C H E C K . P O I N T S

Navigating beyond perspectives

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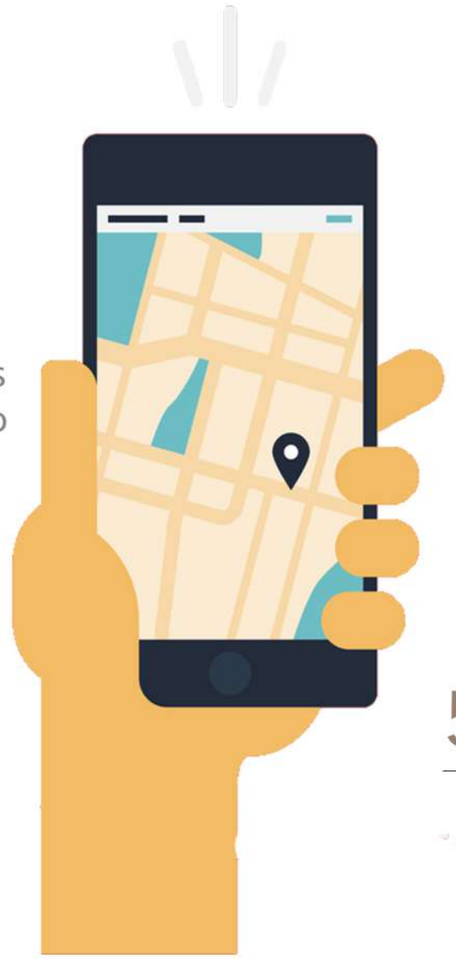
THE WORLD IS TOO BIG FOR YOUR GPS SCREEN

Nature of Wayfinding

Wayfinding in spatially extended environment is an essential human skill for survival and adaptibility. It utilises our cognitive abilities as intelligent creatures.

Being able to understand the environment provides visitors with a sense of control and empowerment, reduces stress, anxiety, and fear. Successful wayfinding systems also make financial sense by saving on productivity cost and preventing missed appointments/meetings.



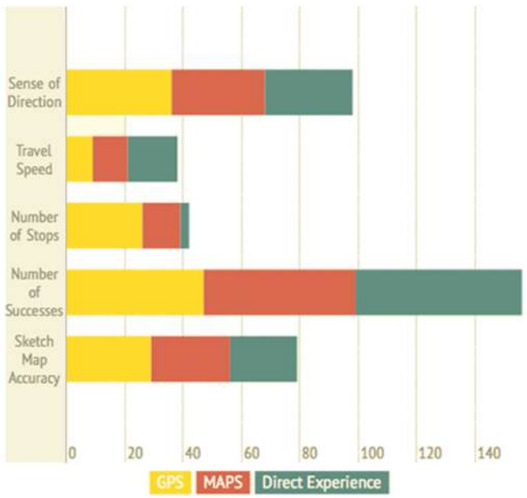
The Problem

Over-reliance on digital navigating has:

1. Divorced us from our surroundings
2. Developed ignorance about space and complex path interconnection .

GPS is merely a combination of small bits of wayfinding methods. The traditional methods, that are now abandoned, still work the best on their own.

Current Solutions



Surveys and Research

56% of our respondents prefer to use their own sense of direction than GPS if there is a better system in near future

How effective is GPS to you?

PROBLEM SCOPING | IDEATION | SYSTEM PROTO | PRODUCT PROTO | USER INTERFACE PROTO | FINAL SOLUTION | FINAL SYSTEM | FINAL PRODUCT | FINAL USER INTERFACE | FUTURE & LIMIT

IDEATION
OUR DESIGN PROCESS

Design Strategy

To develop EMPATHY for the problem by immersing ourselves in foreign environments to experience and understand what it means to feel lost.

To research on the various aspects of the HUMAN COGNITION that are directly related to the field of way-finding.

To DRAW INSPIRATIONS for our design from other human innovations, animals, and cultural products.

To integrate existing solutions in unique ways so as to redefine the experience of navigating from place to place, and CREATE DESIGN THAT MATTER

Concepts & Inspirations

When navigating dense and compacted roads, pedestrians tend to pick out distinct landmarks.

