Design for wayfinding in India

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> Focus area

For wayfinding we consume directions verbally and are used to that. This has led to less penetration of printed and online maps in day to day lives.

This project focuses on designing a wayfinding solution based on landmarks that adheres to our norms and makes navigation easy for Indian cities.

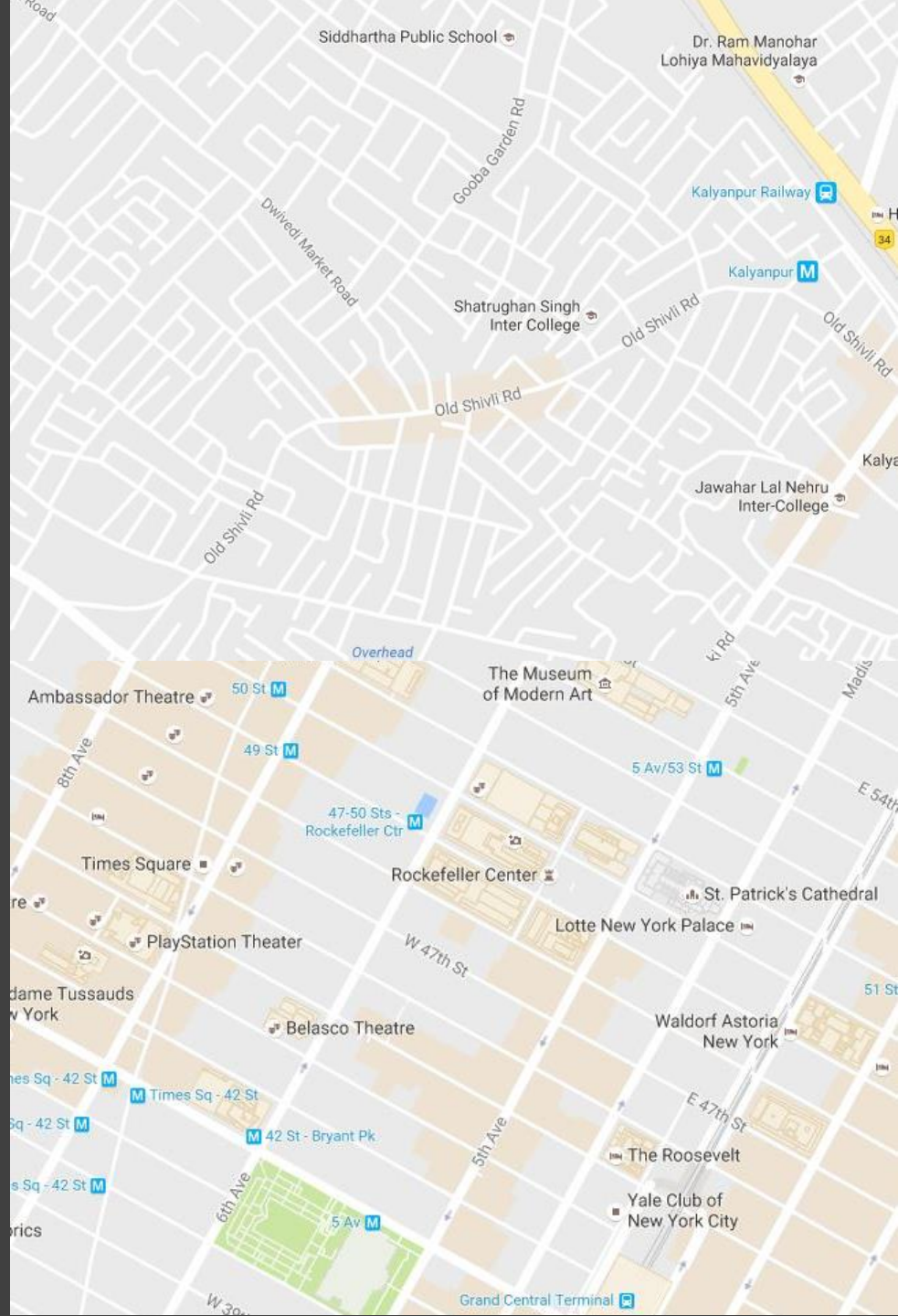
1 Introduction

> Intro

- > Wayfinding is the cognitive element of navigation.
  Information used -
    - > Landmarks
    - > Spatial relationships between them

> Intro

- > Indian cities are heterogeneous, organic in nature
- > Organic growth and less use of maps and signage.
- > Non reliance of maps leads to remembering routes by local landmarks as they are easy to recall being more visual in nature.



> Intro

- > Oral directions become a norm based on local landmarks. As not all streets or roads are named people learned to communicate through verbal directions.

- > Emergence of colloquial way for wayfinding.

" *When you reach a **yellow building**, **ask anyone** there, about Doctor Sharma's clinic, they will tell you.*

2

BACKGROUND

- Literature review
- Existing work

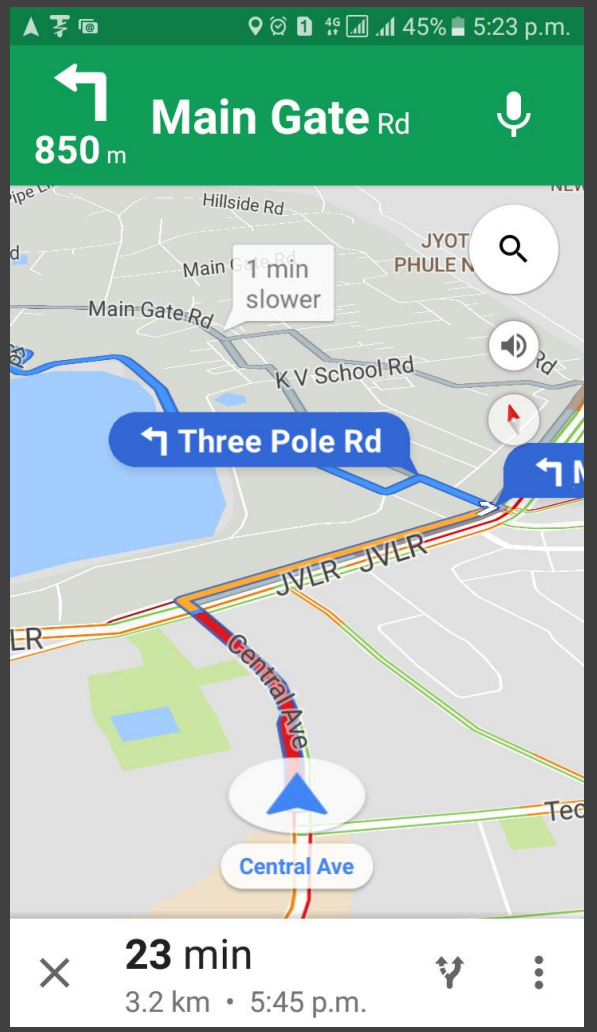
> Background

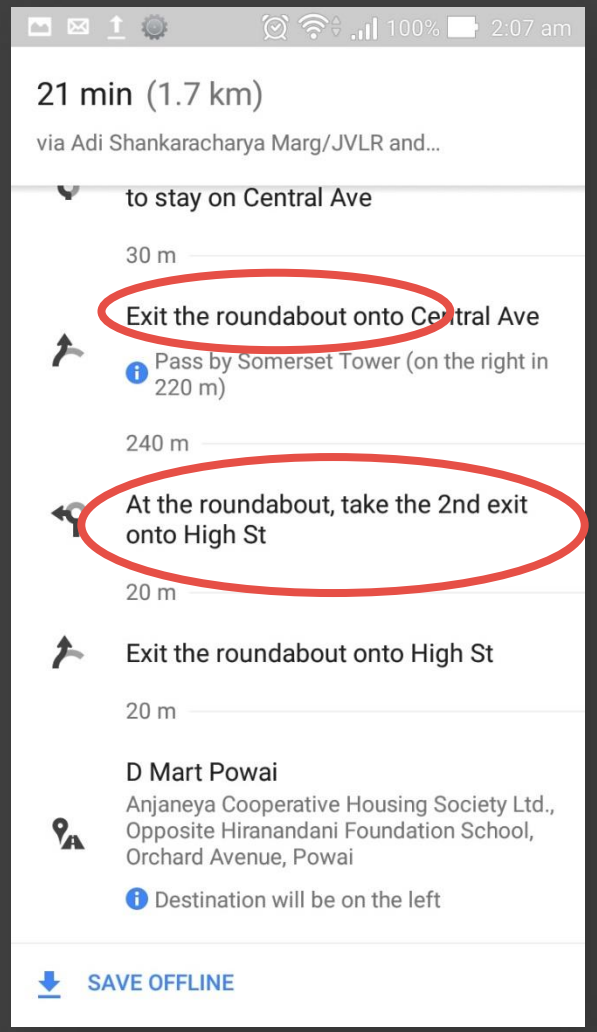
- > Printed maps
  - Not scalable, restricted information.
  - User needs to used legends to understand.
  - Detailed information of streets is not covered.
  - Only major landmarks/buildings are mentioned.

> Background

> Online maps – Google, Here maps.

- Inaccuracy for intricate streets, sudden turns, dead ends and local names.
- The terms such as roundabout, walk south -west, second exit, High St. etc. doesn't resonates with average commuter.
- The lingo of directions confuses leads to Confusion.





> Background

> Nokia city lens, landmark projection

- Bringing up landmark data upfront Nokia city lens displays a list of nearby places based on selected category in the live camera view

- Only nearby information without directions.

> Background

- > GPS units in vehicles
  - Speed alerts.
  - Advanced lane guidance.
  - School zone alerts, trip log etc.

> Background

> Landmark based audio visual interface for Wayfinding.

- Focus on less education users
- Landmark based navigating in place of map based.
- The results indicated that landmark based navigation is better than traditional map base navigation in Indian context as it gives user higher chances of reaching the destination

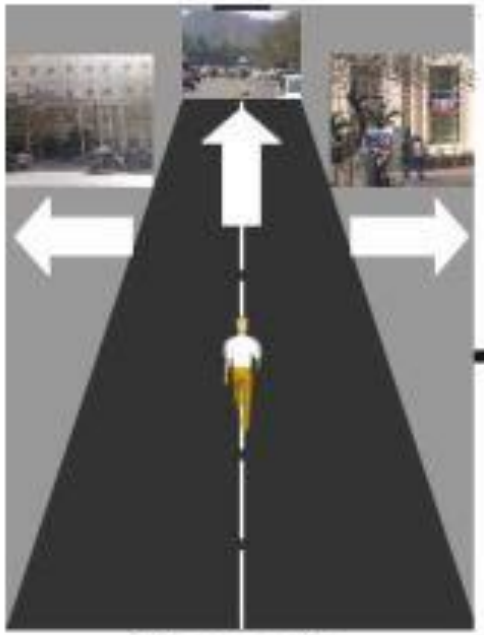


Figure: 2a

Figure: 2b

Figure 2c

Figure: 2d

> Background

- > Paper maps and maps on mobile device vary in the amount of information displayed.
- > Schematic(symbolic) maps with Landmark information is utilized for orienting and routing.
- > Information is abstracted to focus on navigation with schematic maps.

> Background

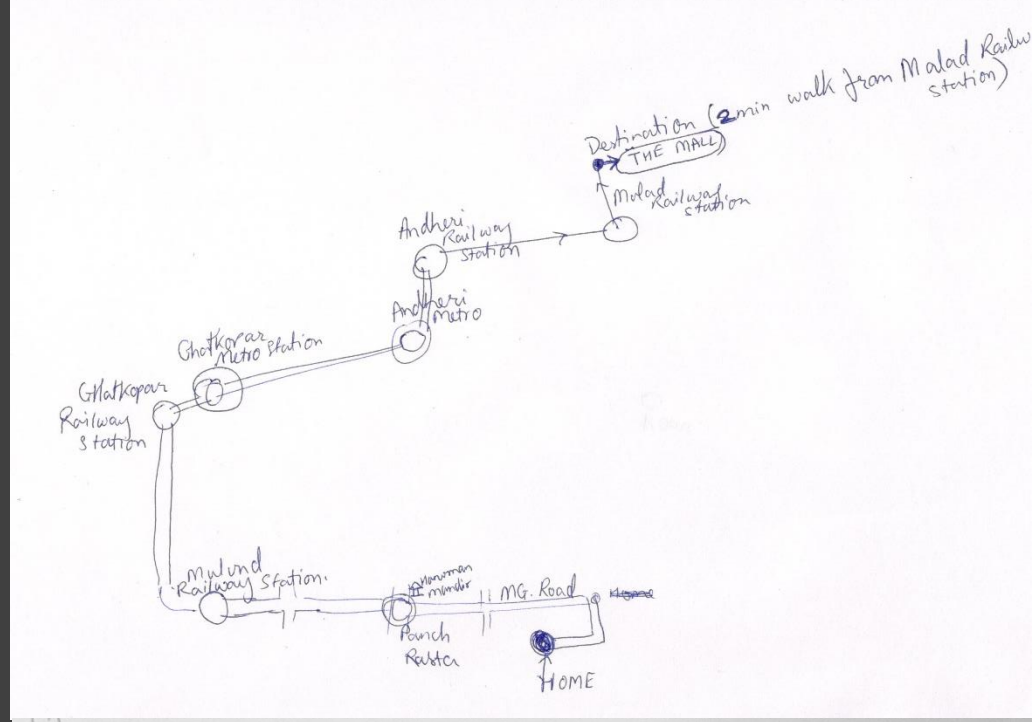
- > Main issues – Why we find it difficult to understand topographically rich maps for navigation.
- > What is the optimal information that can be displayed.
- > How maps are simplified.

