SEE.SENSE®
RIDE INSIGHTS

Cycling Technology and Data for Better Rides

UK - Baltic Smart Cities Event
7th October, 2021

ABOUT US

“Making every journey seen and understood”

- Our patented and sensor-enabled cycling tech products (bike lights and trackers) are sold to **100,000+ cyclists worldwide**
- Partner to **British Cycling** & **Cycling Ireland**
- Working with **B2B bike and scooter share operators** to integrate our tech to collect deep data insights
- **Smart cities in UK, Ireland, US, Australia, Belgium & Portugal** already use our data insights to improve cycling safety and to help design and maintain cycling infrastructure.

OUR MISSION

To make cycling better - safer, more convenient and ultimately more appealing.

We have redesigned cycling technology, with products that make cycling safer and improve the cycling experience, provide unparalleled insights to help cities transform for more cycling.

See.Sense Lights

See.Sense AIR

Bike Share Integration

See.Sense Data Insights

_ Wide range of data
_ Targetted at specific groups
_ Mobile coverage

WHAT MAKES US DIFFERENT

See.Sense combines award-winning & innovative technology with powerful data insights

AI - ENABLED SENSOR TECHNOLOGY

Our patented sensor technology monitors the riders' environment at over 800 times per second, providing contextual awareness of the rider.

DEEP DATA INSIGHTS

Processing billions of sensor reading into meaningful insight layers and predictive layers.

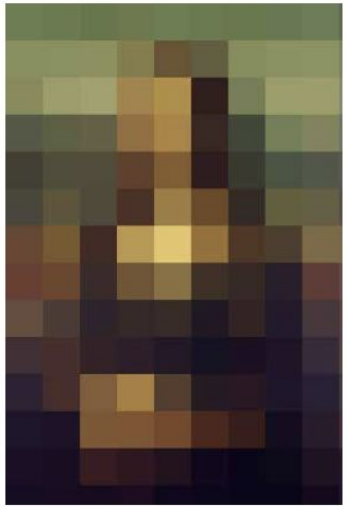
VISUALISATION TOOLS AND ANALYSIS

Enabling quick assimilation of multiple data layers to enable actionable insights.

OUR PATENTED SENSOR TECH AND AI IS EMBEDDED IN OUR DEVICES

Which means we can monitor the rider's environment, and gain deep insights into the rider's experience

MOBILE PHONE



10 Readings per second

SEE.SENSE DEVICE

800 Readings per second

WAYS TO WORK WITH US

SMART CYCLING CITY PROJECTS
Cities can:

- Run a citizen engagement project using 200 lights and our tested playbook
- Deploy lights to specific target group
- Get access to our dashboard and API

EMPLOYEE PROGRAMMES
We partner with companies to:

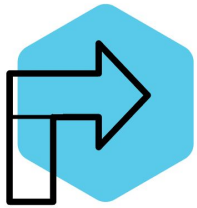
- Make employees safer
- Measure CSR programmes
- Improve Employee incentive schemes
- Help upgrade your city for cycling

SMART FLEET SOLUTIONS
Bike/cargo-bike and scooter operators can:

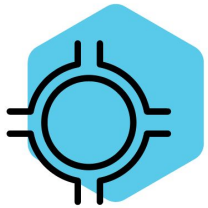
- Prevent theft and vandalism
- Use data for predictive maintenance or to redistribute bikes
- Share data with their city.

OUR SENSOR TECH BRINGS BENEFITS TO THE CYCLIST

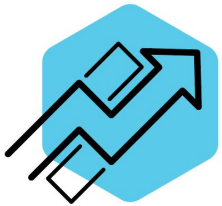
By profiling the rider and their environment hundreds of times per second, See.Sense lights react to flash brighter and faster when cyclists are most at risk:



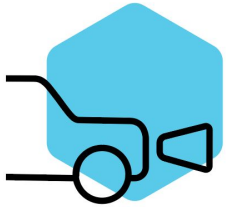
Road Junctions



Roundabouts



Filtering in Traffic



Car Headlights

- Official Bike Light to British Cycling & Cycling Ireland
- Editor’s Choice - Cycling Weekly

DAYLIGHT VISIBILITY

See.Sense was one of the first companies in the world to create daylight-visible bike lights for improved visibility in all conditions. Our rear ACE bike light shines at 125 lumens.

