

Using AI to Improve Road Safety

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COO and Co Founder

September 2023



VIVA
CITY



VIVA CITY

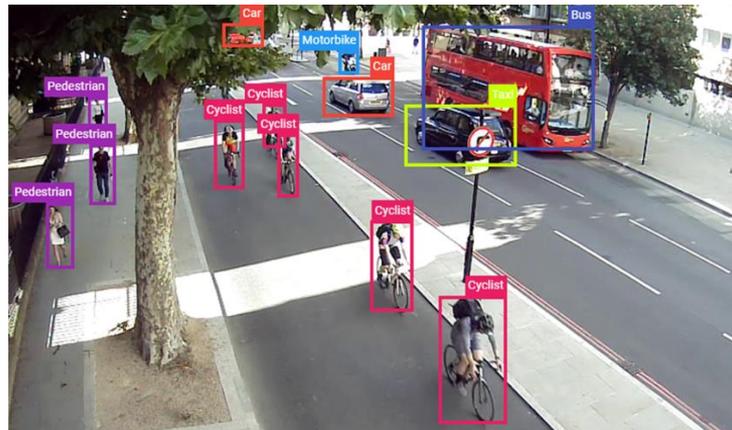
Agenda

- Zeroes: Net Zero + Road to Zero
- Measurement of Risk Factors
- Direct Measurement of Hazard / Near Miss
- Case Studies
- Two new projects in New Zealand

Who are VivaCity



- Computer vision tech company based in London, UK
- Founded 2015 by 3 friends who met at the University of Cambridge
- Over 100 members of staff, presence in UK, Australia and US
- 100+ local and regional authorities
- 3500+ sensors
- 29 Billion unique movements

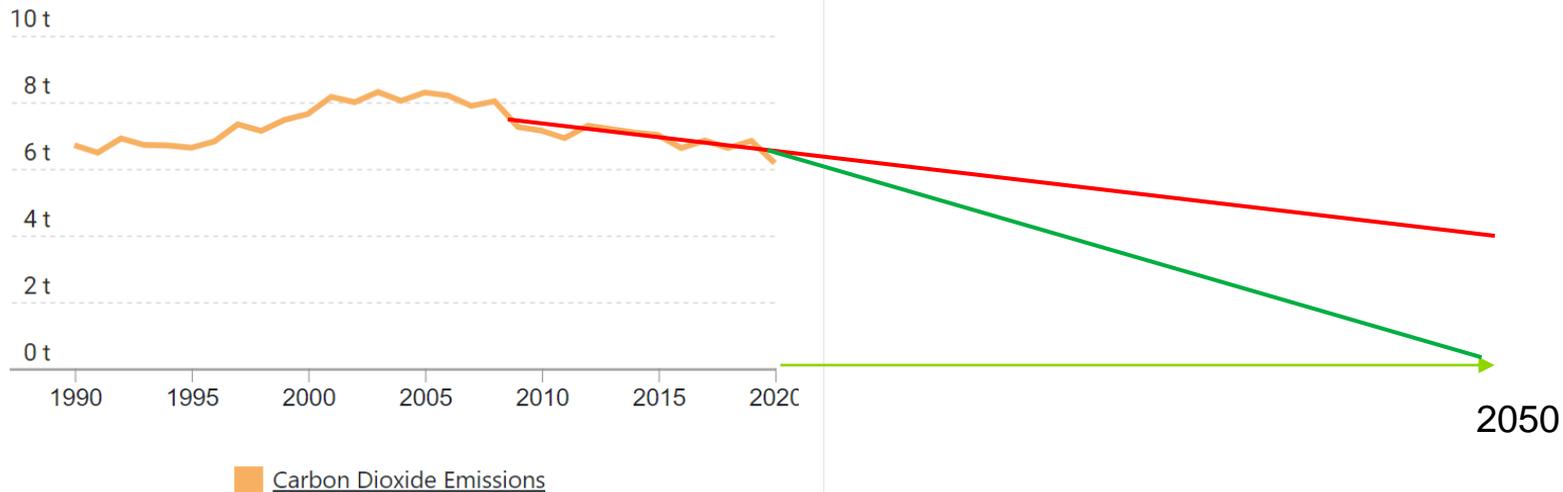


This image was taken from a VivaCity sensor in central London.

Net Zero by 2050

Enshrined in New Zealand Law

Carbon dioxide emissions per capita in New Zealand



Data from datacatalog.worldbank.org

Transport Decarbonisation

Government Strategy

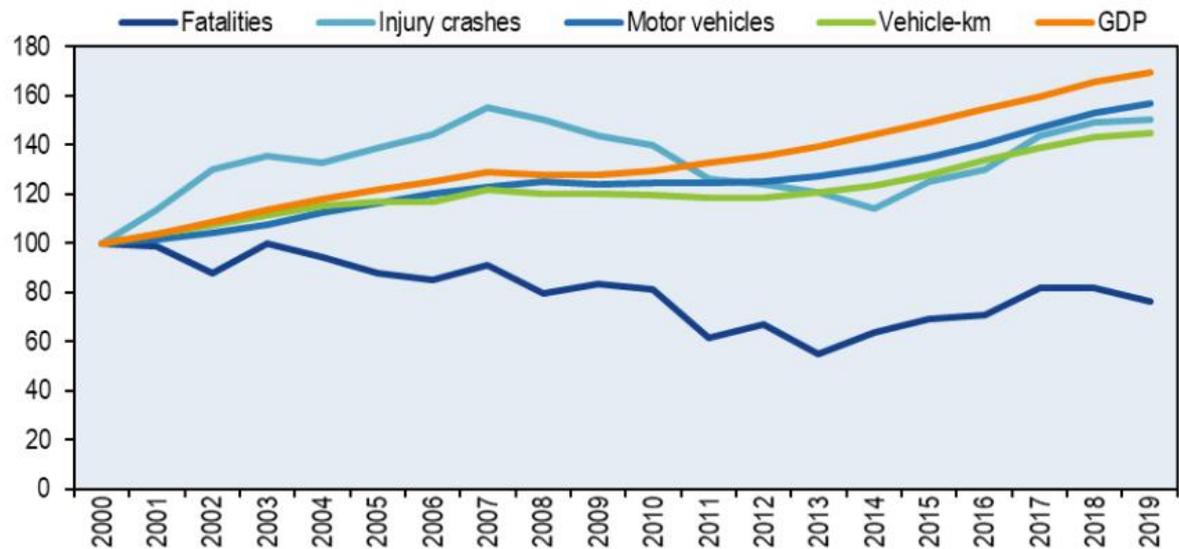
➤ The Decarbonising Transport Action Plan 2022-25 sets out the areas that we will focus on to reduce transport emissions:

- **Make it easy to get around without a car.**
- Help New Zealand make the shift to zero emissions vehicles.
- Encourage low emissions freight and heavy transport options.



