Information System for BEST Commuters

Aniket Sarangdhar
08633802

Project Guide: Prof. Anirudha Joshi

Need for the project

The best bus network is complex – *a Spider Web*
4000 bus stops and 380 bus routes

Unpredictability

41lakh commuters travel daily by BEST bus.
Since last 20 years the figure is almost same

13,72,874 private vehicles out of a total of
16,31,837 vehicles in Mumbai

Public transport usage - need of the hour

Need to establish a strong connection between BEST and its commuters by using an Information System

Ref: Mumbai Environmental Social Network (www.mesn.org)

Design Process

Background Research

User Study + Field Study

Problems and need identification

Ideation

Design Decisions

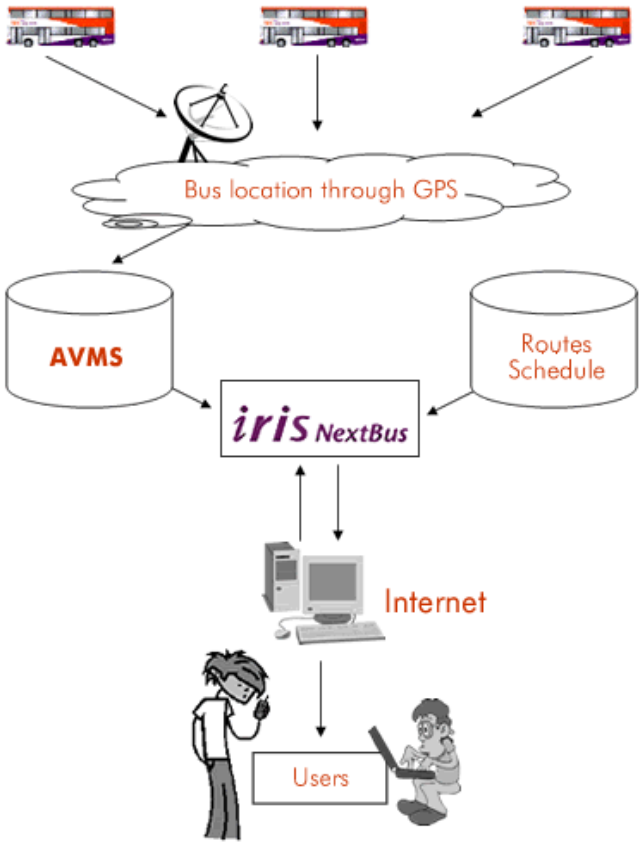
Final Concept

Study of Bus Services of Other Cities

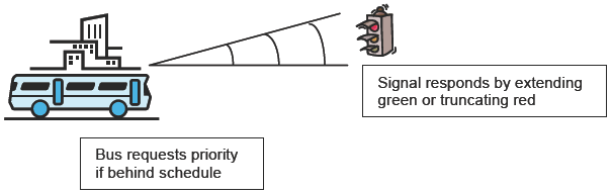
Singapore (SBS Transit)

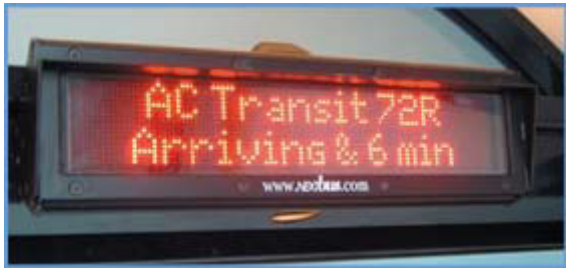
irisNextbus: Real time bus arrival time estimation

irisJourney Planner: Plan destination based on fare, walking distance and travelling time



Study of Bus Services of Other Cities





London (“Smart Bus Technology”)

