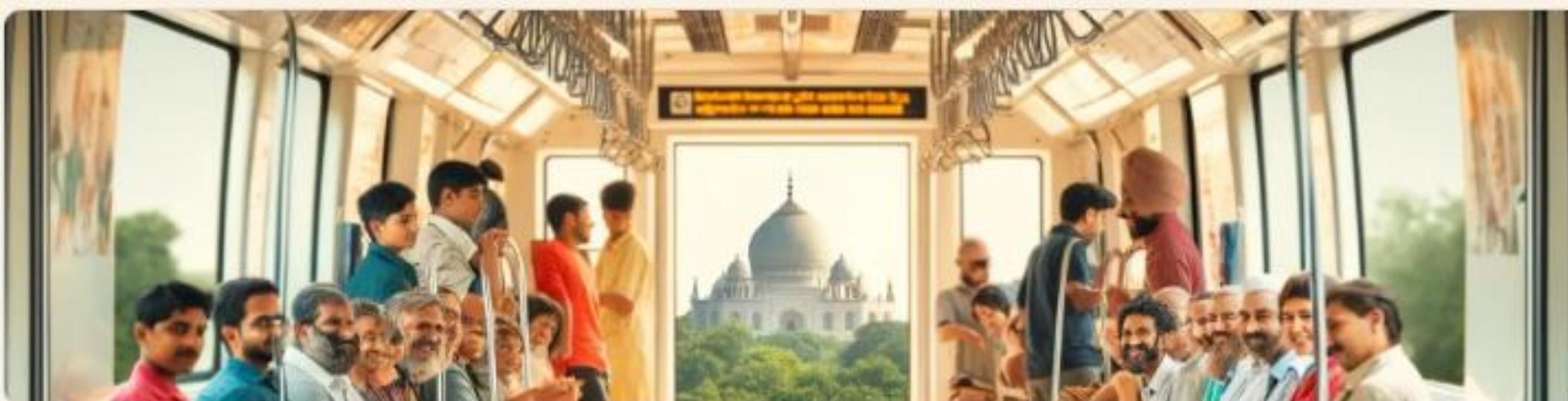
- How might we enable differently-abled individuals to travel safely and comfortably during rush hours?
- ***How might we create a more accessible public transportation system that reduces the need for assistance from others?***
- How might we develop ergonomic and supportive seating options for differently-abled individuals in public spaces?
- How might we improve the accessibility of public infrastructure to accommodate the physical limitations of differently-abled individuals?

# Distribution of Different Disabilities in India



Source: Ministry of Statistics and Programme Implementation

[https://www.mospi.gov.in/sites/default/files/reports\\_and\\_publication/statistical\\_publication/social\\_statistics/Chapter%204-Dimension\\_Disability.pdf](https://www.mospi.gov.in/sites/default/files/reports_and_publication/statistical_publication/social_statistics/Chapter%204-Dimension_Disability.pdf)



# Survey: Summary

Key difficulties include:

1. Entry Barriers: Many face obstacles from the entrance of the facility, including inadequate ramps and poorly designed entrances.
2. Stair Navigation: Climbing stairs is a major issue, particularly for those with mobility impairments.
3. Boarding and Alighting: Getting inside and outside of trains or buses is the biggest challenge, often due to high steps and lack of assistance.

Impact on Well-being-These accessibility issues have notable impacts:

- Emotional Well-being: Reduced confidence and increased frustration.
- Daily Life Activities: Adverse effects on commuting for work and other essential activities.

Desired Solutions:

Respondents expressed a need for mechanisms to assist in climbing stairs and boarding or alighting from trains, which would significantly improve their daily commute and overall quality of life.

## Accessibility in Public Transportation

Hello Fellow Citizen!

We are students at SP Jain Institute of Management and Research (SPJIMR) trying to understand the journey of Specially Abled People through Public Transportation in different cities across India.

We are studying the problems faced by

Specially Abled going through the Bus/Train/Metro networks of their cities and shall be using the **Anonymous** data provided by you in framing policy and design recommendations for urban infrastructure development in line with UN SDG 11.2.

Kindly Note,

For the purpose of this study, we shall be using the term

**Specially Abled**, which is defined as:

*A person who is physically impaired, limited by a physical condition, or incapacitated by illness or injury.*

Link to survey :

<https://forms.gle/1Q1LNUlCP8177915>

# Enabling Differently-Abled Individuals to Travel Safely and Comfortably During Rush Hours

	<b>Frame 1: How can we train &amp; equip staff?</b>	<b>Frame 2: How can we assist differently-abled individuals?</b>	<b>Frame 3: How can we design infrastructure?</b>	<b>Frame 4: How can we manage rush hours?</b>	<b>Frame 5: How can we support continuous improvement?</b>
<b>Services or Programs</b>	Sensitization Training for Railways/BEST Employees	AI Assistant for Divyangjan	Ramps at Stations	Reserved Seating	Awareness Campaign for Co-Passengers
<b>Products</b>		Smart Bands for Fall/Health/Location Monitoring , Vibration Feedback Shoe Sole	Tactile Tiles	Audio & Visual Announcements	
<b>Staff</b>	Hire Accessibility Coordinators to assist during rush hours	Service Animal	Handrail Guided Paths		
<b>Technology &amp; Digital Media</b>		Augmented Reality Glasses for Guidance & Paths	Braille Maps		