Road to Zero

NZTA: We have a vision of zero deaths and serious injuries on New Zealand roads



Source: International Transport Forum: Road Safety Data New Zealand

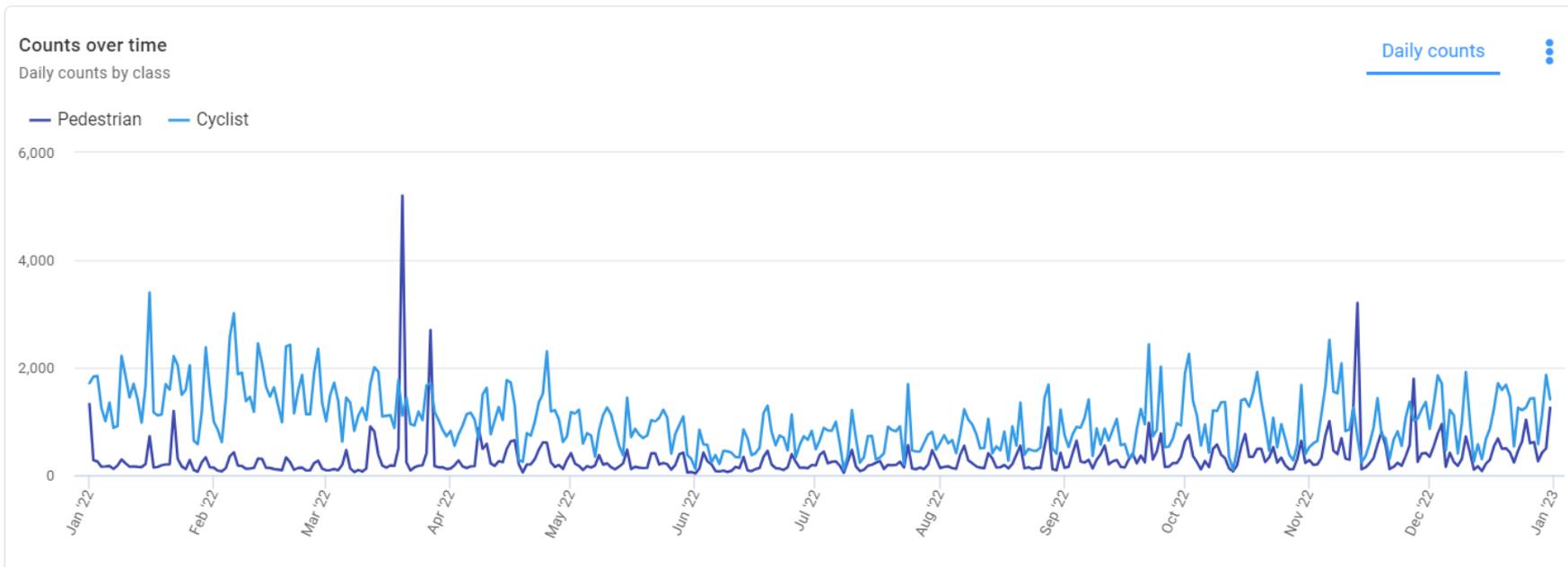
The Challenge: Promote model shift towards Active Travel, whilst protecting vulnerable road users

Data is key, but do we have the right data?



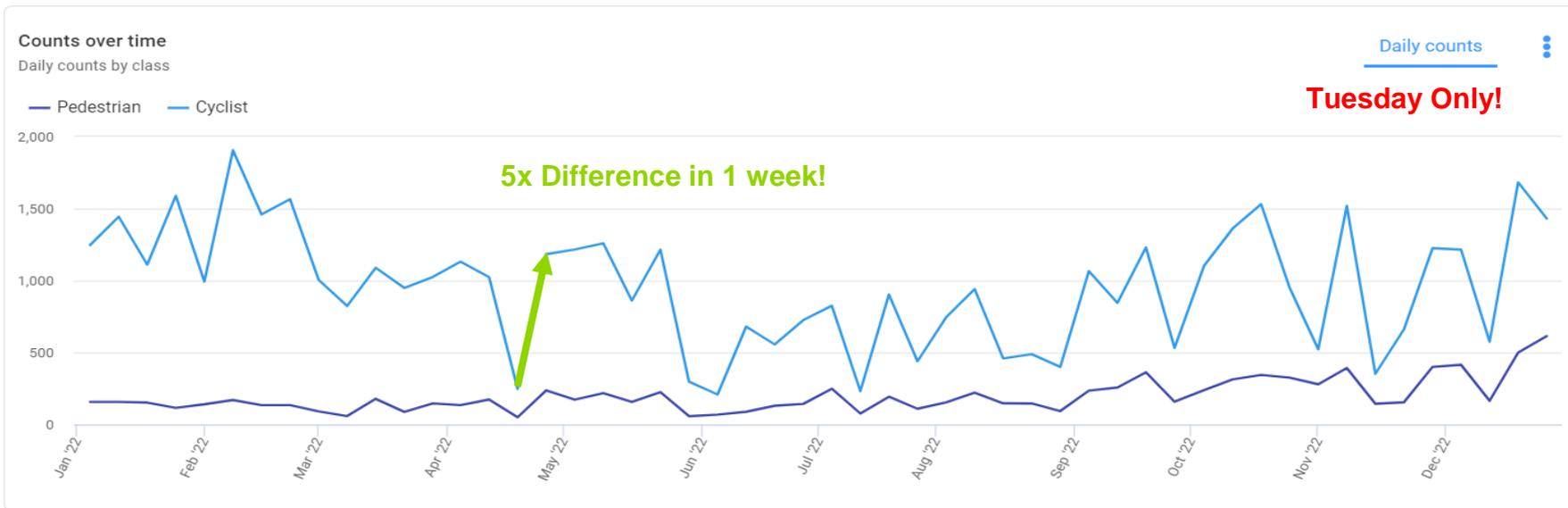
Promote modal shift towards Active Travel, whilst protecting vulnerable road users

Data is key, but do we have the right data?