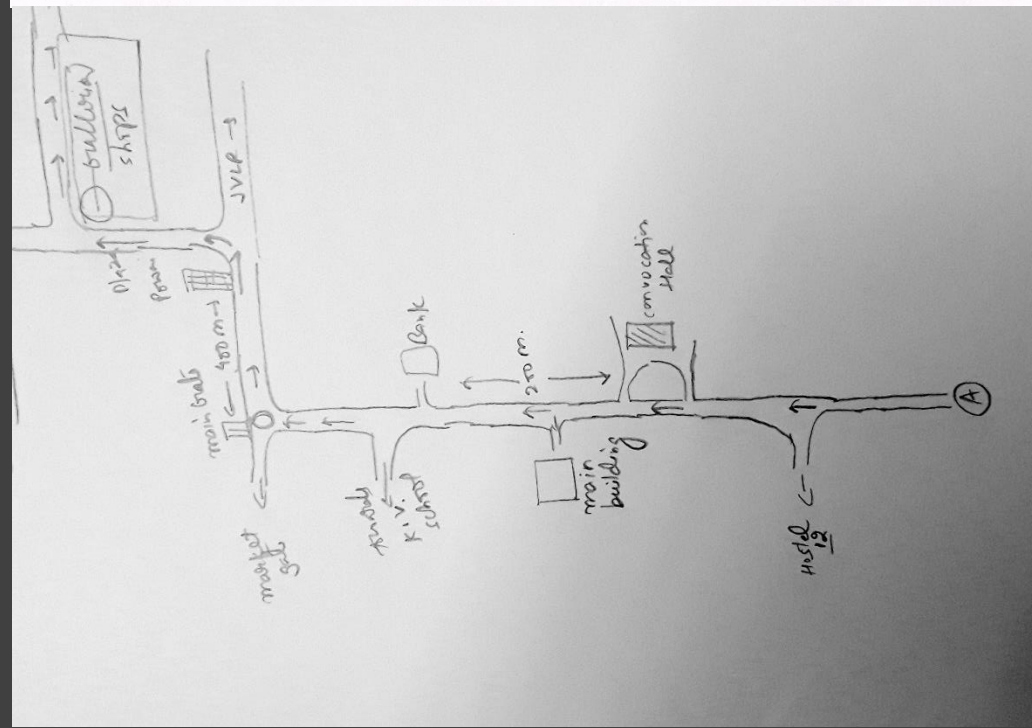
> Background

> Wayfinding by people, Human wayfinding, (Raubel, 2002)

- Cognitive – perception of route, acquired knowledge
- Spatial – information processing of environment

> Landmarks at decision points aid in effective mental representation of space.





> Background

- Martin Raubel, 2002 (**Enriching Wayfinding Instructions with Local Landmarks**), navigation is improved if it is adaptive for individual users, with landmarks at decision points called *local* landmarks with respect to a specific route

- We identify routes with landmarks which are even not official or not practically on available maps. E.g., tea shop, garbage bin, an old abandoned house, cigarette vendor, size, color and condition of buildings etc.

- Each landmark which has other characteristic aids in remembering and pin pointing them correctly.

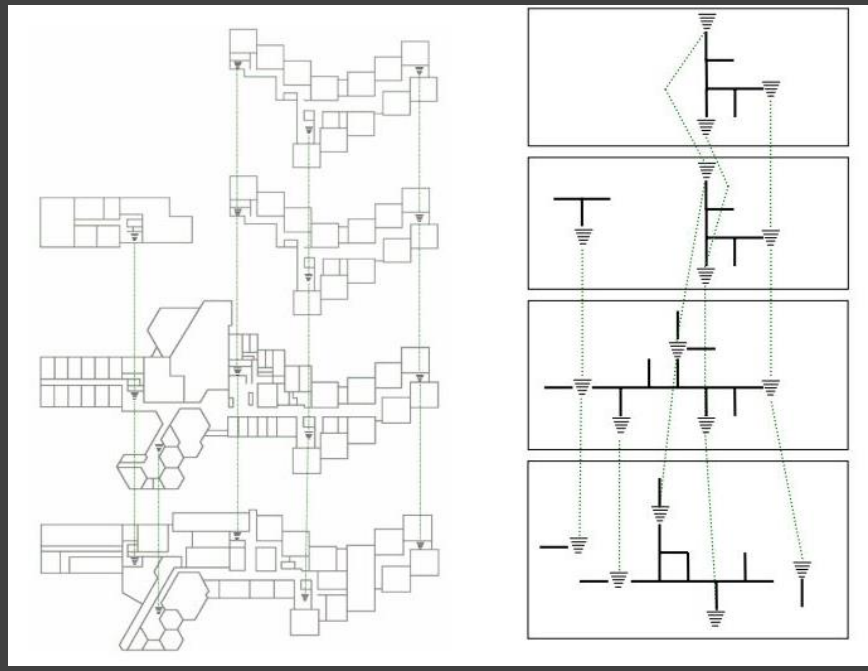
Source : athikoms blog, bottom : The Hindu

> Background

- Tobias Meilinger (**How Much Information Do You Need? Schematic Maps in Wayfinding and Self Localisation)** talks about route and survey knowledge.

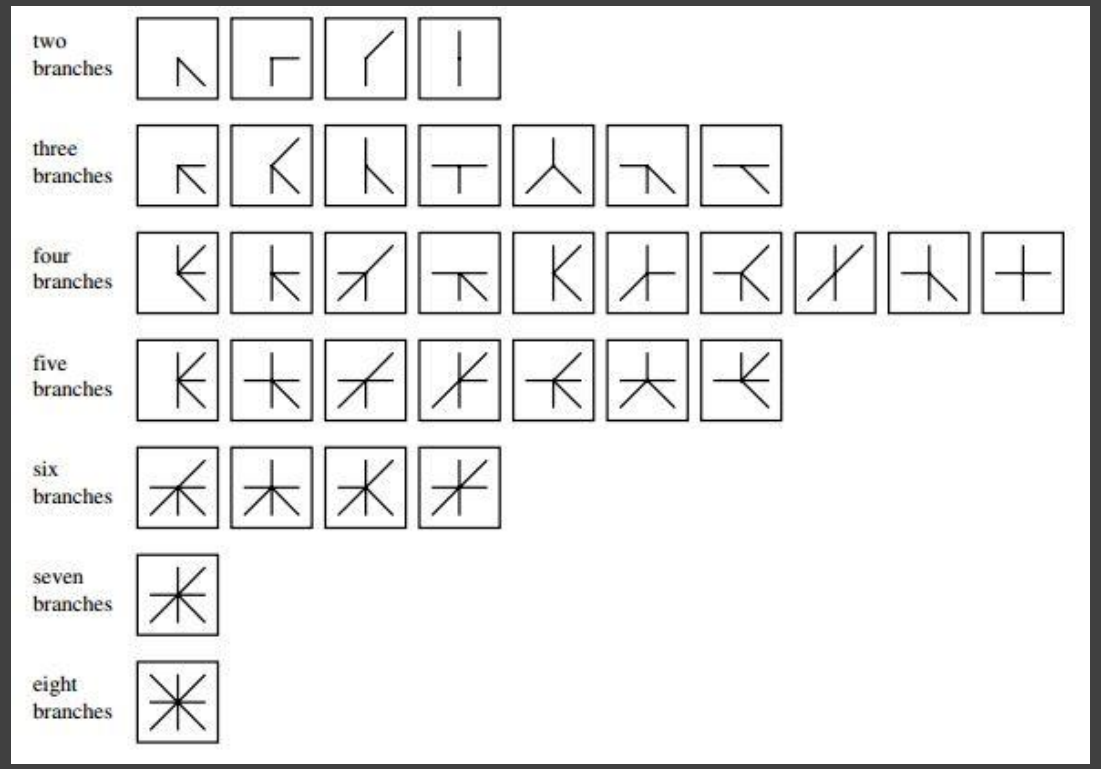
- Despite containing much less information, a highly schematic map can lead to better wayfinding performance than using a topographic plan. Focus on route strategy is effective and route knowledge is sufficient in guiding users.

- Casakin, (**Schematic Maps as Wayfinding Aids,**) talks about a simplifying routes by creating a structure to represent real world roads and streets in schematic maps.



> Background

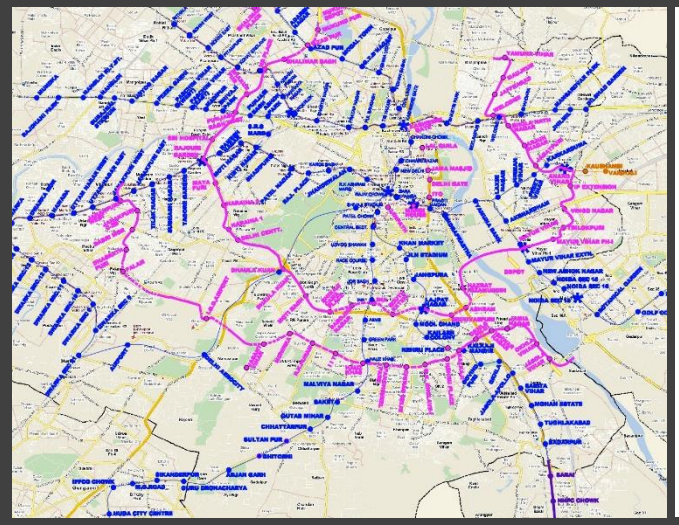
- > Simplifying routes reduces cognitive load and helps in faster information processing.
- > Casakin proposed taxonomy for streets and interactions.
- > Maps for major cities in India with network of inner streets can be much simplified with this strategy.

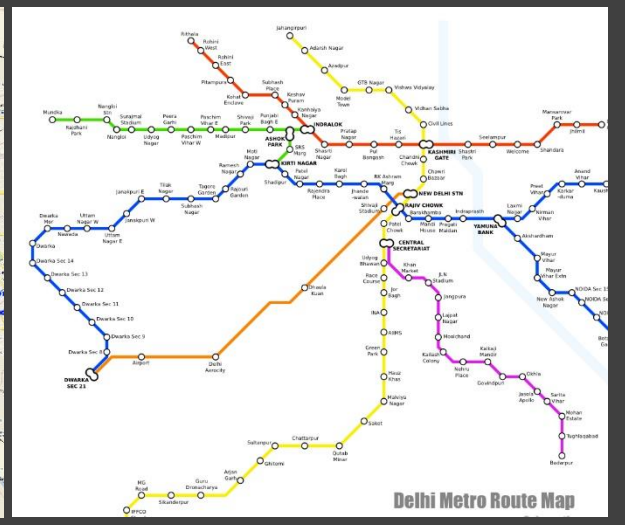


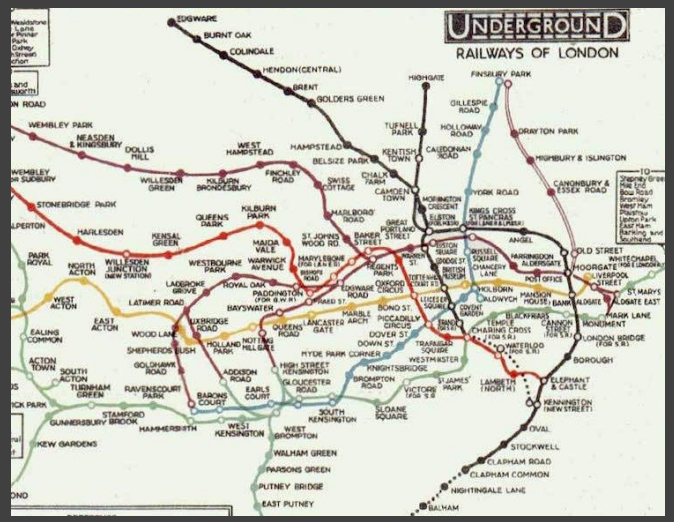
> Background

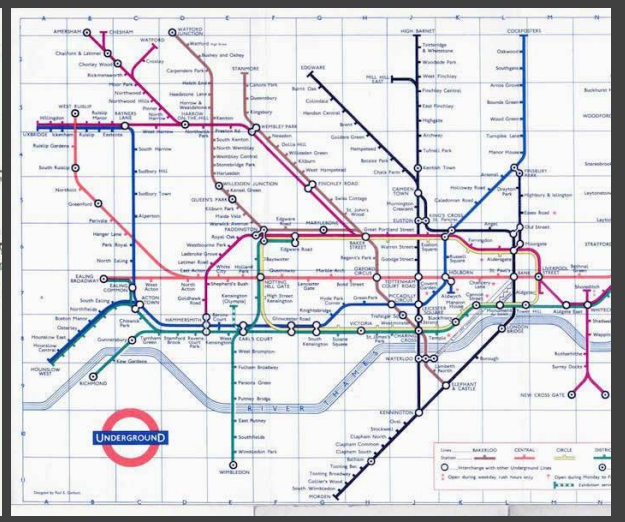
- Transit systems around the world utilize schematic and abstract representation of routes.