# **Creating a More Accessible Public Transportation System That Reduces the Need For Assistance from Others**

	<b>Frame 1: How can we train &amp; equip staff?</b>	<b>Frame 2: How can we assist differently-abled individuals independently?</b>	<b>Frame 3: How can we design infrastructure for self-sufficiency?</b>	<b>Frame 4: How can we implement supportive technology?</b>	<b>Frame 5: How can we promote continuous independence?</b>
<b>Services or Programs</b>	Sensitization Training for Railways/BEST Employees				Awareness Campaign for Co-Passengers
<b>Products</b>		Smart Bands for Fall/Health/Location Monitoring	Tactile Tiles, Rumble Strips	Vibration Feedback Joystick for Guidance,Level Adjustable Walking Aid	
<b>Staff</b>		Service Animal	Handrail Guided Paths	Augmented Reality Glasses for Guidance & Paths	
<b>Technology &amp; Digital Media</b>	Webinars on disability awareness		Braille Maps		

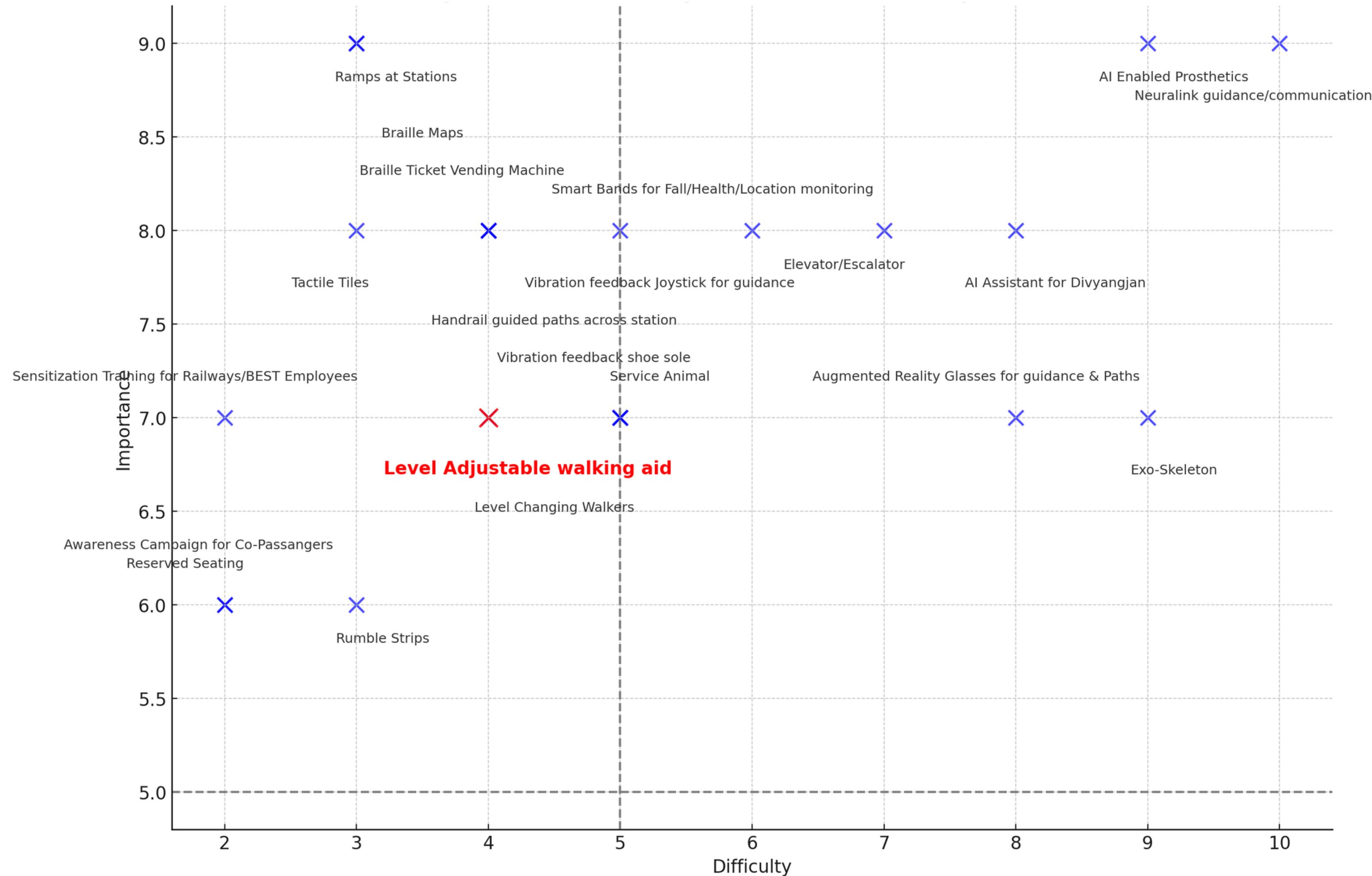
# **Developing Ergonomic and Supportive Seating Options For Differently-Abled Individuals in Public Spaces**