Promote modal shift towards Active Travel, whilst protecting vulnerable road users

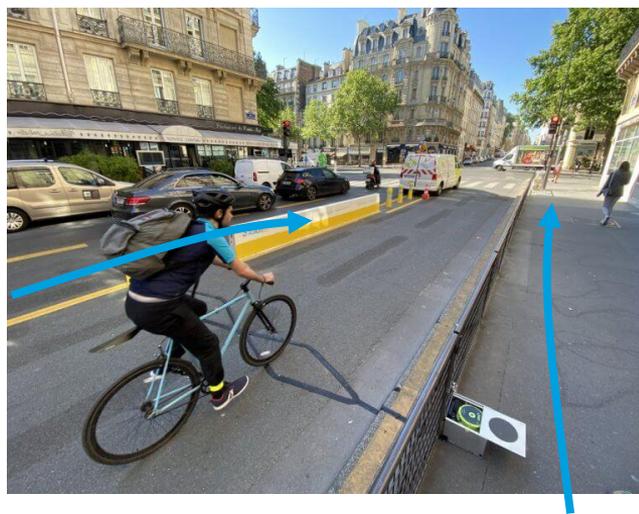
Data is key, but do we have the right data?



Promote modal shift towards Active Travel, whilst protecting vulnerable road users

Data is key, but do we have the right data?

➤ Traditional methods do not provide the whole picture (e.g., speed, path, dwell, turn, interact)