Passenger count: Routing and planning changes

GPS: Real Time Tracking of buses

Traffic Signal Priority: Maintain bus schedules

On board Information in bus: Display and announcements of Next stop

Wayside Information: Display of arrival time of next bus

Website: Real time info on Web

IVRS: Recognise stop name and number, Pin code and Significant location

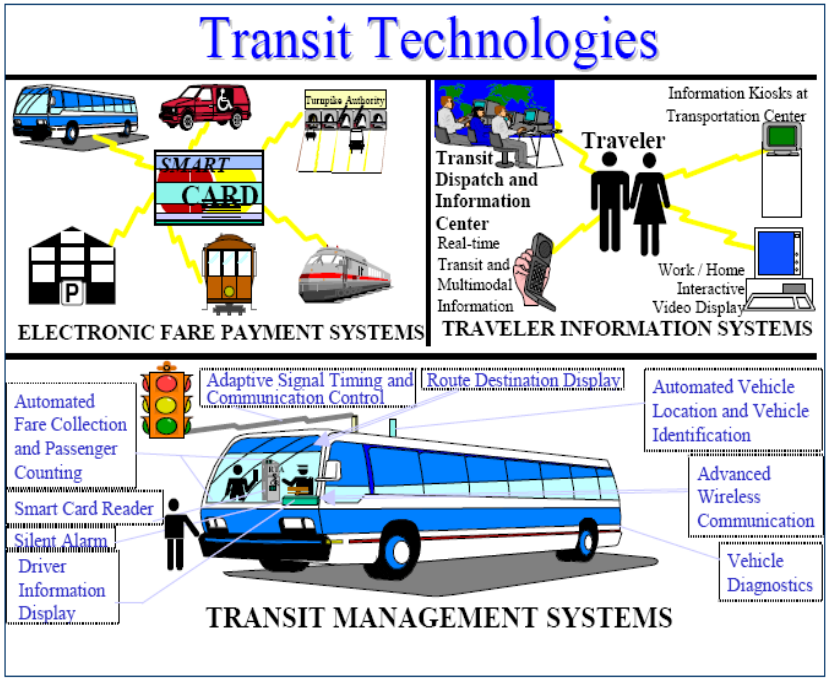
Study of Bus Services of Other Cities

Various cities of USA

GIS: Analyze street and terrain characteristics

Smart Card: Passenger travel data to manage buses

Google Street view: To plan the journey



Current Information System of BEST

At bus stop

Current Information System of BEST

On the bus

Current Information System of BEST

Tickets

On the fly ticketing

Current Information System of BEST

Smart Card

Bus Pass

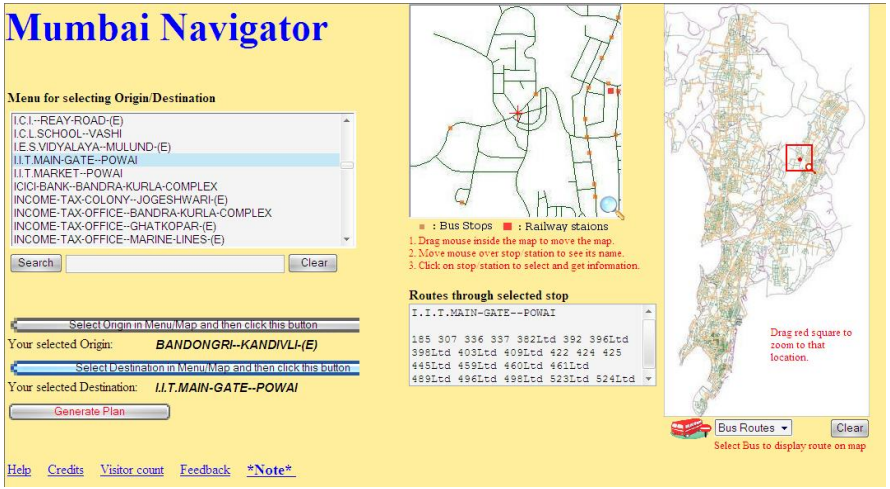
e-purse

Current Information System of BEST

Web services

BEST Undertaking

Mumbai Navigator



User Study & Field Study

Focus
To know, what problems does a users face throughout the journey and what information is required at various instances to make correct decisions related to their journey.

Users
Regular commuters
Non-regular commuters

Methodology
Contextual Inquiry
Following and observing users throughout their journey
Observations at various bus stops and in buses