	<b>Frame 1: How can we train &amp; equip staff?</b>	<b>Frame 2: How can we assist differently-abled individuals with seating?</b>	<b>Frame 3: How can we design ergonomic seating?</b>	<b>Frame 4: How can we implement seating technology?</b>	<b>Frame 5: How can we support continuous seating improvement?</b>
<b>Services or Programs</b>	Sensitization Training for Railways/BEST Employees		Reserved Seating		Awareness Campaign for Co-Passengers
<b>Products</b>		Smart Bands for Fall/Health/Location Monitoring	Ergonomic Seating		
<b>Staff</b>	Hire Accessibility Coordinators to assist during rush hours	Service Animal			
<b>Technology &amp; Digital Media</b>					

# Improving the Accessibility of Public Infrastructure to Accommodate Physical Limitations of Differently-Abled Individuals

	<b>Frame 1: How can we train &amp; equip staff?</b>	<b>Frame 2: How can we assist differently-abled individuals in navigating infrastructure?</b>	<b>Frame 3: How can we redesign public infrastructure?</b>	<b>Frame 4: How can we implement accessibility technology?</b>	<b>Frame 5: How can we ensure ongoing infrastructure improvements?</b>
<b>Services or Programs</b>	Sensitization Training for Railways/BEST Employees		Ramps at Stations		Awareness Campaign for Co-Passengers
<b>Products</b>		Smart Bands for Fall/Health/Location Monitoring	Tactile Tiles		
<b>Staff</b>	Hire Accessibility Coordinators to assist during rush hours	Service Animal	Handrail Guided Paths	Augmented Reality Glasses for Guidance & Paths	
<b>Technology &amp; Digital Media</b>	Webinars on disability awareness		Braille Maps		

# Importance & Difficulty Matrix



# Coverged SOLUTIONS

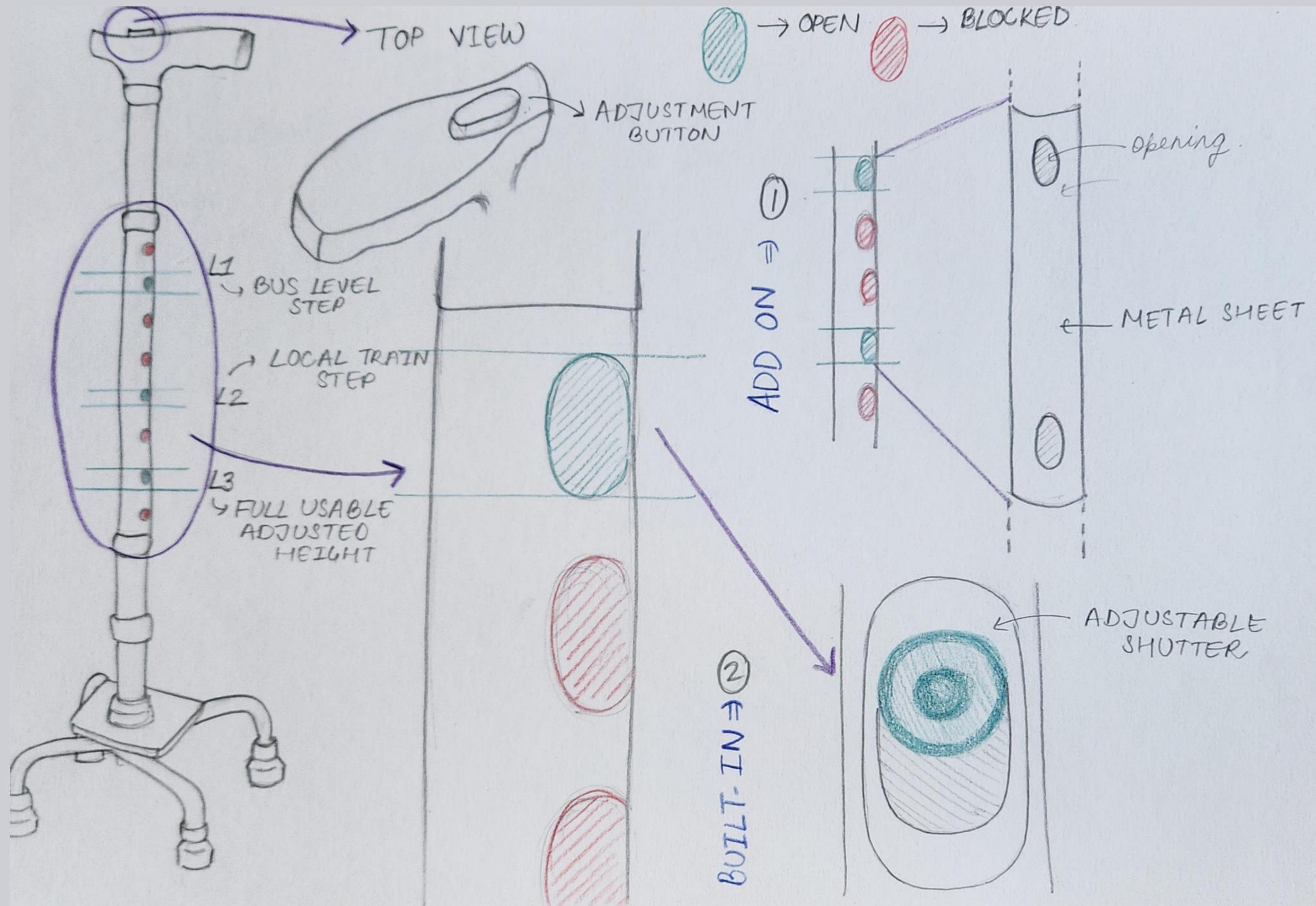
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- Vibration Feedback Shoe Soles
- Level Adjustable Walking sticks
- Tactile Tiles