USING OUR FREE APP, OUR CUSTOMERS ENJOY A CONNECTED RIDING EXPERIENCE

ENHANCEMENTS TO THE HARDWARE

- ICE Crash detection alerts
- Theft detection alerts
- Low battery notifications and changes to light settings

ENGAGING PERSONAL RIDE STATS

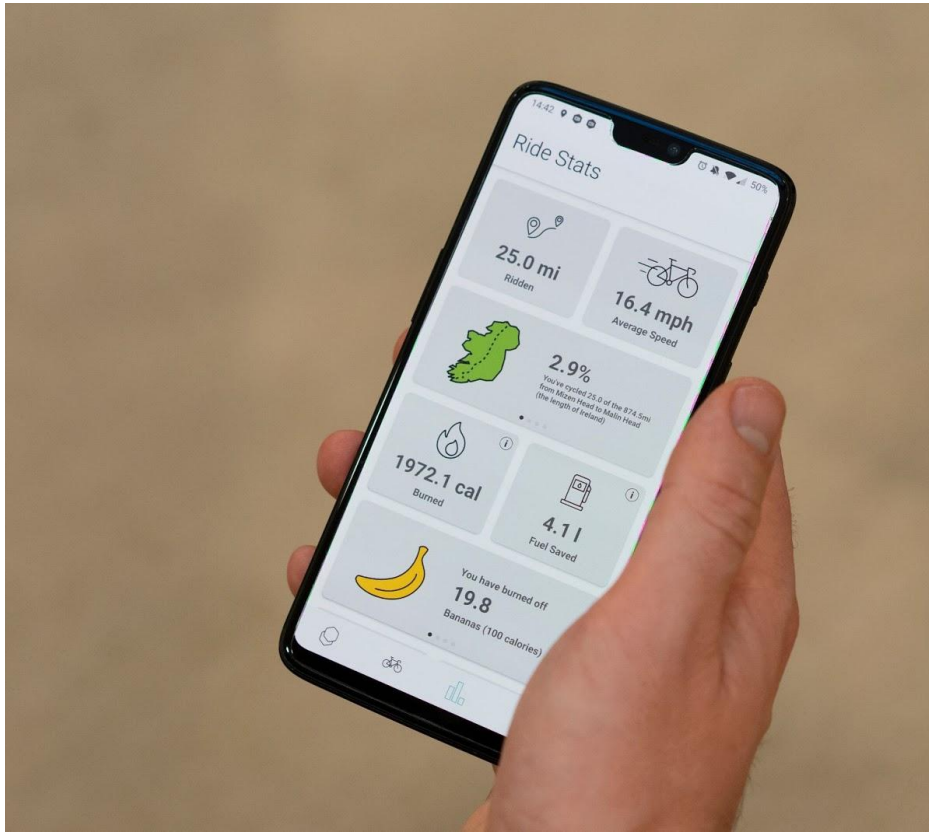
- In-app reports on distance ridden, average speed, calories burned, fuel saved and CO2 saved
- Monthly ‘Vision’ email providing an overview of riding activity across the month

COMMUNITY

- Make ‘See.Sense Reports’ by dropping a in the map to report issues such as a close pass or to request a bike lane

COMING SOON: ‘FIND MY BIKE’

- Owners of See.Sense AIR GPS tracker can use the app to find the location of their bike at anytime



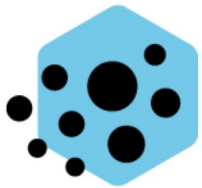
INTRODUCING SEE.SENSE SMART FLEET SOLUTIONS

See.Sense Smart Fleet is an IoT module for micro-mobility vehicles that is capable of granular sensor data gathering at 800/second in real time, providing precise ground truth information.

Whether as the IoT of record or as an add-on secondary module, See.Sense Smart Fleet is a powerful tool that will enhance your fleet's operational efficiency, regulatory compliance and safety.

Accurately and reliably gather real-time movement of the fleet, and sensor data to indicate safety risks, road surface conditions and more.

