

Project 2

Transportation in IIT

Project Report

Project by

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Visual Communication

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Approval Sheet

The Visual Communication Project 2 entitled *Transportation in IIT* by Pooja Masurkar (Roll no. 136250014) is approved, in partial fulfilment of requirements of the Masters of Design degree in Visual Communication in Industrial Design Centre of Indian Institute of Technology, Bombay.

Guide - Prof. Sudesh Balan



Internal Examiner



External examiner




Chairperson



Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/ data/ fact/ source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.



Pooja Masurkar

136250014

Date: 14th NOVEMBER, 2014

Acknowledgements

I would like to thank my project guide Prof. Sudesh Balan for his guidance and advice, Prof. P. Vedagiri (Civil Engineering Department) and his team for letting me work on his project on transportation in the IIT Bombay campus. I am also grateful to Industrial Design Centre and IIT Bombay for providing the opportunity, resources and infrastructure to work on this project.

I owe my gratitude to my family and friends for their constant support.

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1. My thoughts about the topic...

The reason I chose this topic as my project was that delving into this area would alleviate the everyday grievances faced by students, residents of the campus and visitors who use the Tum Tum service. This service forming a major part of our daily life has never been given a serious thought in order to re-organise its services for easy access to its end users. With this project I intend to design a user interface for tracking buses which would enhance the travelling experience of people. Since, this is an age where we are witnessing an upsurge of mobile applications and interactive websites and there are consumers demanding them, the project is focused on creating a simplistic and user friendly website.

2. Abstract

Narrowing down the scale and focusing on one of the solutions to the problems surrounding the transportation issues in the campus, this project is an attempt to redesign the existing digital interface i.e a website that works on various devices such as smartphones, tablets and desktop computers which enable a person to search the most convenient route to her/his desired destination.

The core aim of the project is to empower the end user to save time travelling from one place to the other within the campus so that one can be more efficient in her/his work. The redesigned interface would enrich the user's experience using the digital media while navigating through the campus in the real world by pinpointing accurate directions and precise timings at which the user will reach the destination.

3. Objective

The objective of this project is designing a responsive digital user interface platform i.e. a website which runs on desktop computers, smartphones and tablets envisaging the user's convenience.

The following design principles have been followed in the making the website:

- i) Output and input is clear, concise and conveniently readable.
- ii) Simplistic design - minimal distraction, task focused design.
- iii) Content is accurate and precise.
- iv) Organised flow of information.
- v) Clean display without visual clutter.
- vi) Optimal utilisation of onscreen space.
- vii) Content follows sequential order of navigation and output.
- viii) Content follows a visual hierarchy.
- ix) A key has been used for the routes on the map.
- x) Hierarchy and consistency are maintained throughout the website.

4. Target Audience

The target audience for the website are as follows:

- i) Students
- ii) Staff
- iii) Faculty
- iv) Residents
- v) Visitors

The prerequisite for the above target audience is that they must have access to either a desktop computer, smartphone or tablet with an internet connection to use the application.

5. Current Scenario

The mode of transit for the residents of the IIT Bombay Campus comprises of bus services provided by the Institute, private cars and motorcycles of residents, private bicycles belonging to students, walking and autorickshaws. The same applies to visitors and outsiders as well.

Problem:

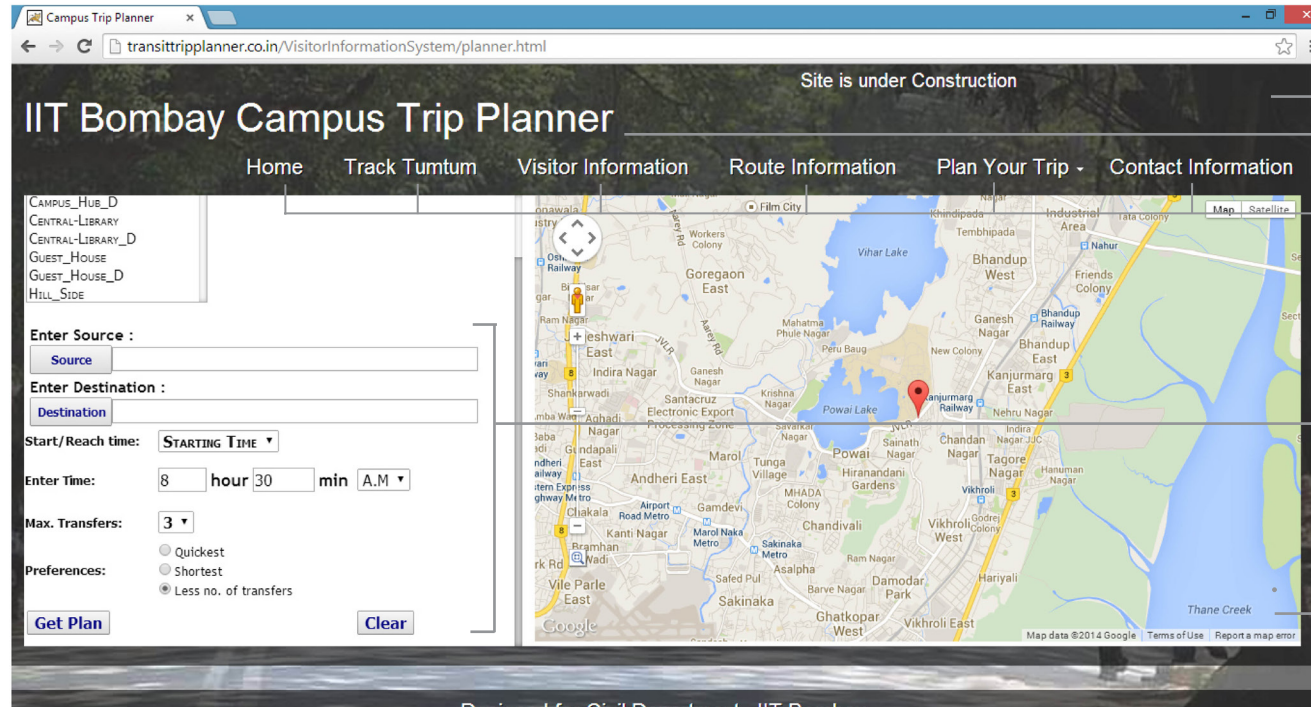
After interviewing users of the current bus service it can be inferred that the target audience has lack of access to organised and analysed information of bus timings, knowledge about shortest routes to targeted destination.

Solution:

A transit platform that organises the output required by the user.i.e.

- i) The shortest route to the destination giving accurate directions to the targeted destination.
- ii) The sorting is primarily based on the time taken to reach the destination.
- iii) Filter for displaying routes based on mode of travel i.e. miscellaneous, bus, car or walk.

Earlier interface



Observations

Lack of a clear photograph that is optimised to web viewing conditions

Lack of a visual identity to the website

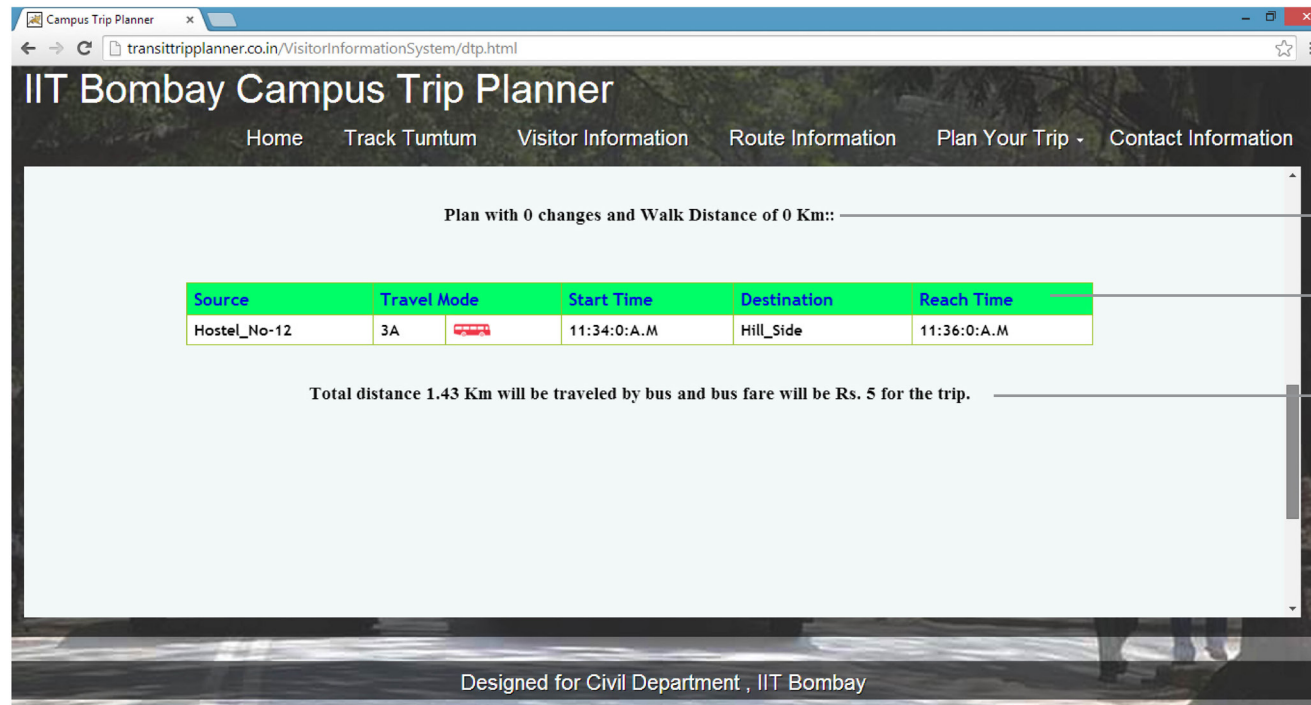
Cluttered menu bar
Lack of an organised and systematic navigation model.

The system requires several inputs from user that can be avoided by planning the structure of the website. Improper alignment of data. Lacks a margin from the edge of the screen.

The map provided is overextensive than required

Courtesy: <http://transittripplanner.co.in/VisitorInformationSystem/>

Earlier interface



Observations

Lack of a visual to display route on map

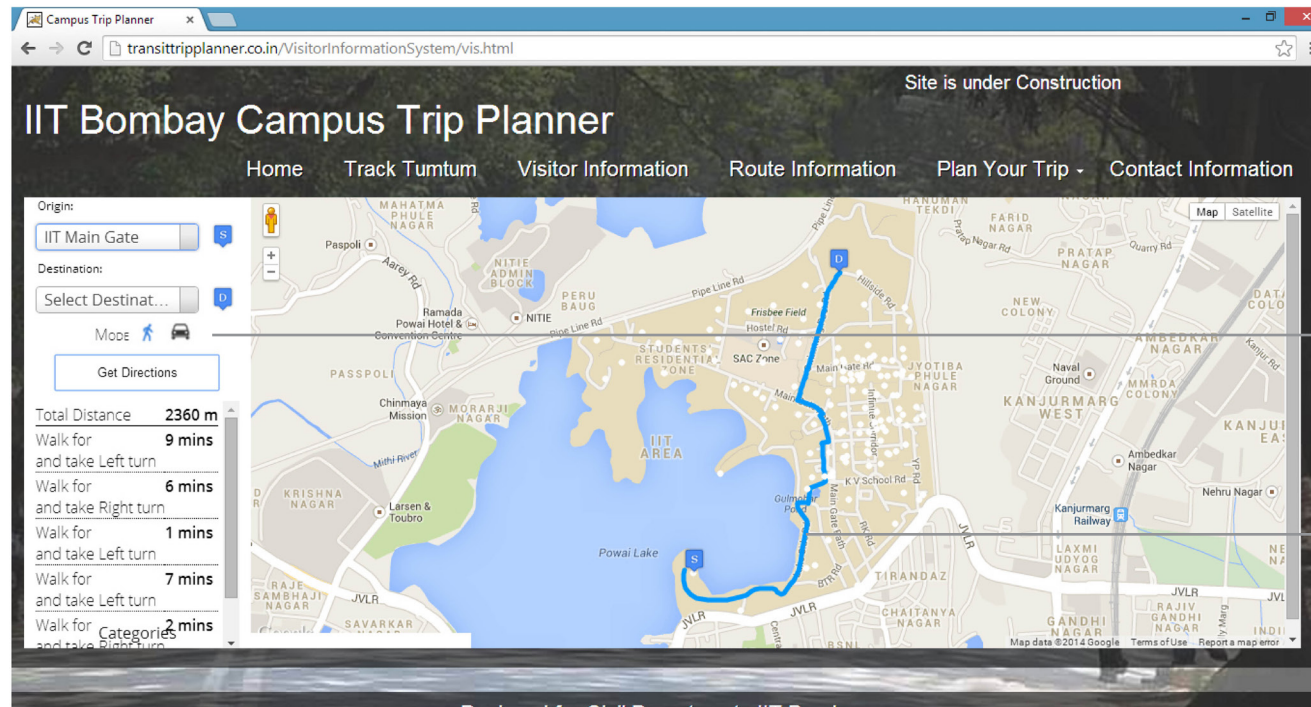
Unnecessary display of output. Out of context sentences can be eliminated

Improper visual design
Unnecessary use of colour

Lack of visual hierarchy

Courtesy: <http://transitripplanner.co.in/VisitorInformationSystem/>

Earlier interface



Observations

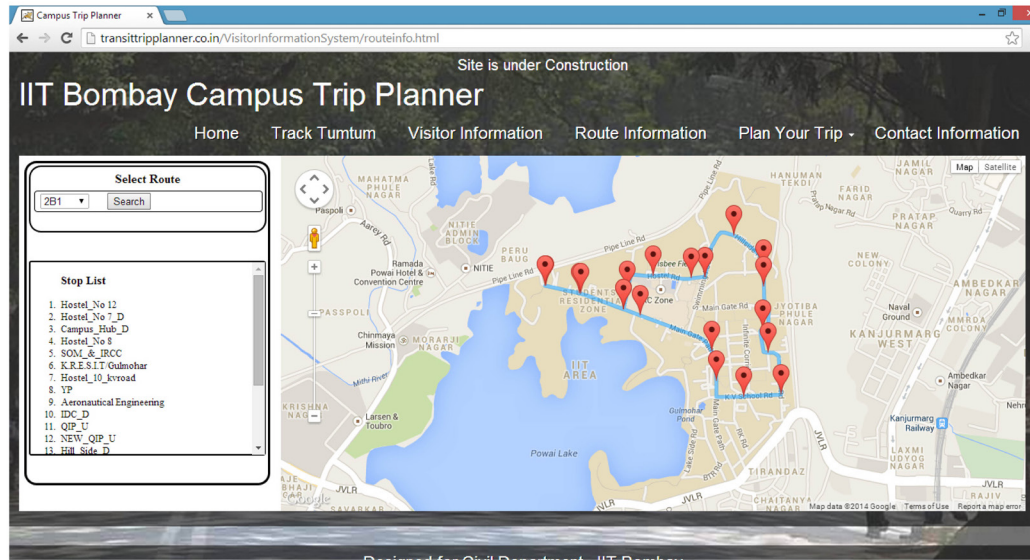
Excludes bus service as one mode of travel

Lack of arrows to signify direction

Precise timings of the journey are absent

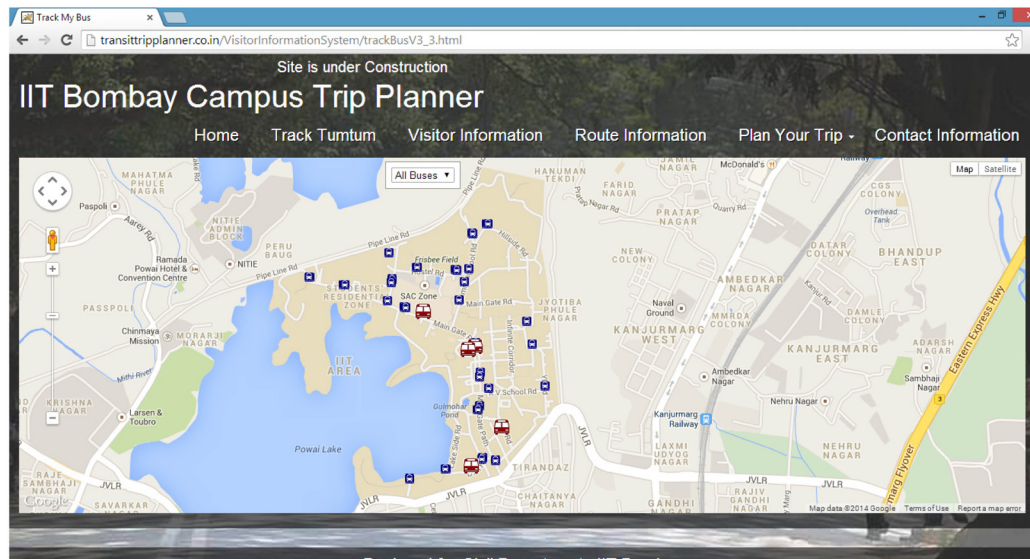
Courtesy: <http://transitriplanner.co.in/VisitorInformationSystem/>

Earlier interface

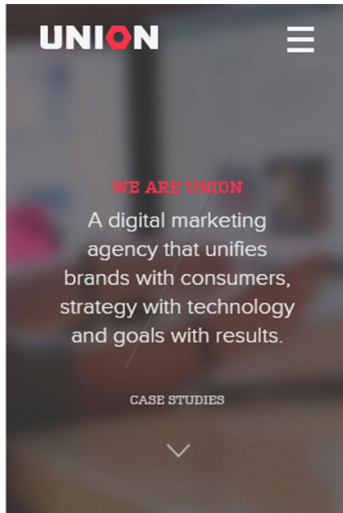


Observations

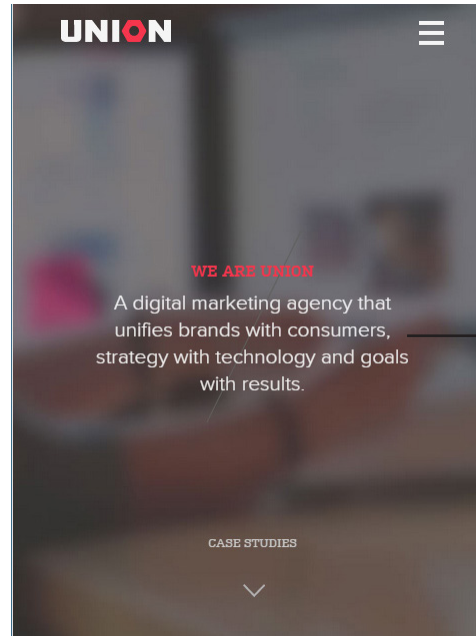
Unnecessary display of information such as bus stops and live bus tracking information. Such data can be hidden from the user to avoid clutter and enhance the visual experience of the user without overloading information on the user.