They identify their location with respect to these iconic landmarks.

They orientate themselves accordingly and use it as a base to check and ensure that they are not wandering too far off.

We were inspired by the Dewey Decimal System that classified books using the concept of relative location and relative index ordered with the use of Arabic numerals and decimals. This method of classification is methodical and logical.

We were inspired by this method to come up with a system of coding the signs that would allow road users to navigate based purely on logic.

Some animals use the natural world as a compass.
For instance, Salmon use particular magnetic signatures to identify their home river.

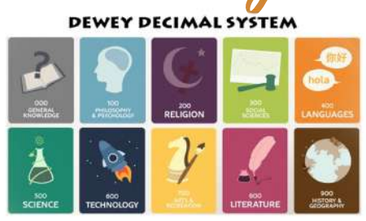
This form of identification uses the earth's magnetic field as a directional compass to enable the fish to ultimately find their way back their "home".

Homing pigeons may use an olfactory map; i.e. their sense of smell, or use the sun and stars as compasses.

SYSTEM PROTOTYPING

Signs

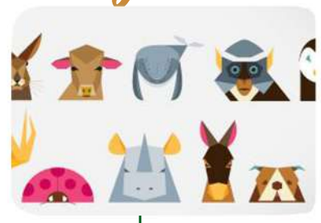
Road Coding



MRT as Satellites

Game Mechanics

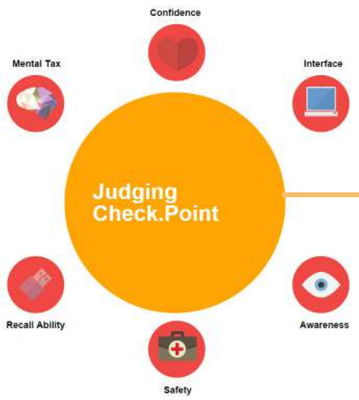
Animal Navigation



Our system is based on a database in each sign with the information of every other checkpoint. The microprocessor inside an RFID reader will take the information and generate a route leading to your destination starting from this checkpoint.

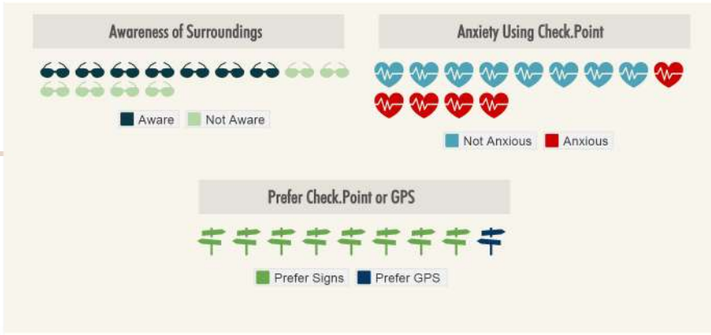
An output signal which contains the information of the direction of the next checkpoint on your route will be generated. The rotational sign will subsequently turn to that angle and the user can intuitively reach their destination just simply by going through certain number of checkpoints.

SURVEY & CONSUMER TEST RESULTS



As we got closer to conclude our final solutions, we went out to test our system prototypes.

We took Haji Lane, Singapore, as our perimeter for the test. Utilising the junctions and the crowds in the area, we tested out the response towards our ideas and their effectiveness.



What is the feasibility of our proposed installation and working mechanism?

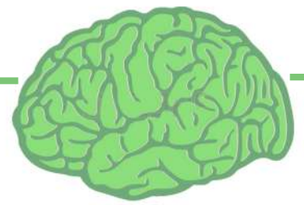
How user-friendly and attractive / eye-catching is it? (Colour &dimensions?)

Wearable

Communicates through haptic feedback.

Expensive wi-fi technology and most probably with huge power consumption.

Users are required to purchase an expensive extra device



Turning Sign

It is simple and straightforward.

Interaction between the user and our check-points can be done by using a portable information storage device.