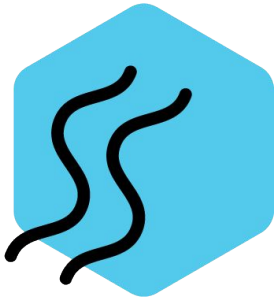
Low power cellular network providing improved connection and positioning



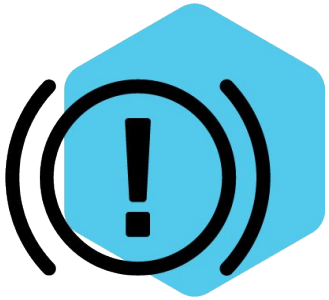
Sensor data readings 800 times per second providing data on rider experience and safety

PROVIDING A STANDARDISED DATA SET WITH SAFETY AT ITS CORE

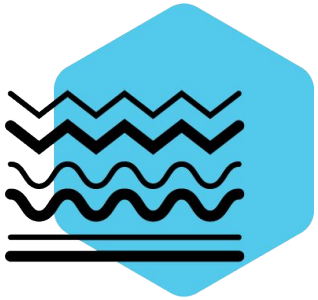
SWERVING



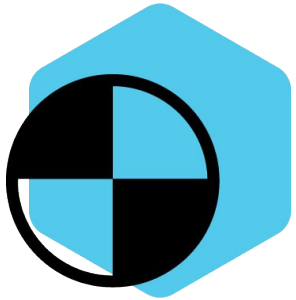
BRAKING



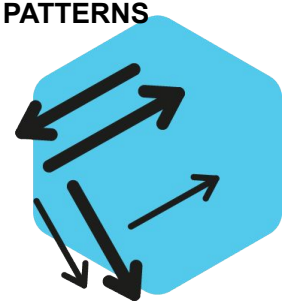
ROAD ROUGHNESS



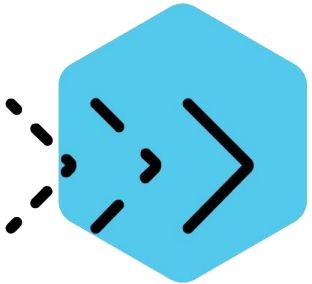
COLLISIONS



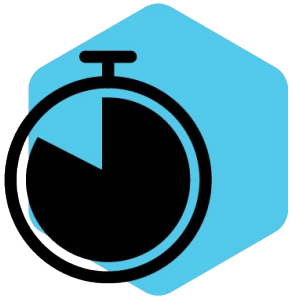
MOVEMENT PATTERNS



SPEED