Delhi metro lines









London Underground map

3

USER STUDY

> Interviews

> Insights

> User study

- > The studies were conducted to observe and question how average commuters navigates to reach destination and the issues faced.

- > Areas such as bus stops and local stations where there are lots of commuters at a given time were chosen to get more feedback and information.

> User study

> Focus –

- Users commuting daily either on familiar routes or new and unknown ones.
- Some people were using existing solutions and were asked about their usage behavior.
- To get more diverse input people who take both private and public commute were interviewed.

> User study

> Approach –

Semi structured interview
Online survey

-Pre written question along with context based questions asked at the field.

Participants

3 bus stops
Local train station
25 People including office goers, daily workers, students etc.
2 Ticker checkers on bus stops.

-Interviewed daily commuters having fixed destination, multiple destinations, wayfinding troubles etc.

> User study

- > Observation and findings

- > **Users simply prefer to ask others for routes related info which is mostly verbal instead of referring a map.**

  People aren’t used to digital maps and can’t recall names of roads and streets, so remembering landmarks on the route helps in deciding when to get down of the bus or to orient themselves at a given time.

> User study

- > Observation and findings

- > **Less inclination towards usage of online navigation apps**

  Indifference towards online maps. Users seem to not indulge in finding destinations by using Google maps rather seeking for information sources which seems trustworthy like a bus conductor or a tea shop at a busy corner.

  Drivers (Uber,Ola) said the maps doesn’t complete with what knowledge they already have about the routes and find the navigation systems confusing.

> User study

- > Observation and findings

- > **User statement, colloquial way of wayfinding**

“Age left leke ek mandir ata hai, waha pe ek bus stop hai .“
“ Huma cinema se right cut jana, station samne he hai. “

This colloquial way of telling directions is understood by all as very few urban areas are laid out in a grid, contrary to major cities in the west. We don’t name all of our streets and roads and building blocks.

> User study

- > Observation and findings

- > **Landmark information with character, rich information**

  *“At the gate of **the Hospital***
  there will be an old man selling toys, ask him
  and he will tell you exactly where you want
  to go.”

  In this way the landmark information
  comes as more rich from local people

> User study

> Observation and findings

> **Subjective landmarks**

We identify landmarks as it suits to us depending upon the time of the day, environment and need.

There is no category for landmarks in day to day life, anything prominent is a landmark, road side vendors, temporary events, garbage bins, shops boards, parks, old tree, collapsed building, building color, taxi stands etc.

> User study

> Observation and findings

> **People are integral part of our wayfinding habit**

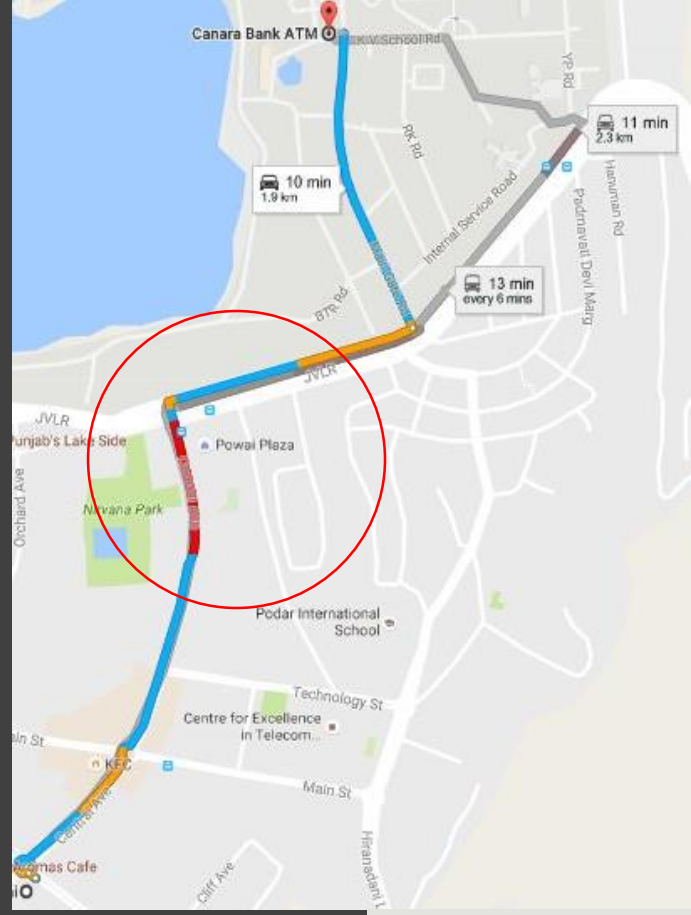
Till the destination is reached user keeps on verifying and validating the route information and landmarks by consulting multiple people. These can be *Autowallahs*, pan shop vendor, a policemen etc.

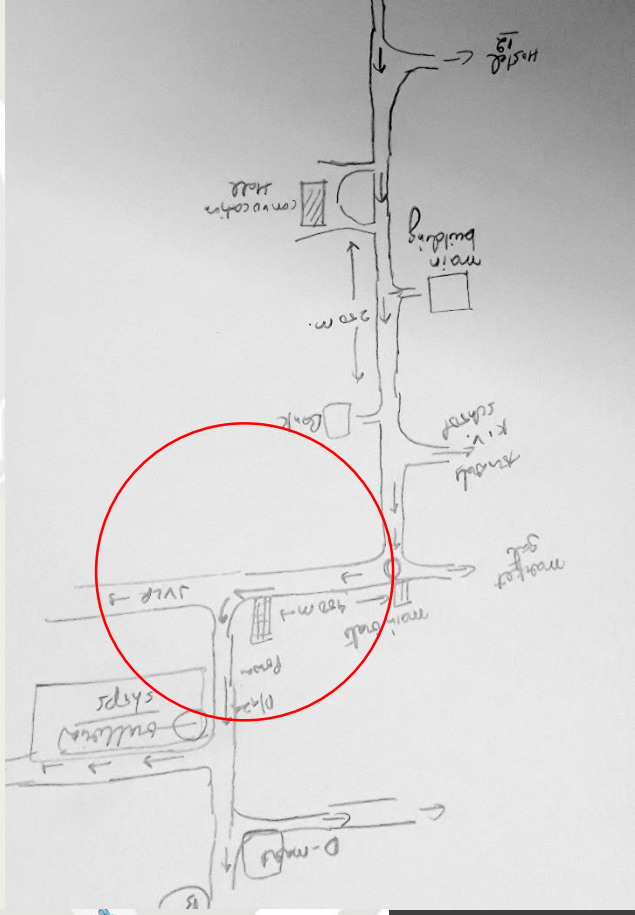
It is a combined effort.

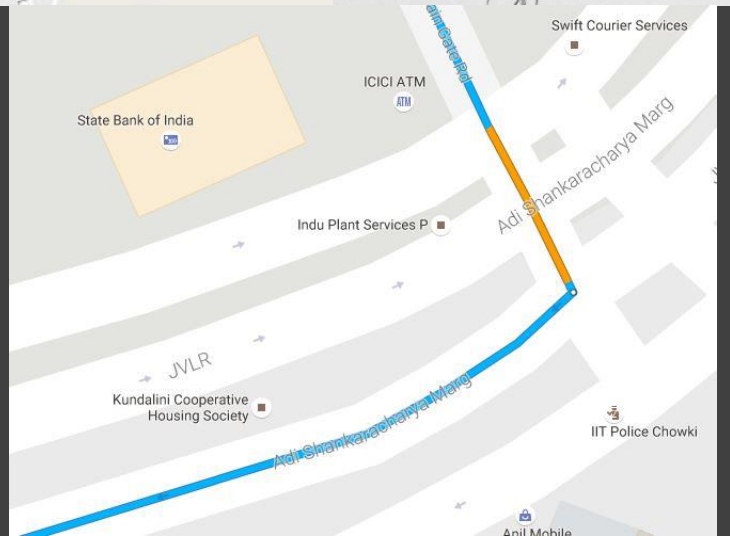
> User study

- > Observation and findings
- > **Removal of unwanted information on the map**

  When route sketched by memory only the main decision points come while recalling. Thus design should get rid of unwanted data and only focus on information at decision points.

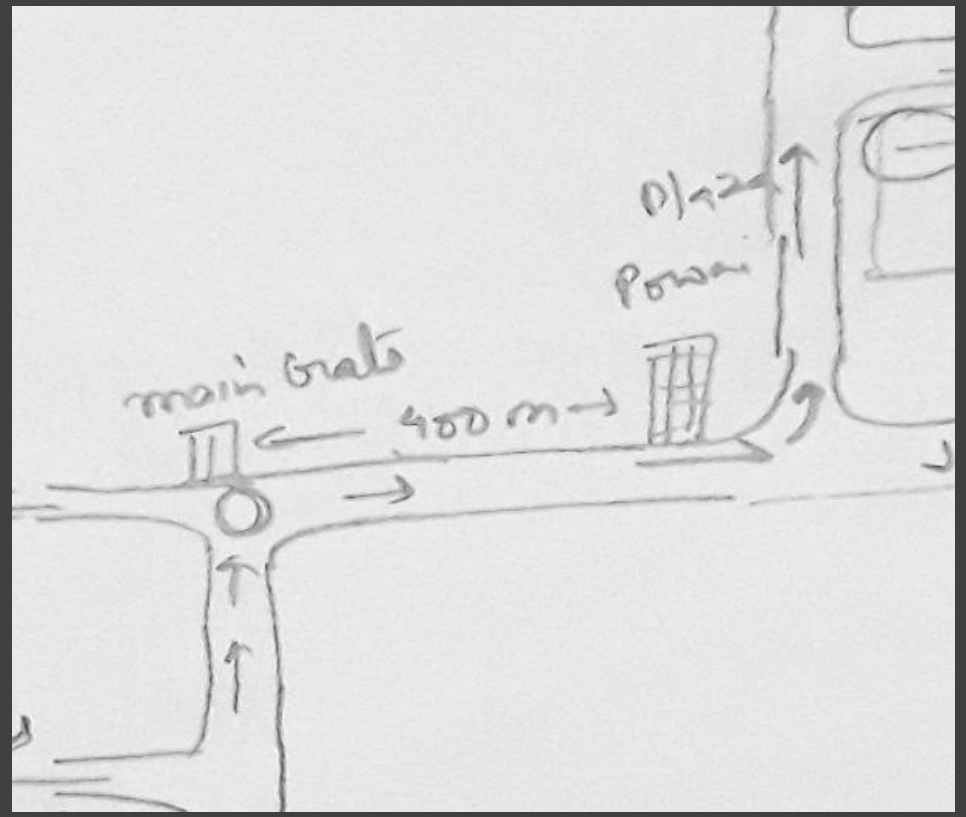


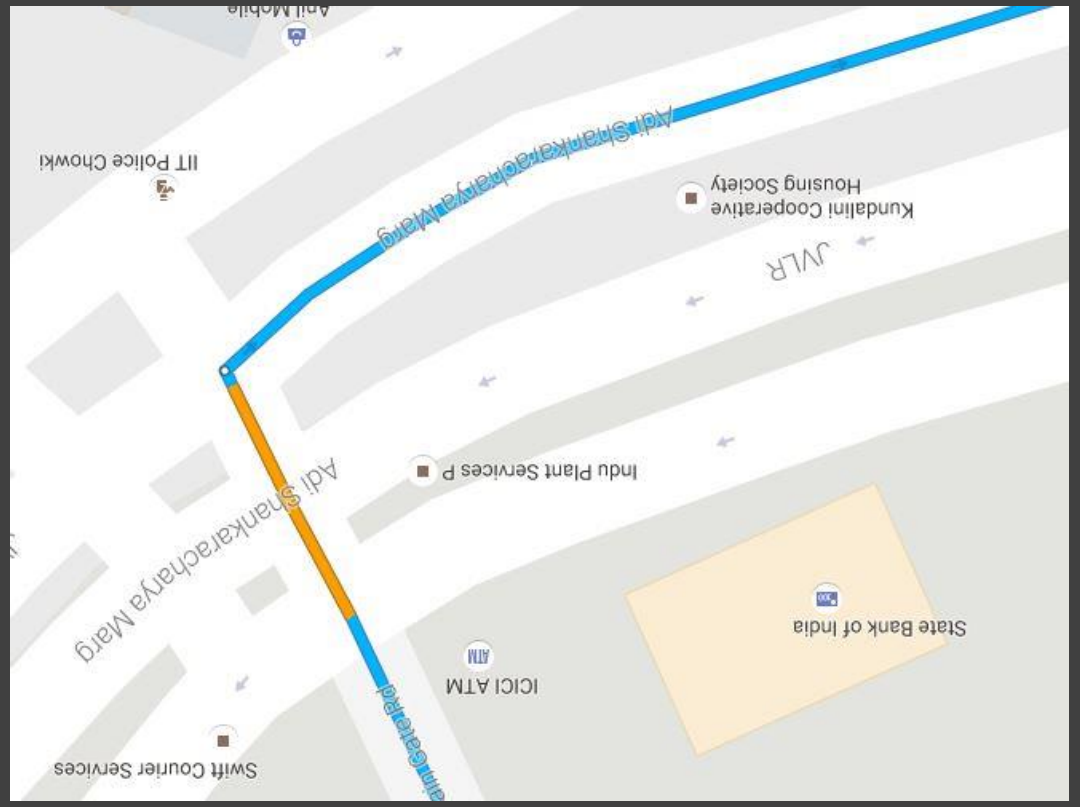




> User study

> Observation and findings





4 Ideation

> Ideation

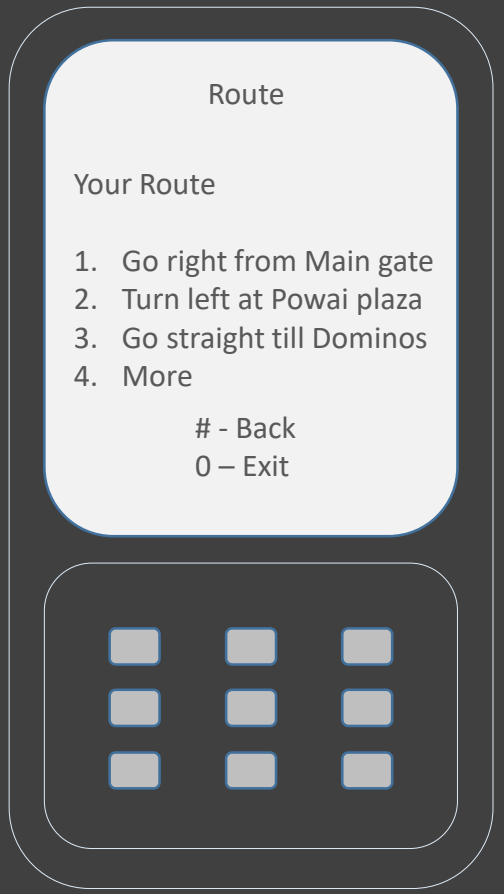
> Concept 1 – location based wayfinding through text interface

User will type in their location and
destination and receive a list of nearby
landmarks and routes through text.
User will select the most nearest and familiar
start point one and will be guided from there by
already populated data in the server.