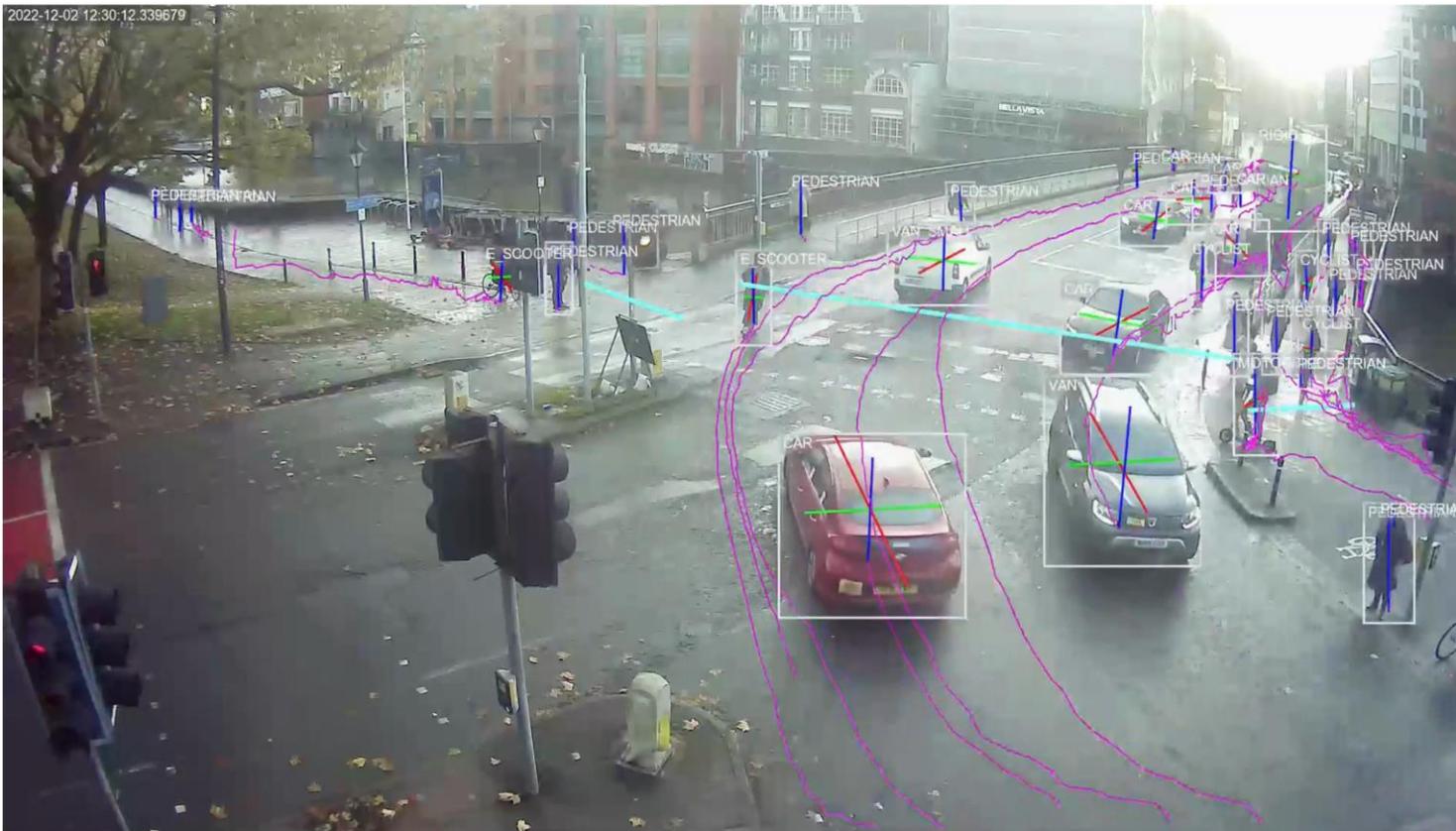


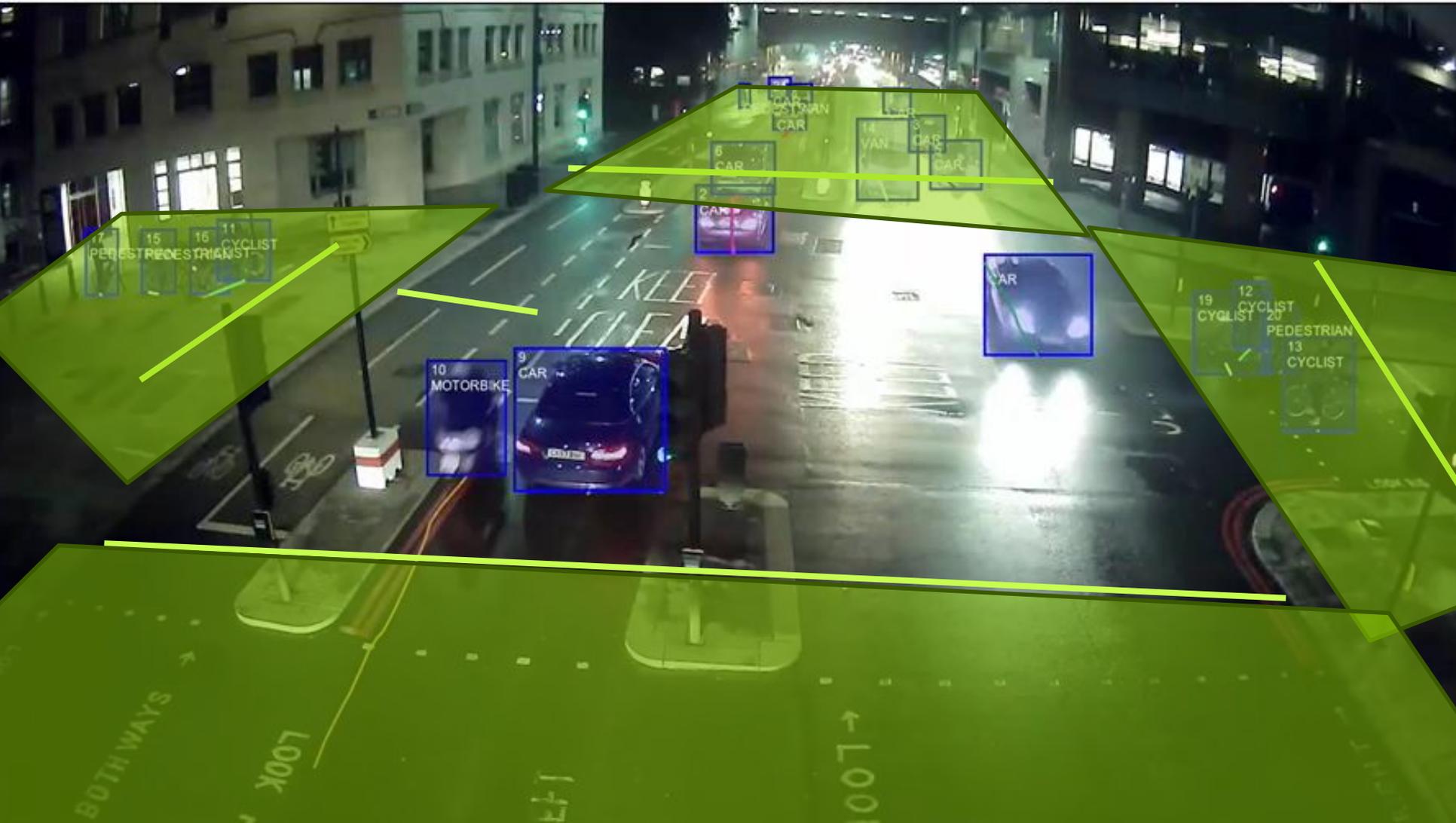
Not the whole picture:

- Speed
- Path
- Dwell
- Turn
- **Interact**

The solution: Edge Vision Sensors

Data is key, measure the right things





17 PEDESTRIAN
15 PEDESTRIAN
16 PEDESTRIAN
11 CYCLIST

10 MOTORBIKE

9 CAR

2 CAR

1 CAR
10 PEDESTRIAN
11 CAR

14 VAN
8 CAR
3 CAR

7 CAR

19 CYCLIST
12 CYCLIST
20 PEDESTRIAN
13 CYCLIST

The solution: Edge Vision Sensors

Not all Computer Vision is Equal





The solution: Data Dashboard

Data Supporting Zeros Strategy

Last 28 days

21 Jul - 17 Aug 2023

Period: Last 28 days | Assets: All countlines

[Learn more](#)