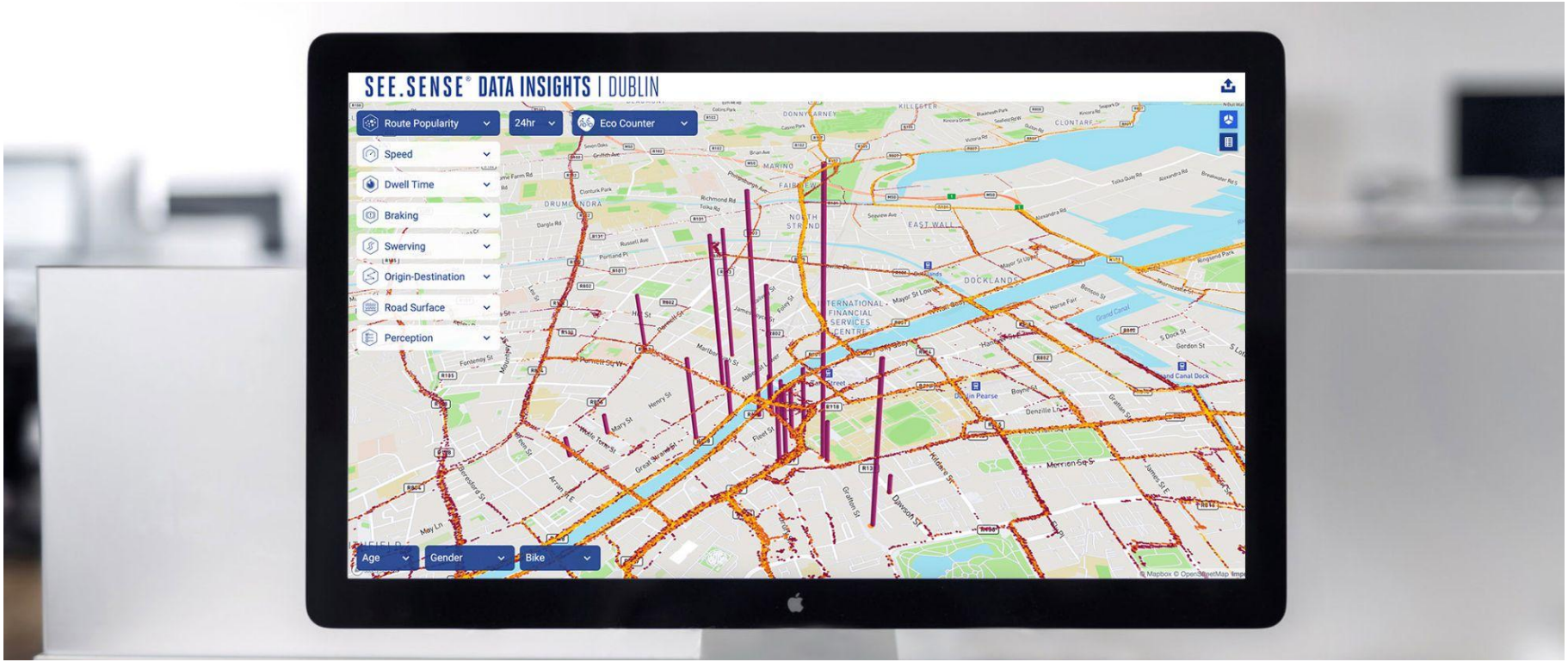


DWELL TIMES

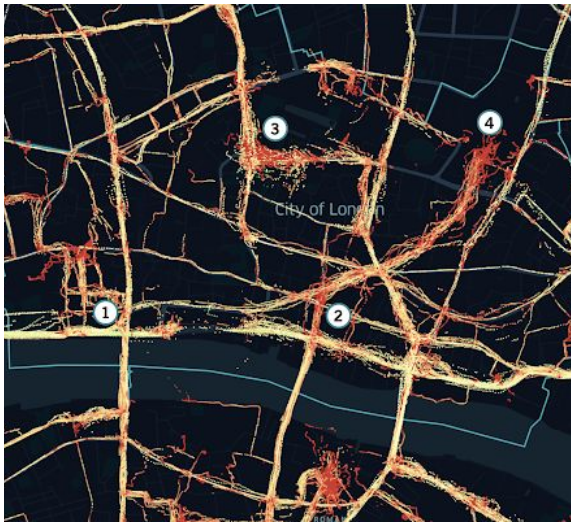


CYCLIST SURVEY REPORTS

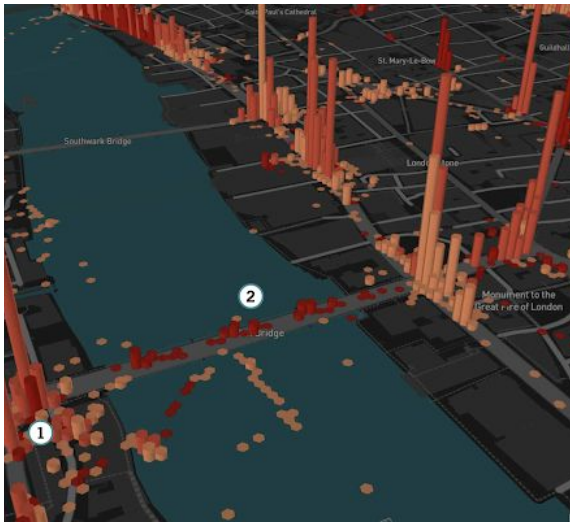
WE PROVIDE A USER-FRIENDLY WEB-BASED DASHBOARD TAILORED FOR CITY PLANNERS



DATA FOR CYCLE NETWORK PLANNING



POPULAR ROUTES AND SPEEDS



DWELL TIME AND CONGESTION

PEDESTRIAN CONFLICT

Data can be used to understand how cyclists are travelling across the city, popular route choices, what is influencing choices, as well as congestion points, and conflict areas with pedestrians - helping to design optimal cycling networks.