To help user orient Bluetooth
beacons can be used which transmit signal at
designated locations.

> Ideation

> Concept1



> Ideation

> Concept 2 – Location aware tool for wayfinding using audio and visual aid

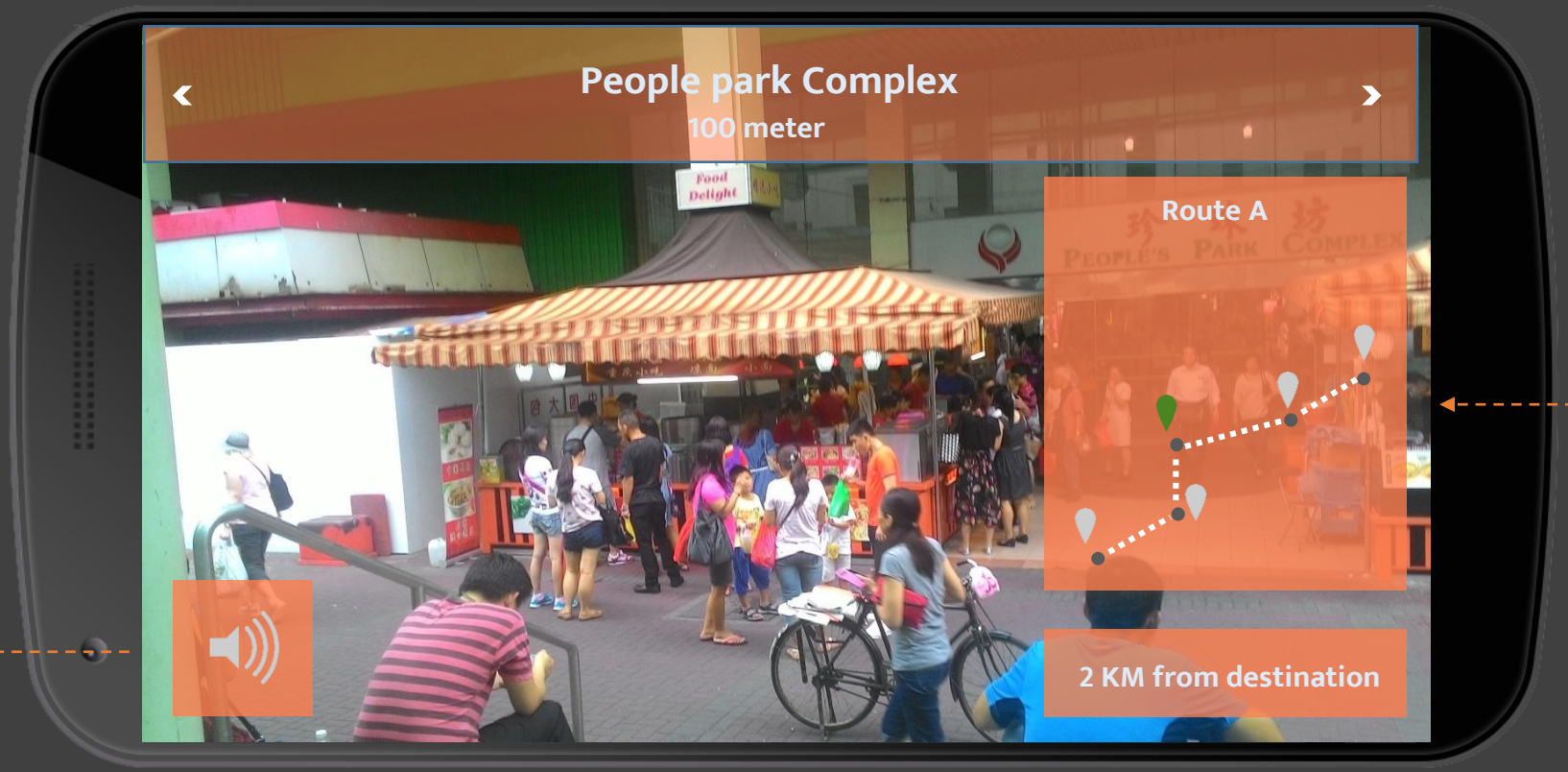
Phone screen displays landmark image when user approaches a location. Embedded audio gives location aware information thus guiding the user.

The audio can be recorded an geo tagged by users who have been to that location.

User navigates from landmark to landmark with detailed images.

> Ideation

> Concept 2 – Location aware tool for wayfinding using audio and visual aid



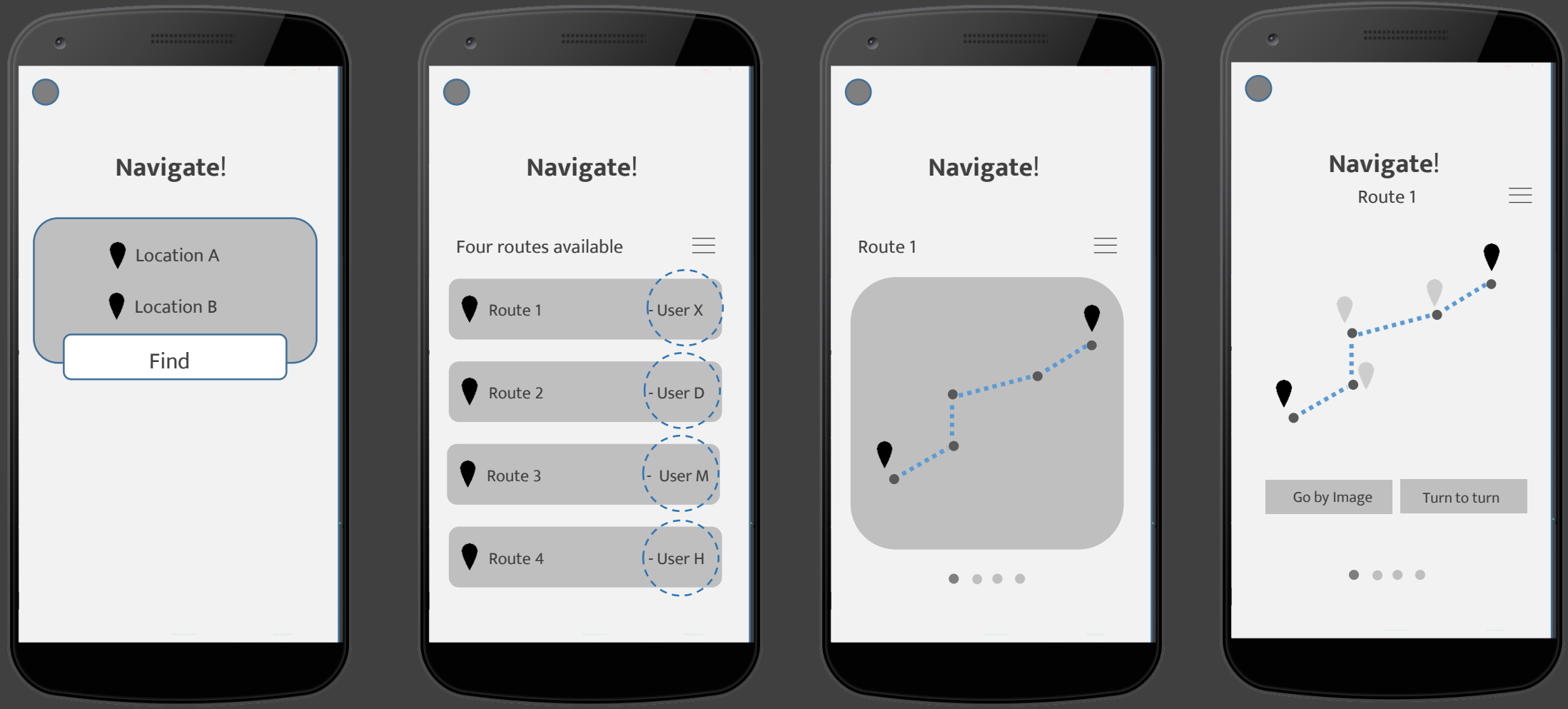
> Ideation

> Concept 3 – Crowdsourced landmark info

This concept focuses in generating local landmark data and also identifying and verifying them. Images, audio tags and other location specific data submitted by different users are sourced and maintained