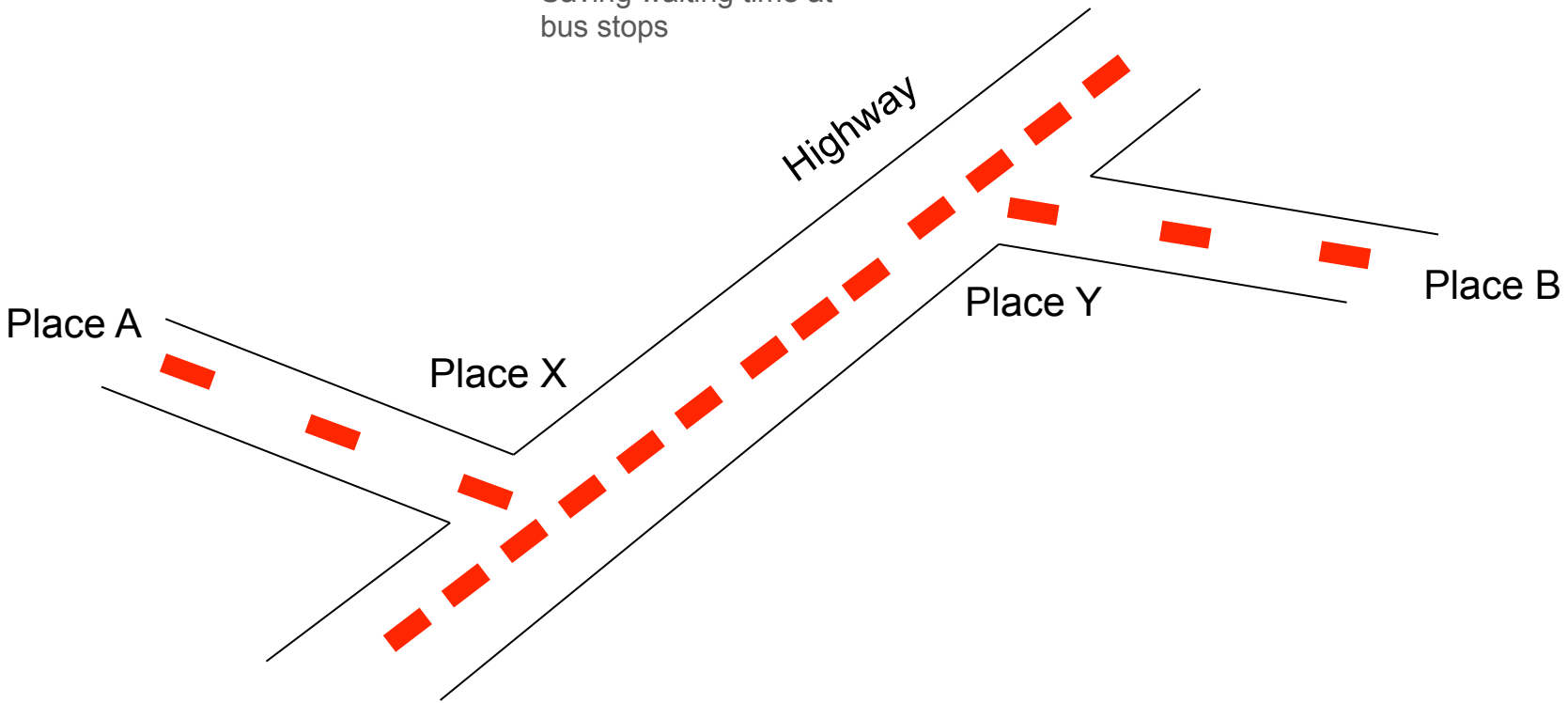
User Study & Field Study

Problem Scenario

User Study & Field Study

Third Category of commuters

Saving waiting time at bus stops



Insights

What Matters?

Time

Comfort

Cost

Various Real time information is required to satisfy the above requirements

Regular announcements of names of bus stops

Display of route map of bus network at various places

Increases knowledge about Bus network among commuters and makes it more familiar

User goals

User must be able to catch a bus which suits his/her comfort, time and requirements.

If a user misses the preferred bus then he/she must have real time information to make correct decision regarding alternate travel plan

User must get down at appropriate bus stop

User must get the desired information whenever required.

- Bus stop's name and its location,
- Bus route number, route map,
- Fare
- Arrival time of the bus at a bus stop and reaching time of a bus at the desired destination (considering current traffic condition)
- Crowd at a bus stop and in a bus

User must not wait for a desired bus for long time at the bus stop.

User must spend less time travelling in the bus.

Constraints

Mumbai has a multilingual environment.

The tech savvyness of the commuters varies.

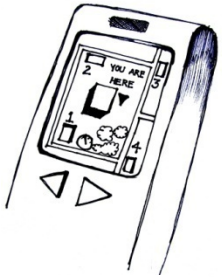
Literacy level of the commuters also varies.