DATA FOR SAFETY ANALYSIS

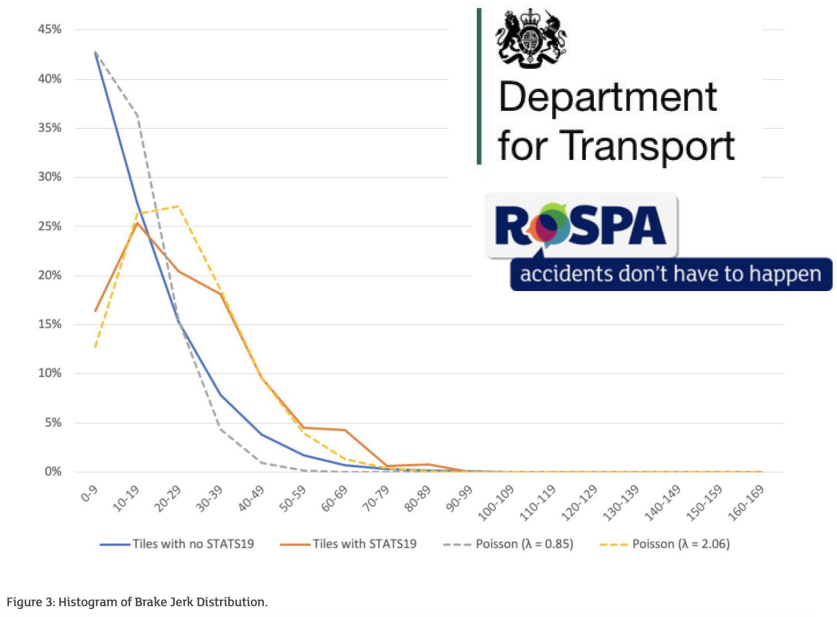


Figure 3: Histogram of Brake Jerk Distribution.

DfT-funded research in partnership with RoSPA found that See.Sense highly granular swerving and braking data had a very high correlation with historical cycling collision areas. This indicates the data can be used to help prioritise interventions and also to help predict location of cycling collision providing 'lead time' indicator rather than the 'lag' indicator of police reports.

See.Sense data forms the basis for a useful investigative tool to quickly identify the most hazardous cycling areas, and has been used by ARUP as part of a detailed corridor analysis.

DATA TO MONITOR AND EVALUATE CYCLE INFRASTRUCTURE PERFORMANCE

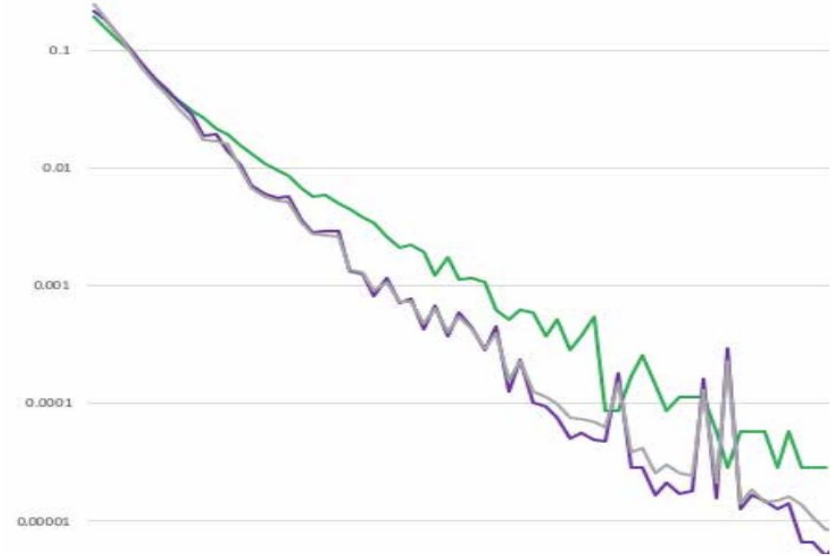
Data can be used to baseline and provide ‘before and after’ evidence to show success of cycle infrastructure schemes, not only in terms of popularity, but also for safety and comfort of the rider.

DATA TO MONITOR ROAD SURFACE CONDITIONS

AECOM validated that See.Sense Road Surface Index is highly correlated to a visual inspection, and can be applied to a ‘Level of Service’ Analysis

- Understand comfort level of cyclists (bumpy roads are less attractive to a cyclist)
- Know where to make repairs to cycle infrastructure
- Improve safety of the cyclist as road surface is a contributory factor for accidents.

DATA TO UNDERSTAND DIVERSE NEEDS



DISAGGREGATE DATA

Our disaggregated profile data on gender, age and bike type (ebike / non-ebike) makes it possible look at differences in the cycling experience across factors such as swerving, braking and collision, as well as uncovering different route choices.

USE SENSOR DATA TO QUANTIFY DIFFERENCES

In this example from Dublin, the data showed that females spend disproportionately more time in rough road surface, relative to male cyclist. Differences in swerving and braking patterns over the same routes were also identified.