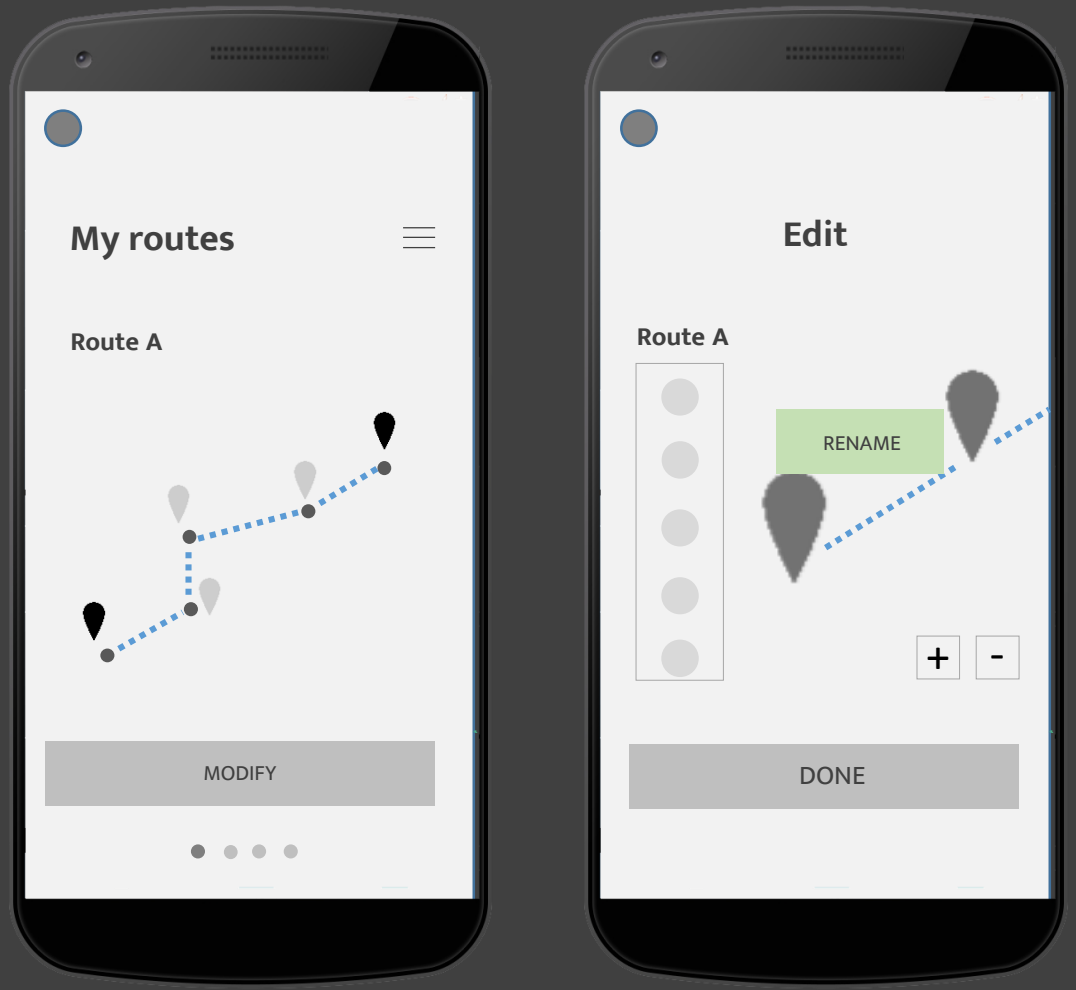
> Ideation

> Concept 3 – Crowdsourced landmark info



> Ideation

> Concept 3 – Adding information



5 Final Design

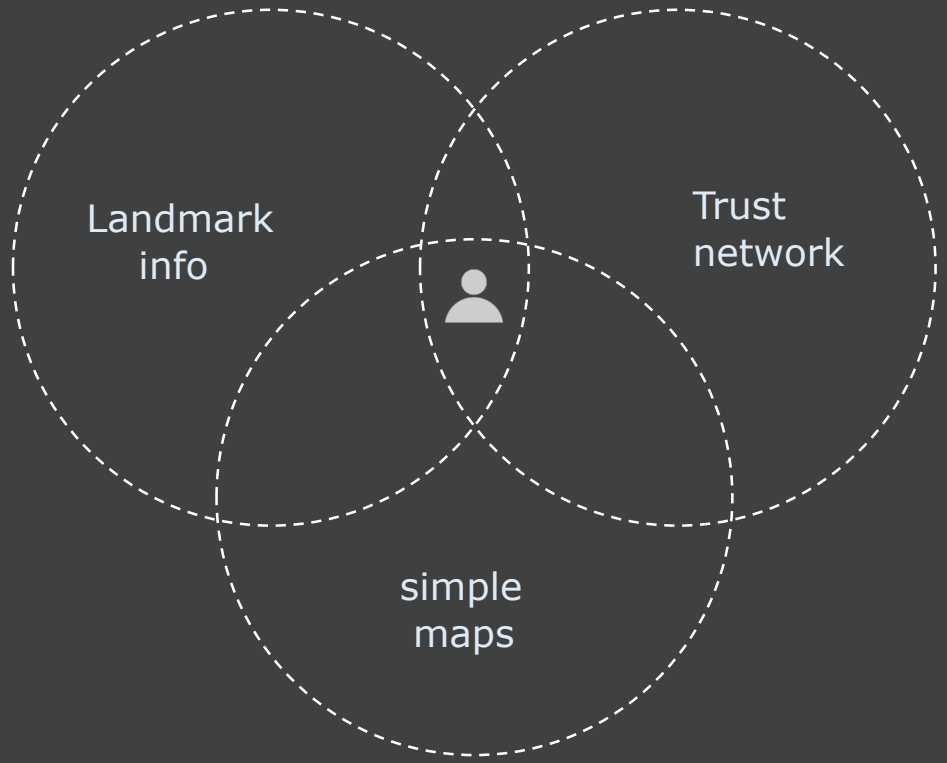
> Final Design

- The proposed design aims to make wayfinding simpler and familiar by crowdsourcing landmark info and routes generated by local people.

- Focus on relevant data and extra info is omitted.

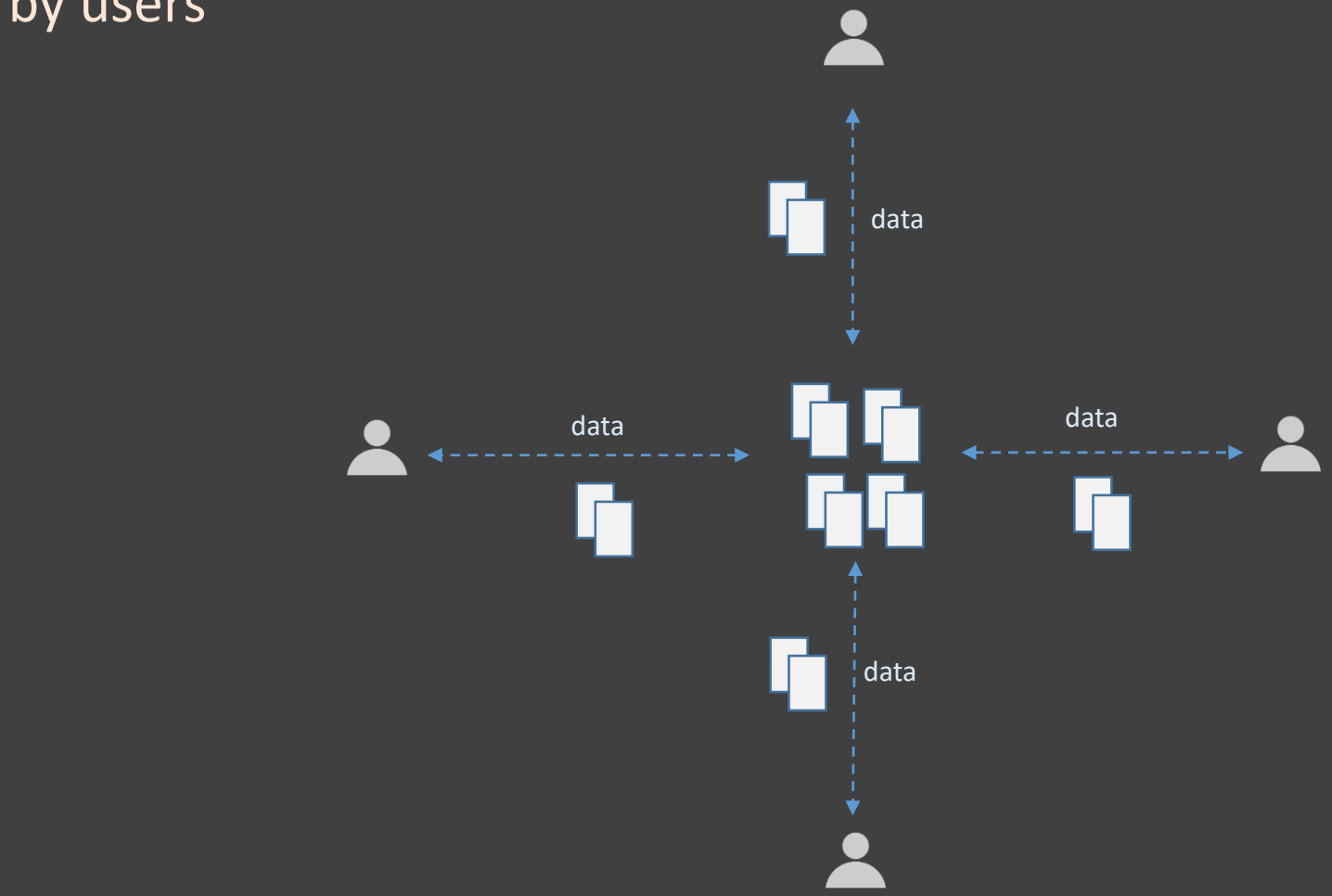
> Final Design

- Landmark to landmark navigation with information at decision points submitted by users.



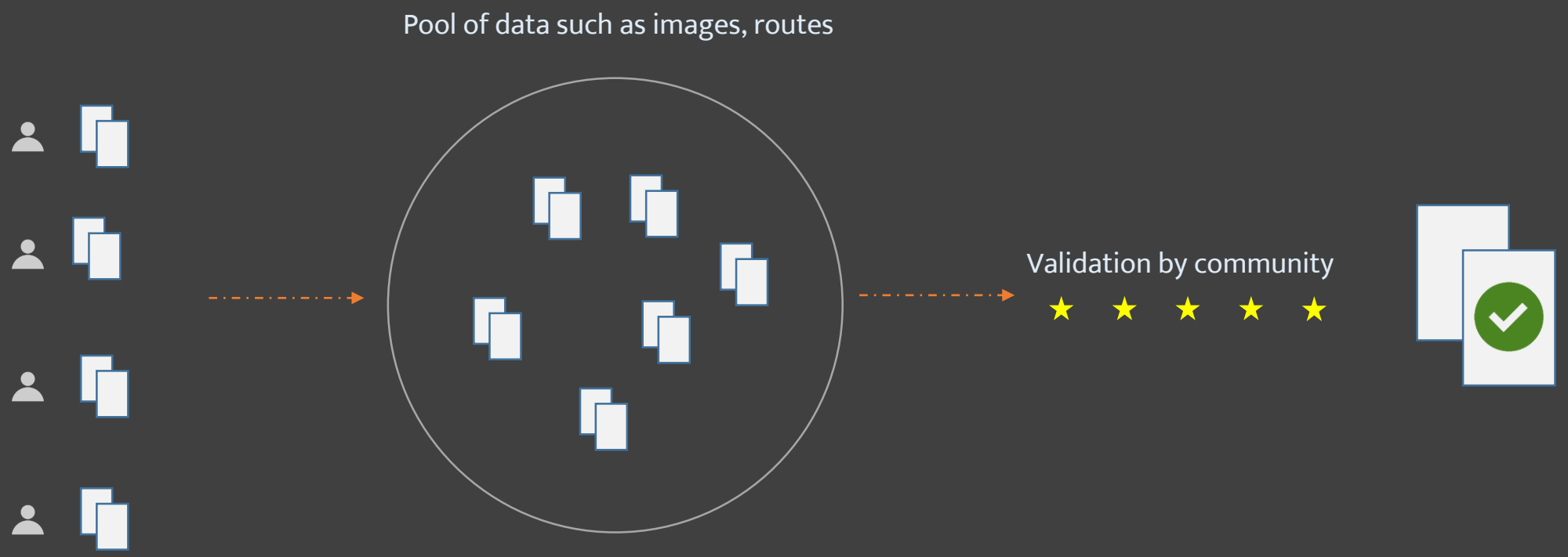
> Final Design

- Utilizing collaboration by users in a social community



> Final Design

> Verification and validation of data so that users can share and get correct info