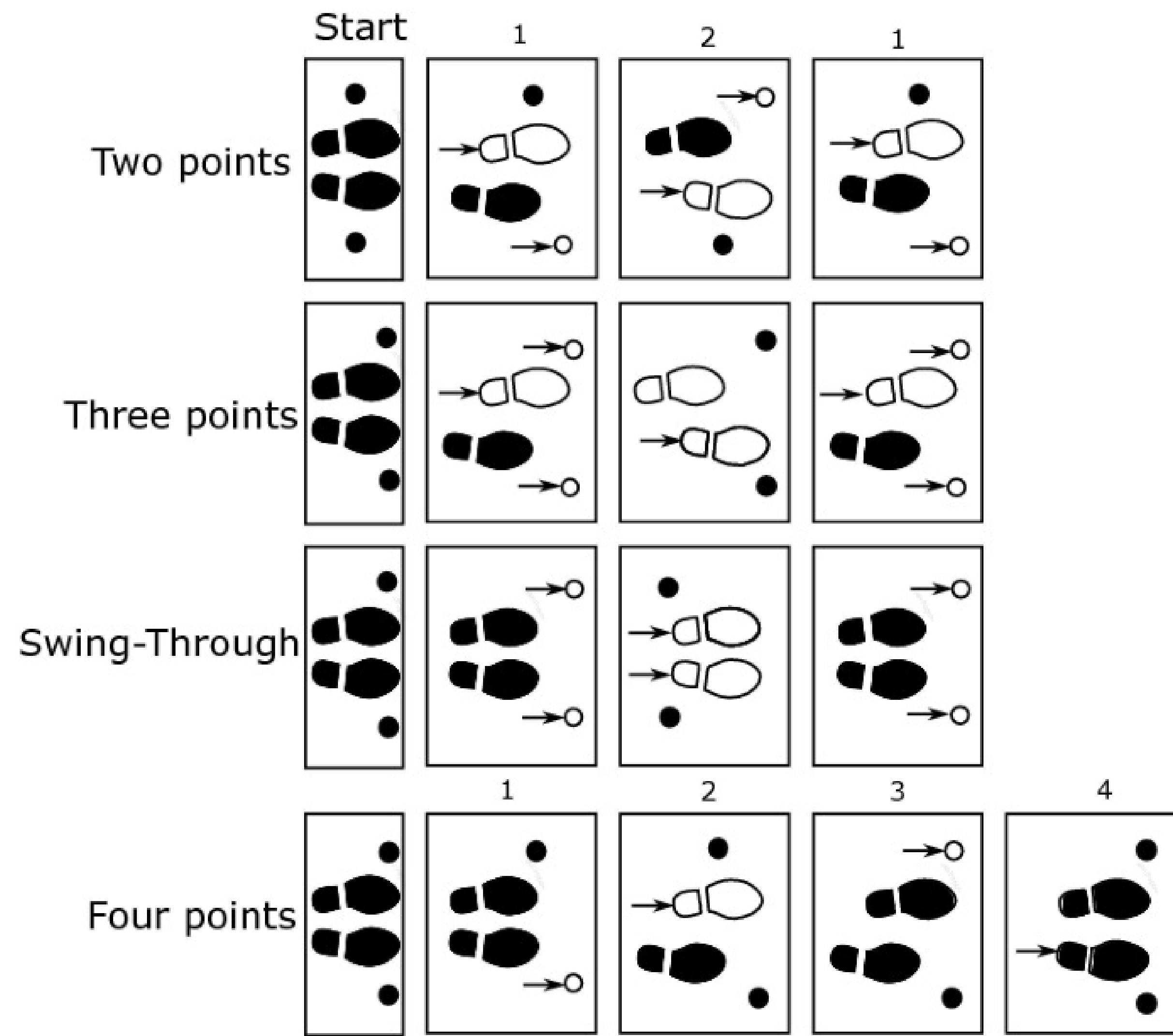
## Reasoning

- Had to be inexpensive
- Had to be easy to carry around

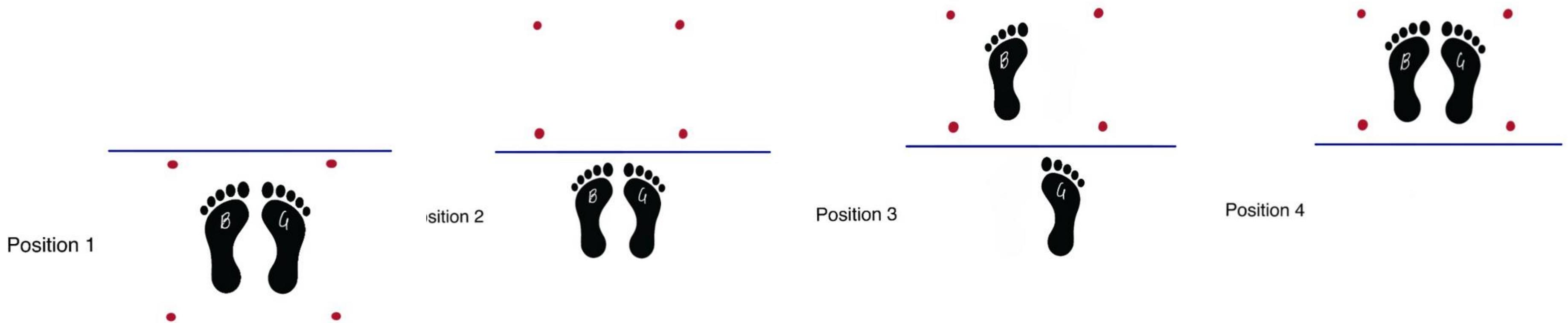