Total active travel counts

2,286,432

10% vs previous 28 days



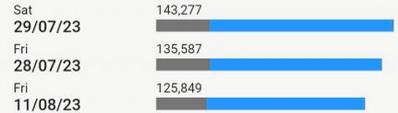
Total motorised counts

855,730

-0.7% vs previous 28 days



Busiest days



Selected assets

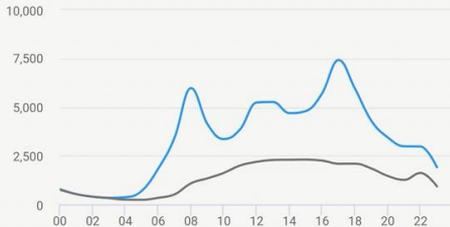
9 Sensors

27 Countlines

Typical day

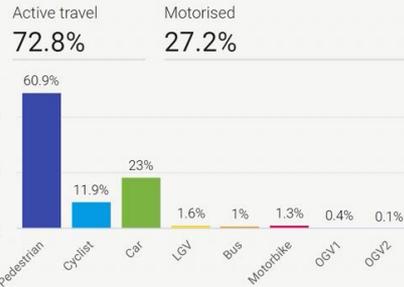
Average hourly counts of all road users

Weekday | Weekend



Modal distribution

Proportion of all counts by class for selected period



The solution: Data Dashboard

Data Supporting Zeros Strategy



Home

Network Overview

Analysis

Sensor Management



Project
City of Melbourne

Date
17/08/2023

Feature
Classified Counts

Classes
Car, Cyclist

Expand Classes

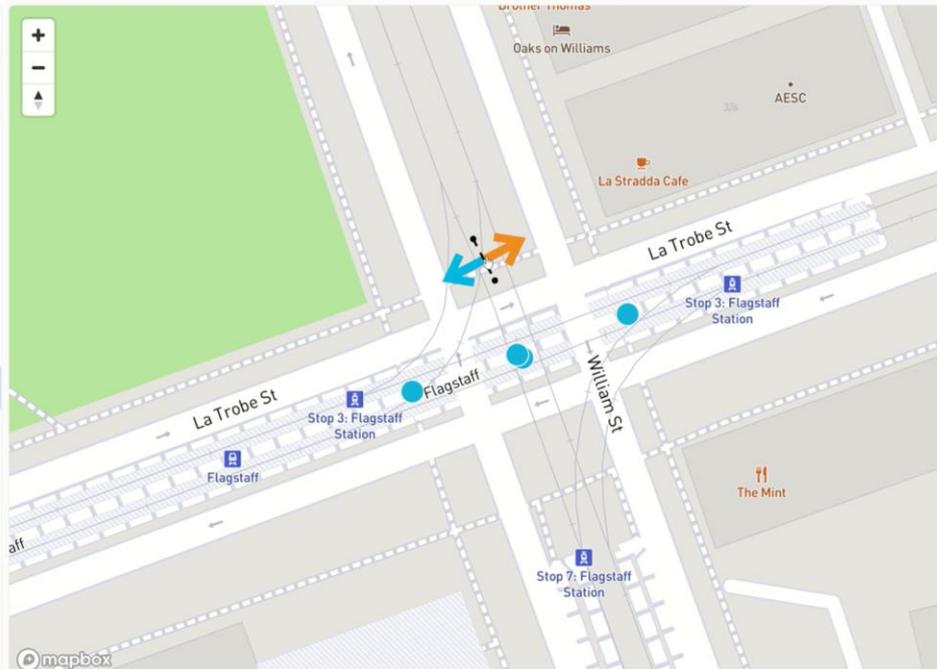
Map Settings

Assets

Download

Search for assets

- Sensor 1 (Deepstream)
- Sensor 2 (Deepstream)
- Sensor 3 (Deepstream)
- Sensor 4 (Deepstream)
- Sensor 5 (Deepstream)
- Sensor 6 (Deepstream)
- Sensor 7 (Deepstream)**
- Sensor 8 (Deepstream)
- Sensor 9 (Deepstream)



S07_WilliamSt_Crossing_bn
003
(ID: 45473)
SENSOR 7 / LENS 2

Total In Out

Time Bucket
3 hours Show typical total

Time	Total	In	Out
09:00	100	50	50
12:00	100	50	50
15:00	170	85	85
18:00	170	85	85
21:00	80	40	40

View details Download data

Trend analysis

The solution: Data Dashboard

Data Supporting Zeros Strategy



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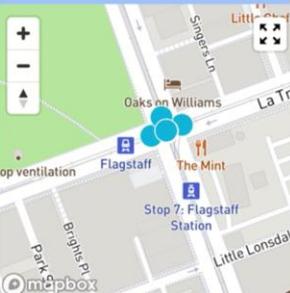


Assets Download

Search for assets

- Sensor 1 (Deepstream)
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- Sensor 5 (Deepstream)
- Sensor 6 (Deepstream)
- Sensor 7 (Deepstream)

Lens 1



Sensor 7 / Lens 1

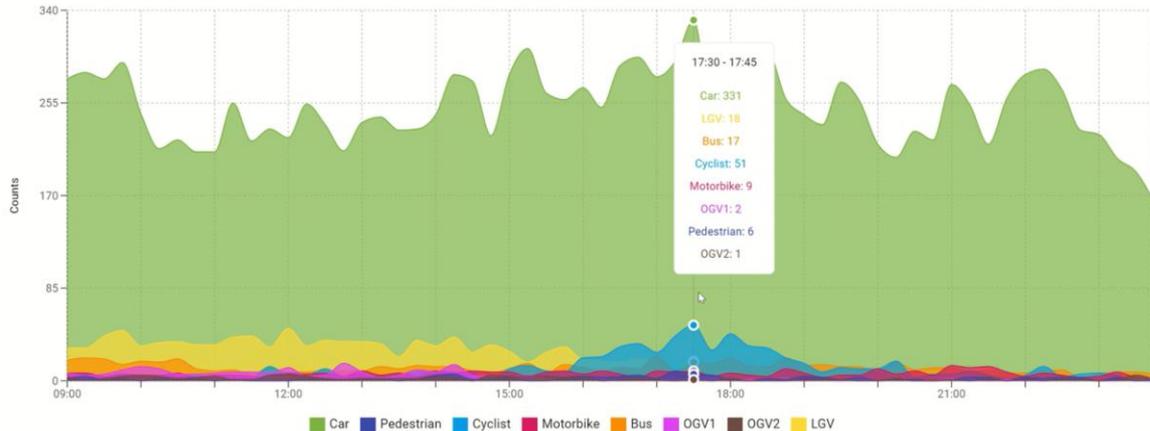
Classified Counts Journey Times Classified Journey Times Sensor Image Tracks View Turning Counts Zonal Speeds Occupancy Countline Speeds Dwell Times Near Misses

Date: 17/08/2023 Classes: Car, Pedestrian, Cyclist, Motorbike, Bus, OGV1, OGV2... Time Bucket: 15 minutes Expand Classes Show Image Capture image

Add all to download

Lens 1

Stack Show Typical Totals Total In Out Add to download



The solution: Data Dashboard

Data Supporting Zeros Strategy

VIVA CITY Home **Network Overview** Analysis Sensor Management

Assets Download

Search for assets

- Sensor 1 (Deepstream)
- Sensor 2 (Deepstream)
- Sensor 3 (Deepstream)
- Sensor 4 (Deepstream)
- Sensor 5 (Deepstream)
- Sensor 6 (Deepstream)
- Sensor 7 (Deepstream)**
- Sensor 8 (Deepstream)

Map: Flagstaff Station, Little Lonsdale, The Mint, Oaks on Williams, La Trobe, Bright, Park, mapbox

Sensor 7 / Lens 1

Classified Counts Journey Times Classified Journey Times Sensor Image **Tracks View** Turning Counts Zonal Speeds Occupancy Countline Speeds Dwell Times Near Misses

Date: 17/08/2023 Classes: Car, Pedestrian, Cyclist, Motorbike, Bus, OGV1, OGV... Expand Classes **Capture image**