Requires external power source and high infrastructural costs

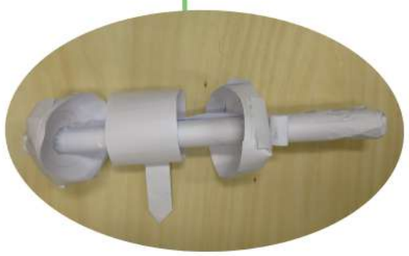
Turning Lights

It is simple and straightforward.

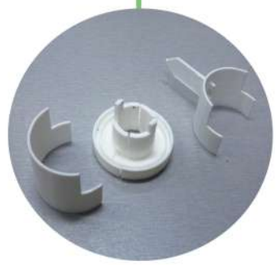
Interaction between the user and our check-points can be done by using an information storing device.

There is high infrastructural costs and limited day-use

SIGNS PROTOTYPING

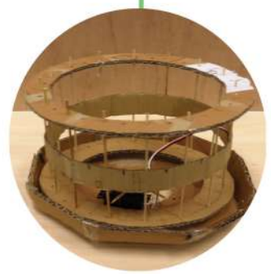


We decided that there were 4 main parts to the design: The case; the cylindrical sign housing; the sign itself; and the electrical components.



The casing and the cylindrical sign housing is split into two and can be easily assembled together without compromising on its functionality

The colour and proportions of this CAD gives a clearer picture of what the actual sign would look like to scale when it is used.



For the sign to be attached to any pole, the motor cannot be situated in the centre.
The cylindrical sign housing will have toothed edged on the inside, which will interact with the motor output.

RFID Technology

RFID systems offer unique identification method using the mechanism of a scanner. Using this technology and attaching a reader on the sign, information on the angle the sign is supposed to turn at will be computed from the algorithms and database.

CARD

Card dispensing machine will be placed at various points of interest. Pedestrians can choose their desired destination that will be tied to the card they get.

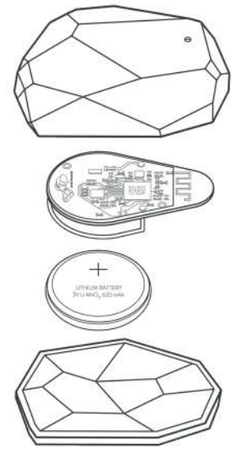
Possible Solutions: Integration on ez-link cards

APPS

Involves multiple modes that allows the user to explore the area in a more directed or exploratory way. The user indicates his intended destination on the app and communicate with the sign using NFC technology.

Possible Solutions: Estimote beacons

Simulated App Layout

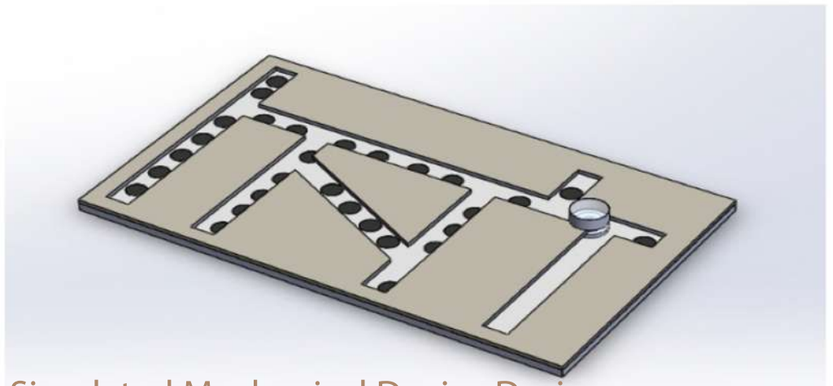


Estimote

Mechanical Information System

The device shows the layout of the district, with the dots representing the places that potential users might want to go. Users would move the pin to the location of their intended destination.

This device could be fixed at the sign itself or be portable with one for each user. A scanner would then read the location they want to get to and the sign would turn in the direction of the next checkpoint in their calculated route.