# Design 1 Walking Stick



# Types of GAITS



# 3-Point Gait ASSISTED WALKER



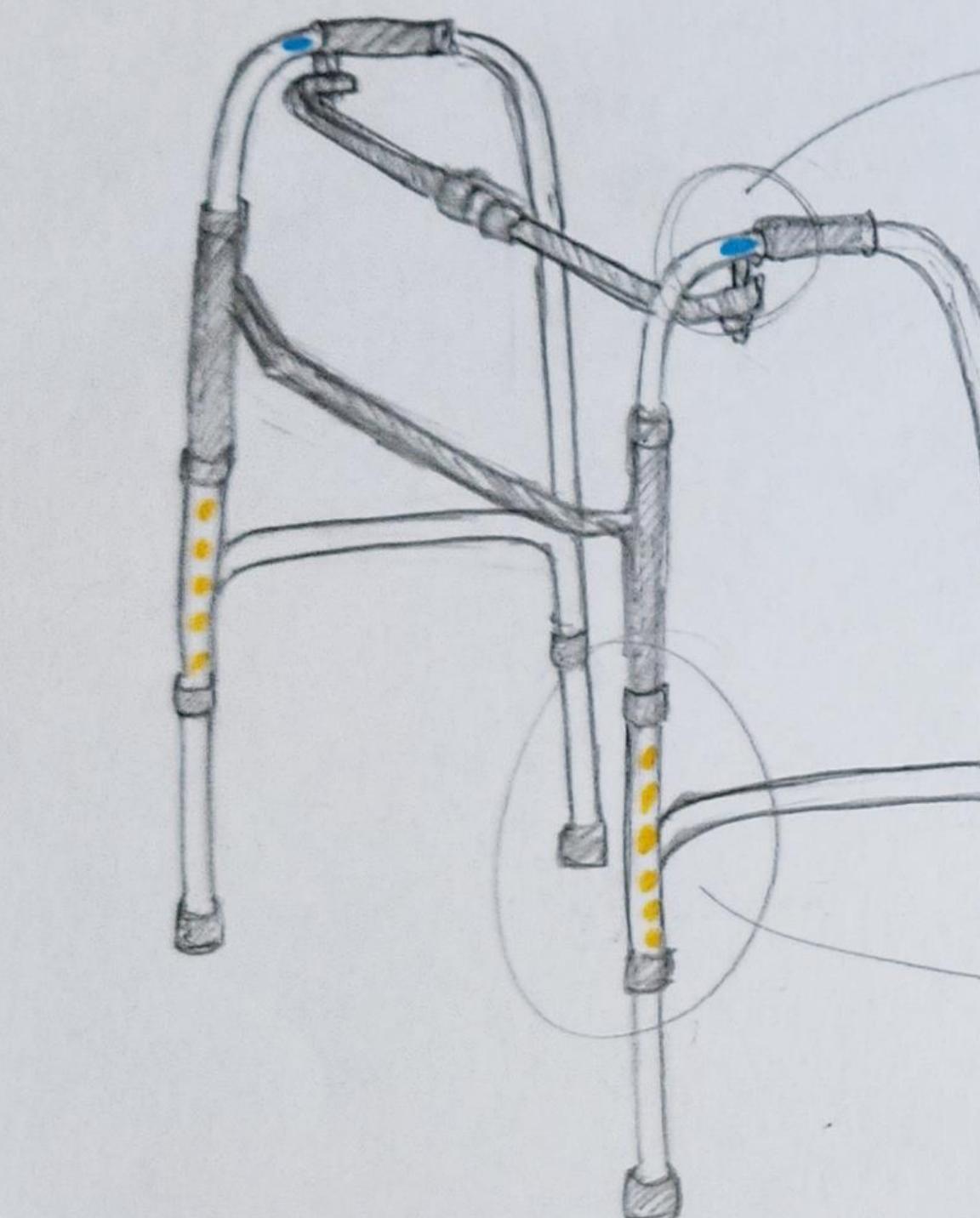
LEGEND:

- Bad Leg
- Good Leg
- Walker

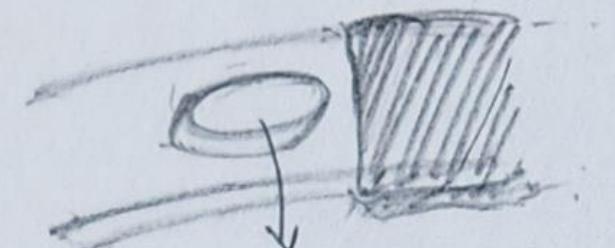
# Design 2 Assisted Walker

## ③ ATTACHMENT

TOP VIEW

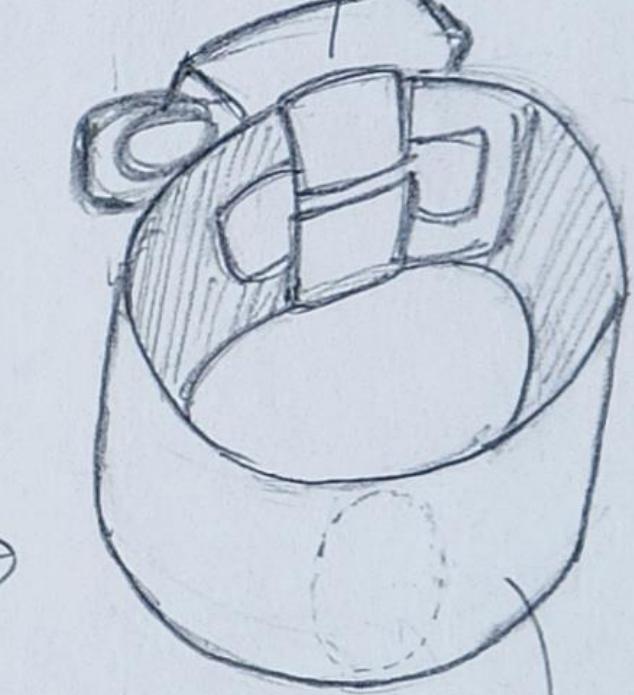


ADJUSTMENT  
BUTTON

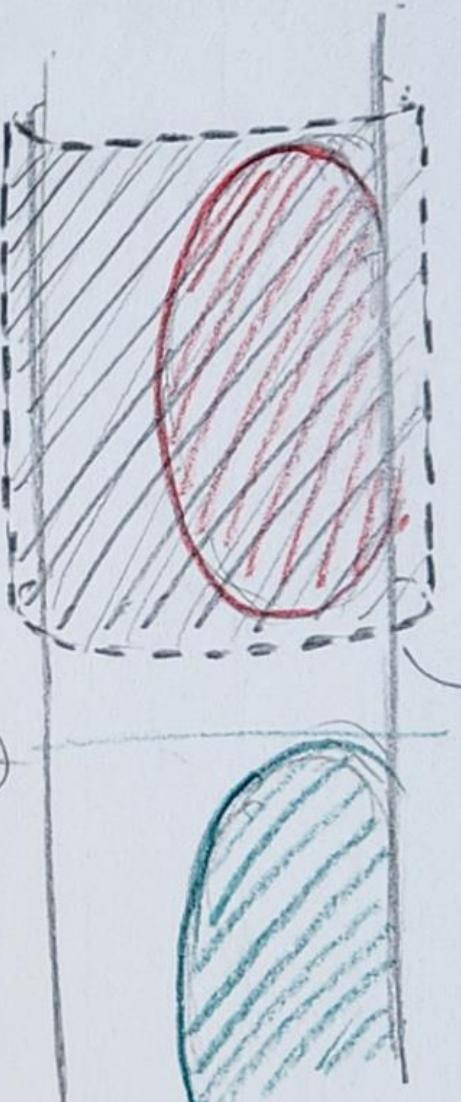


ADJUSTABLE  
CLAMP

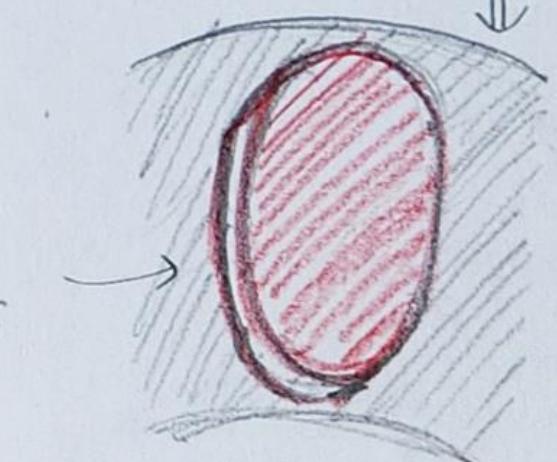
ADJUSTMENT  
SCREW



INSIDE

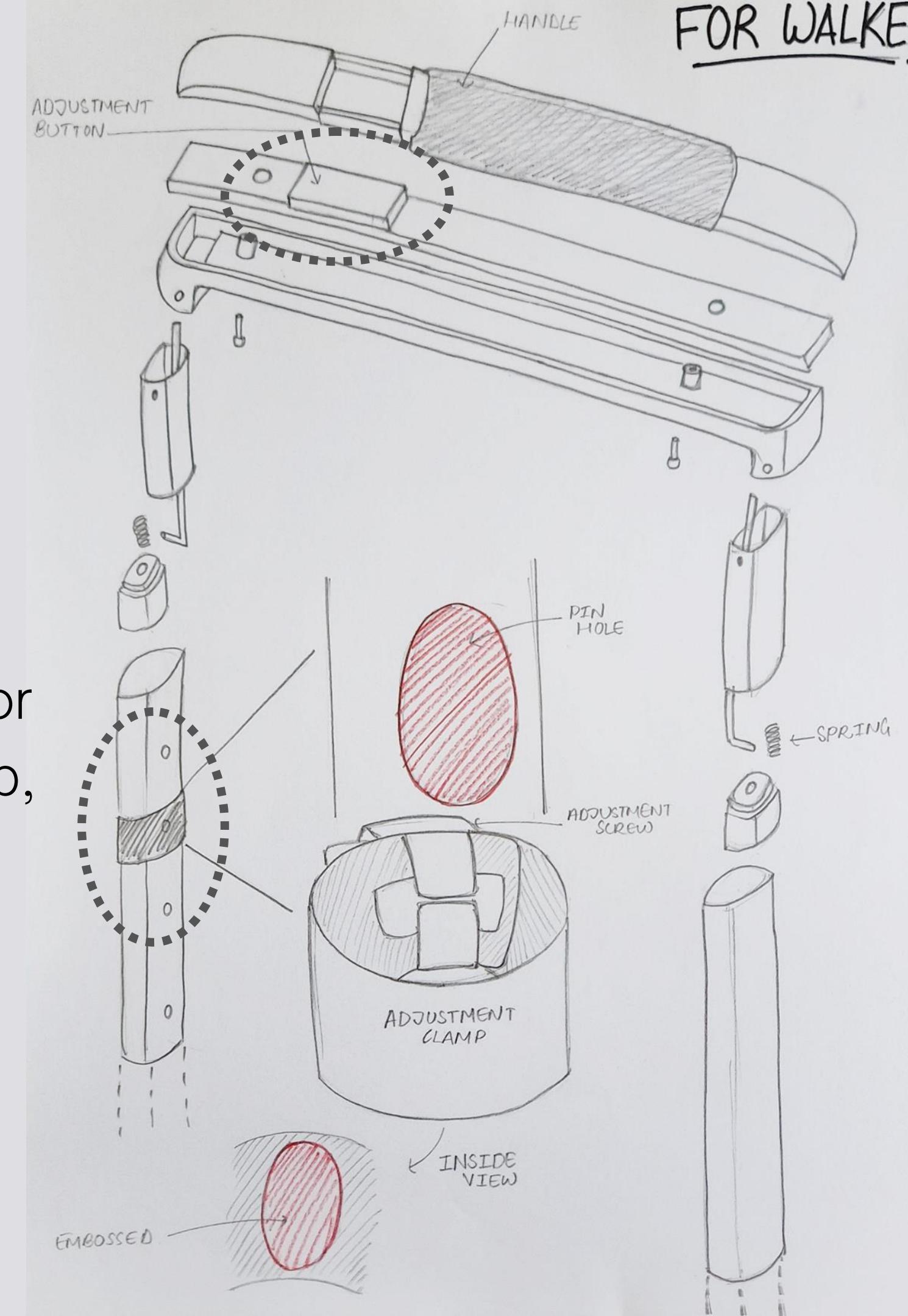


EMBOSSING  
TO BLOCK  
PIN HOLE