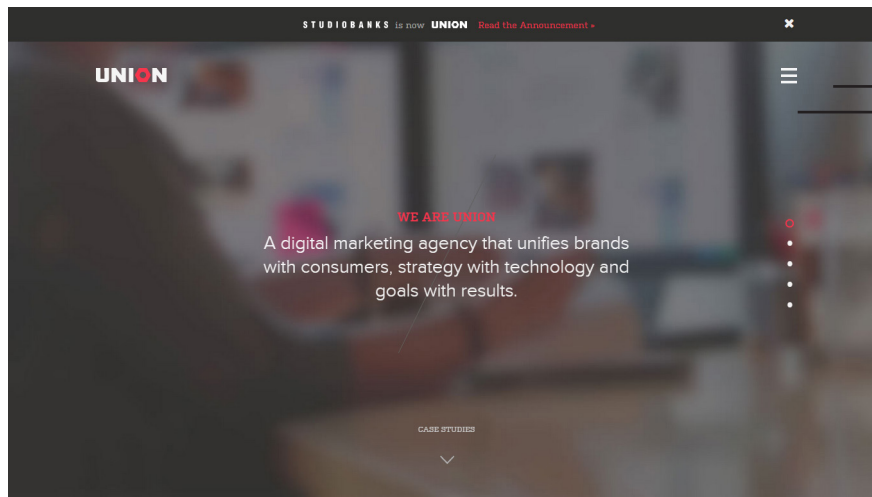
Courtesy: <http://transitriplanner.co.in/VisitorInformationSystem/>



320px x 480px



480px x 640px



1366 x 768px

Courtesy: <http://union.co/>

6. Case Studies

<http://union.co/work/duke-energy>

Highlights of the website

Responsive web design principles: enables a viewing experience to the user that is optimised across all devices such that the screen size and its contents is adapted proportionately to technical requirements of each.

Responsive type: The typography resizes and realigns to the variable screen sizes enabling easier reading.

Fluid inline images: The images embedded in the content, resize proportionately to the screen sizes according to set percentages.

Responsive layouts: The grids and columns of the screen realign according to the variable screen sizes.

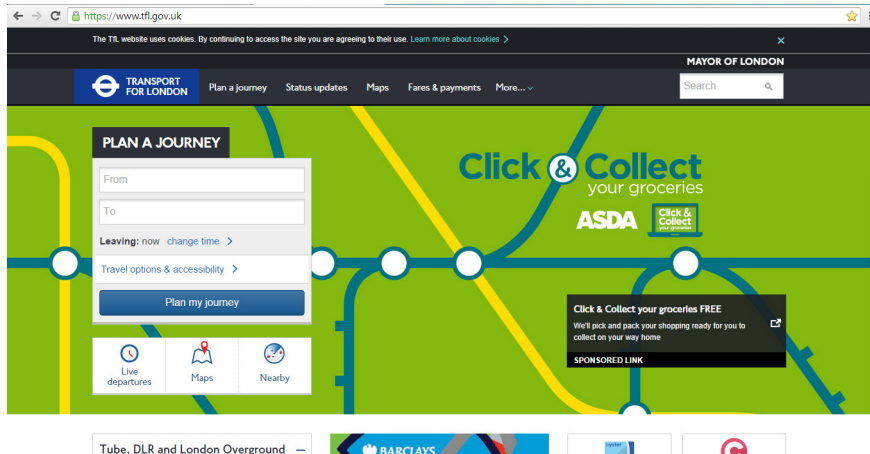
Responsive navigation: The navigation adapts its to the various screen sizes such that it is easy for the user to sort the menu sequentially.

Responsive menu bars: The menu bars resize optimally such that user is able read the text on menu bars and navigate easily through minimum clicks.

Blurred background image: Blurred photographs reduces the overall size of the website while loading the image.

Hamburger menu style: It is symbolic icon to depict a classic menu when clicked.

Modern User interface: The characteristics of a modern user interface are minimal visual clutter, simple navigation with least number of clicks, high clarity photographs that are optimised to load in least amount of time, organised data and clear sequential flow of information.



Case Studies

Transport for London - <https://www.tfl.gov.uk>

Highlights of the website:

Responsive web design principles

Responsive type

Fluid inline images

Responsive layouts

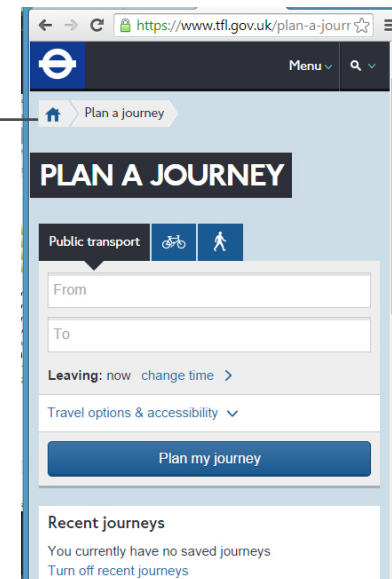
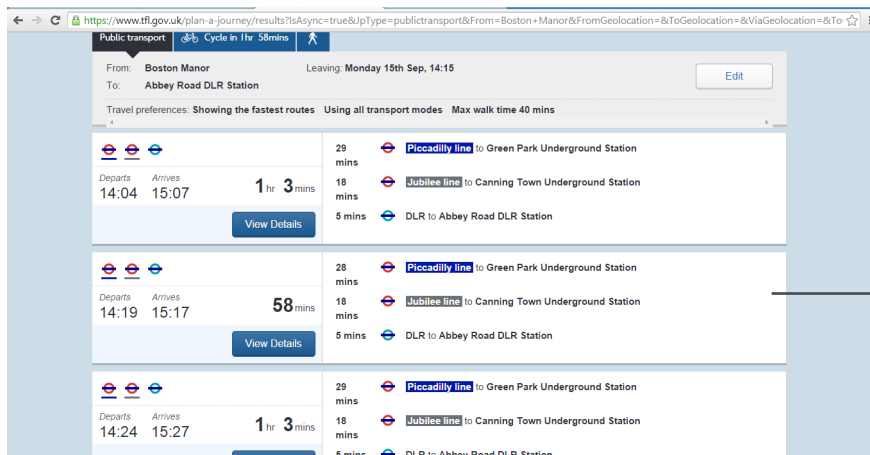
Responsive navigation

Responsive menu bars

Hamburger menu style

Modern user interface

Breadcrumbs navigation: Navigation that shows the flow of information from the original source to the current page status.

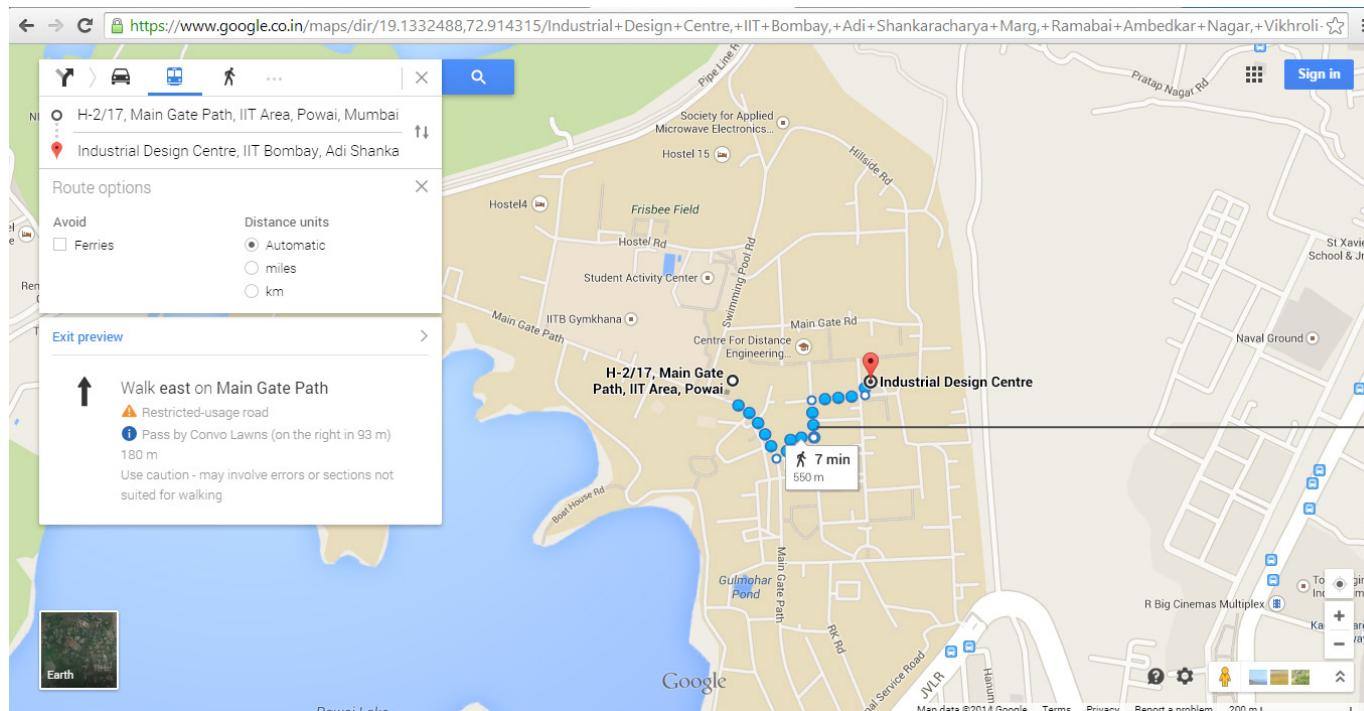


Courtesy: <https://www.tfl.gov.uk>

7. Inference

After studying the various websites, the following conclusions can be made:

Websites such as Google and London Transport have similar features to the current civil transportation website but it does not cater to a micro community such as IIT Bombay which constitutes of a local bus service i.e *Tum Tum*.



The route does not depict the bus routes of IIT Bombay.

Courtesy: Google maps

8. Focus Area

A) Content

Input from the user:

1. Place of origin
2. Destination
3. Time - detected automatically

Output for the user:

Route on the map

Information to be processed

Route on the map traversing from point A to point B based on the following parameters:

- i) Time
- ii) Direction
- iii) Mode of travel

Plugins

- i) Weather forecast
- ii) Social Networking site



From Convocation Hall

To Industrial Design Centre

Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board Bus 2A

10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate

facebook

Discuss this event

Post to Facebook Share

Aditi Rao
Avoid QIP hillside...just spotted a leopard chasing a dog
December 30 at 7:52pm





Kenneth Francis
Great news- I will go there right away!
December 30 at 7:55pm

Website

Objective

Person travels from point A to point B in minimum time within the IIT Bombay Campus.

Legend

Walking route	
Vehicular route	
Origin / Destination	
Bus stop	

Map

Google maps have been used as the basis for depicting routes on the website.

Analysis of the Website Scenarios

After analysing the information to be processed based on the inputs given by the user, the scenarios have been segregated into four parts as follows:

i) 2 scenarios assume that the original location co-ordinates have been detected by the devices using GPS (Global Positioning System) mechanism.

Further, 1 scenario assumes that the name of the destination is known to the user while the visual location is not known to her/him and vice versa for the second scenario.

ii) 2 scenarios assume that the original locations have not been detected by the device and user has to type the name of the location.

Further, 1 scenario assumes that the name of the destination is known to the user while the visual location is not known to her/him and vice versa for the 2nd scenario.

Apart from the 4 scenarios mentioned above an additional situation has been accommodated to depict change of route while travelling.

Scenario 1

Person travelling in the campus

Locations

1. Origin

Device detects the location automatically using GPS co-ordinates

2. Destination

Name - User knows the name of the location.

Location on map - User does not know the visual location of the place on the map.



Weather forecast plugin uses GPS co-ordinates to locate user's place and predict the weather conditions in that region

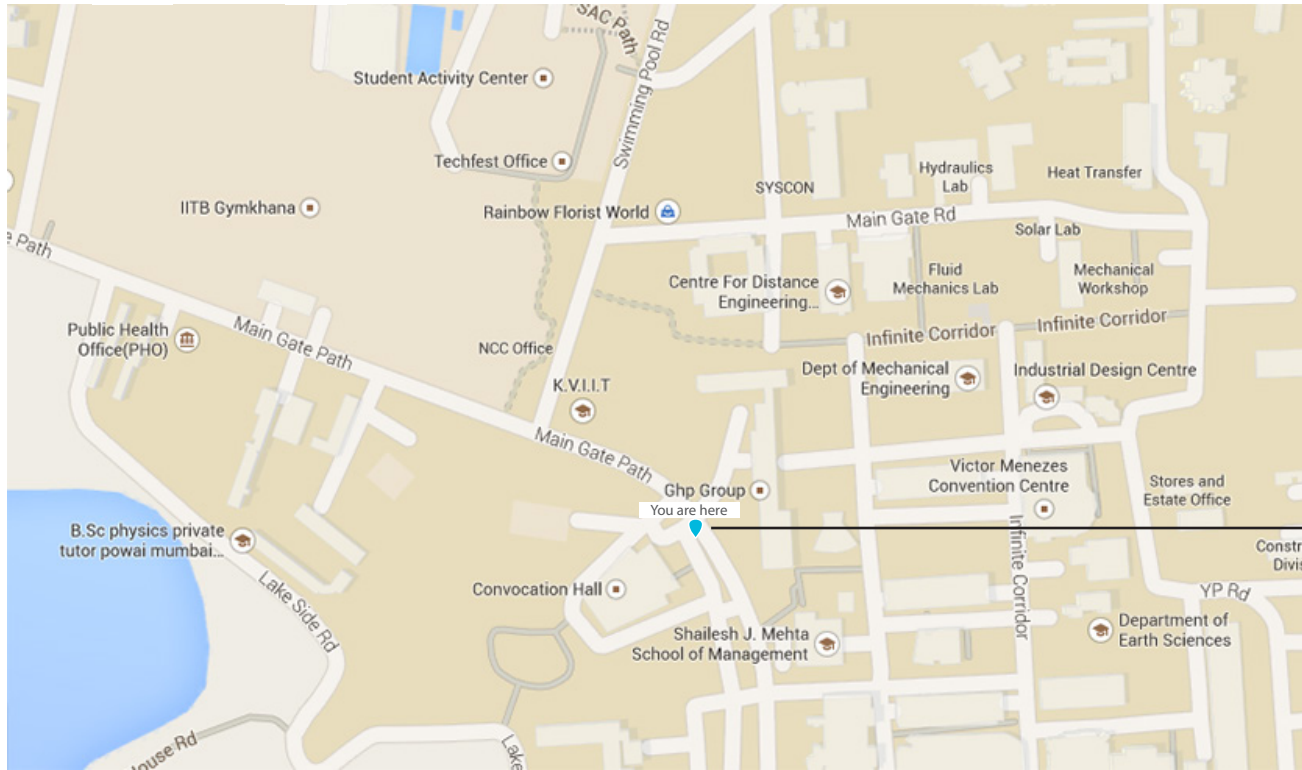
Now	Next 2 hrs
18°C	15°C



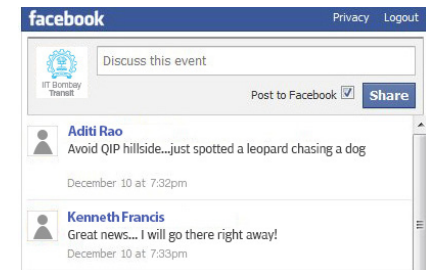
From

To

Original location co-ordinates are detected automatically by the GPS (Global Positioning System) mechanism of the device



The social networking site ensures that the user is updated with conversations posted in the IIT Bombay Transit Group



STEP 1



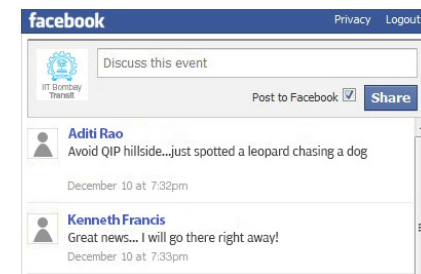
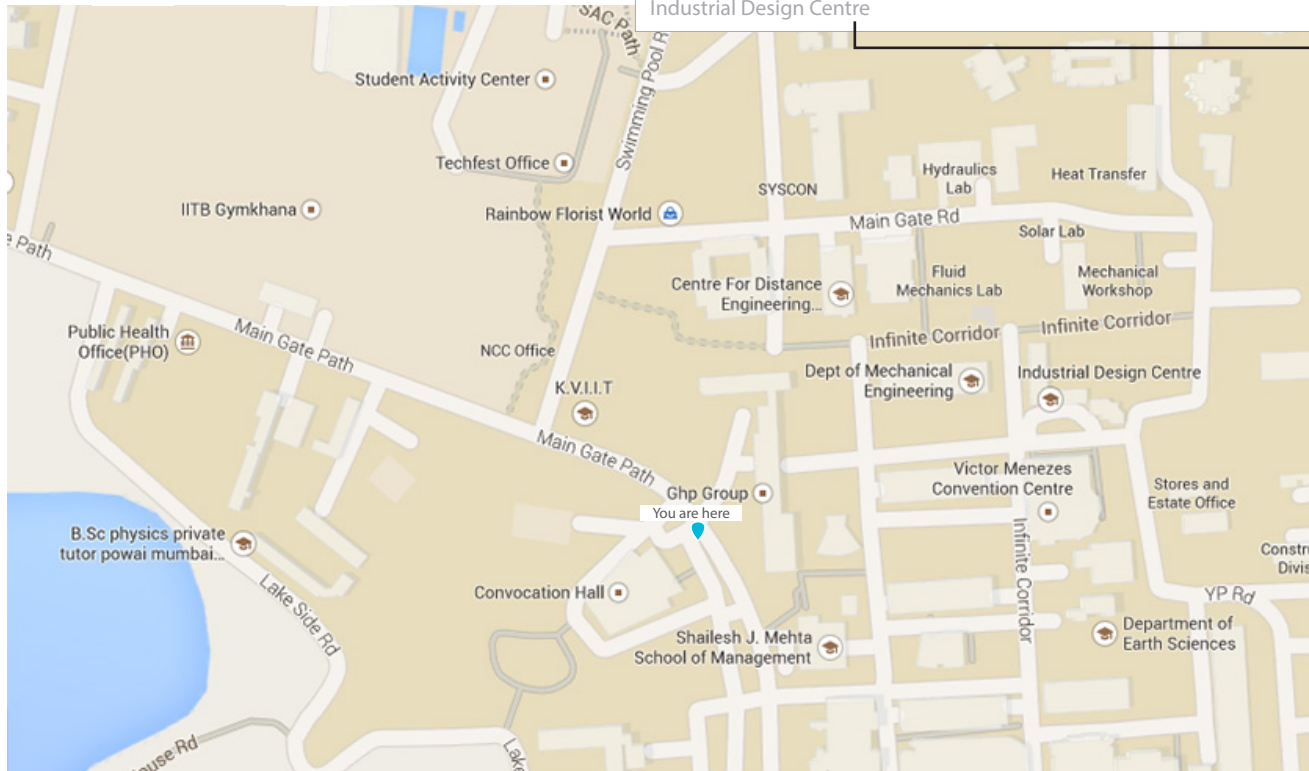
From Convocation Hall

To Industrial Des

Industrial Design Centre

Destination location is entered by the user.