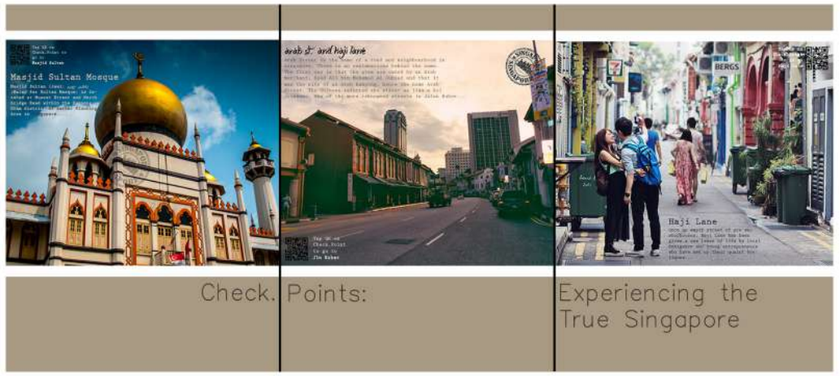


Simulated Mechanical Device Design

Barcode/QR Code

Pamphlets could be printed with information about certain locations and routes, together with a QR code printed next to it.

The user would scan the QR code which contains the information of the intended destination on the scanner at the sign, which would then output a direction. This would work similar to the RFID tag



Simulated Pamplet Layout

---USER INTERFACE PROTOTYPING ---

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FINAL PRODUCT

Our Sign

We based the design of our motorized signs on a modular concept.
This affords versatility to our system as the sign can be incorporated onto existing infrastructure – be it traffic lights or lampposts – with the sign revolving around the axis of the pole it is attached to.

Collectively, our signs would calculate the exact route for the user.The signs would work fluidly together to provide a whole new navigation experience for the everyday pedestrian.

Our System

Our system is tailored to the urban landscape of various districts in Singapore.
The various checkpoints constitute a sophisticated network within each district. Individual checkpoints would display information in relation to the other to provide a seamless transition from checkpoint to checkpoint.

Together, this gives the everyday pedestrian a fresh new perspective on their surroundings - the people, the architecture, and the greenery.

Users will interact with our system using QR codes as the input of their final destination. Pre-set routes could be devised to bring users through a value-added journey. Using our system is as easy as scanning a pamphlet.

Seamless Journey

A seamless journey is governed by thinking in terms of journeys rather than jurisdictions, which makes navigation much more enjoyable and memorable.