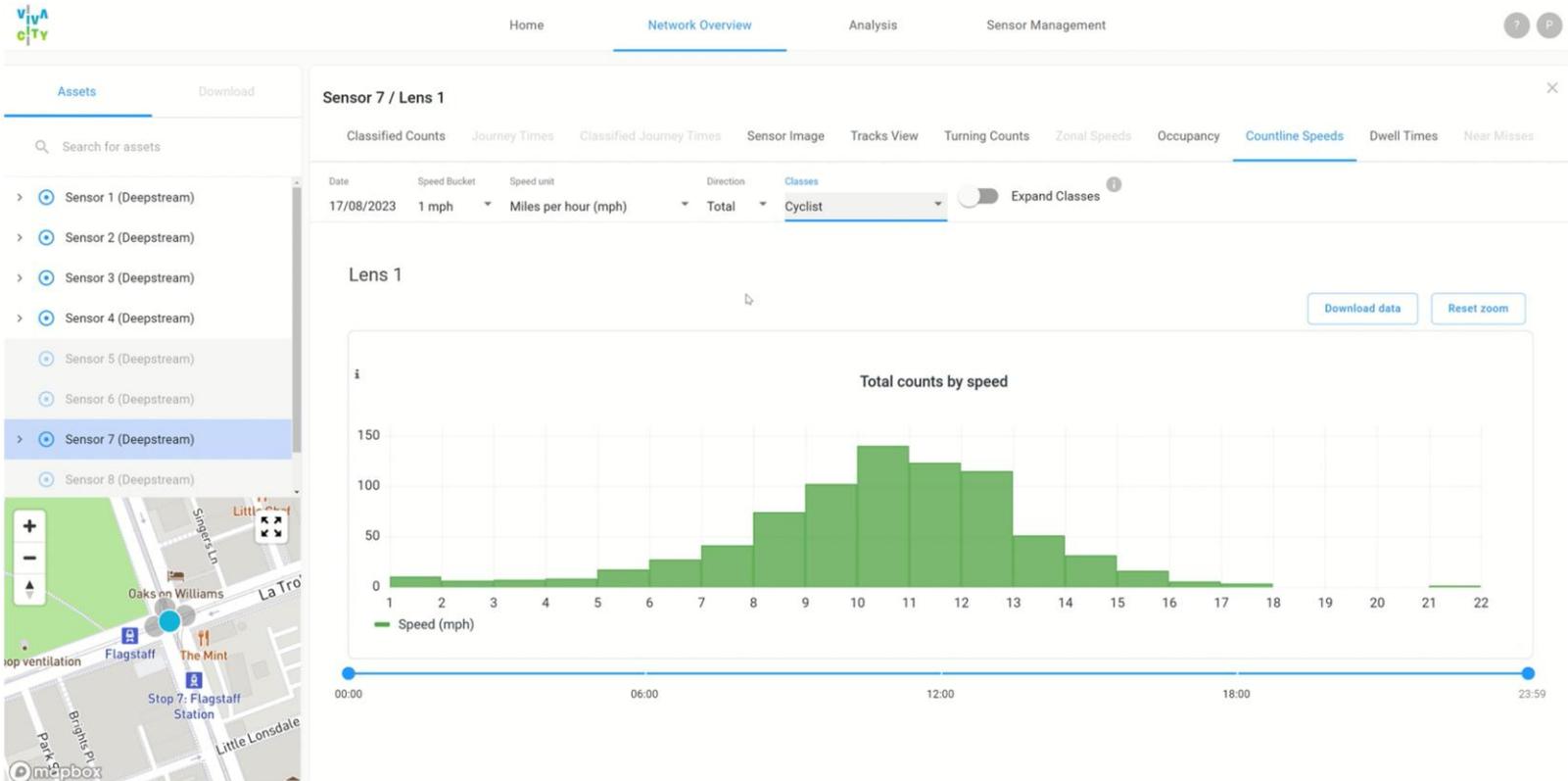
Currently viewing fetched tracks for: 11:30 - 12:00, 17/08/2023

00:00 06:00 12:00 18:00 23:59

Download image Tracks already fetched for this interval

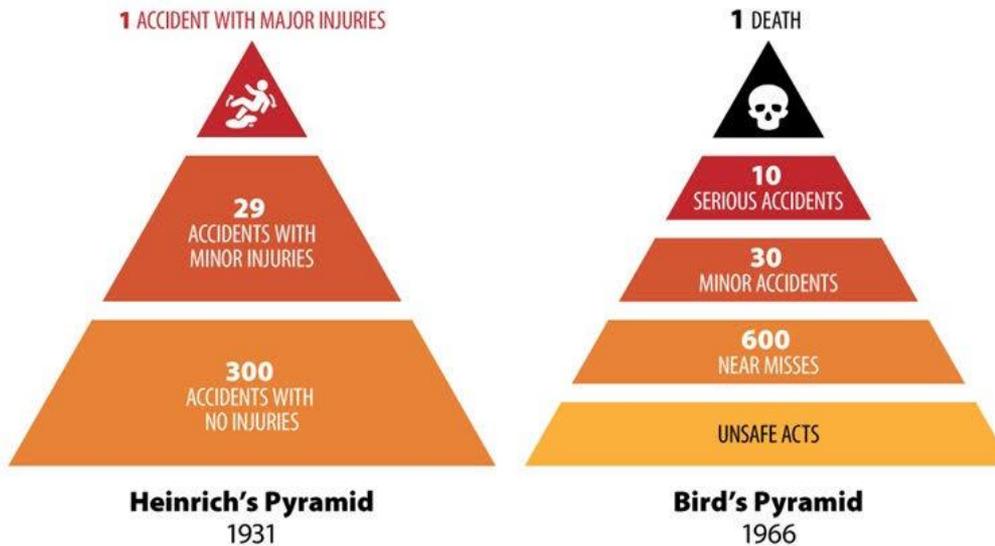
The solution: Data Dashboard

Data Supporting Zeros Strategy



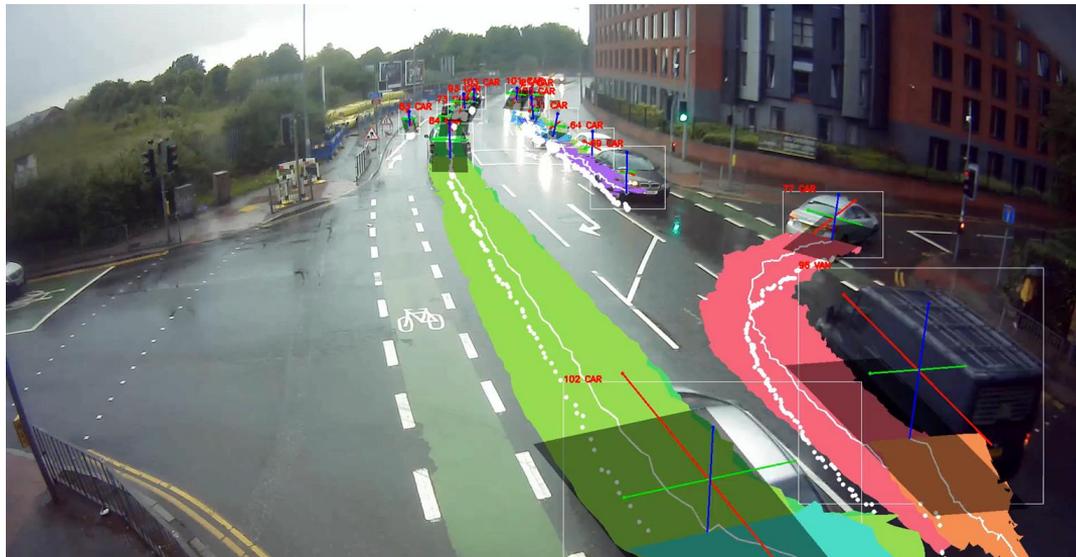
The solution: Directly measure Near Misses