A dropdown menu prompts the user to select the input from various options.



STEP 2

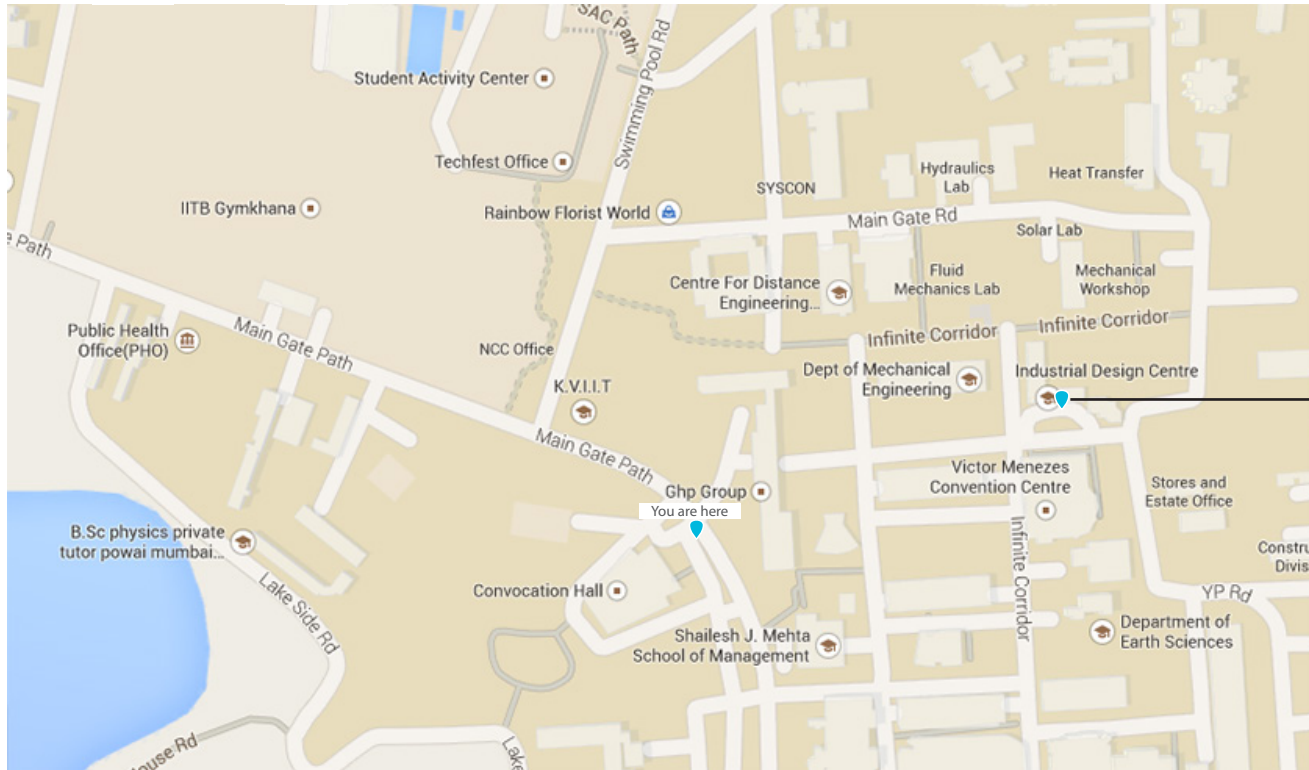


IIT Bombay
Transit

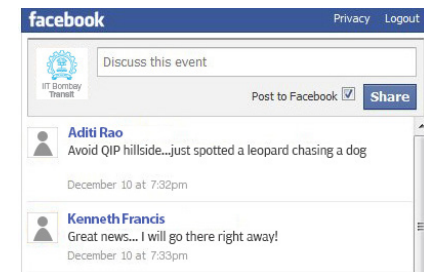
Now
18°C
Next 2 hrs
15°C

From Convocation Hall

To Industrial Design Centre



Destination is located on the map



STEP 3



IIT Bombay
Transit

Now Next 2 hrs

18°C 15°C

Miscellaneous mode

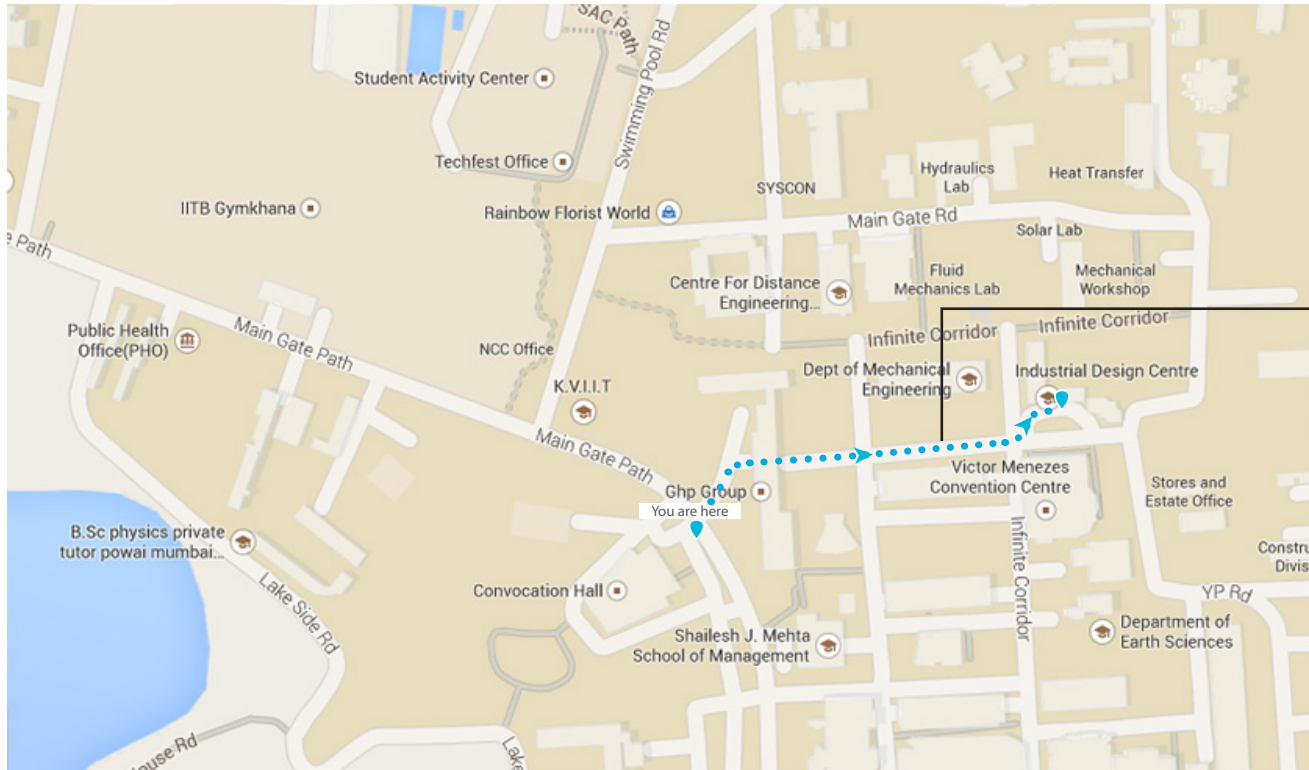


From Convocation Hall
To Industrial Design Centre

Route

Shortest mode of travel: **Walk**

10:25am
Reach Industrial Design Centre



The shortest route in the least possible time is detected automatically in the miscellaneous mode as walking depicted as a dotted line.



STEP 4



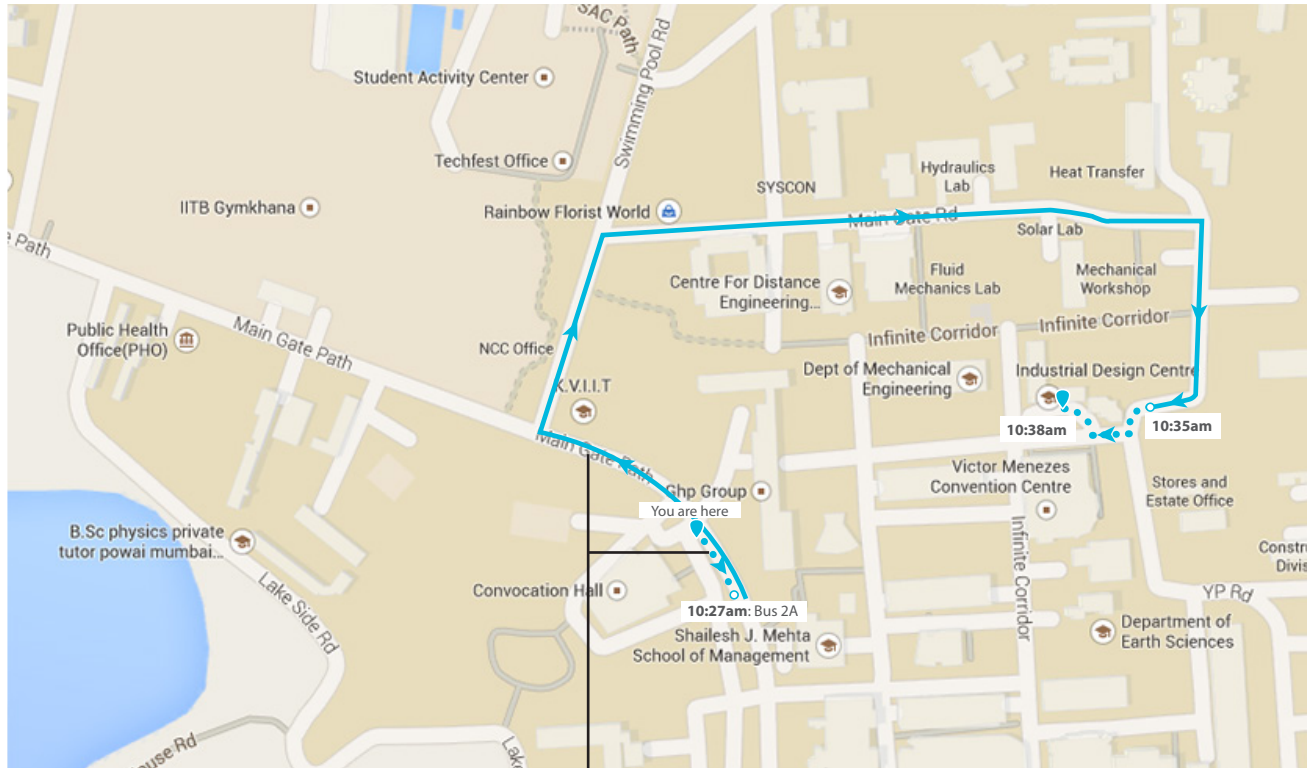
IIT Bombay
Transit

Bus mode



From Convocation Hall

To Industrial Design Centre



Route displayed as combination of walking instructions to the nearest bus stop and the route by bus

STEP 5

Output displayed as sequential steps with instructions, precise timings and accurate directions

Now Next 2 hrs

18°C 15°C

Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board **Bus 2A**

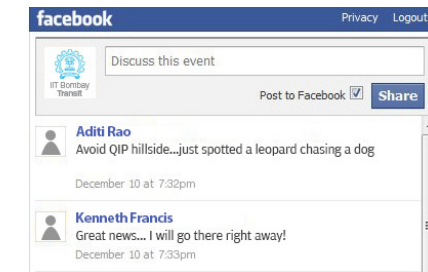
10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate





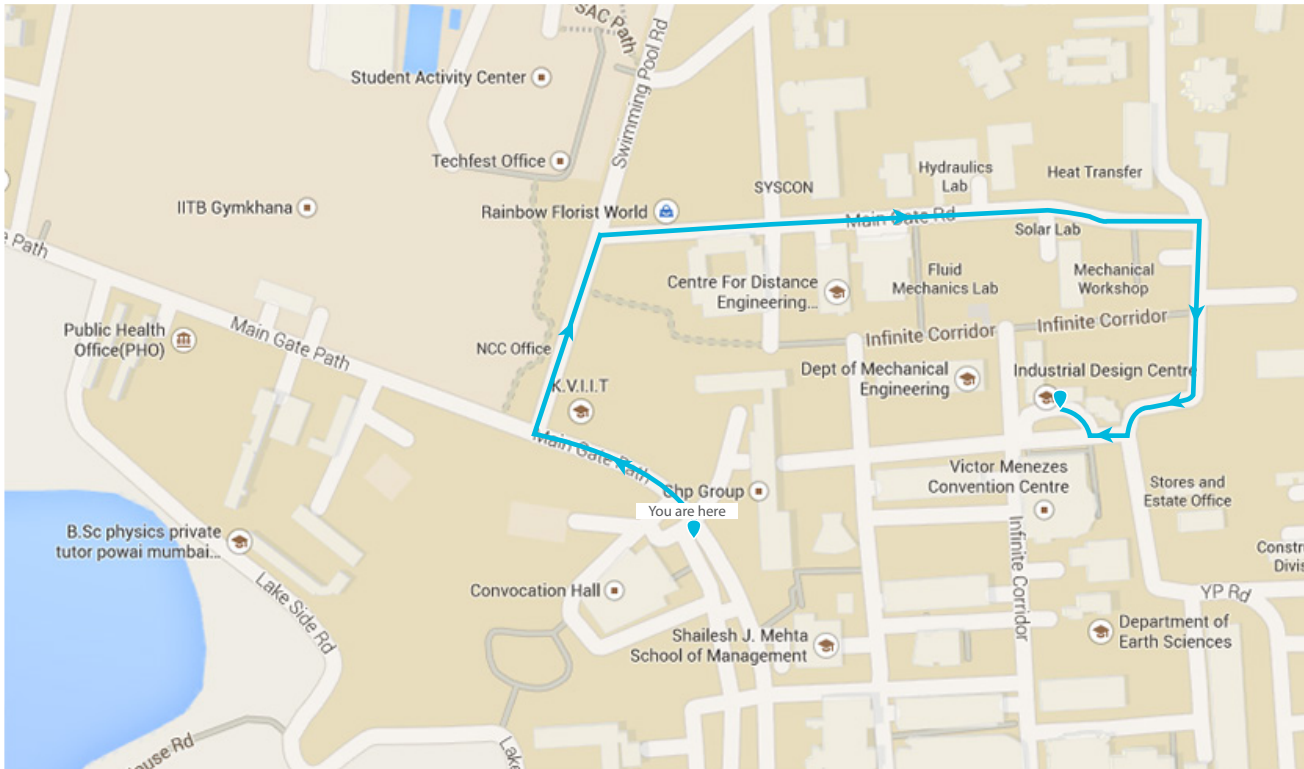
IIT Bombay
Transit

Now
18°C
Next 2 hrs
15°C

Private vehicle mode



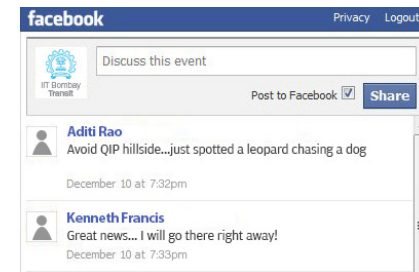
From Convocation Hall
To Industrial Design Centre



Route

Drive North West

- Turn right towards Swimming Pool Road
- Turn right towards Main Gate Road
- Turn right towards YP Road
- Turn right towards IDC
- Turn right Reach IDC main gate



STEP 6



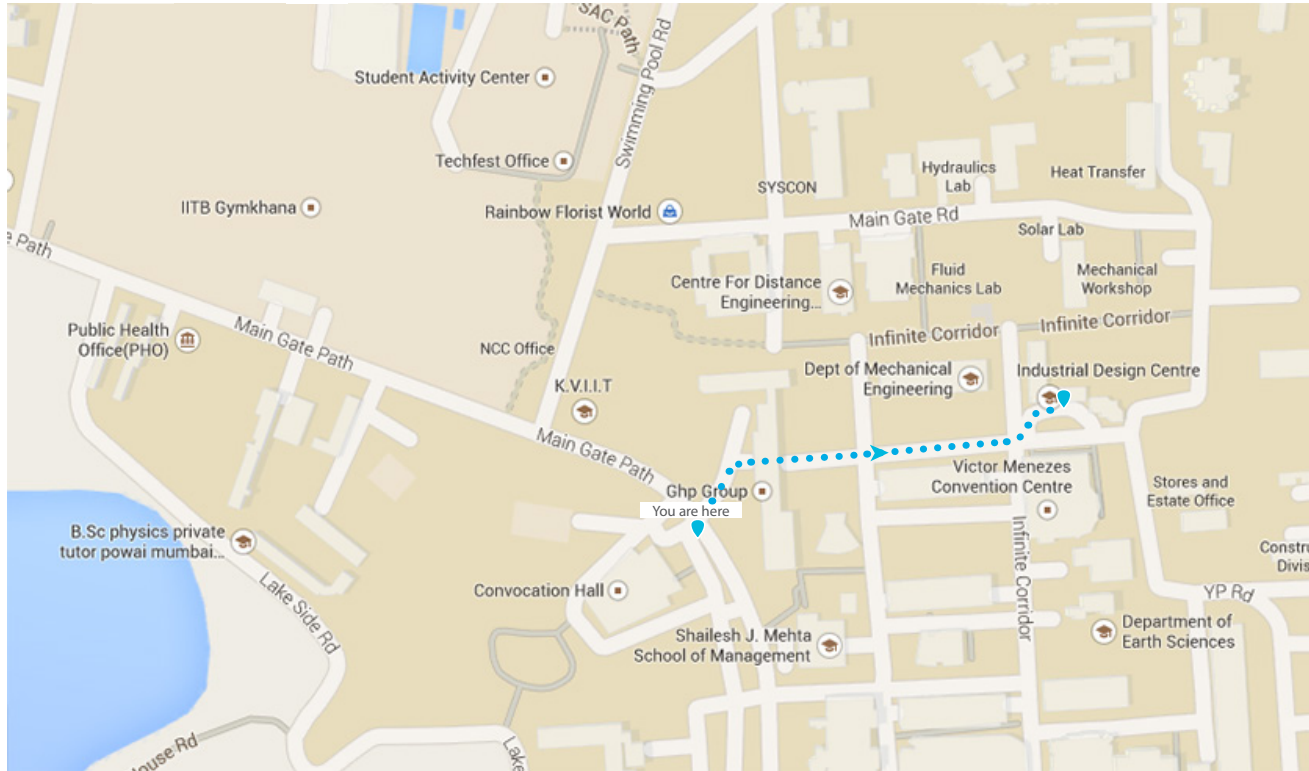
IIT Bombay
Transit

Pedestrian mode



From

To



Now 18°C

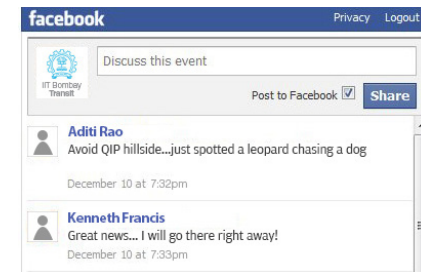
Next 2 hrs 15°C

Route

Shortest mode of travel: **Walk**

10:25am

Reach Industrial Design Centre



STEP 7

Scenario 2

Person travelling in the campus

Locations

1. Origin

Device detects the location automatically using GPS co-ordinates

2. Destination

Name - User does not know name of the location.