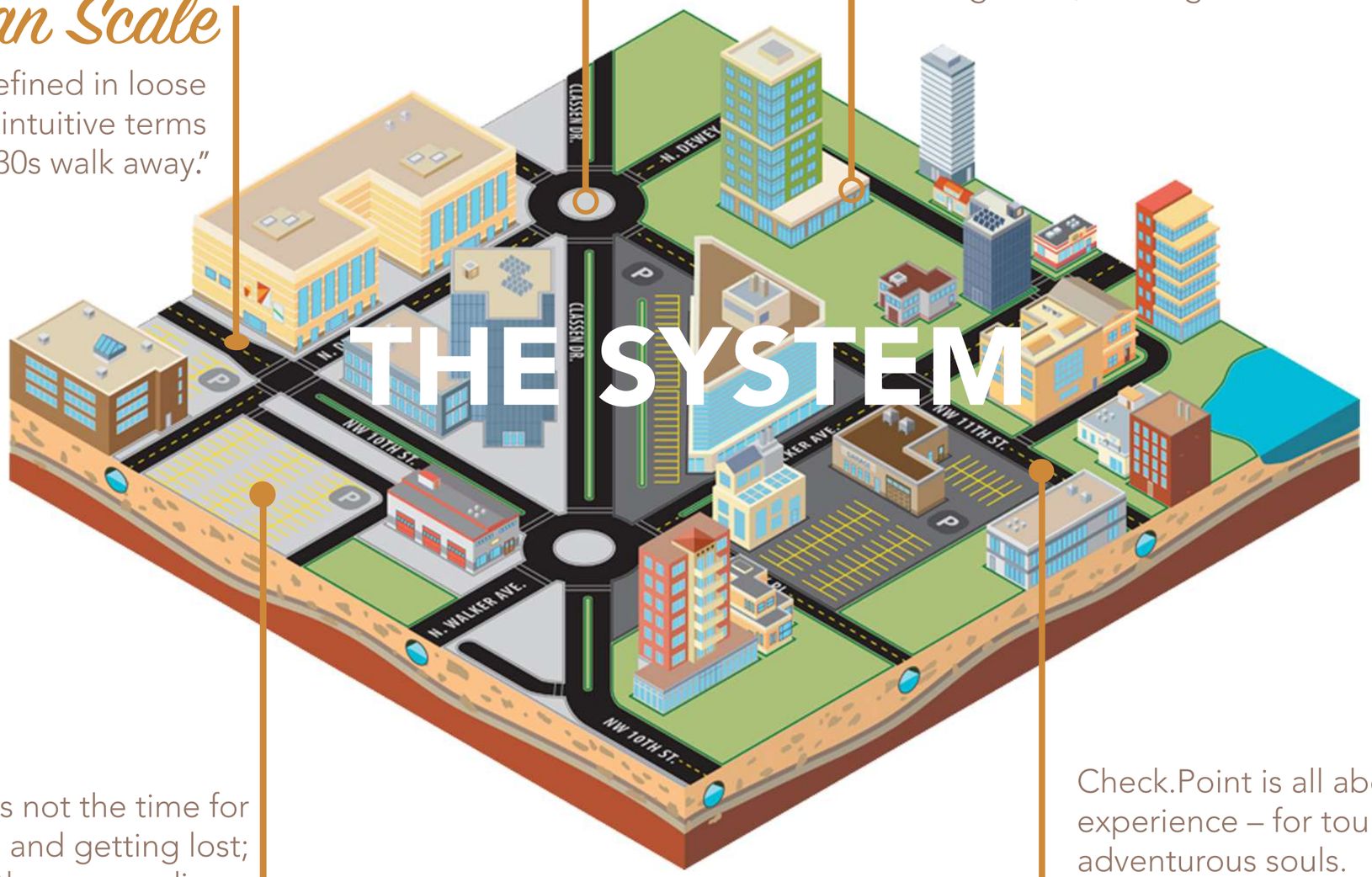
Check.Point Allocation

Goals are placed at natural points of interest, before they are connected to one another to form the paths. Check.Point are never be more than 100m apart.

You will get just the right amount of information, nothing more, nothing less.

Human Scale

Information is defined in loose intuitive terms
"Destination is 30s walk away."



THE SYSTEM

Journeying is not the time for orientating, analysing and getting lost; It's time to enjoy the surroundings. Just tap, Check.Point, and go.

No Sweat

Check.Point is all about the experience – for tourists and adventurous souls.

Target Audience

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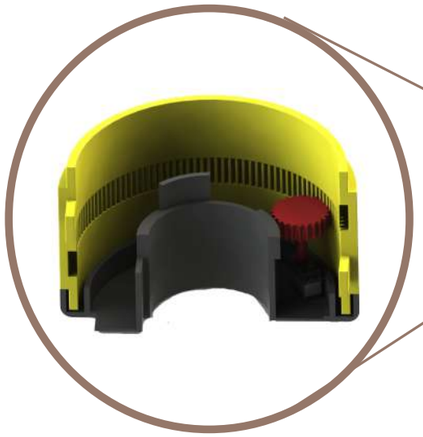
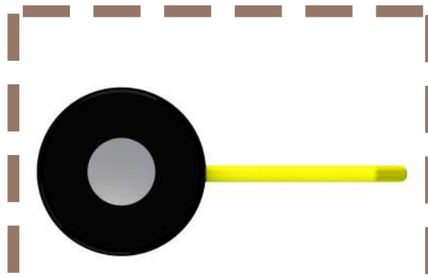
Turning Sign

Turning sign allows users to easily orientate thems elves to their final destination. This removes that hassle when using maps and GPS.

The cylindrical sign housing has toothed edges on the inside which is driven by the motor contained within it. The cylinder is guided by the rails on the base.





LED Sign

LED scrolling display is incorporated into the sign to show sufficient information in a succinct and sleek manner.