Leading Indicator



The solution: Directly measure Near Misses

3D Detection becomes key

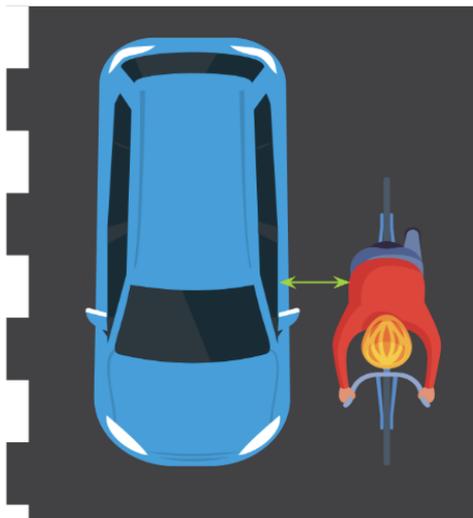


- 2D AI thinks these two road users have crashed!
- 3D AI enables calculation of vehicle ground plate
- Provides a much more accurate proximity measurement for Near Miss

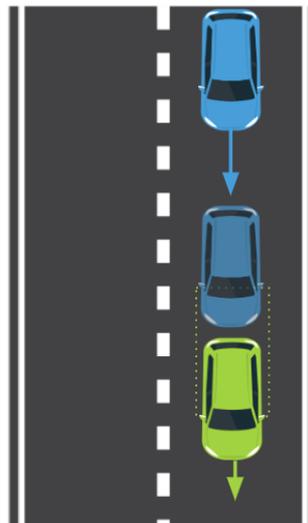
The solution: Directly measure Near Misses

We have identified three principle detection methodologies

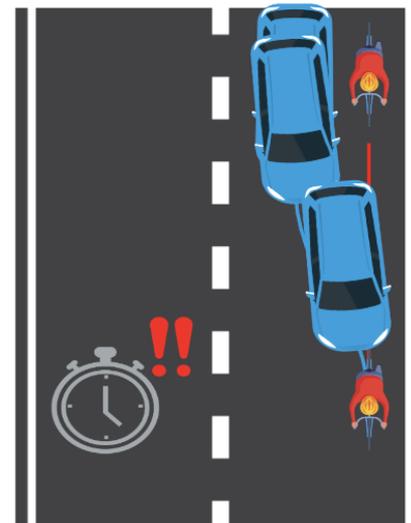
1.
Proximal



2.
Post-encroachment time (PET)



3.
Time to collision



Case Study: New York City

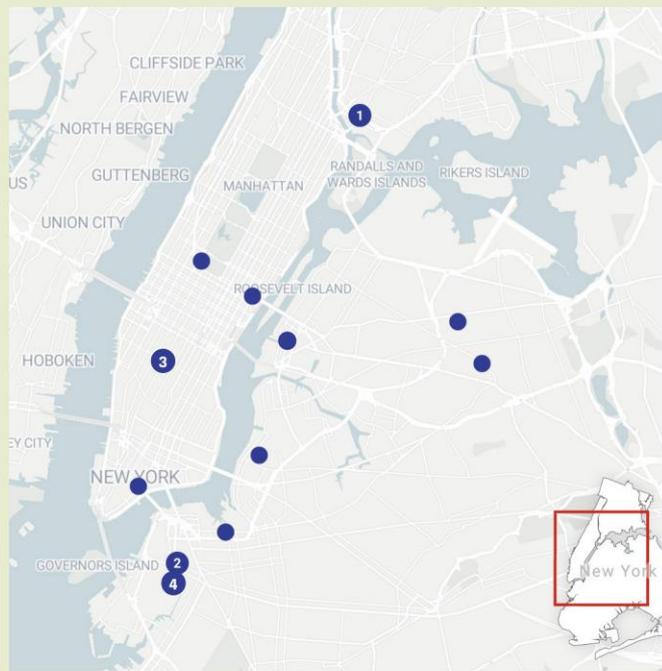
NYC Open Streets: Re-allocate road space to Active Travel to promote safer greener travel



Objectives

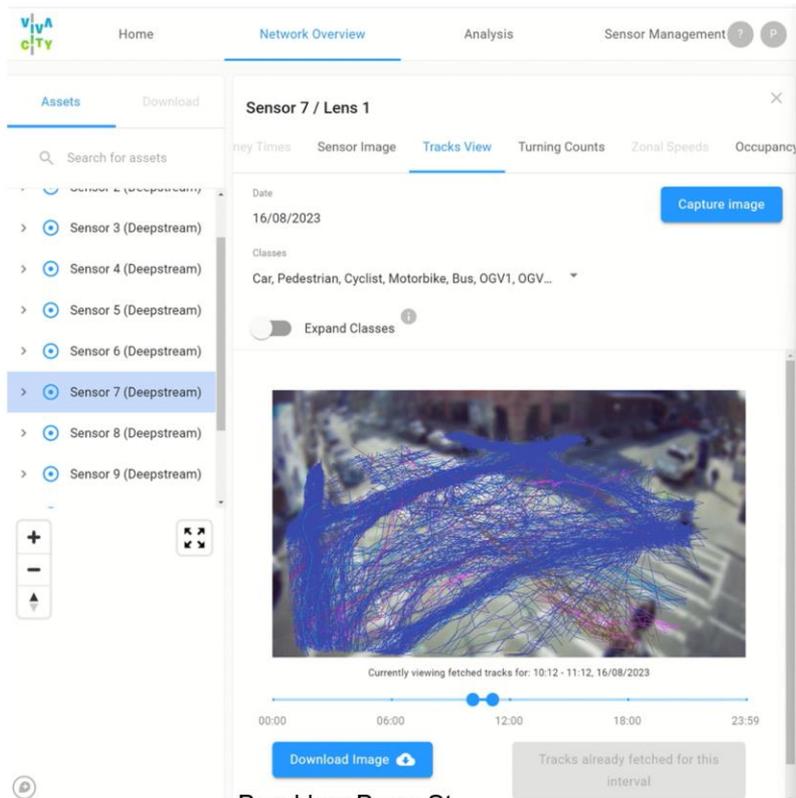
- Have Open Streets interventions encouraged more Active Travel?
- Are the new road spaces being used in the way expected by the design team?
- Are there any safety issues that require further interventions to resolve?