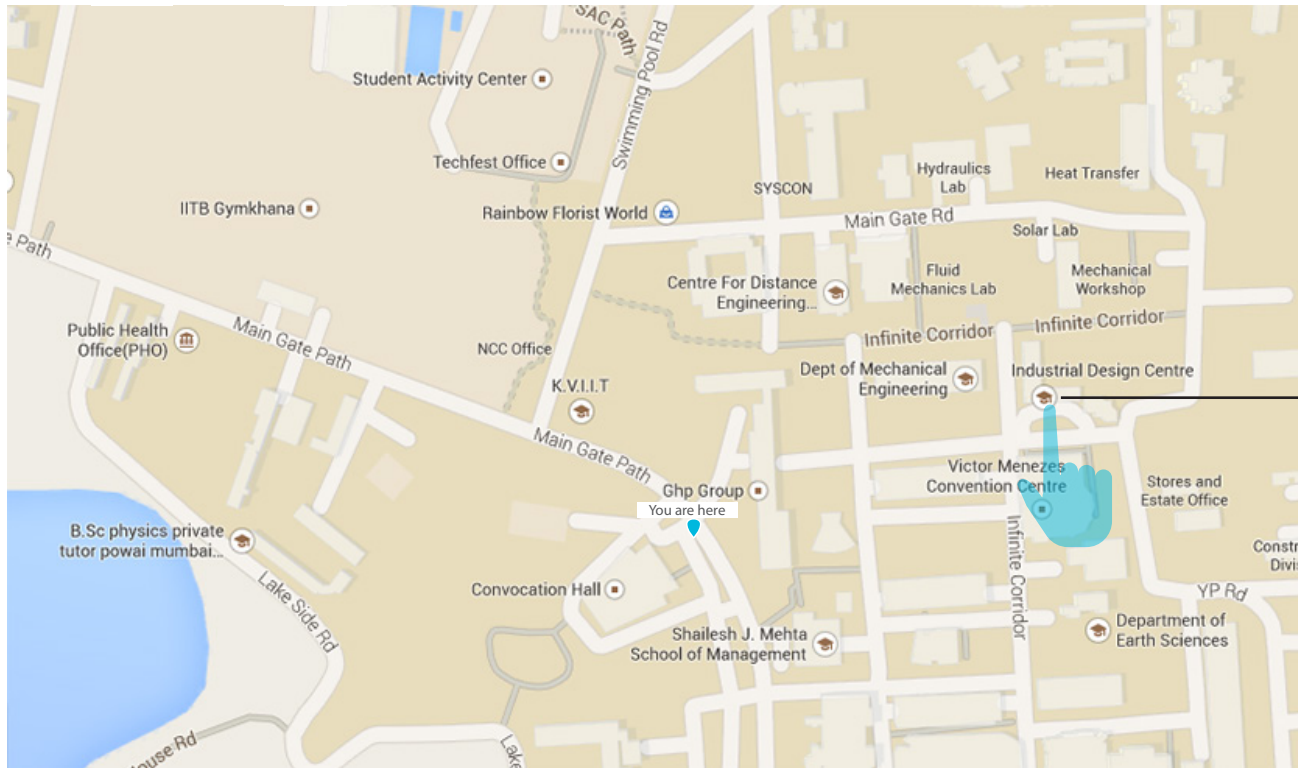
Location on map - User knows the visual location of the place on the map.



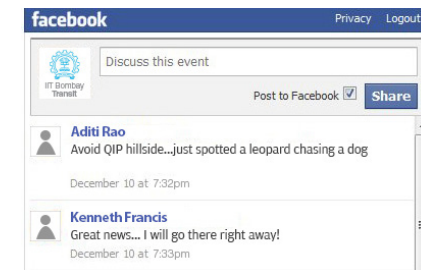
From Convocation Hall

To Type destination here or click on the map

Original location co-ordinates are detected automatically by the GPS mechanism of the device



User selects location manually by clicking location on the map



STEP 1

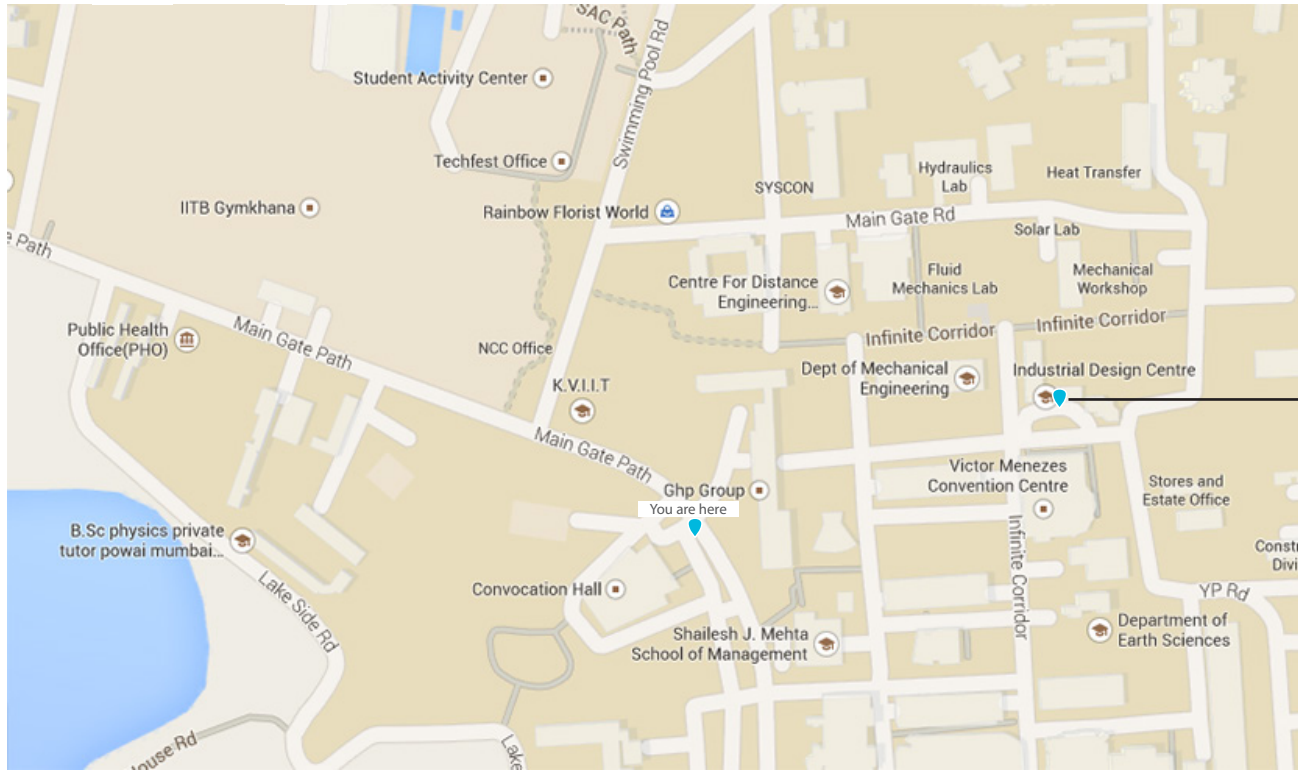


IIT Bombay
Transit

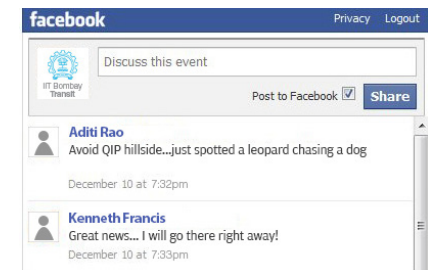
Now
Next 2 hrs
18°C
15°C

From Convocation Hall

To Industrial Design Centre



Destination is located on the map

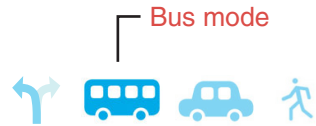


STEP 2



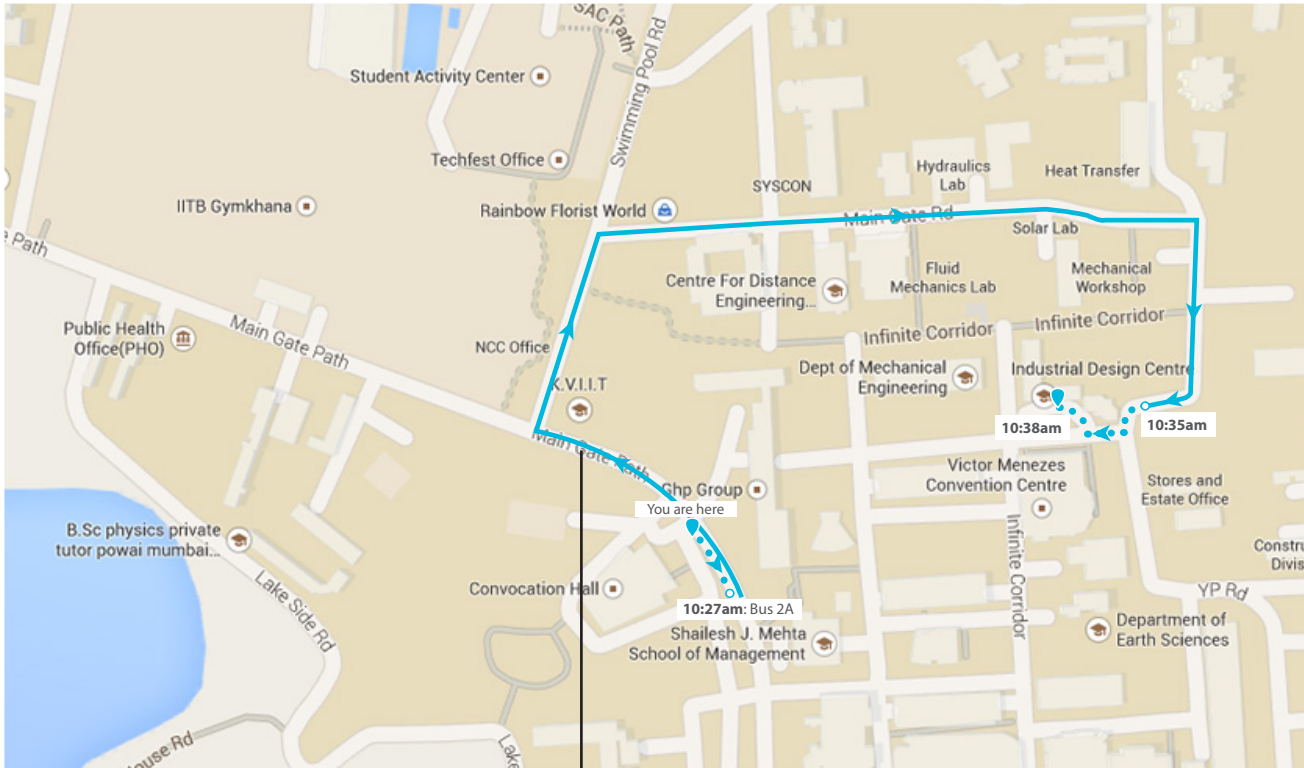
IIT Bombay
Transit

Now Next 2 hrs
 18°C 15°C

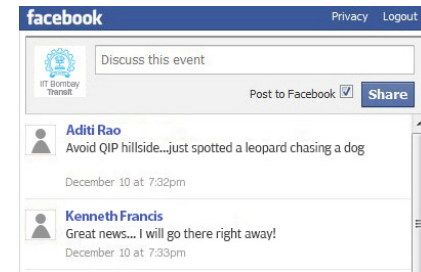


From Convocation Hall
To Industrial Design Centre

Final output instructions are displayed



- Route
- Walk South East**
towards Bus Stop near Shailesh J Mehta School of Management
 - 10:27am**
Board **Bus 2A**
 - 10:35am**
Reach bus stop near Shishu Vihar
 - Walk South West**
towards IDC main gate
 - Turn right
 - Turn right
 - 10:38am**
Reach IDC Main Gate



Route is displayed based on user's selection of mode

STEP 3

Scenario 3

Person travelling in the campus

Locations

1. Origin

The original location is not detected by the device on which the website is being accessed.

2. Destination

Name - User knows the name of the location.

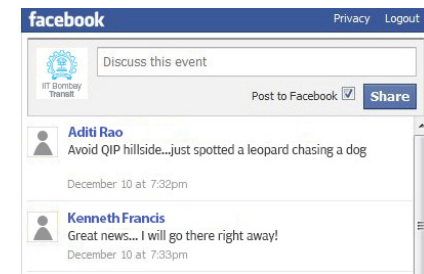
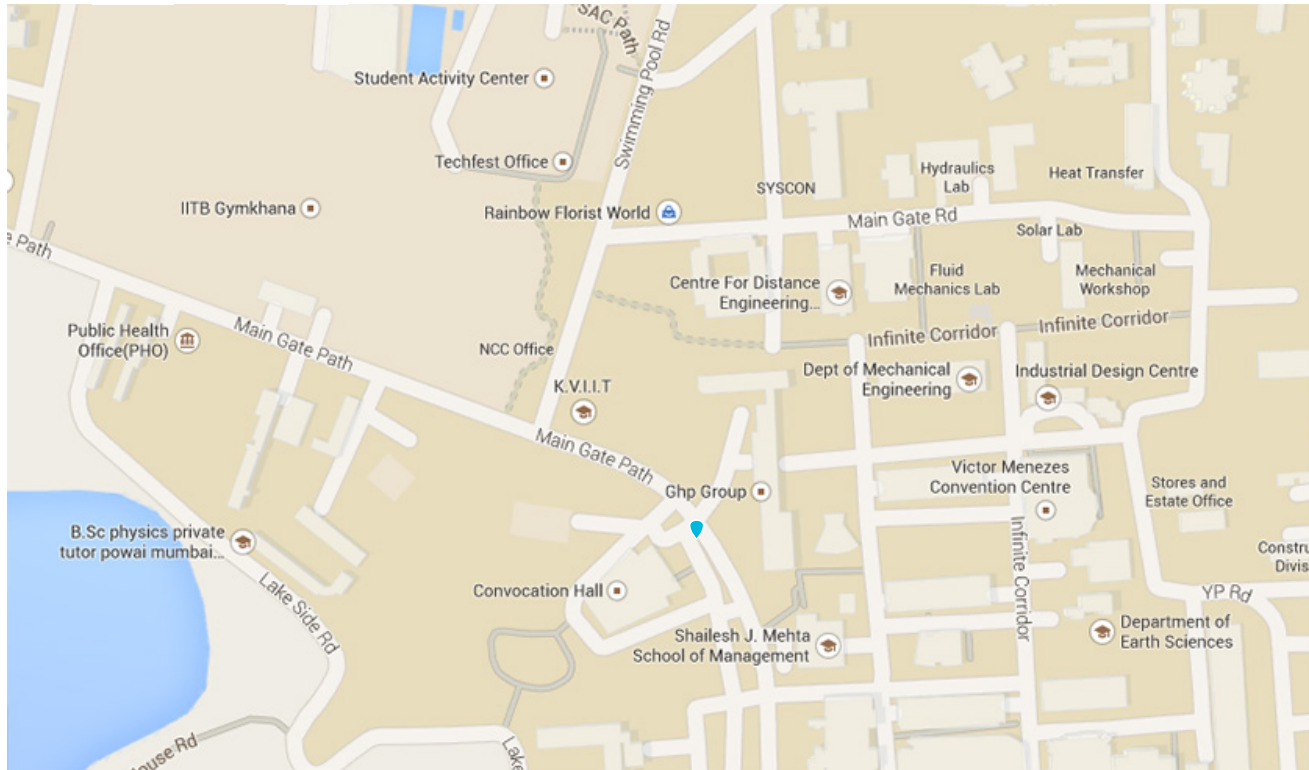
Location on map - User does not know the visual location of the place on the map.



From	Convo
To	Convocation Hall

Original destination is typed by user.

In this scenario original location is not detected automatically by the device due to absence of GPS mechanism in the device.