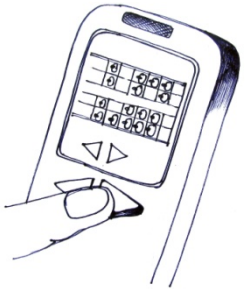
Commuter may or may not carry a mobile device.

The mobile devices which the commuters carry while travelling vary from hi-tech to low-tech.

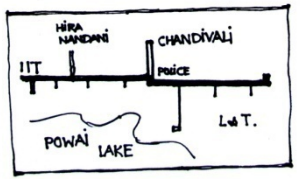
Cost of implementation of devices at stop/in bus if any must be as low as possible.

Ideation


YOU ARE HERE
2
3
1
4




HIRANADANI 481
CHANDIVALI 492
MAROL 682
SAKINAKA 617


HIRA NANDANI
CHANDIVALI
IIT
POLICE
POWAI
LAKE
L&T.

Design Decisions

The information system must be such that:-

All information required must be provided to the user before he/she starts the journey and feedback/conformation about the same must be provided at every stage of the journey.

User arrives at the bus stop just on time to catch the bus, gets down at the appropriate stop and reaches the desired destination as early as possible.

Final Concept

Mr. Kulkarni checks his mobile application before leaving the house

Final Concept

Final Concept

He decides the bus stop and the bus

Final Concept

Santosh has to attend a party at Pizza Hut in Borivli.

He types “Pizza Hut Borivli (W)”

The app finds the bus stop nearest to the above address
And gives info about bus route to the same

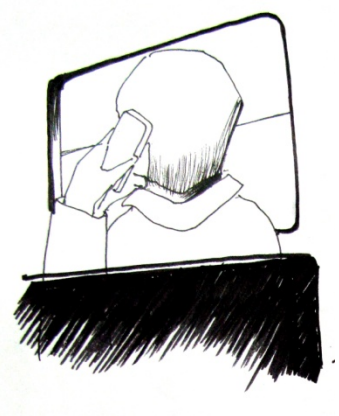
He checks the options and He is on his way in Bus no. 461.

Final Concept

In Bus no 461

Final Concept

Due to some change in plan they decide to meet at Andheri station. So he changes the destination to Andheri



Final Concept

Final Concept

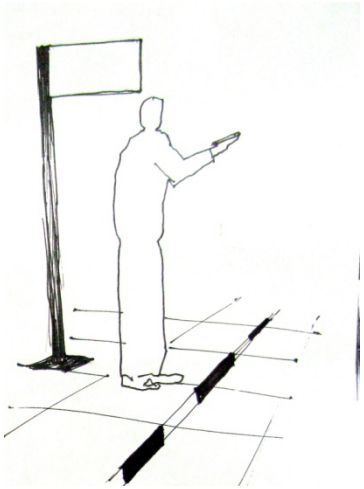
The application immediately generates the plan and suggests him to get down at next stop

Final Concept

He checks the status of buses approaching the next stop and selects an appropriate bus.

Final Concept

He gets down at the next stop and catches a bus to Andheri

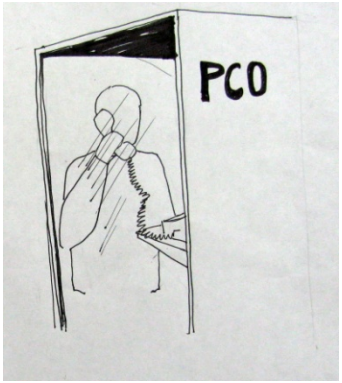


Final Concept

He gets down at appropriate stop to reach Andheri Station

Final Concept

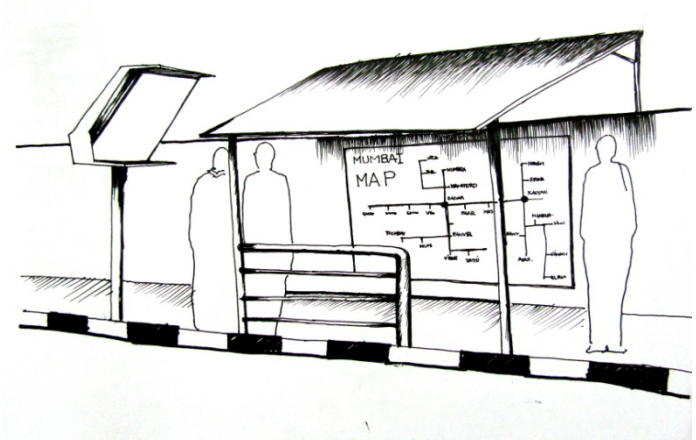
Commuter calls the BEST Helpline Service to get required real time information



What about commuters without this mobile phone application?