DATA TO UNDERSTAND PERCEPTION

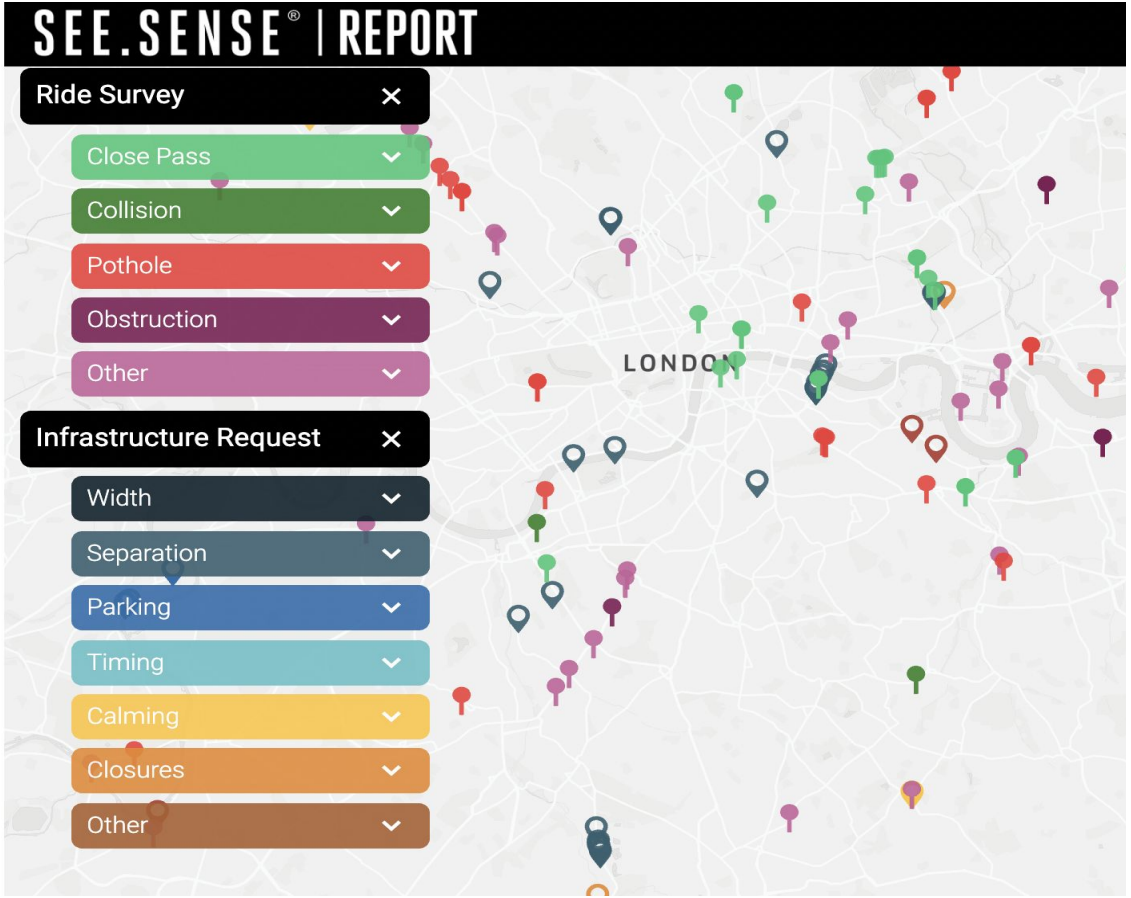
Using our app, riders can drop a pin in a map to make the following reports, providing a wealth of qualitative perception data to compliment our sensor data:

RIDE SURVEYS
- Close passes
- Collisons
- Potholes
- Obstructions
- Other

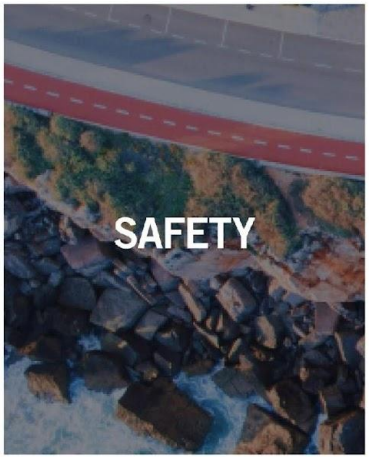
Plus add 250 character descriptions to accompany each report.

INFRASTRUCTURE REQUESTS
- Add more width.
- Add separation from motor traffic.
- Add cycle parking.
- Change timing of traffic lights.
- Slow down traffic.
- Other.