STEP 1

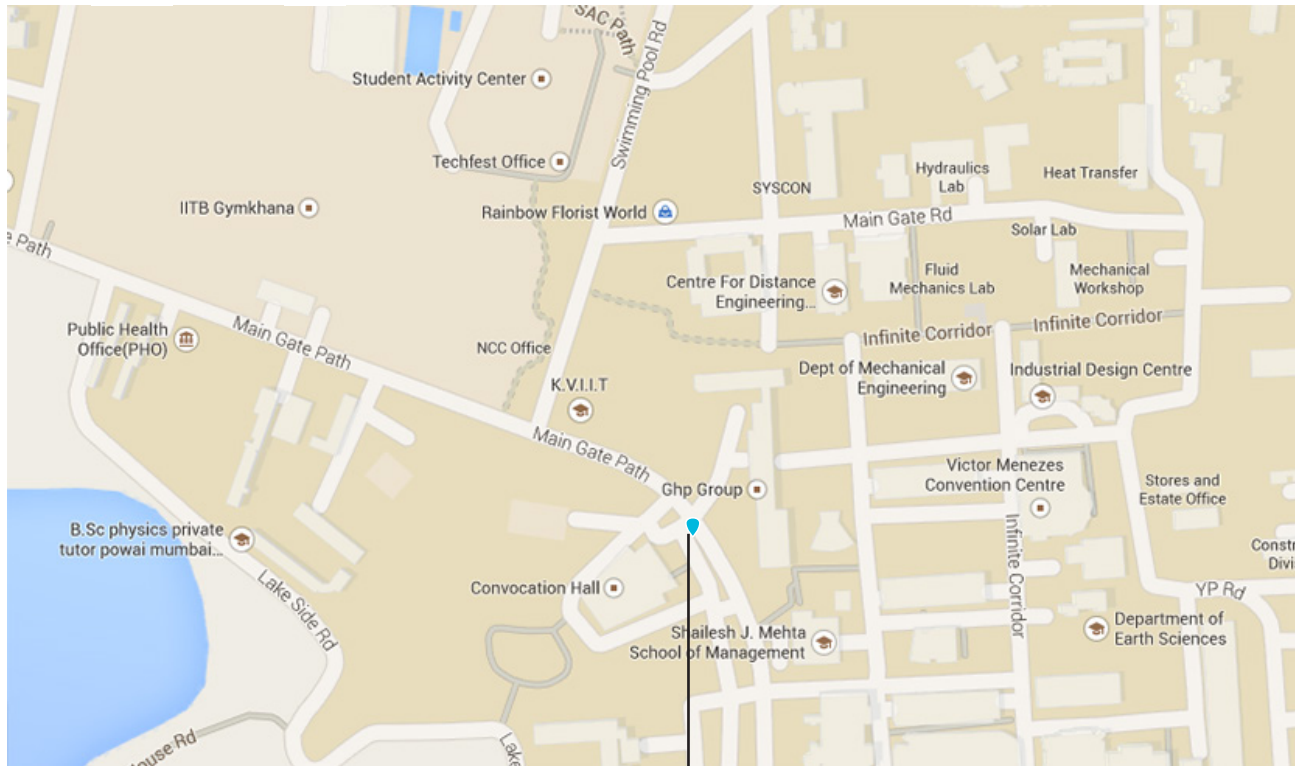


IIT Bombay
Transit

Now
18°C
Next 2 hrs
15°C

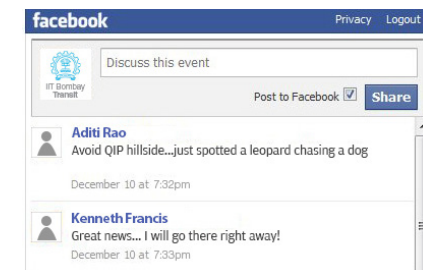
From

To



Original destination is located on the map.

STEP 2

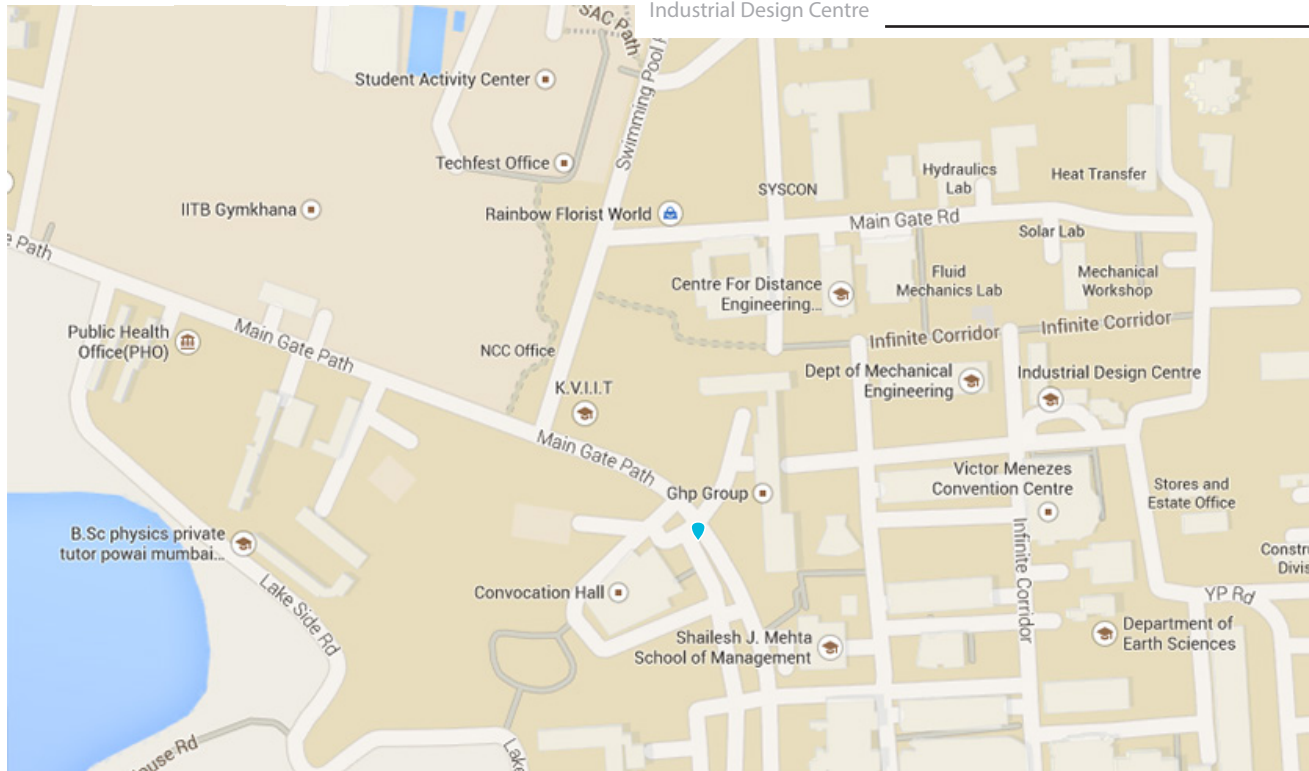




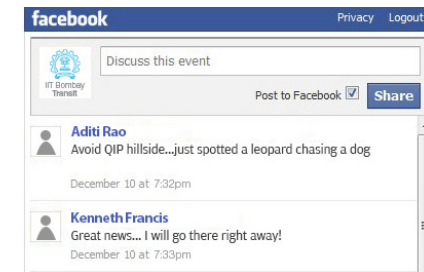
From Convocation Hall

To Industrial Des

Destination location is entered by the user.



A dropdown menu prompts the user to select the input from various options.



STEP 3

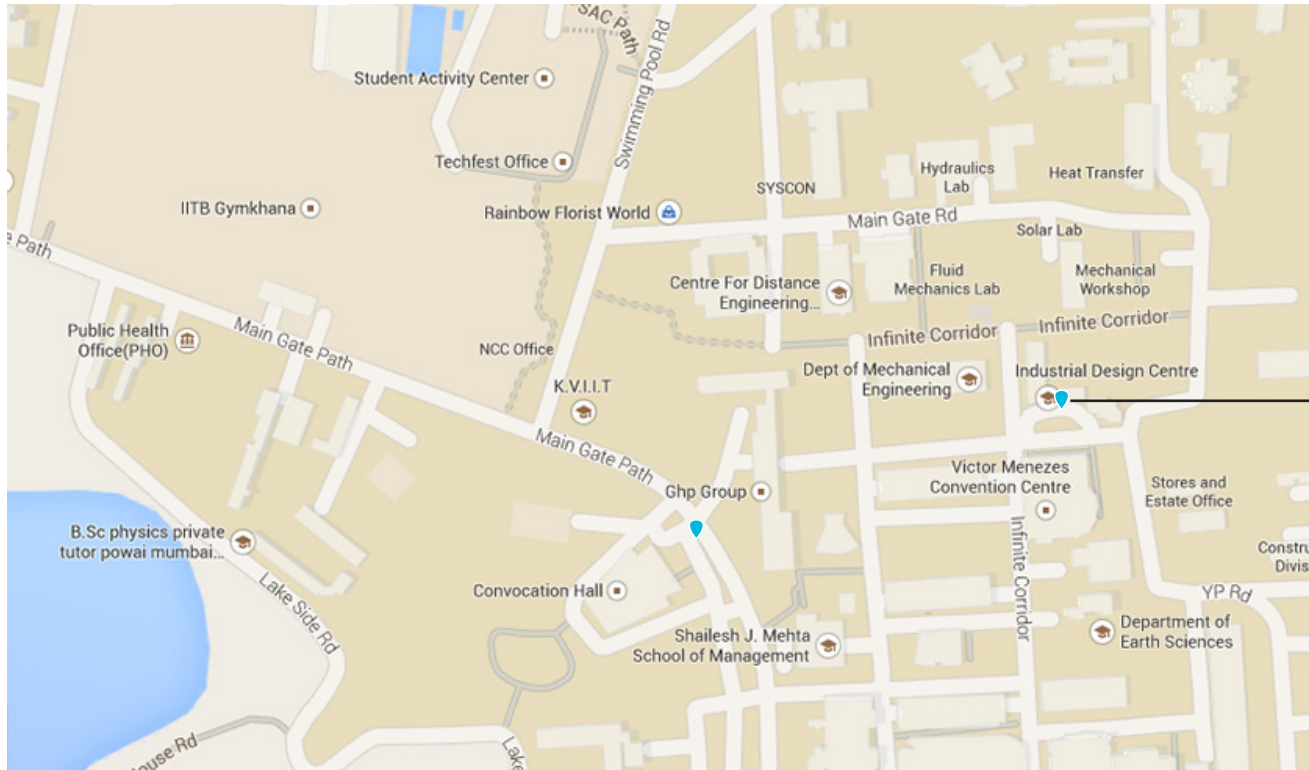


IIT Bombay
Transit

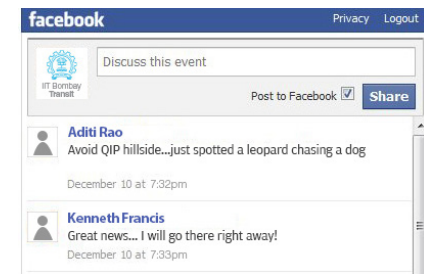
Now
18°C
Next 2 hrs
15°C

From Convocation Hall

To Industrial Design Centre



Destination is located on the map

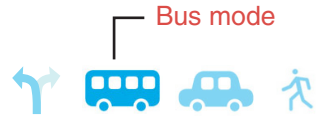


STEP 4



IIT Bombay
Transit

Now Next 2 hrs
 18°C 15°C



Bus mode

From Convocation Hall
To Industrial Design Centre

Final output is displayed

Route

Walk South East
towards Bus Stop near Shailesh
J Mehta School of Management

10:27am
Board **Bus 2A**

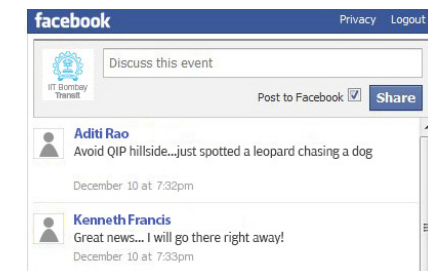
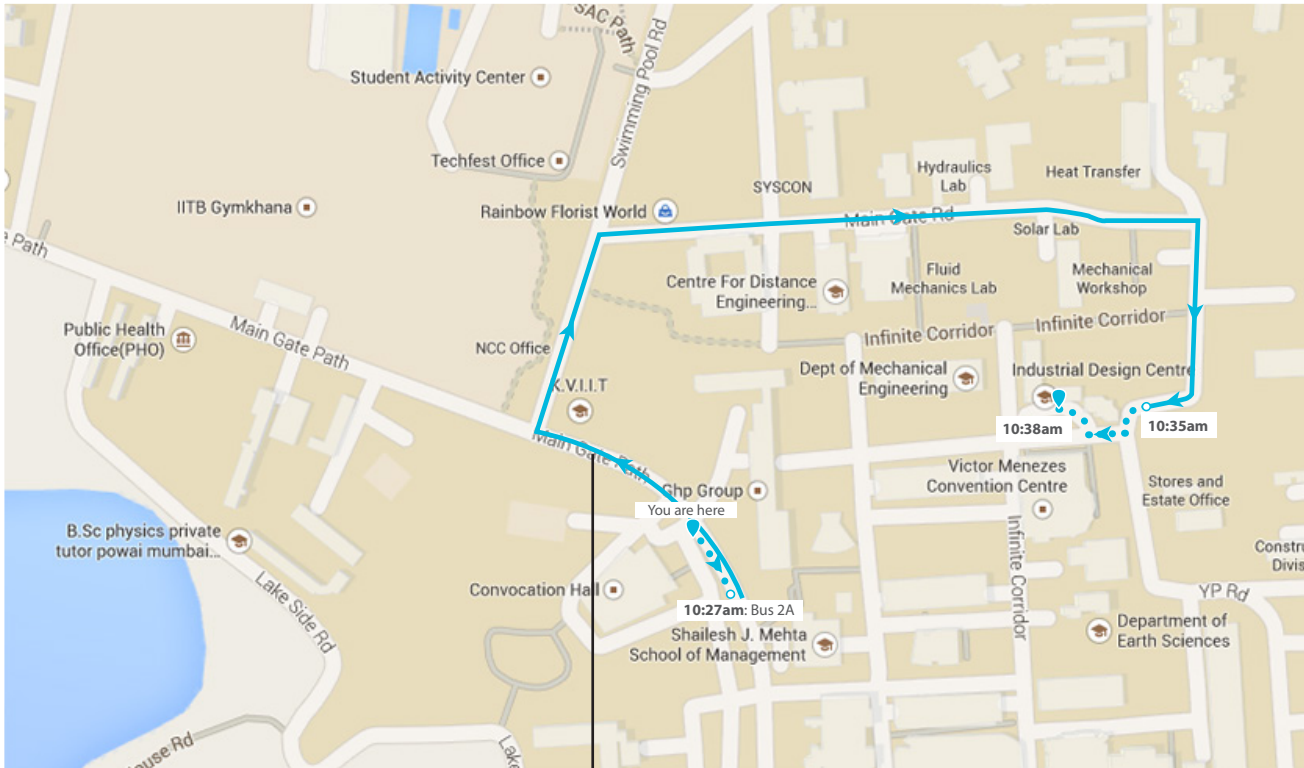
10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate



Route is displayed in bus mode as selected by user

STEP 5

Scenario 4

Person travelling in the campus

Locations

1. Origin

The original location is not detected by the device on which the website is being accessed.

2. Destination

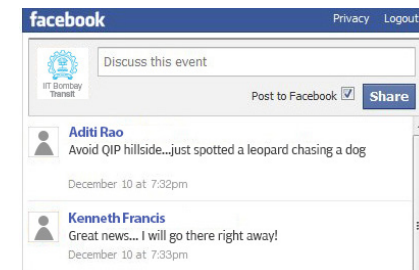
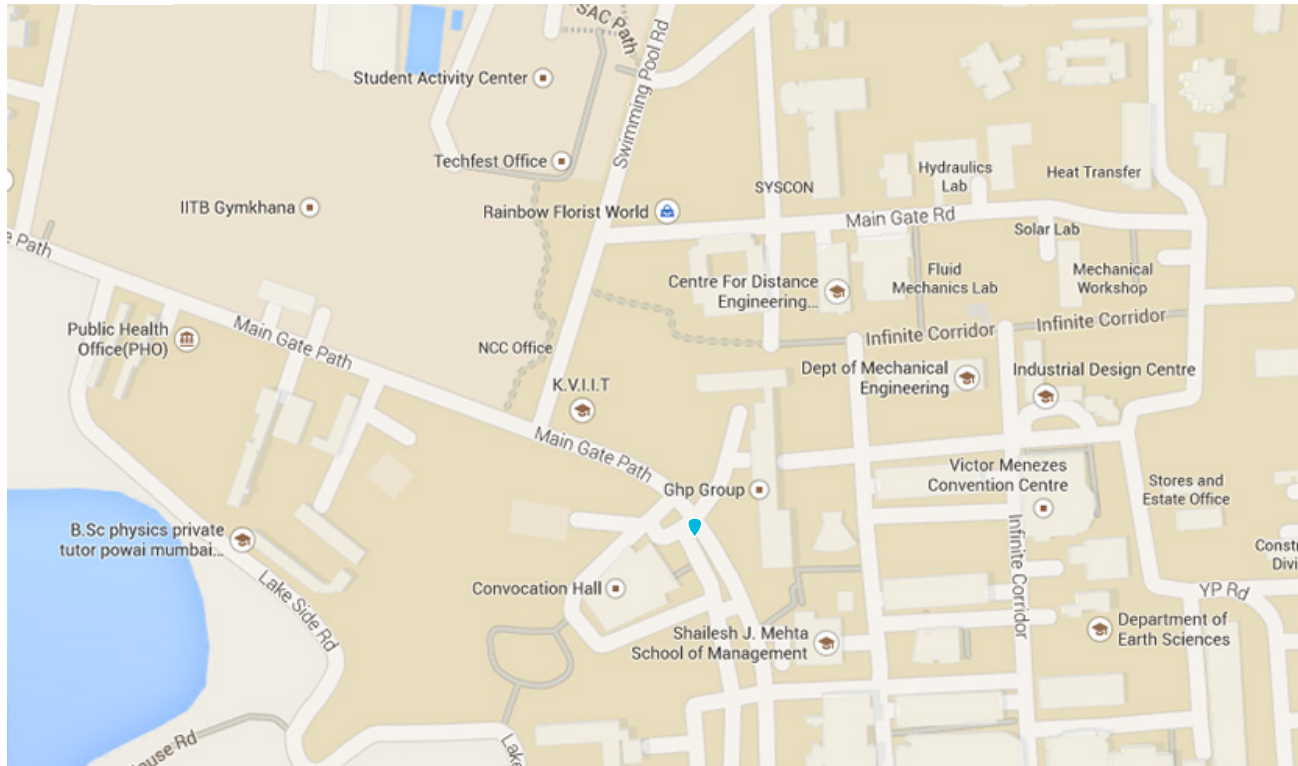
Name - User does not know name of the location.

Location on map - User knows the visual location of the place on the map.



From	Convo
To	Convocation Hall

Original destination is typed by user.
In this scenario original location is not detected automatically by the device due to absence of GPS (Global Positioning System) mechanism in the device.



