DIGIM I: ClearStation

UIC nextstation TEHRAN 2019

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Agenda

- Introduction
- ClearStation Project
  - Methodology
  - Results and Findings
- The Next steps

DIGIM Programme

The DIGIM programme (DIgital IMpacts on business processes):

- Worldwide
- Cross-functional programme

Objectives:

- Leveraging new digital technologies to support business process development
- Improving railway safety and security
- Optimising operations
- Making better use of existing data.

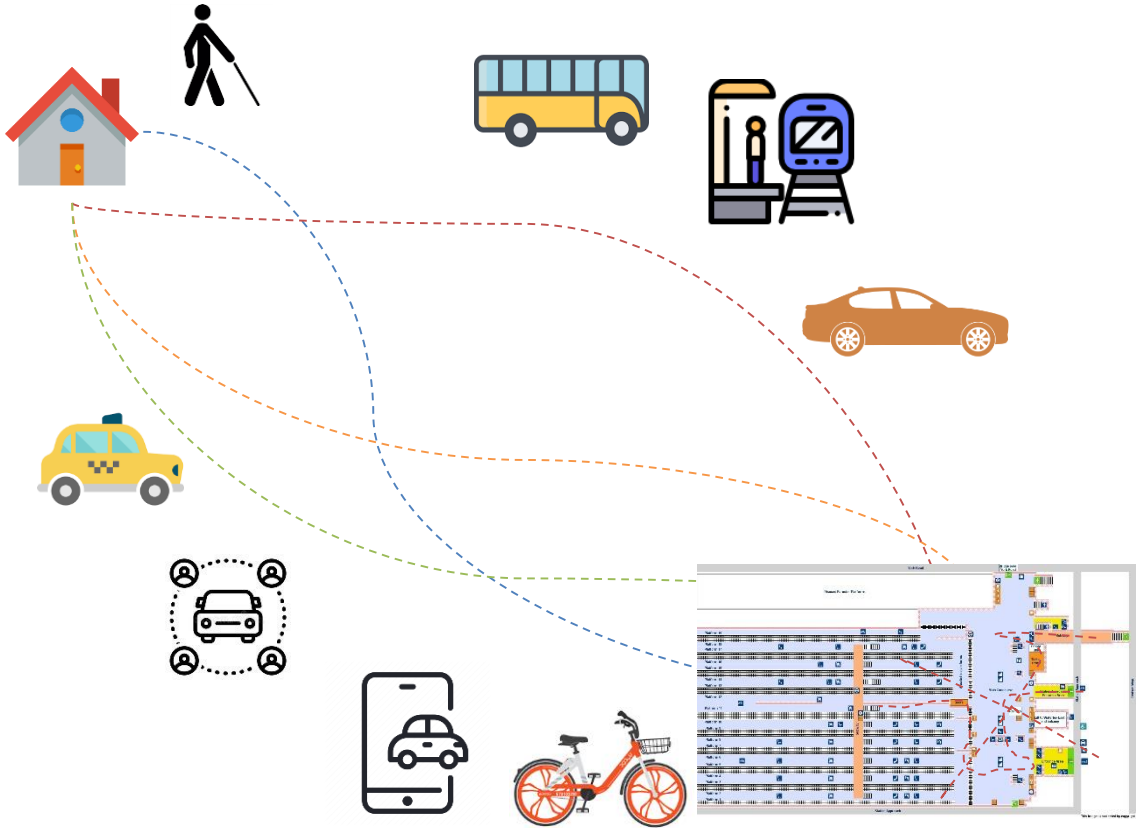
DIGIM I:

- The program initiated by UIC and 6 members were involved: Canada, Russia ,Iran , Italy ,U.K,Luxembourg

- **Clear Stations:**
- Connected level crossings (phase 1)

Mobility

We need to think about all the chain in the mobility system : door to door(seat!!)



Clear Station

The aim of the project :

- Providing safety and full autonomy for blind and partially sighted passengers by successfully navigating them inside station
- Providing Accessibility for all users
- Enhancing customer experience

VIA Rail Canada

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Methodology

1

Understand client's needs and concerns

CANADIAN COUNCIL OF THE BLIND

cnib
seeing beyond vision loss

Observing the journey of partially sighted people inside the station

Understand their feeling, stream of thoughts and the challenges they need to face

Core needs :

- Information clarity
- Choice

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Methodology

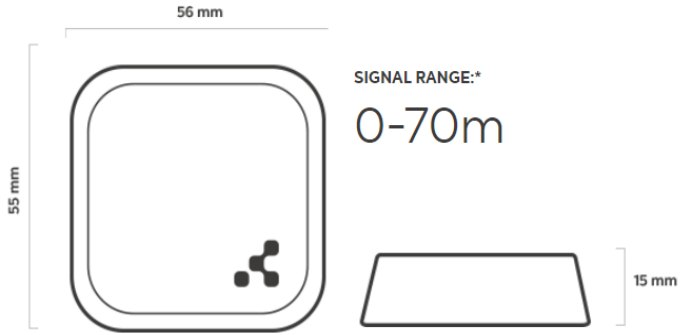
1. **Understand client's need and concerns**
2. **Indoor navigation technologies**

- Different technologies for **wayfinding** (BLE, Wi-Fi, Ultrasound,..)
- and **barrier detection** (white cane modifications, oral echo location techniques, and echo location wearable devices, such as wrist bands) were studied
- Visit from Amtrak's Penn Station and San Francisco Airport
- Desirability, Feasibility, Viability analysis

beacon-based wayfinding + echolocation obstacle detection

Beacon-Based Wayfinding
Technology Overview

Partnership with Indoo.rs



- Kontakt SB16-2 beacons were used
- One beacon every 25 square meters
- Beacons were placed roughly 10 meters apart, 3-4 meters high
- 200 Beacons were used for Ottawa Station

Echolocation Obstacle Detection

Technology Overview

Partnership with Sunu

Sunu wrist-band worn on the user's dominant hand

- Using an ultrasonic sensor, the device converts ultrasonic feedback into haptic pulses, changing the intensity based on distance
- indoor and outdoor modes
- The indoor mode detects objects that are 4ft (1.5m).
- It is designed to work in crowded spaces as well as detecting edges, gaps, walls/solid surfaces, and doorways.

Methodology

1. **Understand client's need and concerns**
2. **Indoor navigation technologies**
3. **Pre-Test and Test the proof of concept**

- To check and test the technologies individually and as a pair.
- The UX of the mobile application was adjusted to be better adapted to the needs of the blind.
- The Sunu band was tested in two indoor and outdoors modes. Range of detection of the device Indoor range 1-2 m and outdoor 3-4 m.

Results and Findings

Test group consists of 7 individuals covering three profiles :

- White cane users
- White cane users with additional mobility challenges
- Dog guide users

- The Sunuband was 100% successful, all participants navigated successfully around potential barriers and obstacles.
- Five of seven participants were able to successfully and safely navigate the station
- Guide dog users struggled with the mobile app solution. Trusting the dog or the app?

The next steps

- To expand the results beyond Ottawa station and implement the solution in other stations.

- To improve the **technology**

  To solve and explore deeper some of the limitations :

  leverage a confidence interval when determining a precise location is difficult.

- **On-train testing** to see if it is possible to guide blind and partially sighted passengers to washrooms, baggage, and their car number

- Brining **new features** such audio sounds to signal progress, arrival at a destination, offering an audio description of a nearby point of interest

- https://www.youtube.com/watch?v=rt5c21gBUA4

Thank you

for your kind attention

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