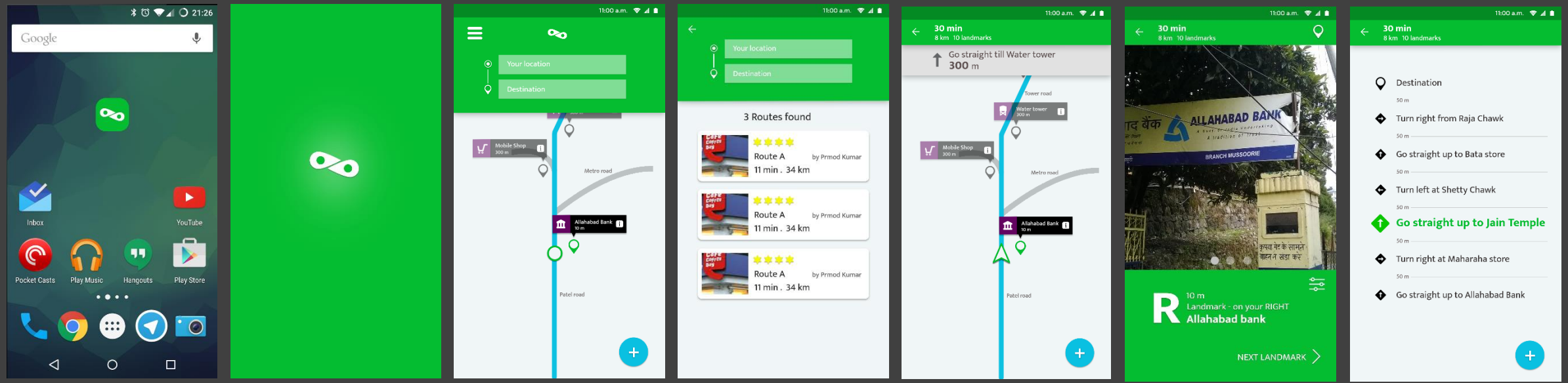
> Final Design

> RouteBay

> Final Design

1

Search
&Navigate



Search | results | Start navigation | Landmark info | Text based

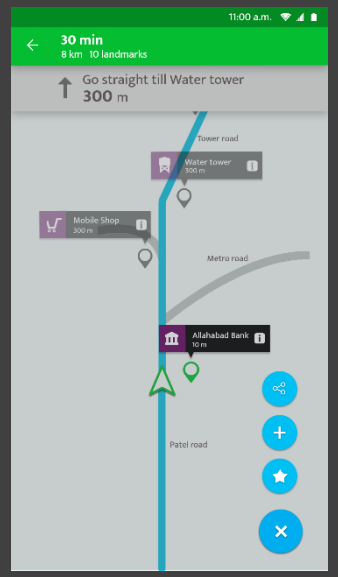
Swipe left

Swipe right

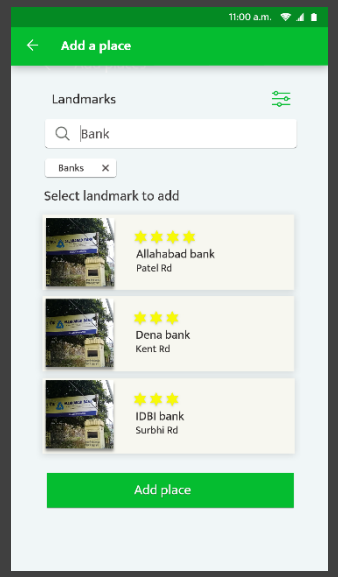
> Final Design

2

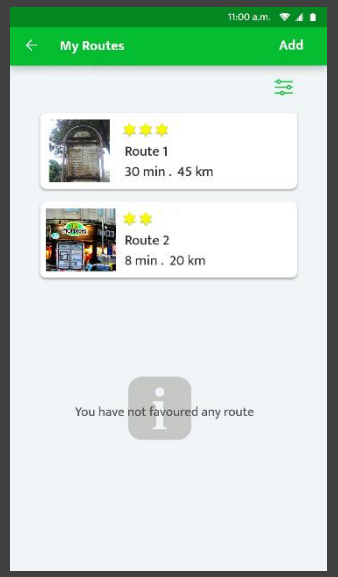
Edit Route



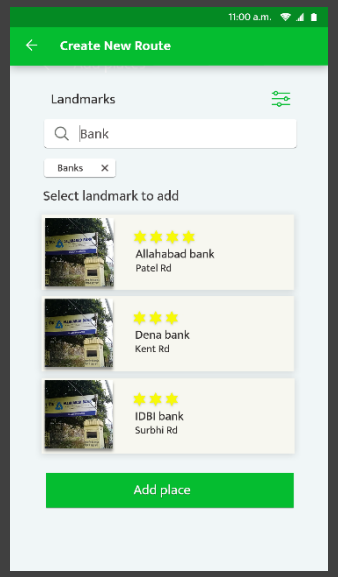
Edit route



Select place to add



My routes

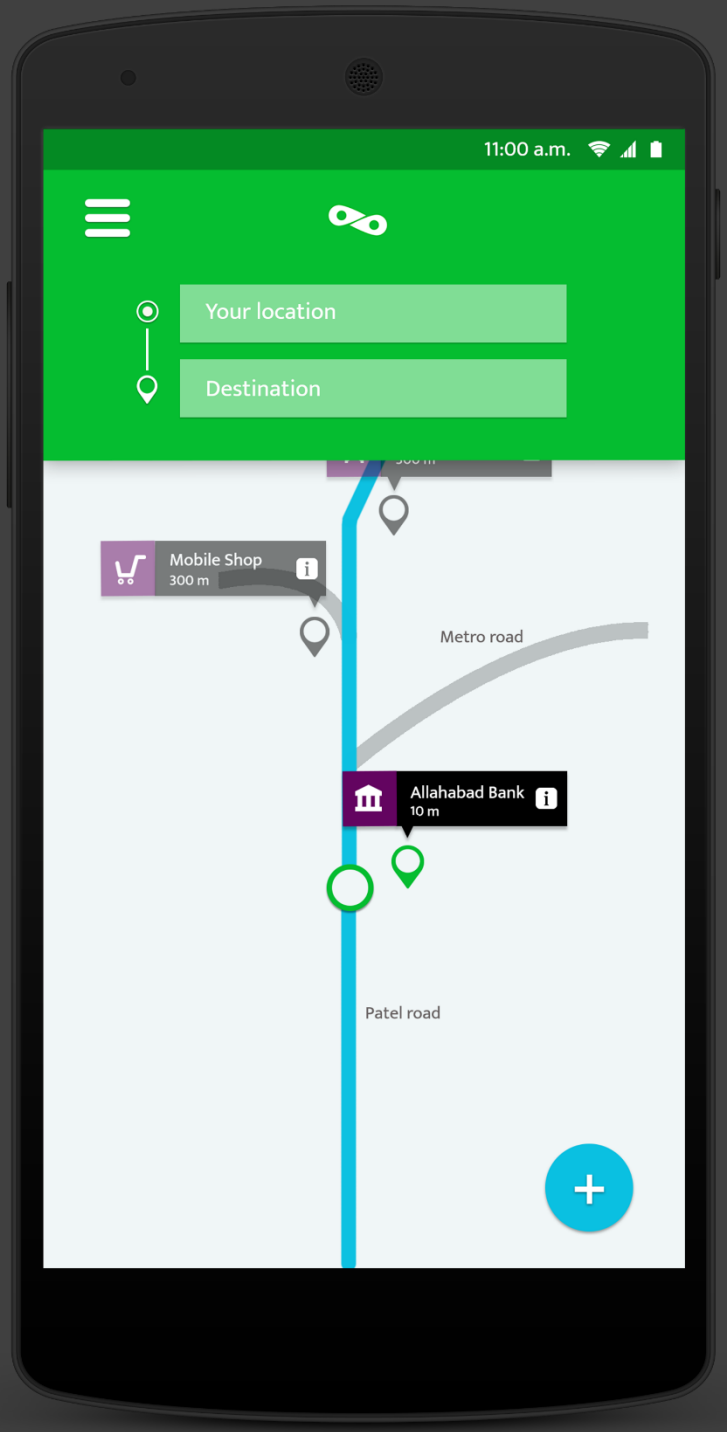


Create new

> Final Design

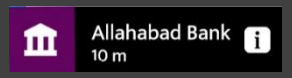
> Search screen.

The navigation interface consists of main schematic map part that displays landmarks at nodes and arms.
Upper part is used to displays status and data input.
The blue plus icon expands
to screens specific actions.



Add a new place, route in map or edit map. Screen related actions.

Icons shows current position on the map with the help of device GPS.



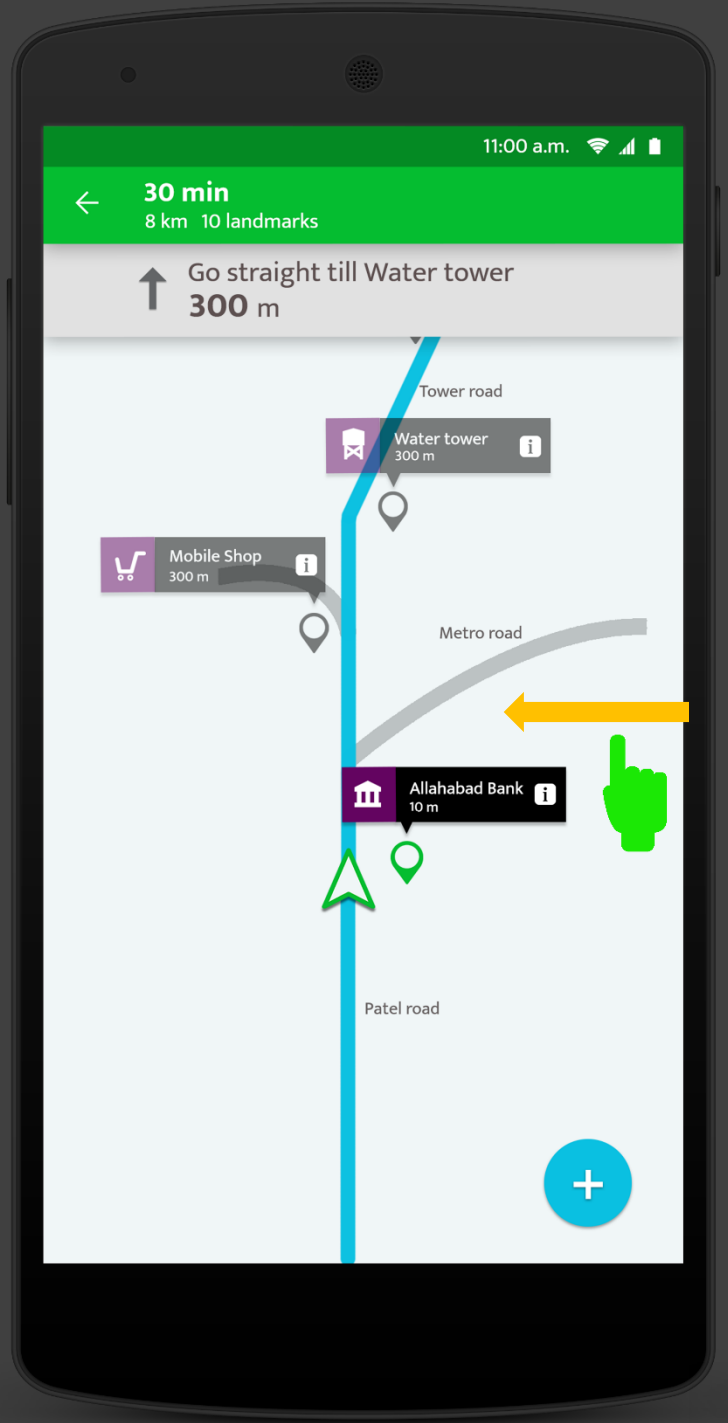
Displays status of the landmark

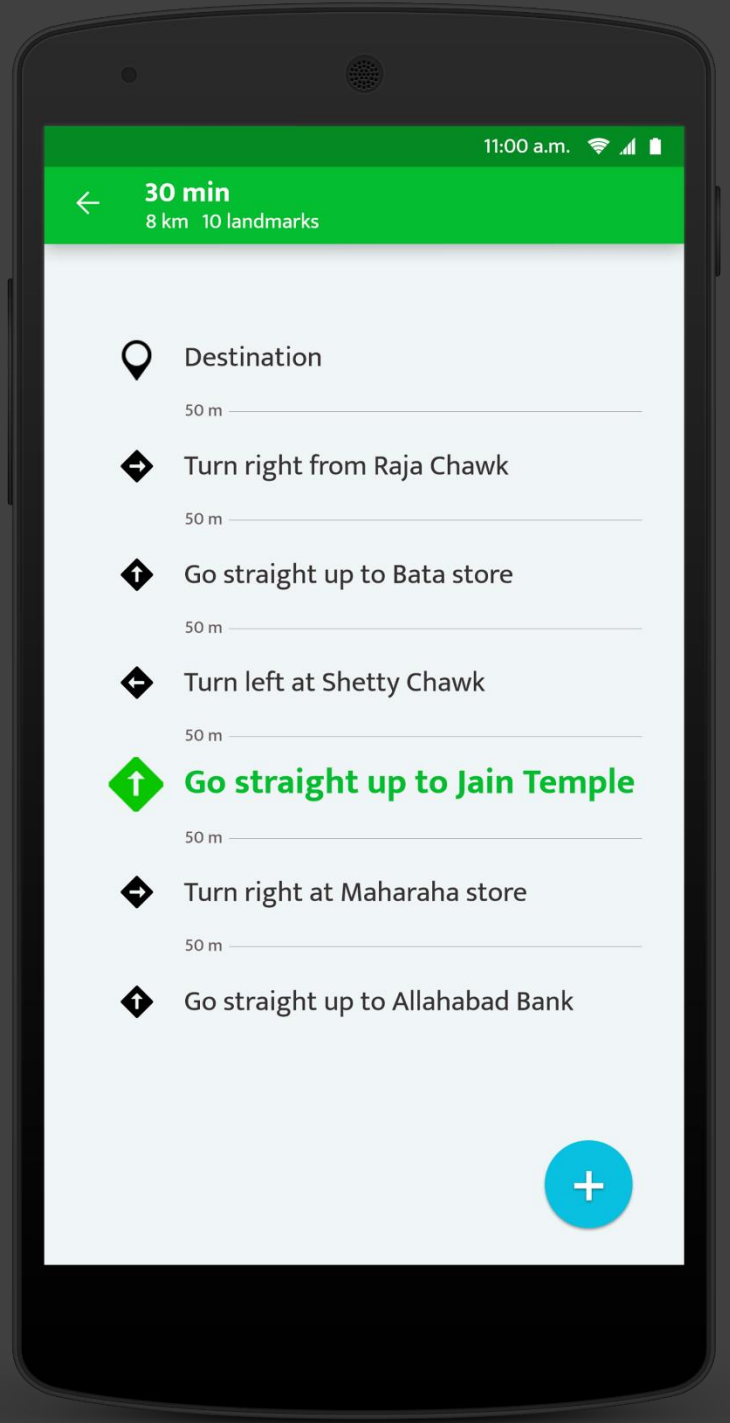
> Final Design

> Search screen.

Swiping left opens the textual route details where the current location is highlighted in green.

The instructions consist of local names and landmarks.





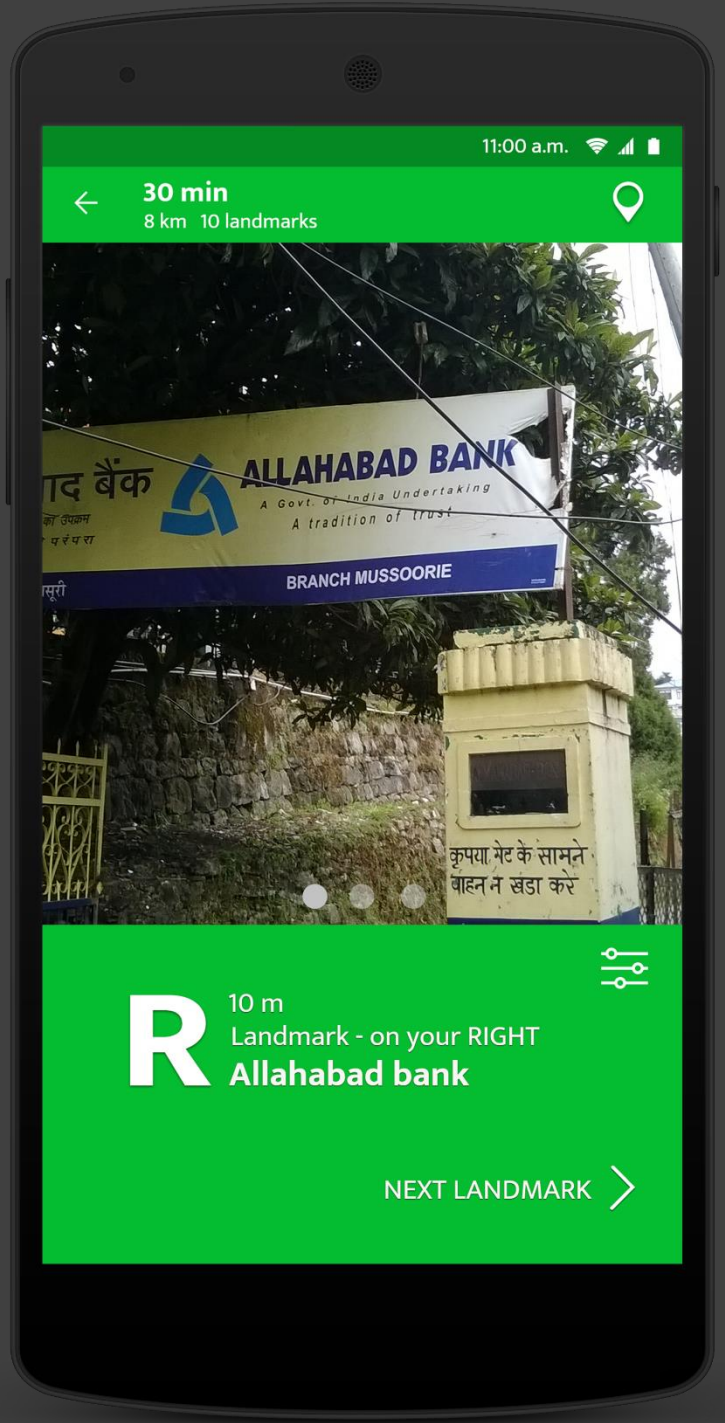
> Final Design

> Search screen.