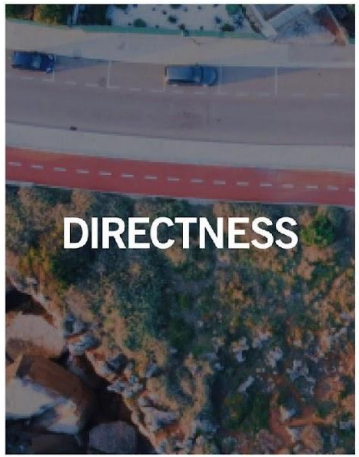
Plus add 250 character descriptions to accompany each report.



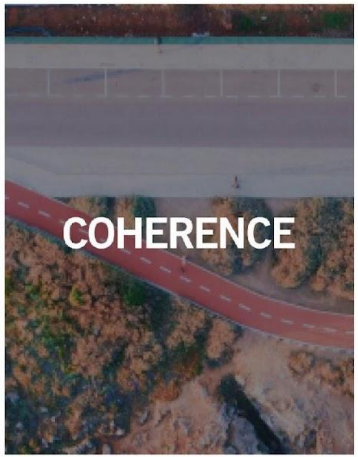
PRINCIPLES OF A GOOD NETWORK



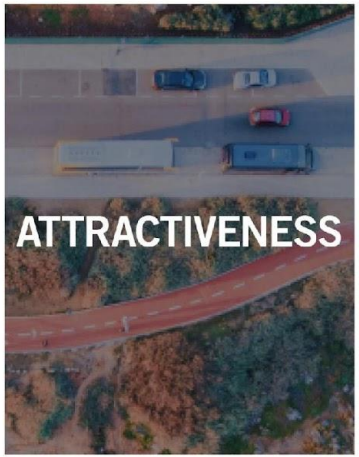
Safety is a basic requirement for any cycling infrastructure, as safety concerns are a major barrier to cycling.



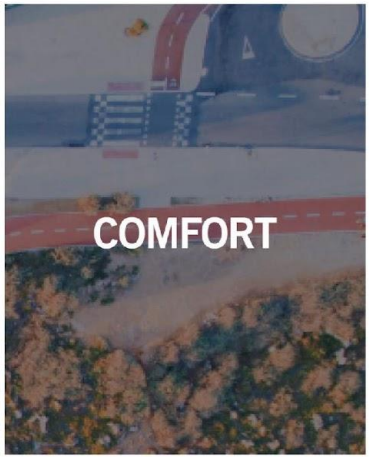
Direct cycle routes reduce travel times and distances and increase competitiveness of the bicycle compared with motorised transport.



Routes should be coherent and accessible, enable people who cycle to easily travel between their origin and destination.



People will be encouraged to cycle if they feel safe and if the infrastructure and route is aesthetically attractive.



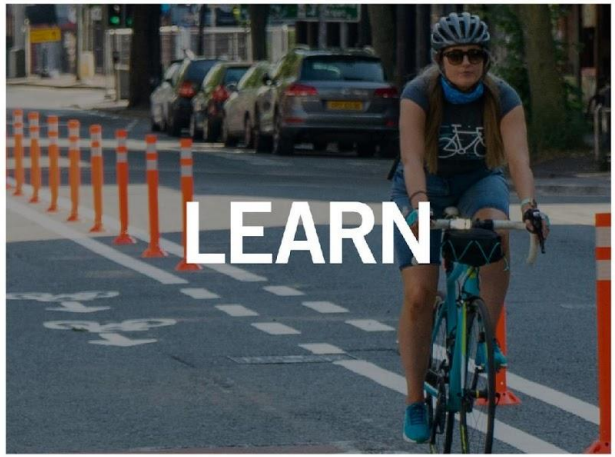
The cycling experience should be enjoyable, smooth and relaxed to maximise the comfort of people cycling.

WHERE SEE.SENSE DATA ADDS INSIGHT

Coherence	● Current route popularity ● Are people diverging from cycle network? ● Actual desire paths on a city-wide scale
Direct	● Popular origins and destinations ● Precise route with any shortcuts ● Average speed ● Dwell time at junctions
Safety	● Finding hotspots for swerving, heavy braking and poor road surface conditions ● Directionality in combination with speed and time ● Route popularity over time ● Survey comments
Comfortable	● Road surface quality data ● Survey comments
Attractiveness	● Swerving and braking data identifying pedestrians and cyclists conflict areas ● Survey comments