VivaCity sensor locations, New York City

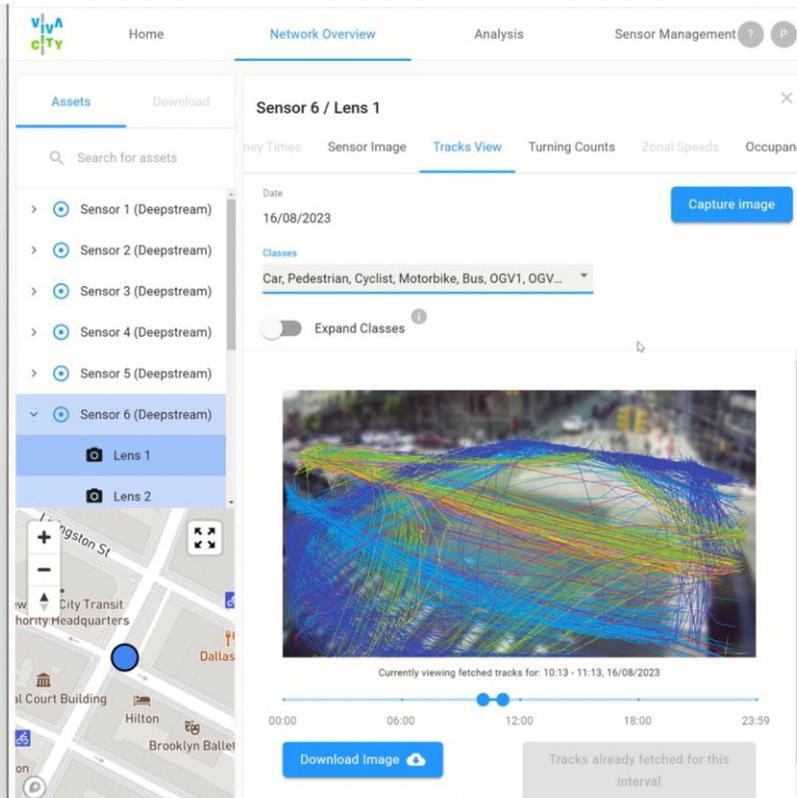


Case Study: New York City

NYC Open Streets: Re-allocate road space to Active Travel to promote safer greener travel



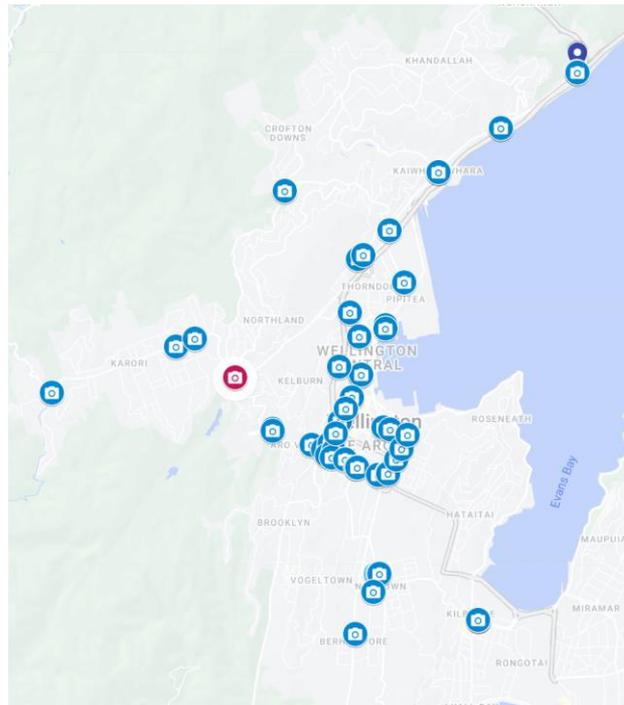
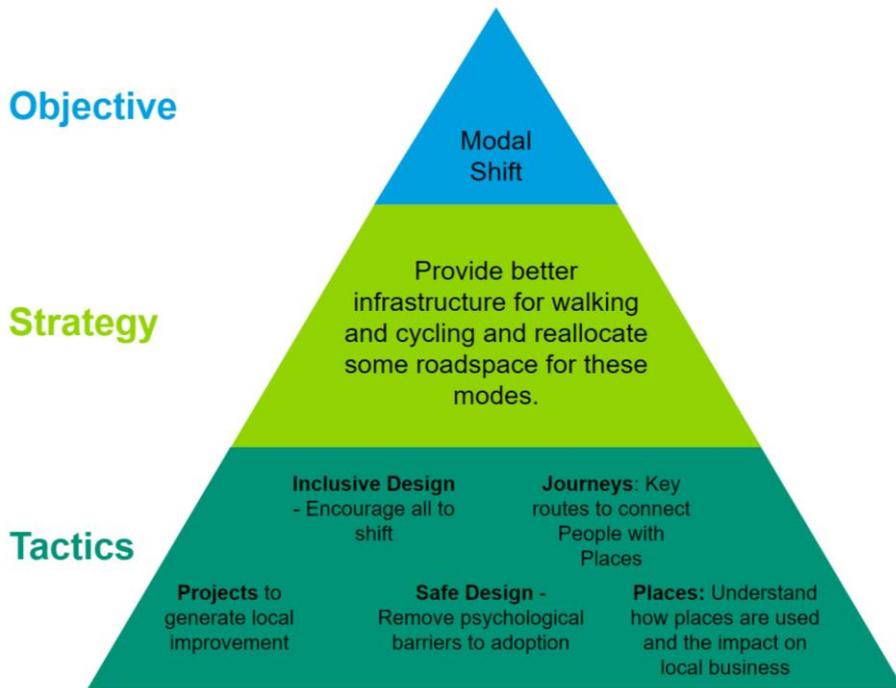
Brooklyn: Berry St
"Open Street Neighbourhood"



Brooklyn: Smith St
"Main Route"

Future Case Study: Wellington City Council, New Zealand

Model Shift Data: City wide strategy & project by project monitoring





Future Case Study

New Zealand Focused Research



- **Objective 1:** Quantify the correlation between Near Misses and fatality and serious injury data
- **Objective 2:** Extend analysis from pedestrians, e-scooters and cyclists to motorbikes and mopeds
- **Objective 3:** Test the benefit of quick and low cost interventions

We are actively looking for authorities in New Zealand to act find us 30 test sites for this innovation project. Please contact me if you have a current accident hot spot that you would like more data on, or a road that you think is currently functioning well and safety to act as our control group.

Interested: peter@vivacitylabs.com



**ANY
QUESTIONS?**