Final Concept

At bus stop he can get the same information from indicator and route map

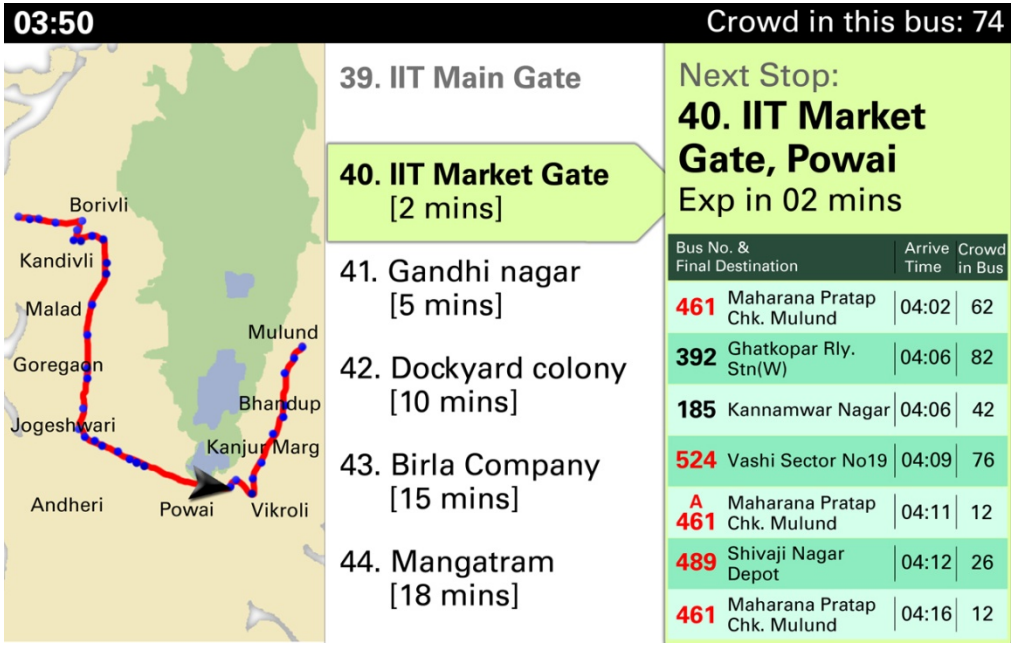


Bus Route No. & Final Destination बसमार्ग – शेवटचे स्थान		Time वेळ	Crowd गर्दी
524	Borivli Rly. Stn. (E) बोरिवली रेल्वे स्था (पु)	04:21 04:26	62 48
409	Chandivli चांदिवली	04:22	43
522	Marol Depot मरोल बस स्था	04:23	56
496	SEEPZ सिप्झ	04:24	52
445	Agarkar Chk, Andheri Stn (E) आगरकर चौक अंधेरी स्था (पु)	04:24 05:05	68
460	Gorai Depot गोराई बस स्था	04:25 04:27	54 43
602	Hiranandani हिरानंदानी	04:25 04:46	34 28
307	Marol Depot मरोल बस स्था	04:26 05:34	46
489	Dahisar Bridge दहिसर पूल	04:26 04:42	69 56
382	Sahara Cargo Complex सहारा कार्गो संकूल	04:26 05:20	53

524	460	403	AC 461
04:26 | 48	04:27 | 43	04:29 | 54	04:32 | 32
04:30 | 46	04:34 | 52	04:57 |	05:38 |

Final Concept

Inside the bus the announcements and display gives information about next stop and buses approaching next stop



Interface Demo

Technical Support

GPS in Bus

Bluetooth/Wifi at Bus Stops and in Buses

Central and Local servers

GSM Network

Future Prospects

Integration with other modes of public transport

Acknowledgements

My guide: Prof Anirudha Joshi

Prof. Ravi Poovaiah and Keyur Sorathia for feedback during stage presentations

Prof S. L. Dhingra

My family members, friends and fellow IDCians

Actors in Scenarios
Mandar Sarnaik
Saurabh Srivastava
Saurabh Tewari
Aniruddha Kadam
Myself

Feedback and Comments

Thank You…