## Design 2 Assisted Walker

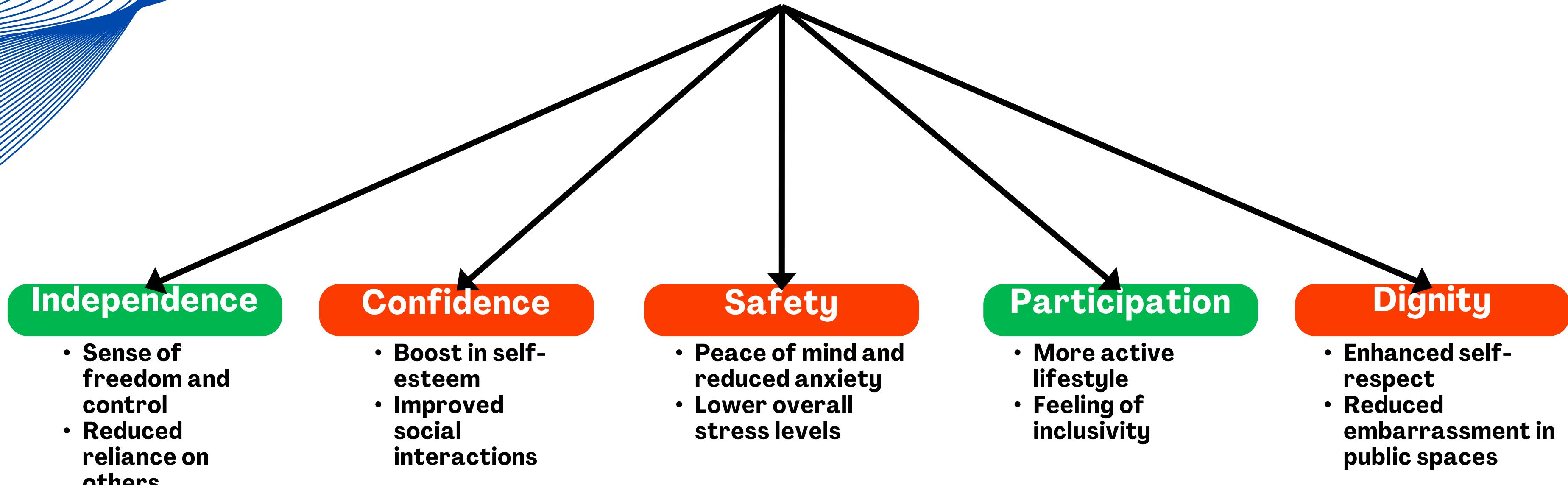
- It is mainly useful for 3-Point Gait users with one hind limb immobile/incapacitated.
- Different levels can be mapped to different buttons. Ex: Lvl 1, Lvl 2, Lvl 3 for common places (Train Station, Bus Stop, Stairs, etc).
- Congruity between all 4 legs' levels in daily use needs to be ensured, strut/connecting rods can be used.