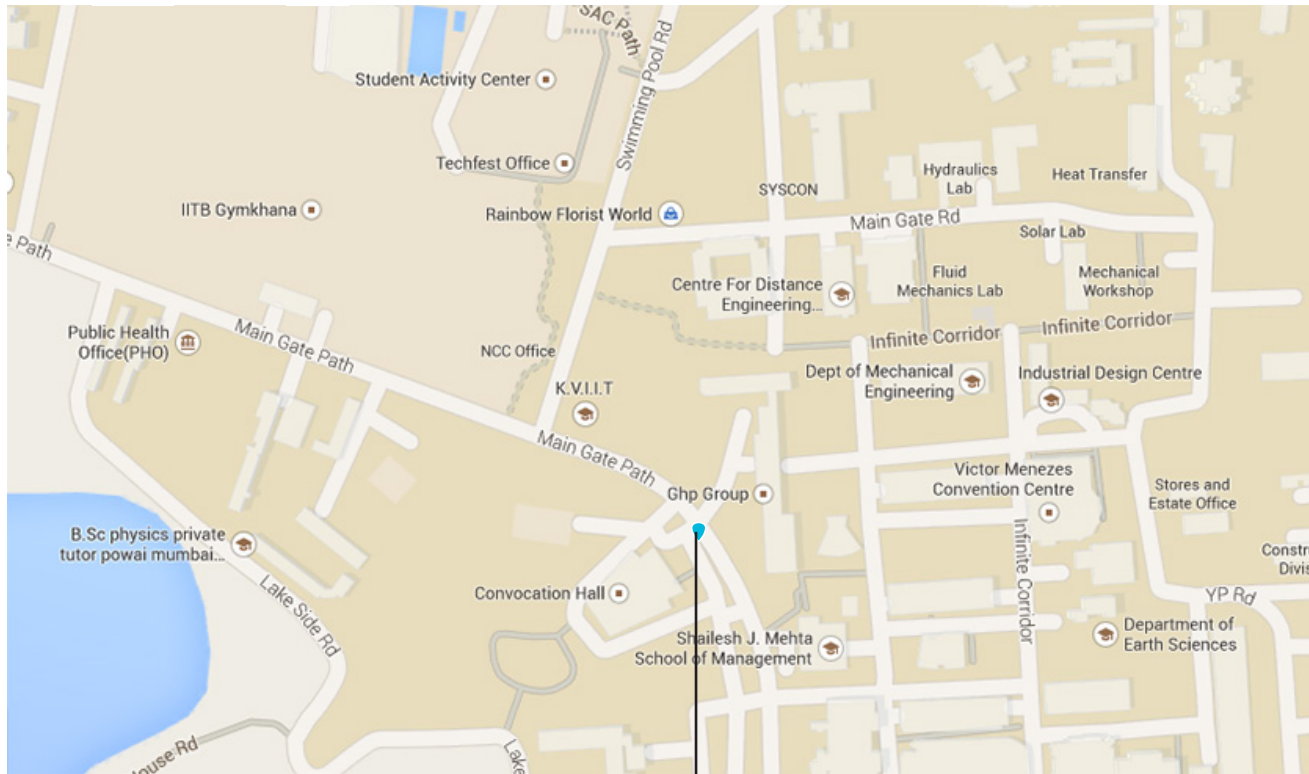
STEP 1



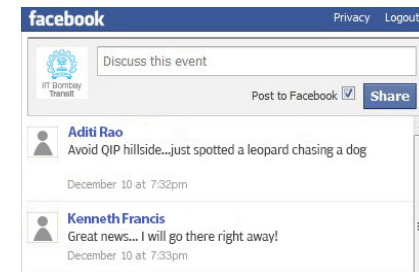
From Convocation Hall



To Type destination here or click on the map



Original destination is located on the map.



STEP 2

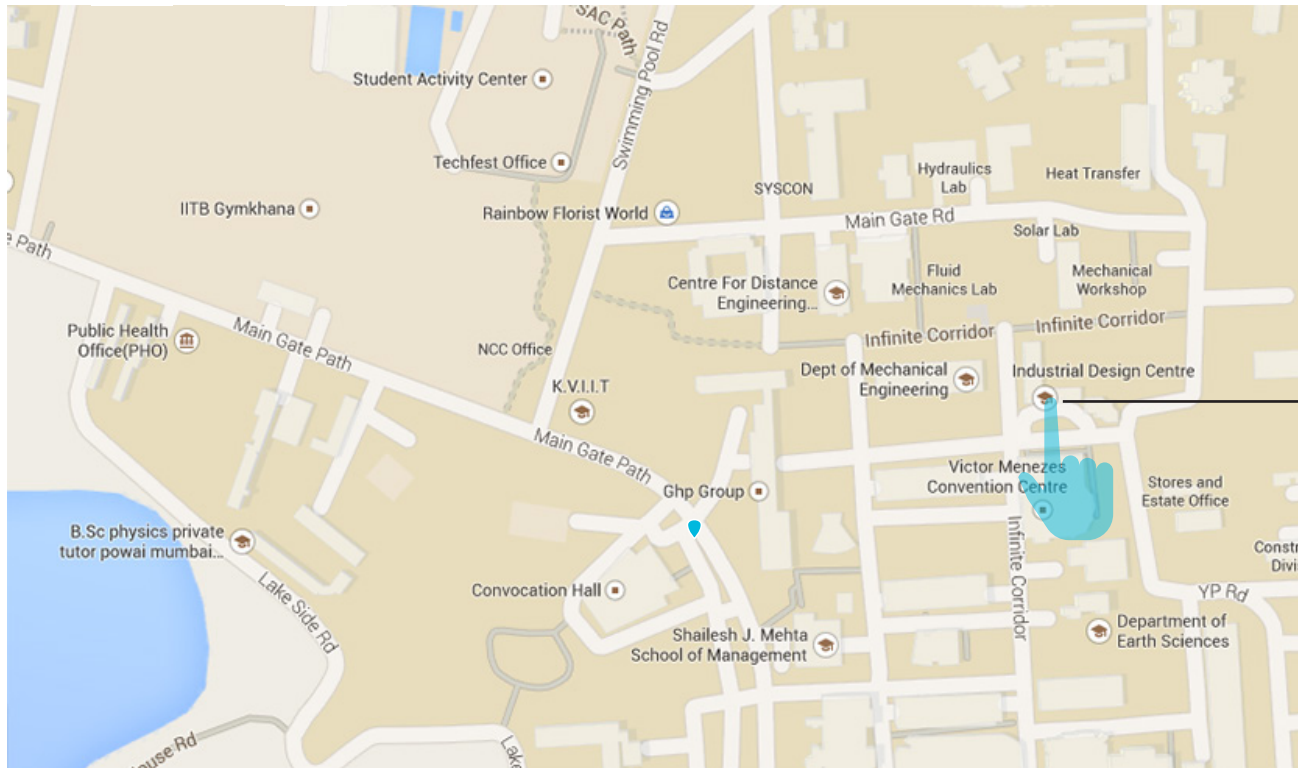


IIT Bombay
Transit

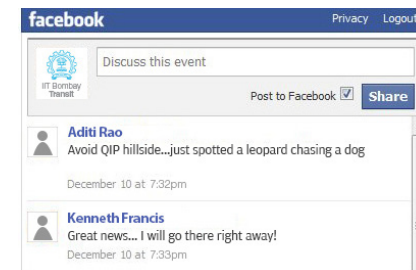
Now
18°C
Next 2 hrs
15°C

From Convocation Hall

To Type destination here or click on the map



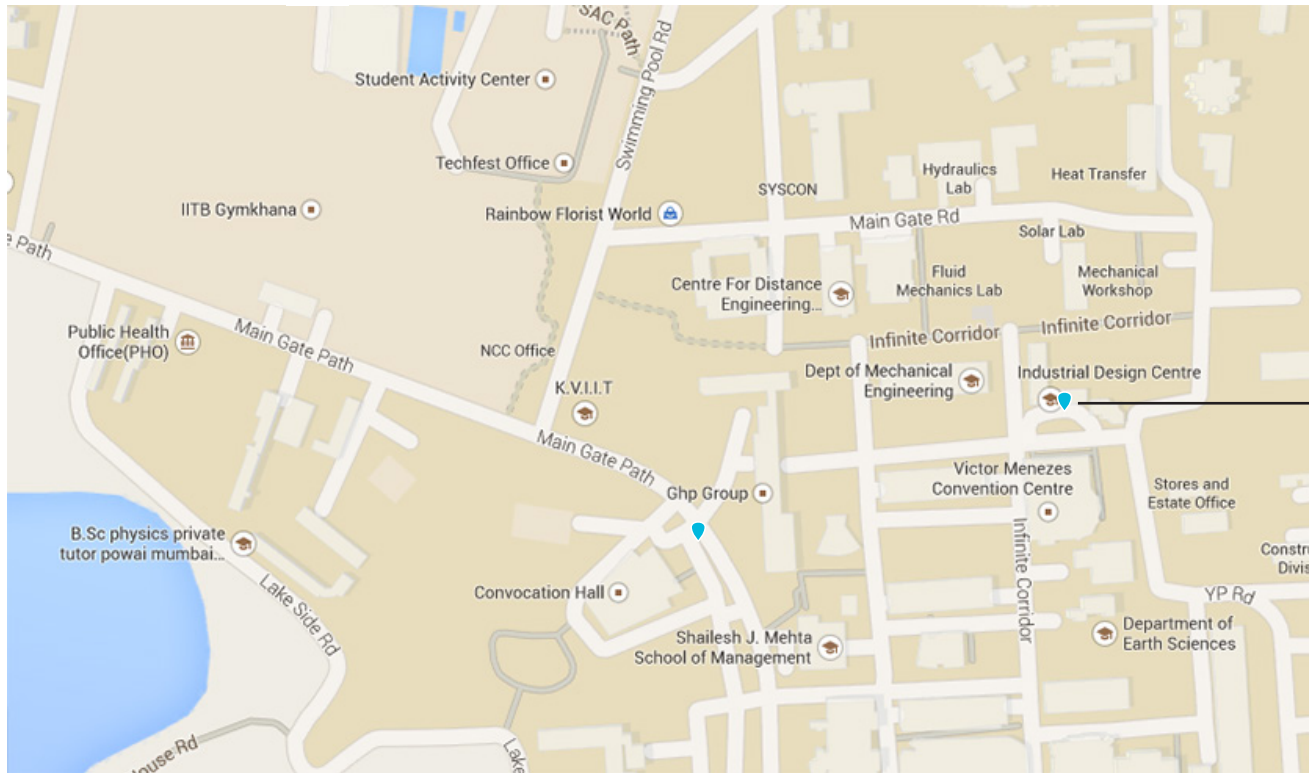
User selects location manually by clicking location on the map



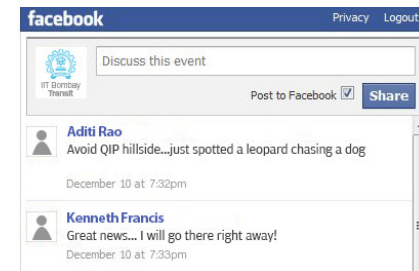
STEP 3



From Convocation Hall
To Industrial Design Centre



The destination is located on the map



STEP 4



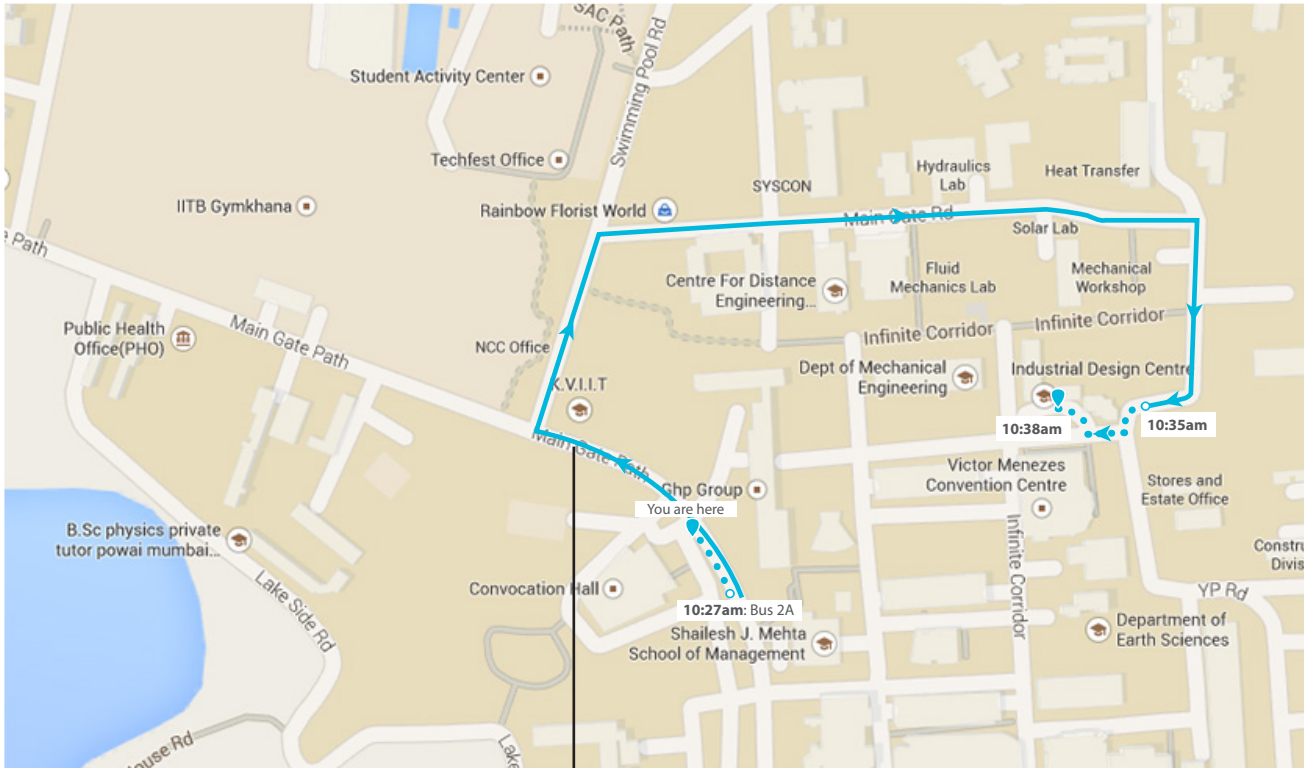
IIT Bombay
Transit

Now Next 2 hrs
 18°C 15°C

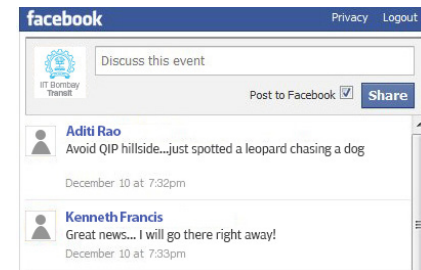


From Convocation Hall
To Industrial Design Centre

Output instructions are displayed



- Route
- Walk South East**
towards Bus Stop near Shailesh J Mehta School of Management
 - 10:27am**
Board **Bus 2A**
 - 10:35am**
Reach bus stop near Shishu Vihar
 - Walk South West**
towards IDC main gate
 - Turn right
 - Turn right
 - 10:38am**
Reach IDC Main Gate



Route is displayed in bus mode as selected by the user

STEP 5

Scenario 5

Change of route while travelling in the campus

Locations

1. Origin

The original location co-ordinates are detected on the device where the website is being accessed.

2. Destination

Name - User does not know name of the location.

Location on map - User knows the visual location of the place on the map.