Tapping on any landmark tile, opens the Image page and available images of the landmark, the R denotes the landmark is on right.

Swiping right will also take user to current landmark or coming one.

The icon inside purple thumbnail denotes the easy feedback about what kind of landmark is that.



> Final Design

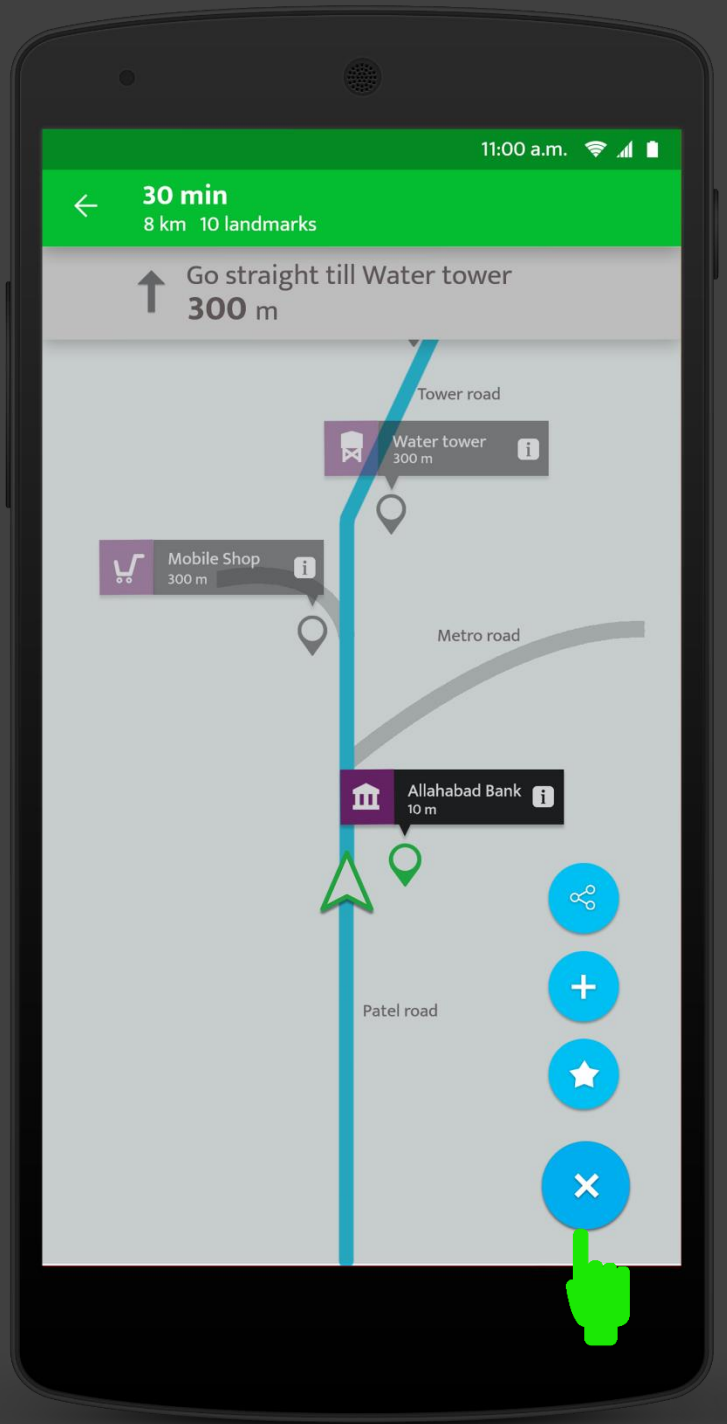
> Edit route.

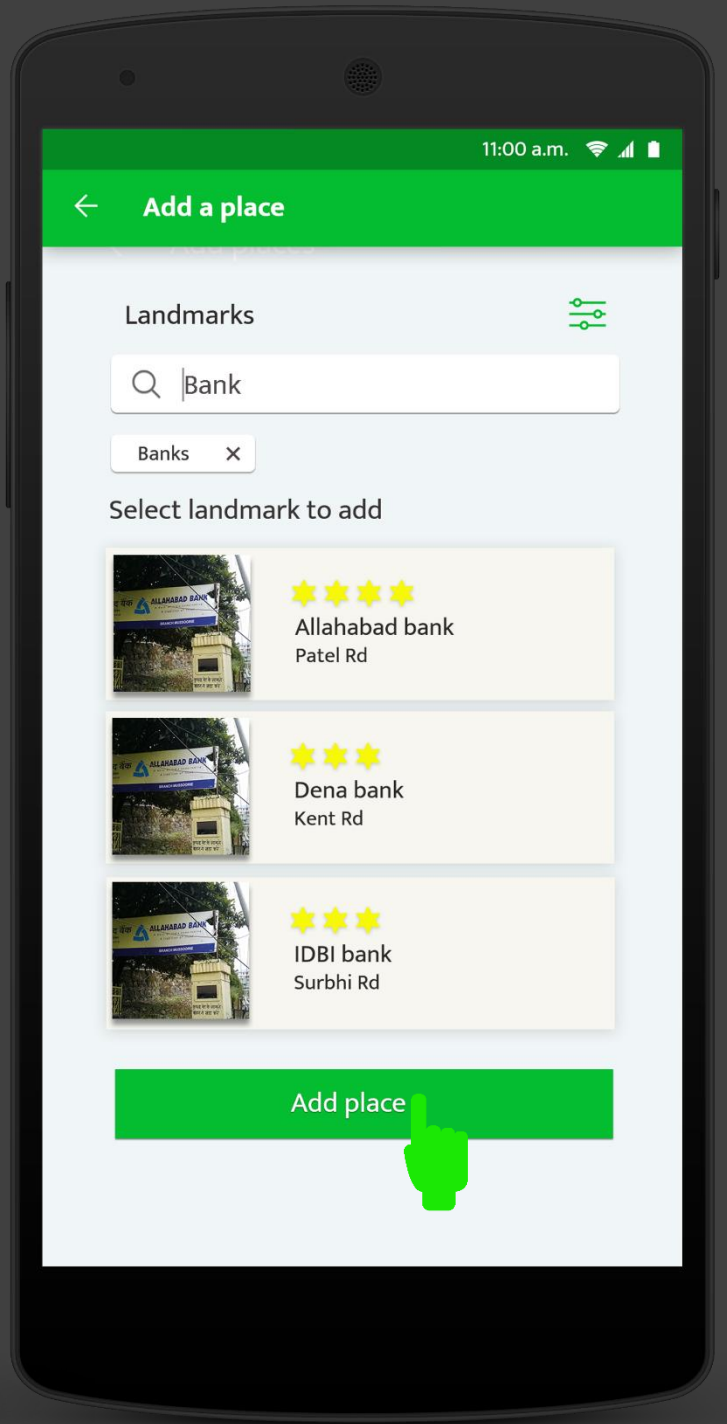
Tap on the blue plus icon and it further expands into more options.

User can add a new place or search for exiting info in the COMMUNITY DATABASE based on many categories such as bank, restaurant, mall etc.

Each info is given a rating in the system which validates the credibility of that info, thus the system crowdsources the verification and validation.

User can filter the results based on categories such as banks, hospital etc.



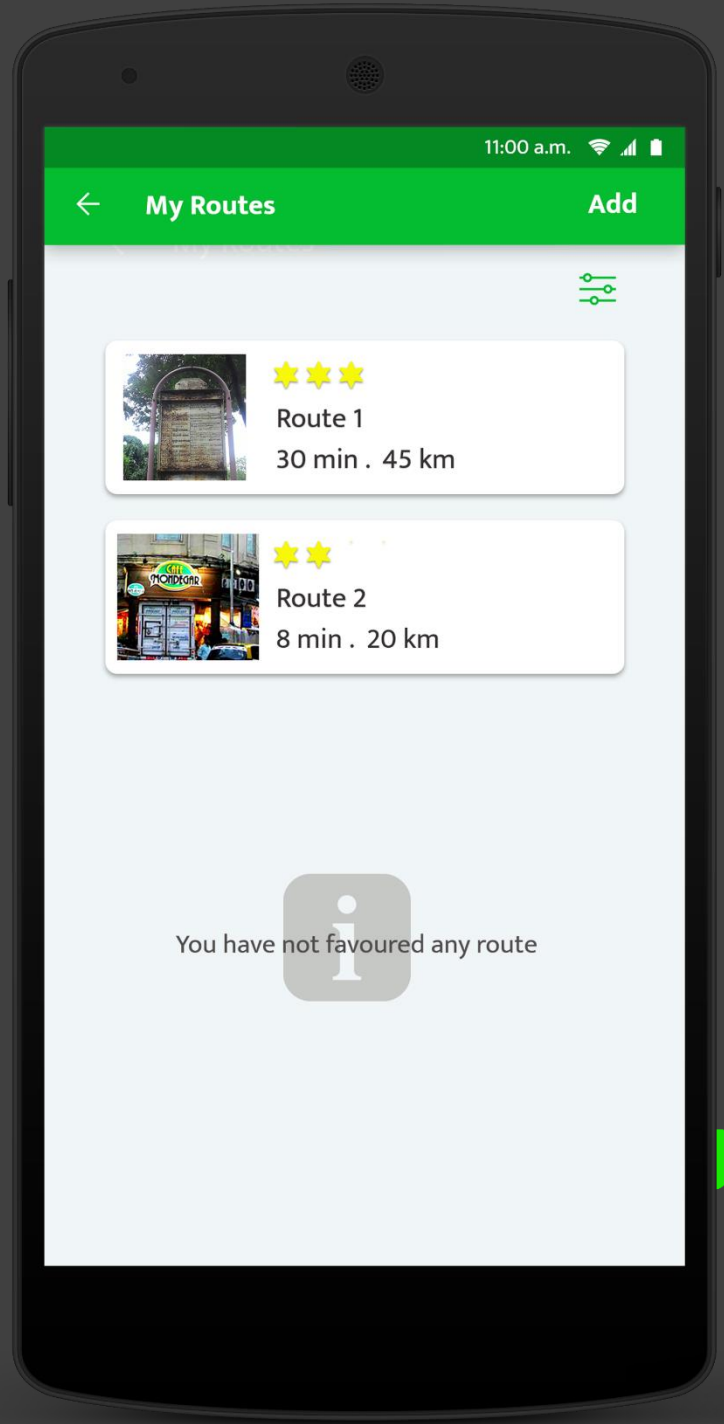


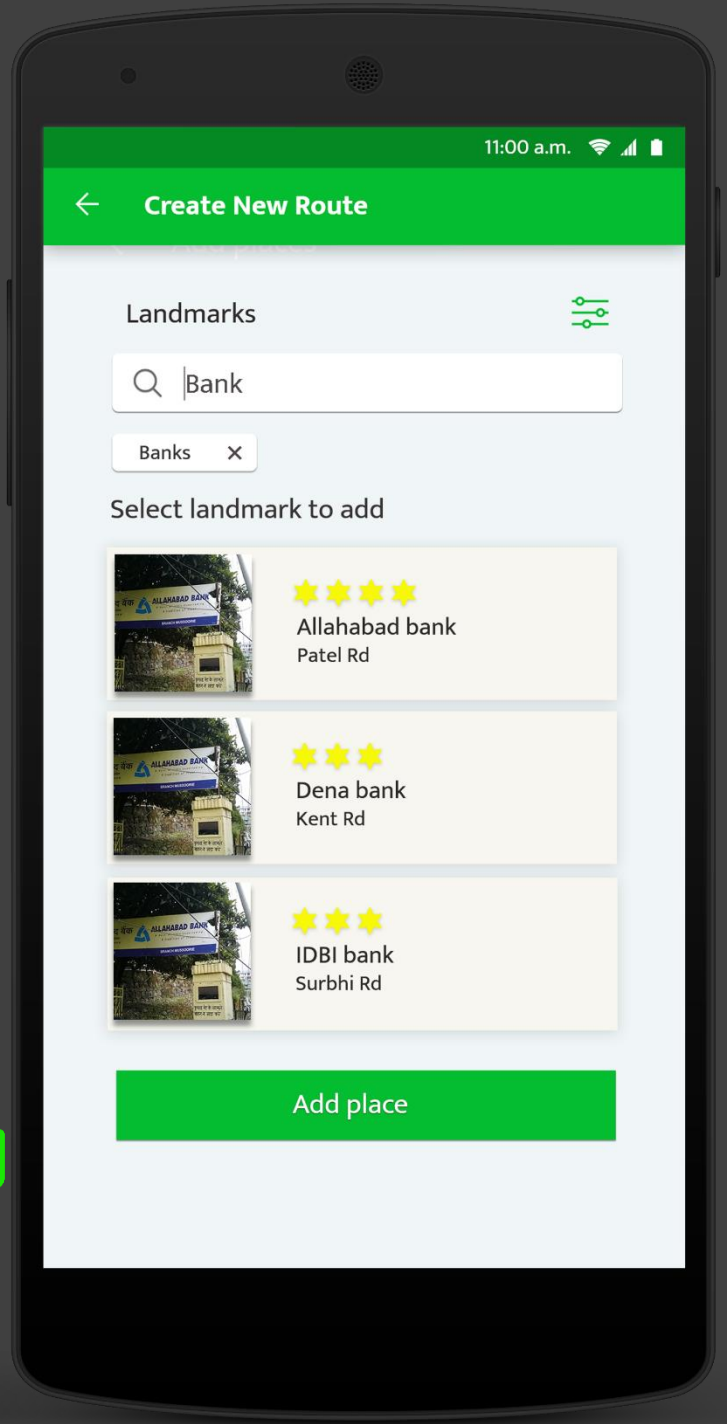
> Final Design

> Manage routes

Users can create routes to suit oneself and also favorite routes created by others, thus increasing the credibility of those routes or users in the community