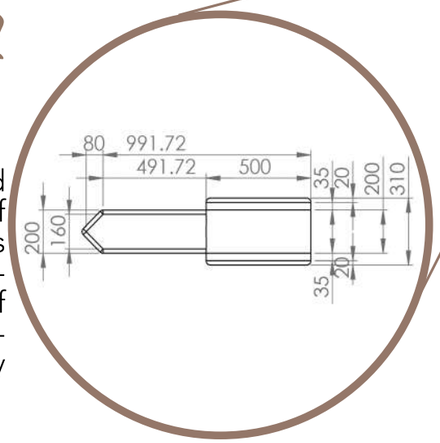
When idle, it displays the current road name and other roads in the perimeter, showing the distance away from current location. When activated by a user, it displays 3 information: Your destination and how far away it is, how many checkpoints left, and how far it is to the next checkpoint.

Dimensions & Colours

The size of the sign is designed to be large to capture the eye of people. The hole in the centre is meant for it to fit any pole of suitable size. We based this size off the diameter of a standard lamppost which is approximately 20cm.

We made sure that there was sufficient space by the side of the hole to fit all the necessary electrical components such as the motor and the microcontroller.

The display sign had to be able to fit a large LED display on both side, which we set to be at _ long and _ wide.



THE PRODUCT

The Assembly

Each component was broken down into 2 such that it can be assembled onto the pole by wrapping around it rather than sliding it from the top.

USER INTERFACE

Simplicity

Due to the various modes possible in the PHONE APP and the choices the user has in indicating his preferred destination, his decision becomes more complex

The NFC CARD has to be preprogramed and this adds to the hassle that the user has to go through in order to use the system

The MECHANICAL INFO STORAGE SYSTEM provides information that is readily displayed on the device such that it can be adjusted in an intuitive way. However, it is a little complex.

QR CODES can be easily printed on many different mediums and therefore can be mass produced cheaply

Visibility & Adaptability

The PHONE APP layout is clear and intuitive, allowing the user to input information easily and get an intelligible output fast. Clarity of information depends on how concise and clean the app is.

OTHER METHODS only provide information output through the signs.
However, the representation of the layout in real tangible form affords the user with a certain level of security with the MECHANICAL STORAGE SYSTEM. The information on the location given with the QR CODE provides a unique experience for the user.

User Error

The PHONE APP can give real-time feedback to the user.

There is a lack of real-time feedback in the OTHER METHODS.

Based on the target audience of tourists, many of them do not use sim cards. Together with the limitation of the battery life on phones, the most suitable option is a low-tech systemof information input at the end of the user. There is a possibility for the integration of use of QR code by the phone app in the near future.

A barcode is a machine-readable optical label that contains information about the item to which it is attached.

QR code (abbreviated from Quick Response Code) is the trademark for a type of two-dimensional barcode. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte / binary, and kanji) to efficiently store data, which can be read by an imaging device, such as a camera, and processed.

The QR Code system has become popular due to its fast readability and greater storage capacity compared to standard UPC barcodes. A QR code can carry up to some hundred times the amount of information a conventional barcode is capable of.

THE MACHINE

1. **The user flips to QR code that encodes the information on where he wants to go**
2. **The user aligns the QR code onto the reader**
3. **the sign decodes the information and points in the direction of the next checkpoint**
4. **the sign will emit a soft buzzing sound as it turns so as to reassure the user as to which direction they are supposed to walk.**
5. **the user follows the direction in which the sign points to the next checkpoint whereby the process repeats again.**
6. **the sign will display how many checkpoints are left to go.**
7. **once the user reaches the end of the route, the LED display will display the name of the location so as to indicate to the user that they have arrived at their intended destination.**

LIMITATIONS & FUTURE EXPANSION

Target Audience

TOURISTS & LOCAL EXPLORER

scope of project could be extended by reaching out to

DEMENTIA & ALZHEIMER'S PATIENTS

Coverage

SPECIFIC NEIGHBOUR-HOODS

that are not interlinked. In the future, have a more expansive coverage

COUNTRY WIDE

Drivers

PEDESTRIANS

Estimote Beacons can be used to provide real time navigation in cars

CAR ROUTE NAVIGATION

Customisation

LIMITED ROUTE CHOICE

Confer more freedom in route choice to the user by incorporating phone apps

PHONE APPS ARE USER-BASED