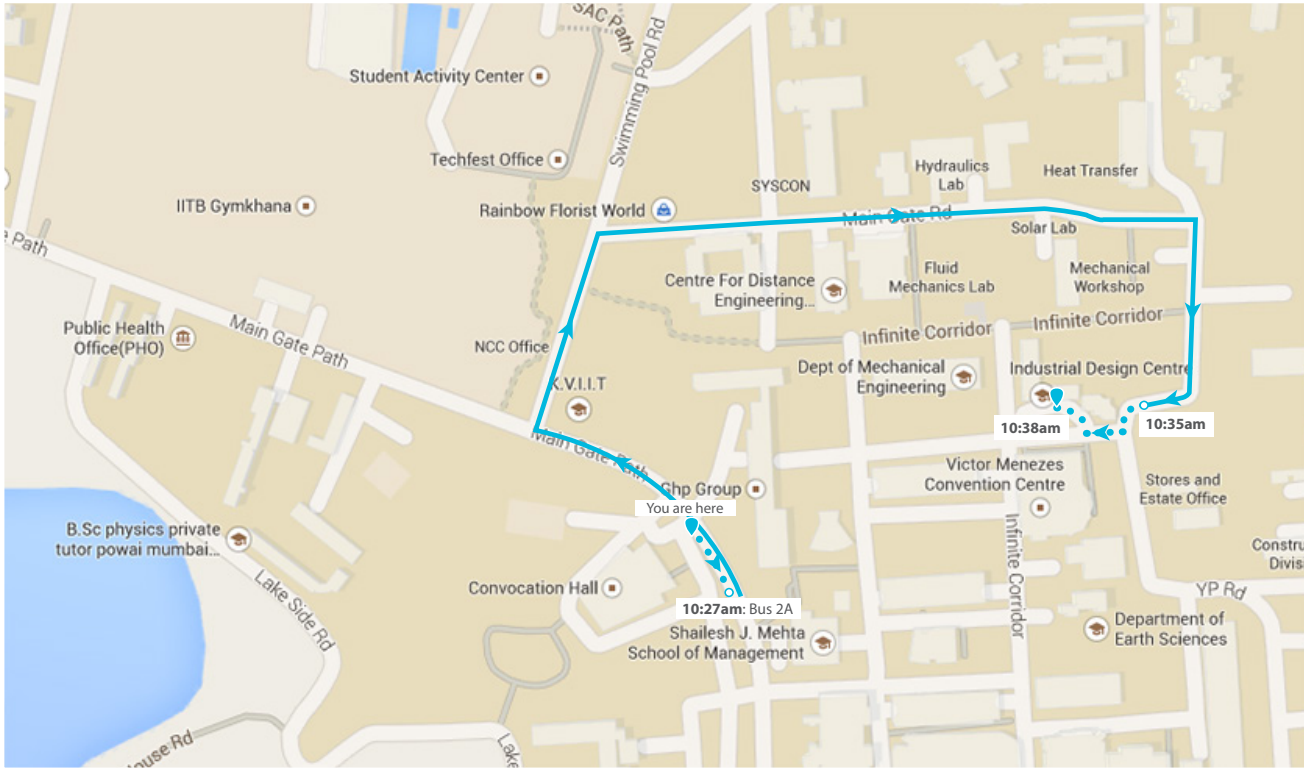
IIT Bombay
Transit

Now Next 2 hrs

18°C 15°C



From Convocation Hall
To Industrial Design Centre



Output instructions are displayed

Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board **Bus 2A**

10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate

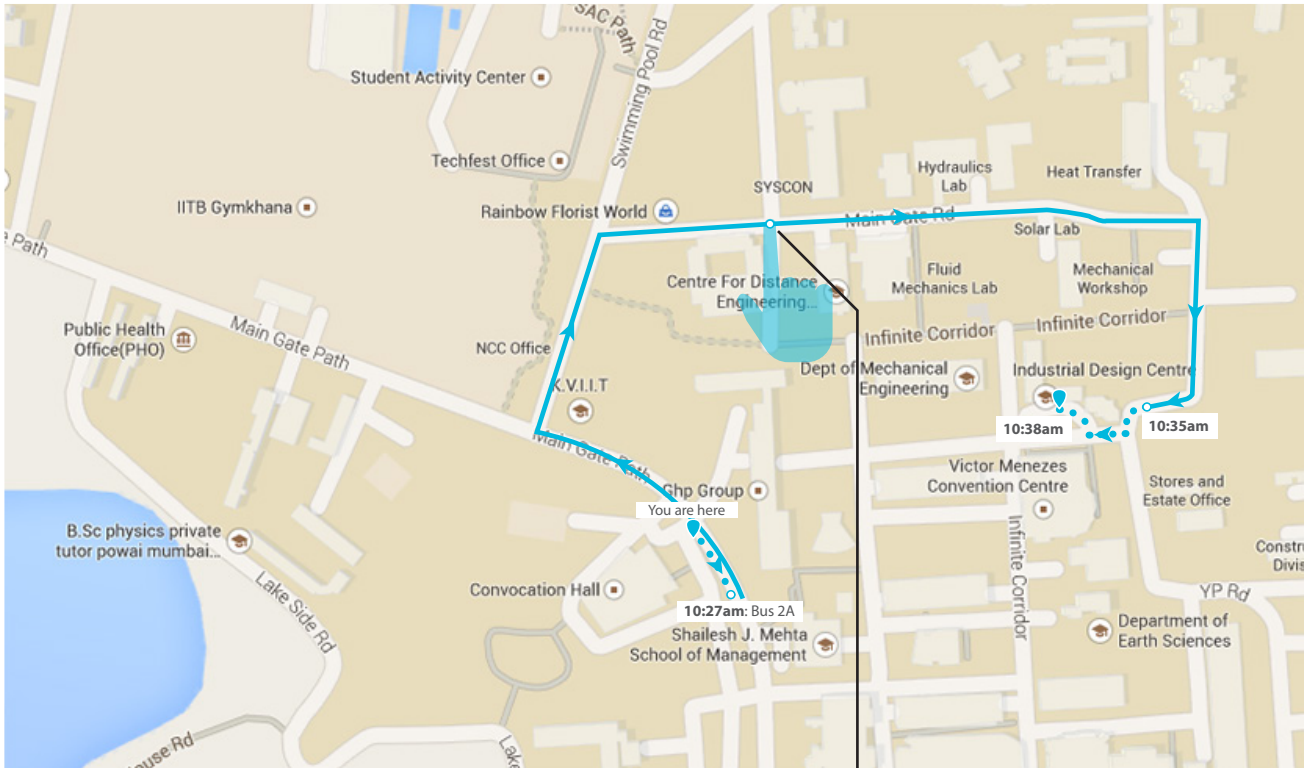


STEP 5

STEP 1, STEP 2, STEP 3 and STEP 4 are same as displayed in scenario 1 where location is detected automatically.



From Convocation Hall
To Industrial Design Centre



Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board **Bus 2A**

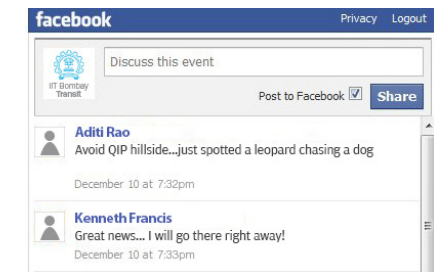
10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate

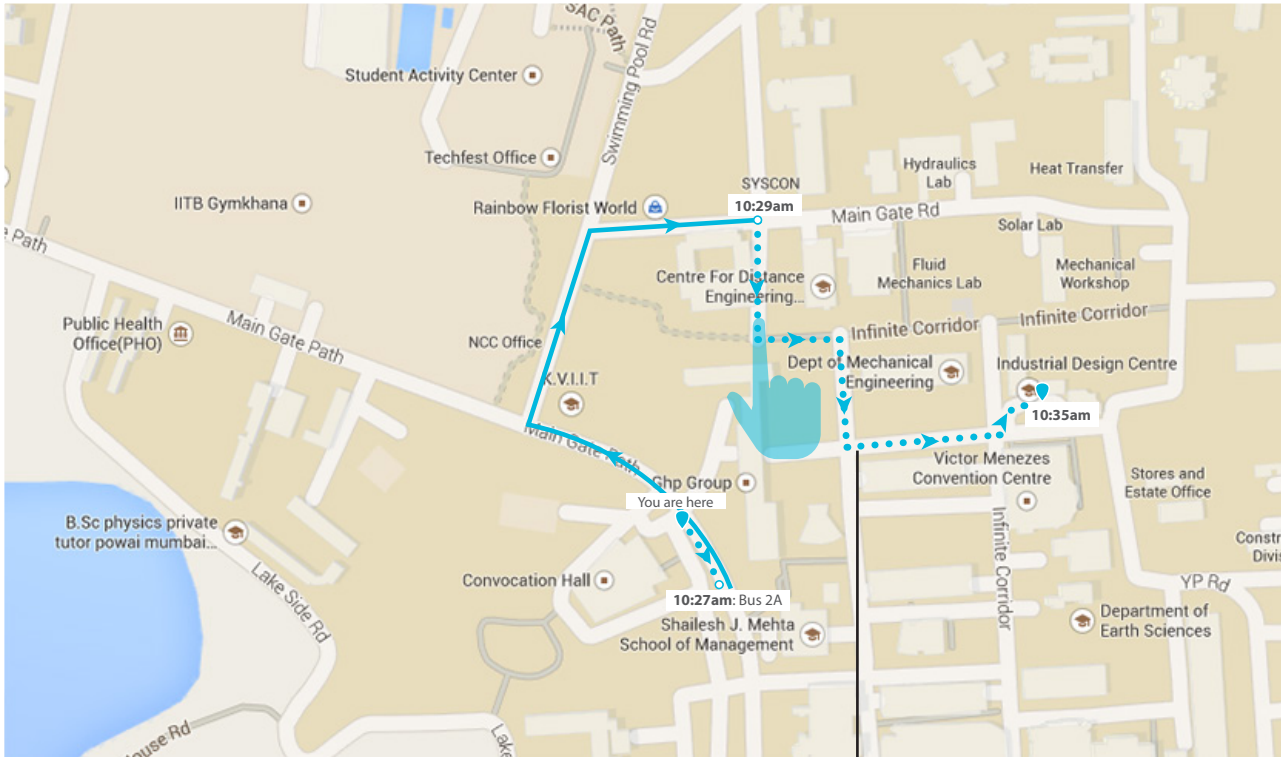


STEP 6

Route is changed manually by dragging the point on the map



From Convocation Hall
To Industrial Design Centre



Output instructions are displayed

Route

Walk South East
towards Bus Stop near
Shailesh J Mehta School
of Management

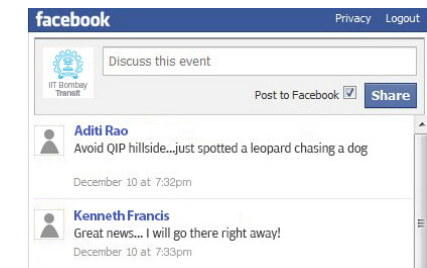
10:27am
Board **Bus 2A**

10:29am
Reach bus stop near SYSCON

Walk South
towards Infinite Corridor

Turn left

Turn right

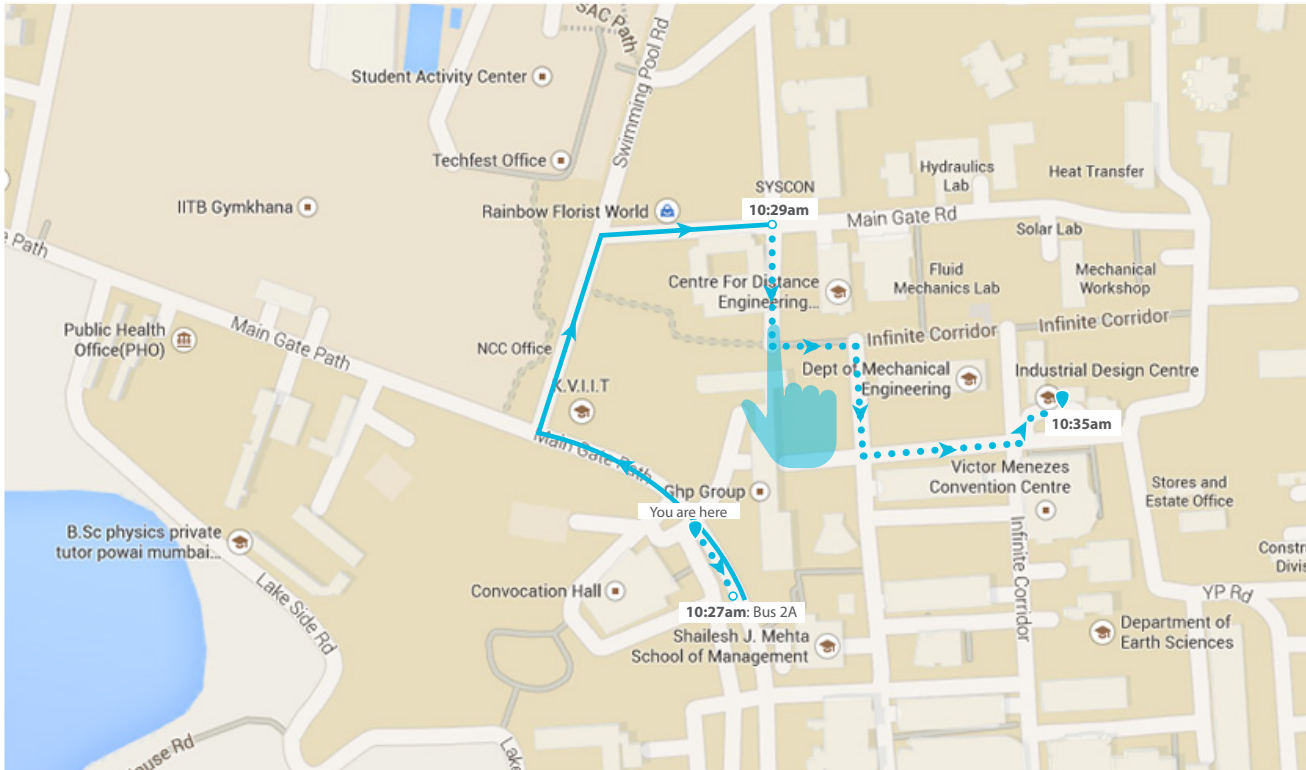


STEP 7

Changed route is displayed based on the optimal mode of navigation i.e. walking in this scenario.



From Convocation Hall
To Industrial Design Centre



Instructions can be scrolled down

Route

10:27am
Board Bus 2A

10:29am
Reach bus stop near SYSCON

Walk South
towards Infinite Corridor

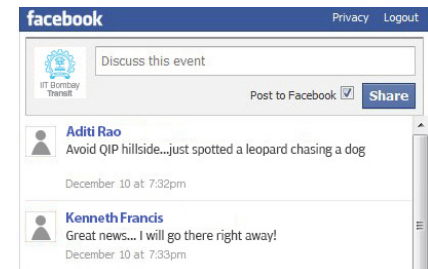
Turn left

Turn right

Climb stairs

Walk South

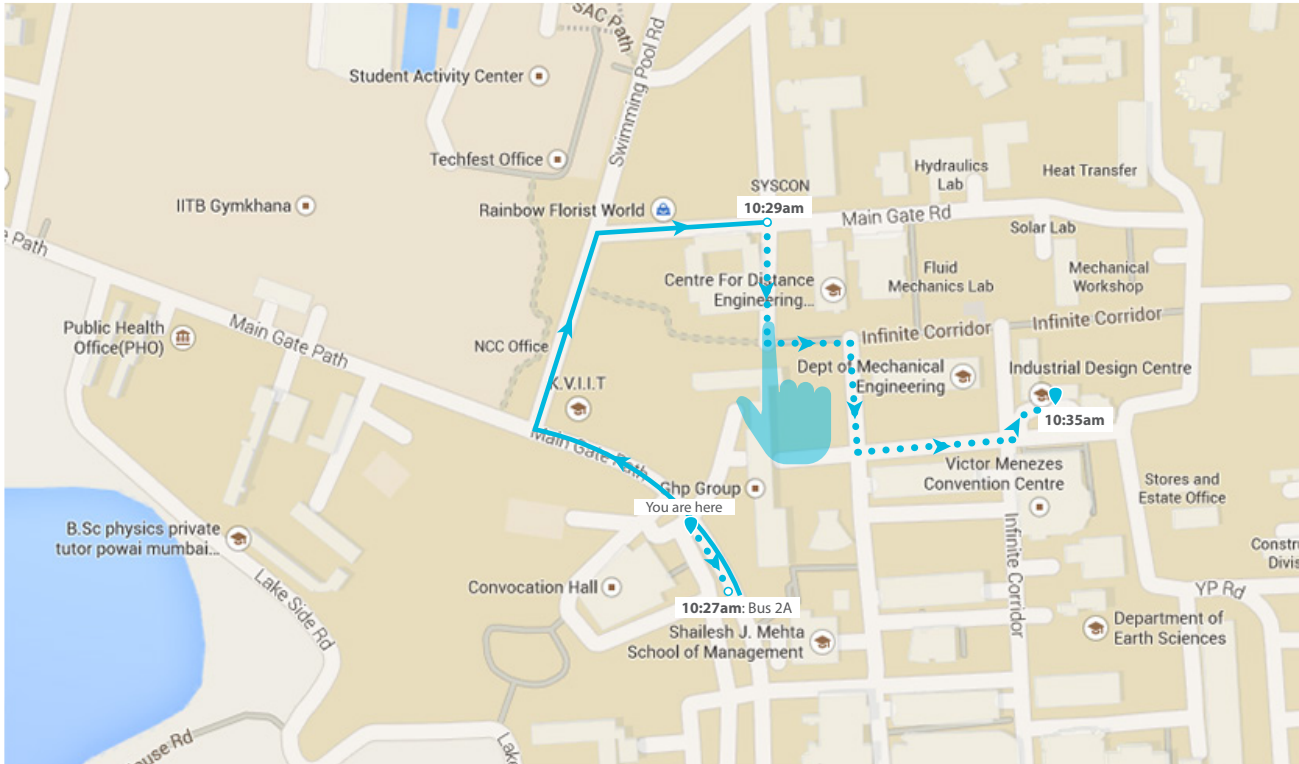
Turn left



STEP 8



From Convocation Hall
To Industrial Design Centre



Instructions can be scrolled down

Route

Walk South
towards Infinite Corridor



Turn left



Turn right



Climb stairs

Walk South



Turn left



Walk East

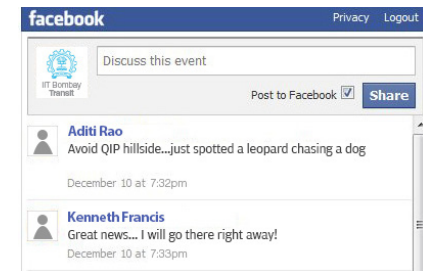


Turn left



10.35am

Reach IDC Main Entrance



STEP 9

Visualisation of Backend Process

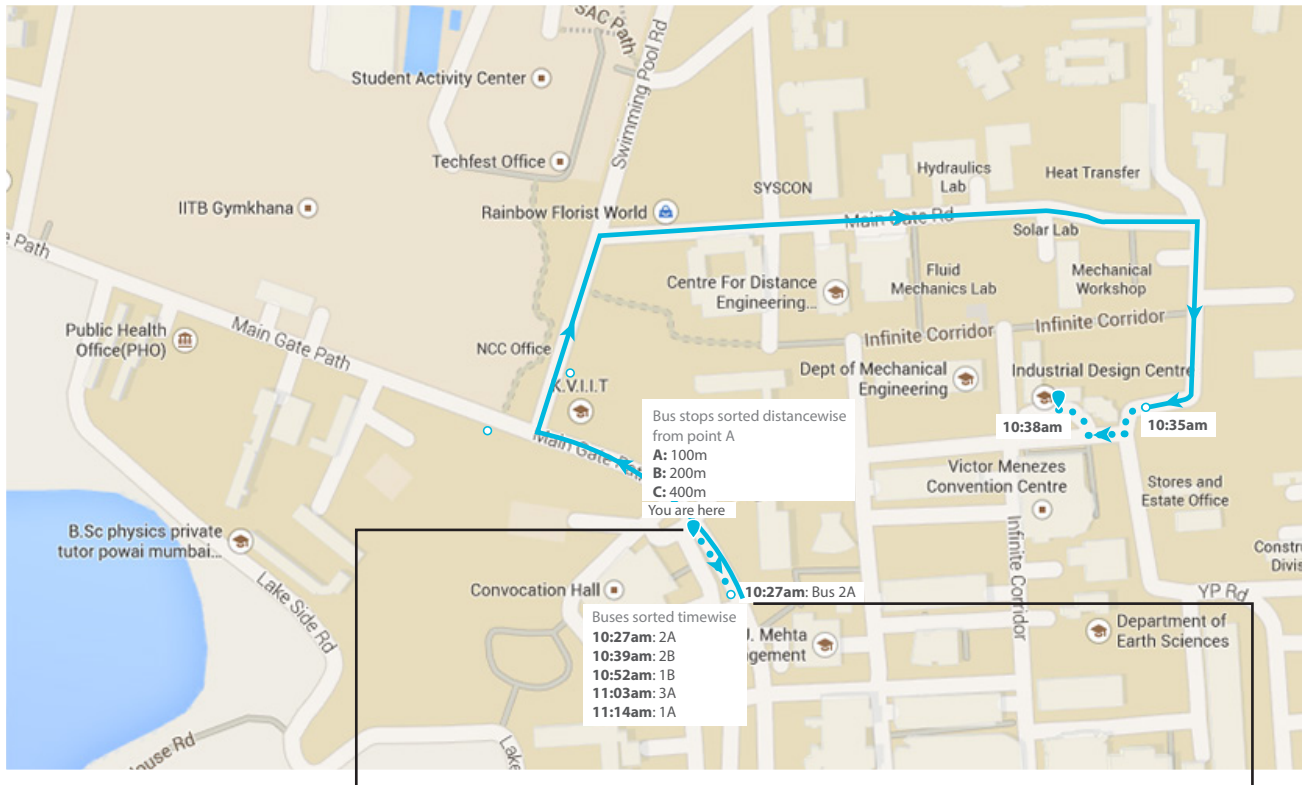
The information for processing is stored as follows in the database.