CONVERT TEMPORARY INTERVENTIONS TO PERMANENT

Test cycling interventions



Learn from pilots together
with citizen engagment

Scale up solutions to
transform the city

COMBINE DATASETS FOR RICHER INSIGHTS

COMBINED STATIC COUNTER & SEE.SENSE SOLUTION

_ Scale GPS data to real traffic enabling extrapolation on volume of cyclists in any location

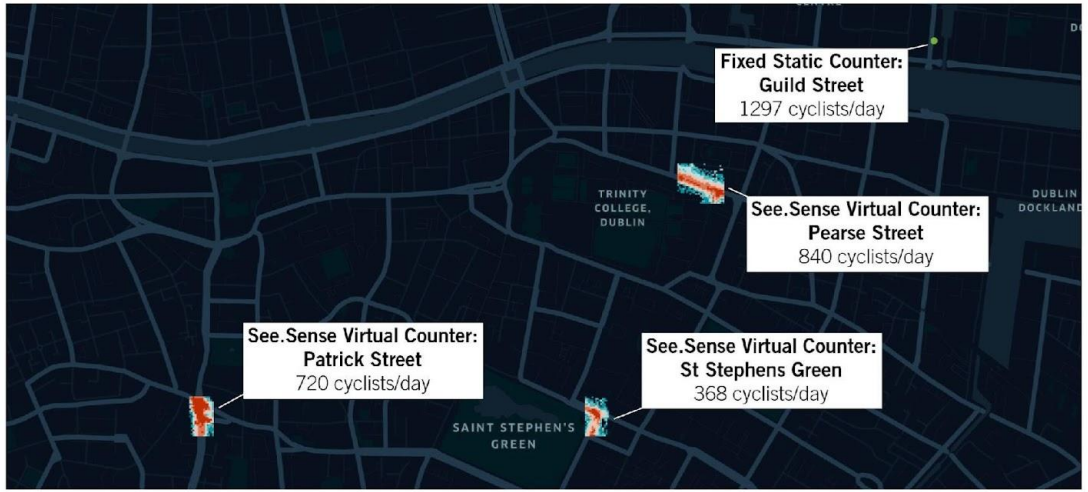
_ Generate deeper insights of usage on routes with profile data, speed and dwell times

_ Identify where to support deployment of more static counters based on routes

_ Origin destination for routes

Case Study: Extrapolation to create virtual counters

A series of three virtual counters, generated by extrapolating riders from the fixed point:



STATIC COUNTER

Average cyclists per day at Guild St in October 2018.

SEE.SENSE

GPS reading at same counter location in October 2017 (extrapolated from 2018 data).

SEE.SENSE

About Us

VALUES DRIVEN COMPANY

Our customers, teamwork and innovation are at the heart of everything we do. We are all cyclists, with a mission to delight the world with products that bring technology to the cutting edge of cycling design.

BASED IN NORTHERN IRELAND

We design and manufacture the majority of our products in Northern Ireland (UK). which means we trade tariff free with both Europe and the UK. Using sustainable principles we minimise waste.

TREE PLANTING

Cycling is kind to the environment, and See.Sense believes businesses should be, too. Since 2014, we've supported WeForest with our **Tree Sense** Initiative, planting thousands of trees.

MEDIA AND INDUSTRY RECOGNITION

Forbes

Cycling Weekly

VELO-CITY 2019 CYCLING FOR THE AGES DUBLIN, IRELAND JUNE 25, 26

CYCLE CITY ACTIVE CITY

FAST COMPANY

Cycling Industries Europe

CitiesToday Connecting the world's urban leaders

POLIS CITIES AND REGIONS FOR TRANSPORT INNOVATION

London Evening Standard

BBC

25TH ITS WORLD CONGRESS COPENHAGEN 17 – 21 SEPTEMBER 2018

GSMA MOBILE WORLD CONGRESS BARCELONA 26 FEB-1 MAR 2018

THE NEW YORKER

INDEPENDENT

The New York Times

AWARDS

Winner Digital Catapult Platinum Award 2019

TRANSTech Award Safety & Security Category 2019

Winner of Safety Category in the Highways UK Intelligent Infrastructure Challenge 2018

Digital DNA Awards, Best Small Tech Company 2018

The Spectator Economic Disruptor Award 2018 Regional Winner (Scotland & NI)

Winner of IoT Impact Award Big Chip Awards 2018

Finalist LA CoMotion New Mobility Challenger 2017

BT Infinity Lab SME Award 2016: Connected Cities, May 2016

THANK YOU

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