# Physical Impact

STEP	PAINS	IMPACT
Preboarding	Crowded areas, stairs, uneven surfaces, long queues, limited seating	Adjustable height for stairs, stability on uneven surfaces, support in queues, comfortable standing.
Boarding	Stepping onto the train, managing gaps, crowded compartments, and lack of seating.	Height adjustment for boarding, support for balance, and maneuvering through crowds.
Transit	Sudden movements, lack of handrails, maintaining balance	Stability during movements, comfort, and posture.
Disembarking	Stepping down, managing gaps, crowded platforms, stairs or ramps	Height adjustment for stepping down, support for balance, navigating uneven surfaces.

# Emotional Impact



- The NSSO's 76th round survey on persons with disabilities found that many disabled individuals experience loneliness, depression, and anxiety
- A 2020 study in the Journal of Disability Studies found that physically disabled individuals in India have lower emotional well-being due to societal attitudes, inaccessible infrastructure, and limited opportunities.

# **Identified NGOs**

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NGOs working with Divyangjan for mobility:

- King George V Memorial
- Jaipur Foot
- Jiv Daya Foundation

# **Pitch to Jiv Daya Foundation:**

Good afternoon, respected members of the Jiv Daya Foundation. We are a group of passionate individuals from SPJIMR, and we are here to present a solution designed to enhance the mobility and independence of differently-abled individuals in Mumbai.

## **Why Jiv Daya Foundation:**

Jiv Daya Foundation is renowned for its dedication to improving the lives of differently-abled individuals. By partnering with you, we can ensure that our solution reaches the right hands and truly makes a difference. Your knowledge and resources will be very helpful in improving and spreading our walking aids, which will ultimately increase many people's mobility and independence.

WE CARRY OUT OUR MISSION THROUGH BUILDING SUSTAINABLE PARTNERSHIPS AND STRENGTHENING EXISTING INFRASTRUCTURE WITH MEDICAL INSTITUTIONS IN INDIA.

# Jiv Daya Foundation:

## OUR MODEL



**IDENTIFY**  
Areas where catalytic impact can be made



**PARTNER**  
With sites to provide targeted grants



**BUILD**  
Capacity by strengthening existing infrastructure



**ANALYZE**  
Outcomes through data collection



**SUSTAIN**  
Impact through developing local leaders

We found that our vision resonates with the model of Jiv Daya

**Our solution focuses on:**

Ergonomic Design  
Independence  
Accessibility

**Importance of the Solution:**

Physical Relief  
Emotional Well-being

**Implementation:**

Prototype Development  
Community Outreach  
Feedback and Improvement

# **Our solution focuses on:**

- Ergonomic Design
- Independence
- Accessibility

# **Importance of the Solution:**

- Independence
- Accessibility

# Jiv Daya Foundation:



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# **ADVOCATING FOR INCLUSIVITY USING WALKIES**

**SPJIMR**



**JIV DAYA**



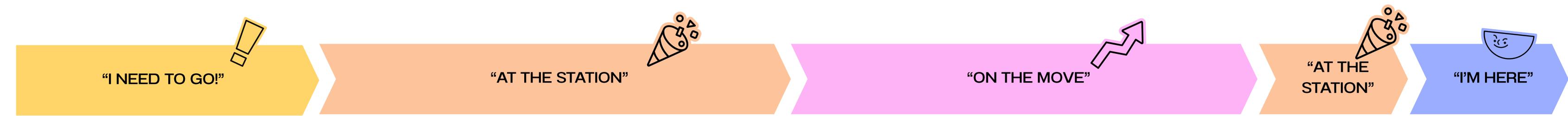
**Empower Differently-Abled  
Lives Today!**



# THANK YOU

**Ashik Sali  
Agam Kaushal  
Jaskirat S. Sanghera  
Joel S. Prasannan**

# Journey Map through Mumbai



THOUGHTS	"I need to go to XYZ"	"How do I get in?"	"How do I get a ticket?"	"How do I reach my platform?"	"How do I board?"	"Where do I sit?"	"Where do I get off?"	"How do I get off?"	"Where do I go from the platform?"	"How do I exit?"
ACTIONS	Choose transport method for journey (Departure & Destination)	Get to access point (Elevator or Stairs)	Get a ticket from authority (Phone, ATVM, Counter)	Go through Security, walk up bridge to PF (Bag security, patdown, turnstile, stairs)	Get to PF part with required coach/entry (Divyangjan coach, accessible entry)	Find space (Reserved seat)	Check train station (Audio Announcements, Visual Screens)	Get off the Veh & get to access point off PF	Decide side of station to exit (Visual maps, signs)	Get off station & onto the destination street
EXPERIENCE/EMOTIONS	Curious	Restless	Impatient	Restless	Nervous	Restless	Anticipation	Nervous	Curious	Curious
TOUCHPOINTS	Audio/Visual/Mind	Staircase/Elevator	Counter	Security-Turnstile	Train-PF					
ENVIRONMENT	Departure Area	Station Entry	Station	Station	Train	Train	Train	Station Maps	Staircase/Elevators	