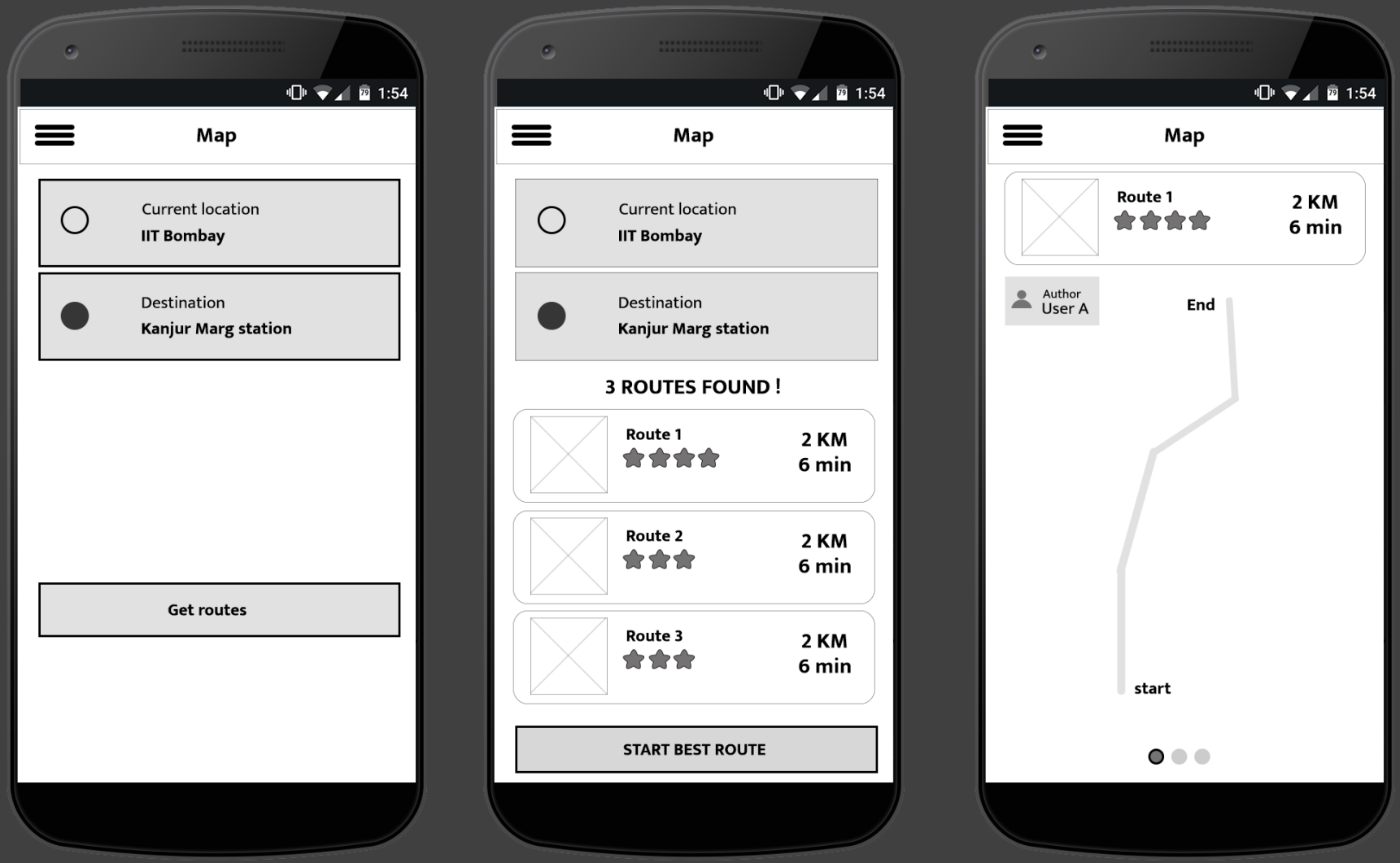
This page shows the routes created by user and other details such as how many users have liked and favorite this route and what are the new changes if any in the routes created or saved by user.





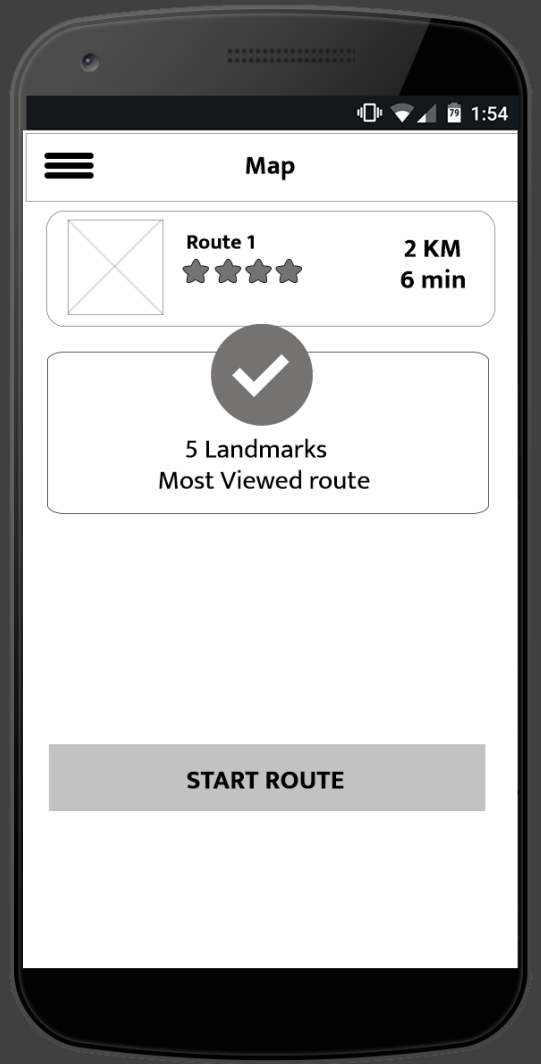
> Final Design

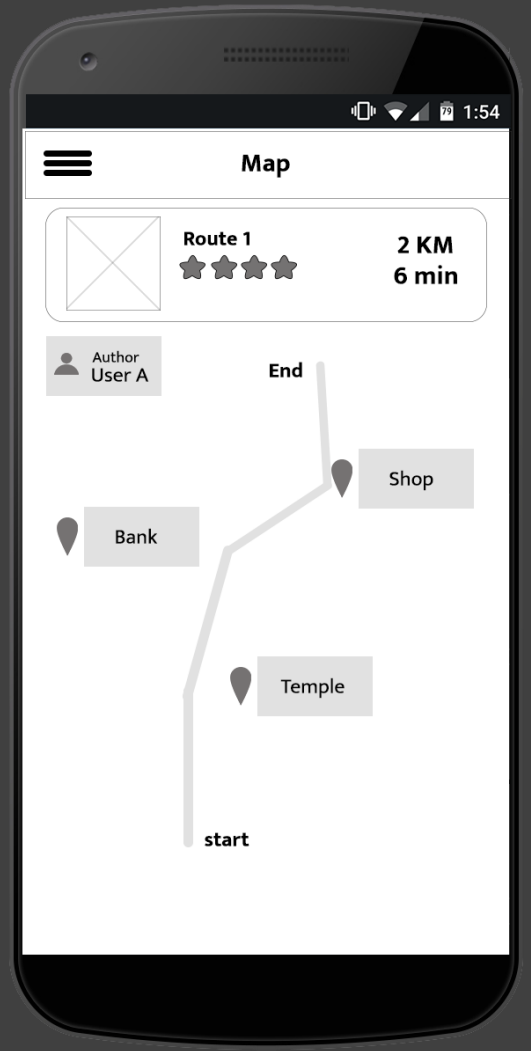
> Wireframes

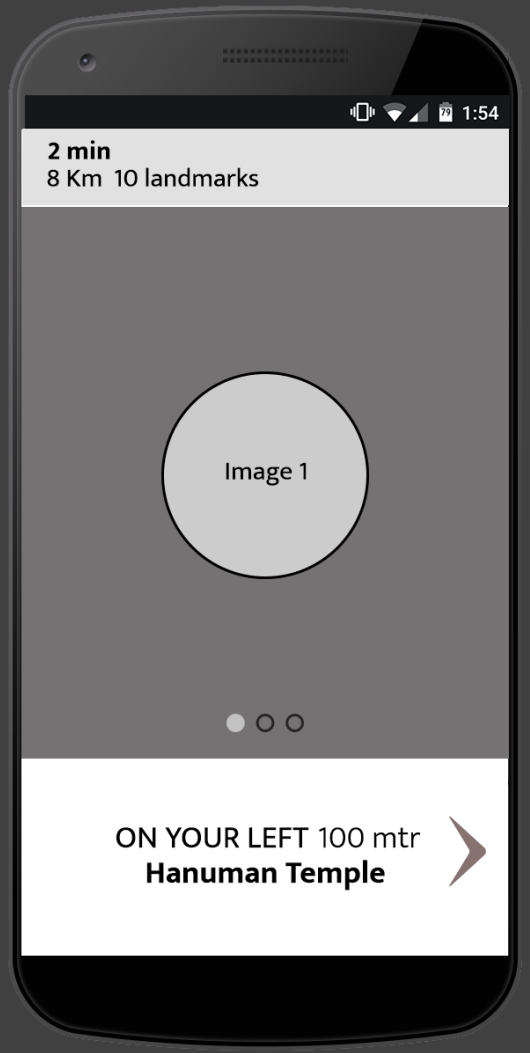


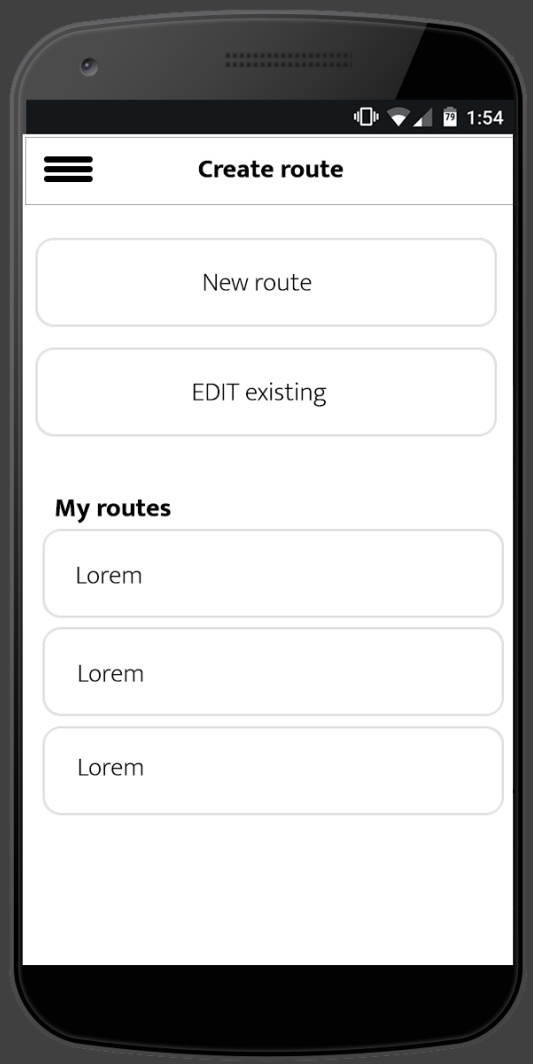
> Final Design

> Wireframes









> Design limitations

- > As crowd-sourcing is the focus, the design has to be motivating enough for user to be a part of the community.
- > User input and feedback is very crucial for this model of wayfinding.
- > Future work include overall implementation to create a full fledged working prototype.

Thank you