- 1) At every fixed location on campus, a list of bus stops are recorded in a sequence sorted according to proximity from the location.
- 2) After locating the closest bus stop from the location, data of the bus routes at the bus stops is accessed.
- 3) At every fixed bus stop on campus, a list of bus routes are recorded in a sequence sorted according to timings at which the bus would pass the location.

Based on the above conditions an optimal route is mapped from origin to destination in the least time frame and sorted according to the user's choice of mode of transport.



From Convocation Hall
To Industrial Design Centre



Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board **Bus 2A**

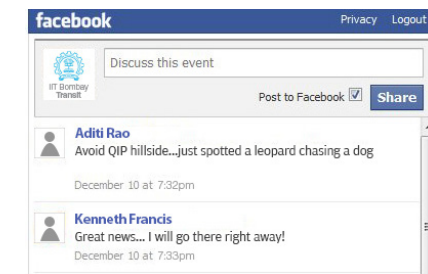
10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate



1) At every fixed location on campus, a list of bus stops are recorded in a sequence sorted according to proximity from the location.

2) After locating the closest bus stop from the location, data of the bus routes at the bus stops is accessed.

3) At every fixed bus stop on campus, a list of bus routes are recorded in a sequence sorted according to timings at which the bus would pass the location.

VISUALISATION OF BACKEND PROCESS TO DETERMINE THE OPTIMAL ROUTE ON THE MAP

8. Focus Area

B) Functionality

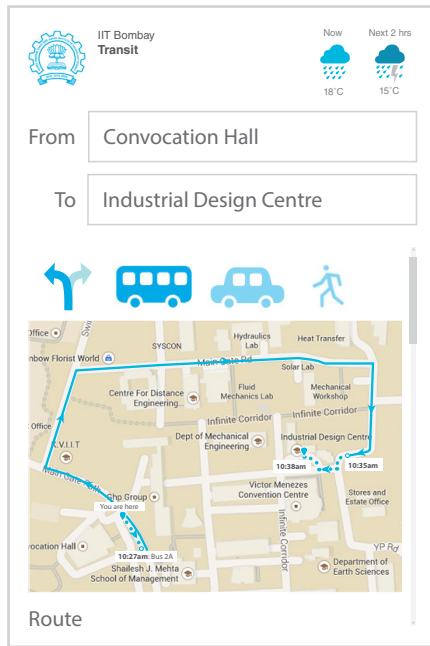
1. Responsive design - The interface would be coded and designed such that it adapts to to any device on which the website is being accessed such as desktop computers, mobile devices or tablets.
2. Scalable interface - The interface would be designed such that it can be scaled on any screen or device.



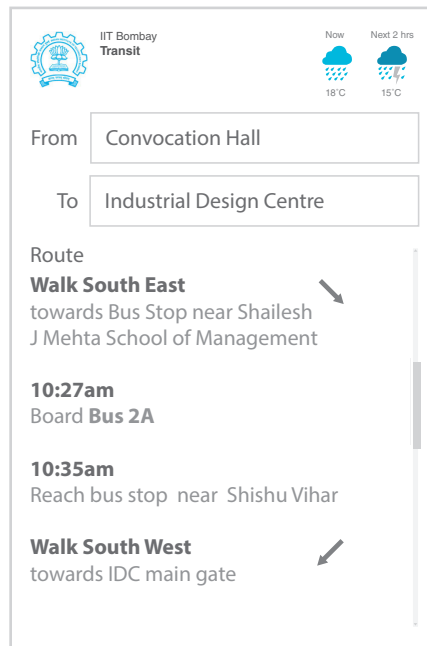
Courtesy: <http://www.mutedialogue.com/work/new-bbc-tv-channel-homepages/>

For Mobile

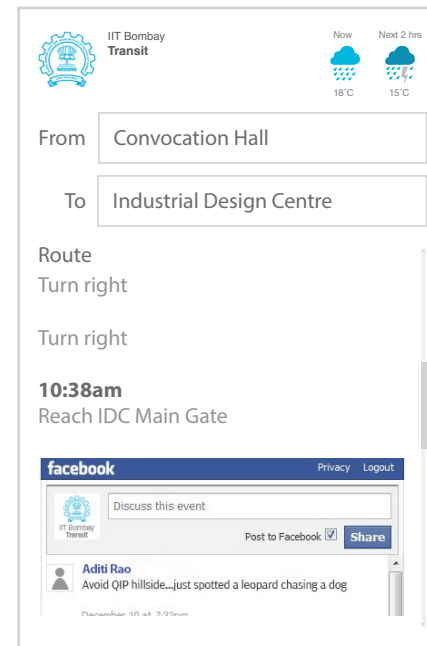
Screen size: 320px x 480px



STEP 1




STEP 2





STEP 3

For Tablet

Screen size: 768px x 1024px







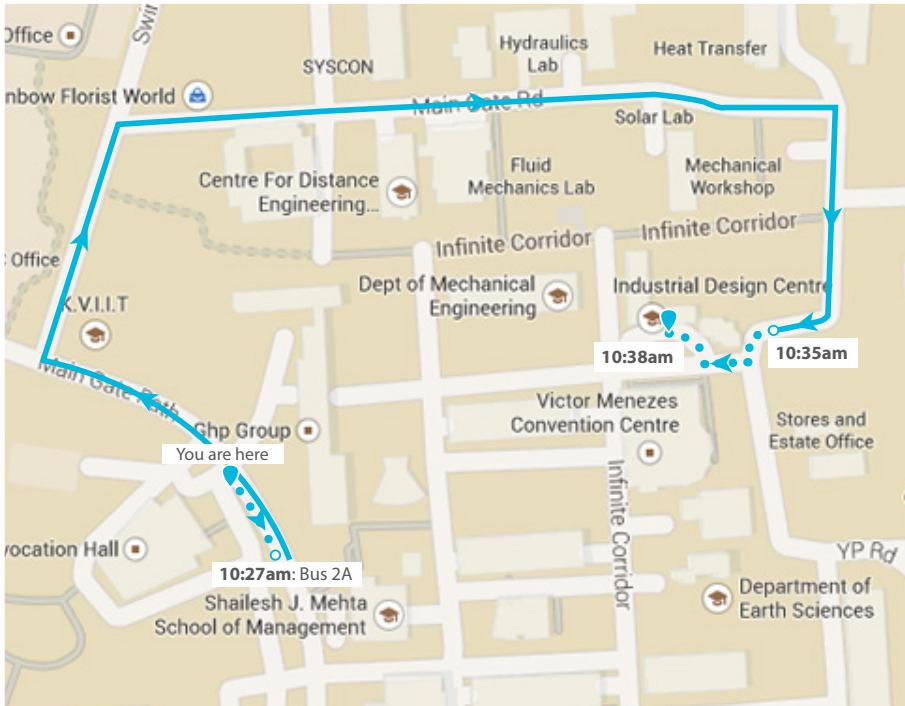
IIT Bombay
Transit

Now  18°C
Next 2 hrs  15°C

From

To


   



Route

For Desktop


Screen size: 1280px x 800px




IIT Bombay
Transit

From

To

Now  18°C

Next 2 hrs  15°C

Route

Walk South East
towards Bus Stop near Shailesh J Mehta School of Management

10:27am
Board **Bus 2A**

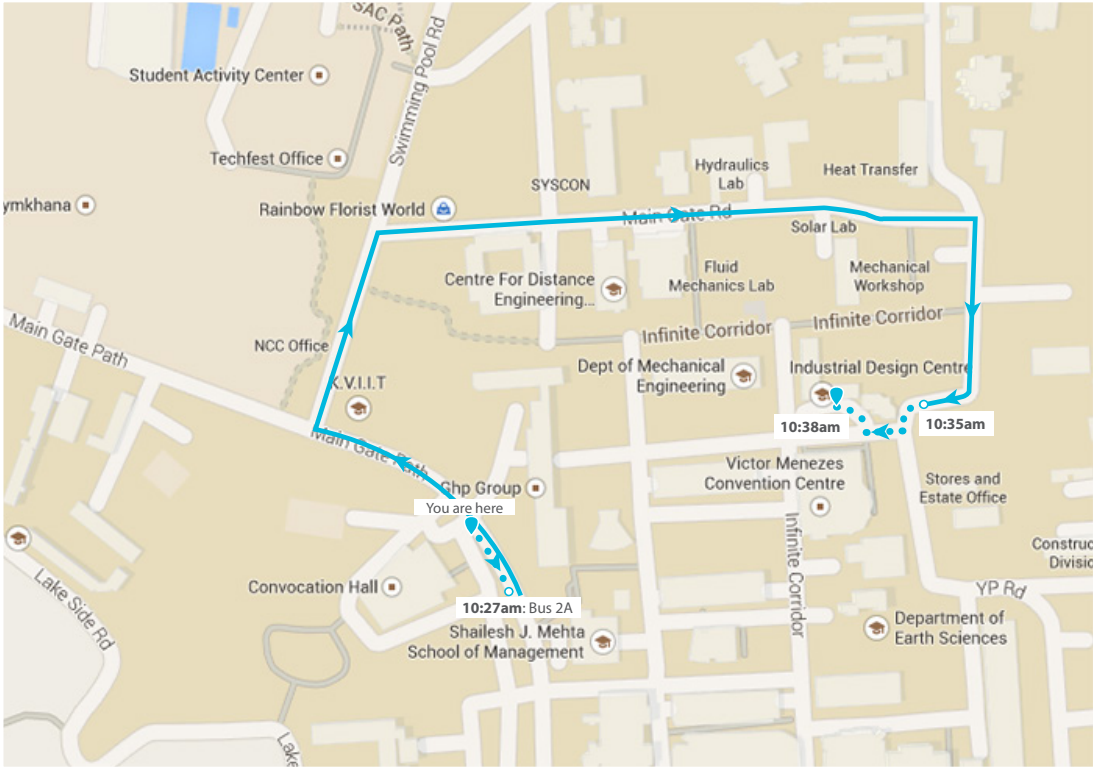
10:35am
Reach bus stop near Shishu Vihar

Walk South West
towards IDC main gate

Turn right

Turn right

10:38am
Reach IDC Main Gate



facebook Privacy Logout

Discuss this event

Post to Facebook **Share**

Aditi Rao
Avoid QIP hillside...just spotted a leopard chasing a dog
December 10 at 7:32pm

Kenneth Francis
Great news... I will go there right away!
December 10 at 7:33pm

8. Focus Area

C) Aesthetics

Identity

The blue colour for the logo stands for knowledge and stability symbolising the identity of Indian Institute of Technology, Bombay.

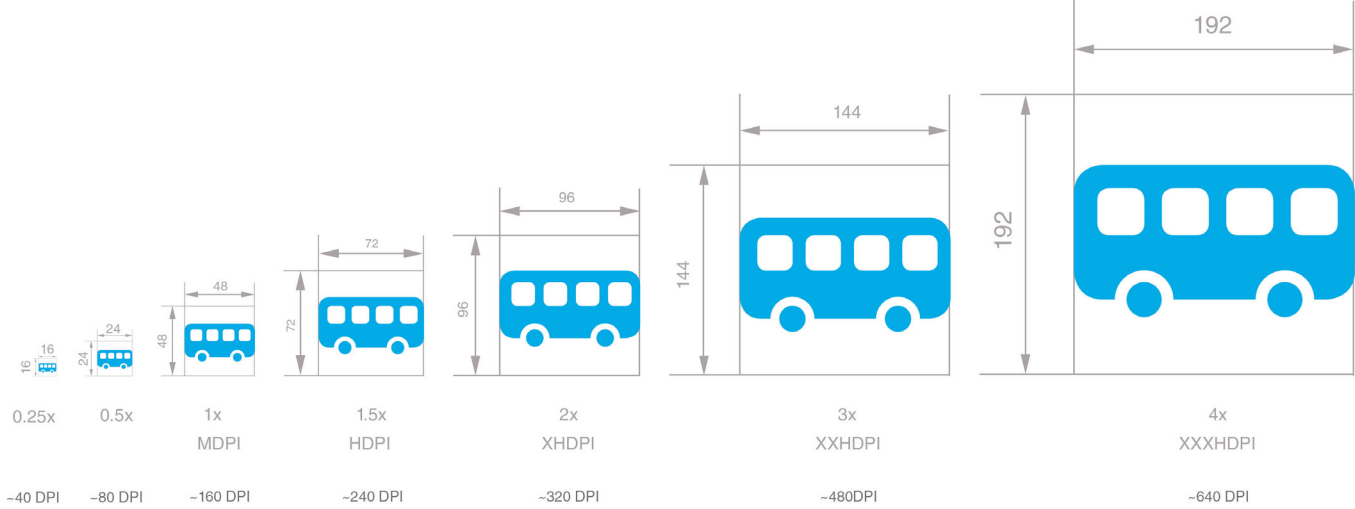
Iconography

The icons have been designed considering the constraints that they would be scaled down to a pixel dimension of 16px by 16px.

Modern Look

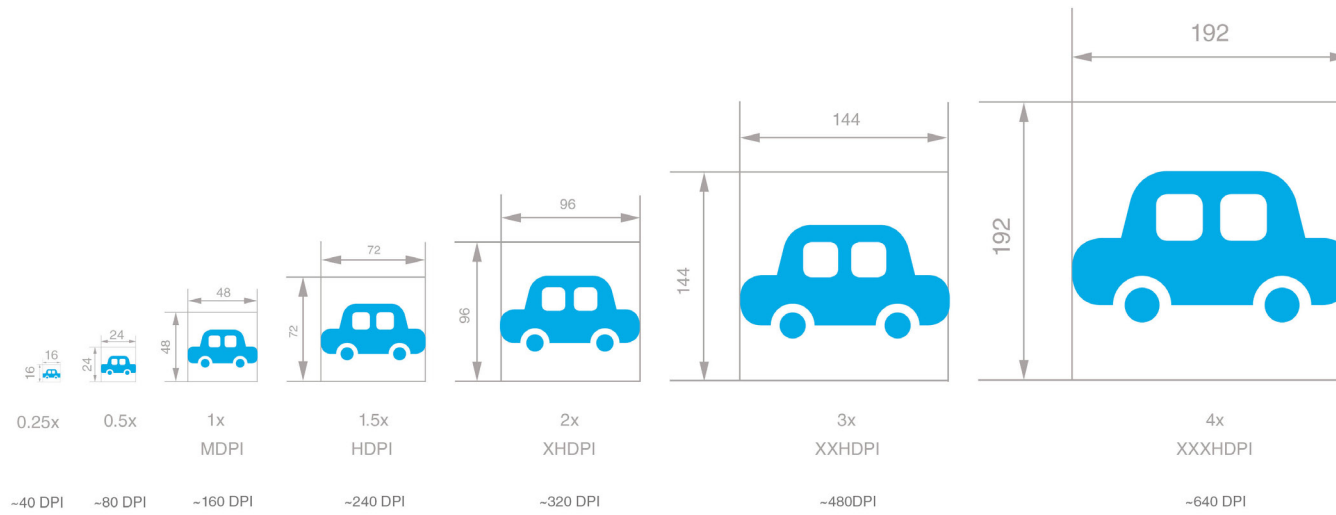
A minimalist approach has been adopted keeping in mind the philosophy of higher education at the IIT Bombay campus.

Bus



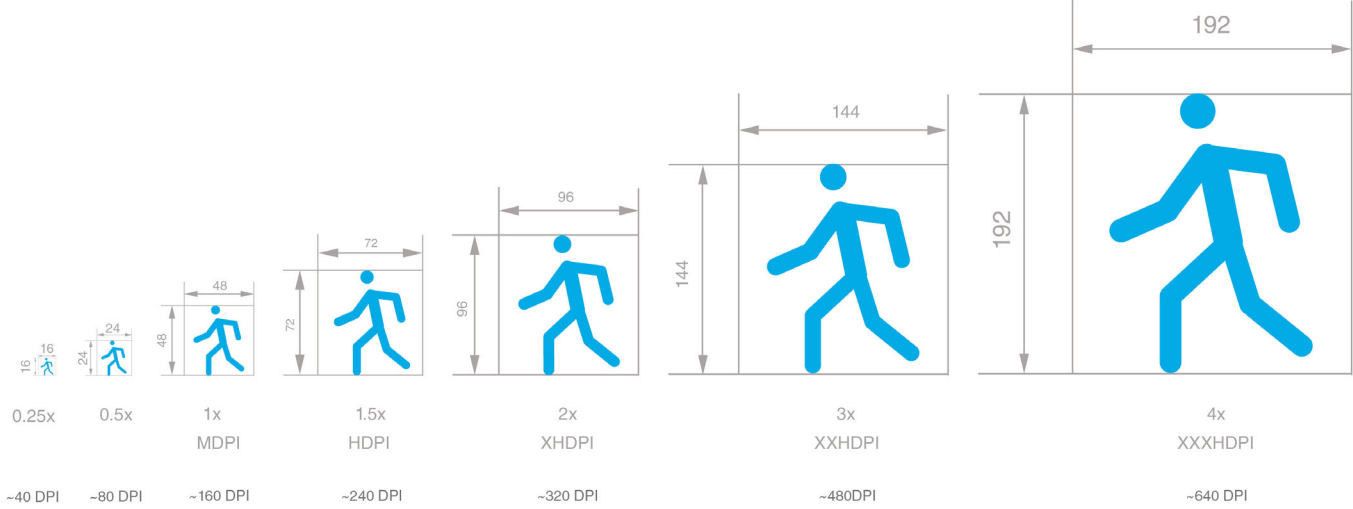
*All measurements are in pixels

Car



*All measurements are in pixels

Pedestrian



*All measurements are in pixels

Colours

The colour blue signifies knowledge, stability, order and integrity. The above qualities reflect the ethos of Indian Institute of Technology hence shades and tints of the colour blue have been chosen.



R=0, G=185, B=242



R=0, G=114, B=188



R=199, G=225, B=245



R=167, G=169, B=172



R=65, G=64, B=66

9. Conclusion

The project would empower people to take appropriate action and become more efficient while travelling within the campus. If this project works in the campus successfully, in future the same project could be applied outside the campus in a wider context.

10. Bibliography

Internet References

<http://transittripplanner.co.in/VisitorInformationSystem/>

<https://www.google.co.in/maps/>

<https://learnable.com/>

<http://union.co/>

<http://www.mutedialogue.com/work/>

[new-bbc-tv-channel-homepages/](http://www.bbc.com/news/technology-2014-08-28)

<https://www.tfl.gov.uk>

Books

Digital Design Essentials - Raj Lal