



Impacts of Mobility on Auto Insurance in 2020

JANUARY 2021



Agenda

- : Where we've been in telematics
- : Learn how telematics works
- : Impacts of COVID-19



TELEMATICS REFRESHER

*“That’s like Google Maps and stuff,
right?”*

TELEMATICS REFRESHER

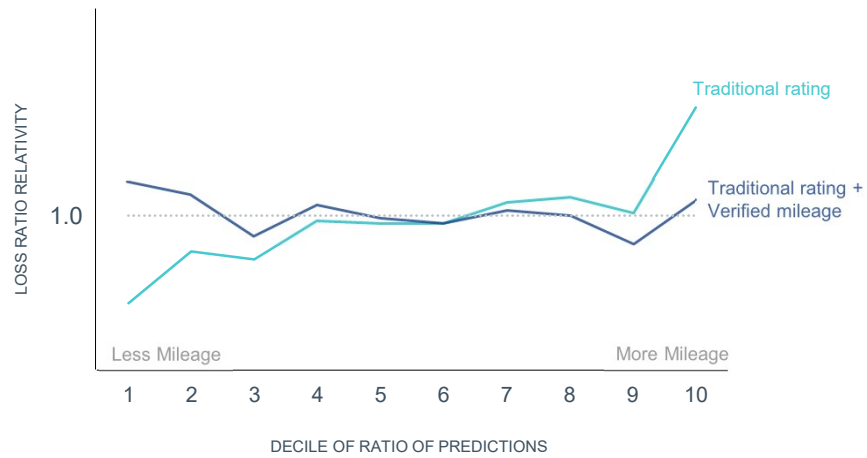
What is telematics?

- : Any **device** which merges **telecommunications** and informatics
- : An **interdisciplinary** field that encompasses telecommunications, **vehicular technologies**, road transportation, road safety, and computer science
- : The branch of **information technology** that deals with the long-distance **transmission** of computerized information

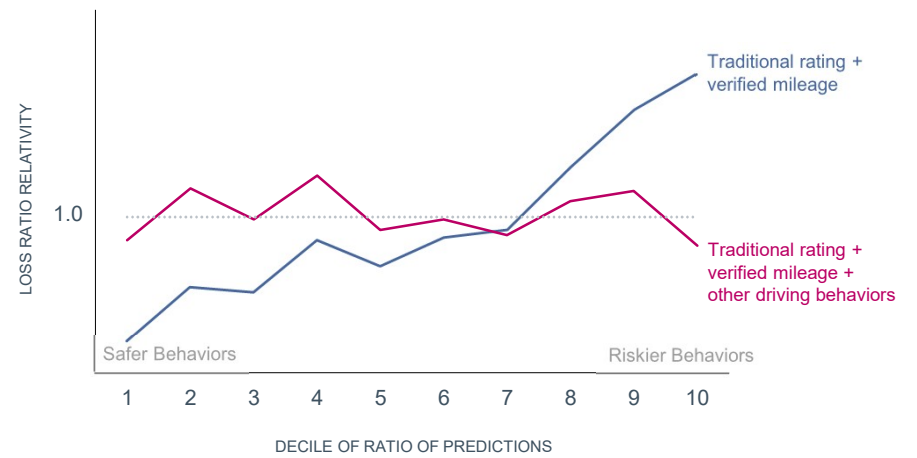
Why is understanding driving behavior so important?

Mileage and driving behavior trends help to understand potential impact on loss

Mileage is good...



... and behavior is better



Source: Arity

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TELEMATICS REFRESHER

What does telematics mean to most insurance companies?

UBI / PHYD / BBI

Customers pay based on how, when, and where they drive

Loss prevention

Encourage safe driving to reduce losses

Claims facilitation

Expedite or augment the claims process

Driving engagement

Engage customers so they drive safer

TELEMATICS REFRESHER

What does telematics mean to the insured?

Vehicle insights

Stay informed about vehicle health

Personalized pricing

Have confidence in my coverage and price

Accident detection

Receive immediate assistance at the time of incident

Enhanced safety

Identify safe and efficient routes

Where we're going

HOWEVER, STUFF IS CHANGING

: Competition expanding



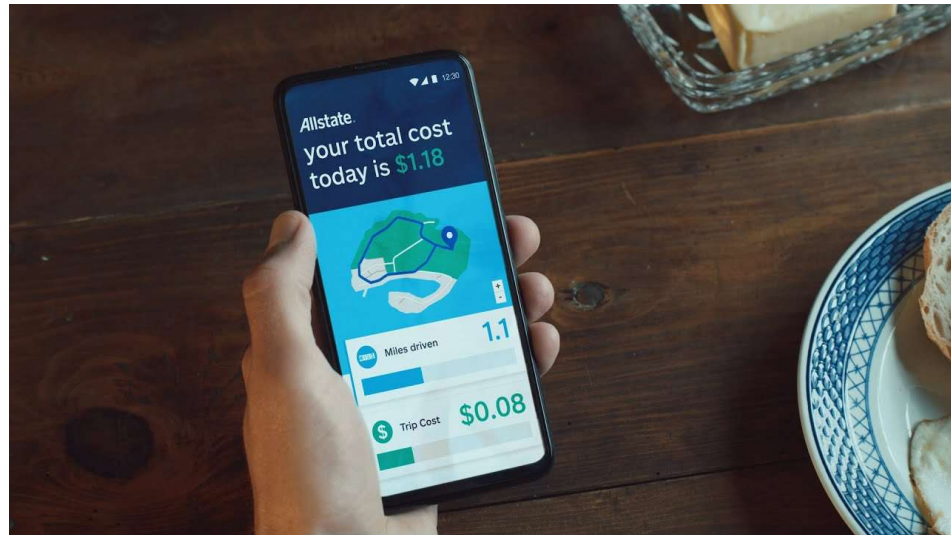
HOWEVER, STUFF IS CHANGING

: Competition expanding

: Marketing spend increase

Source: YouTube

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Internal Information

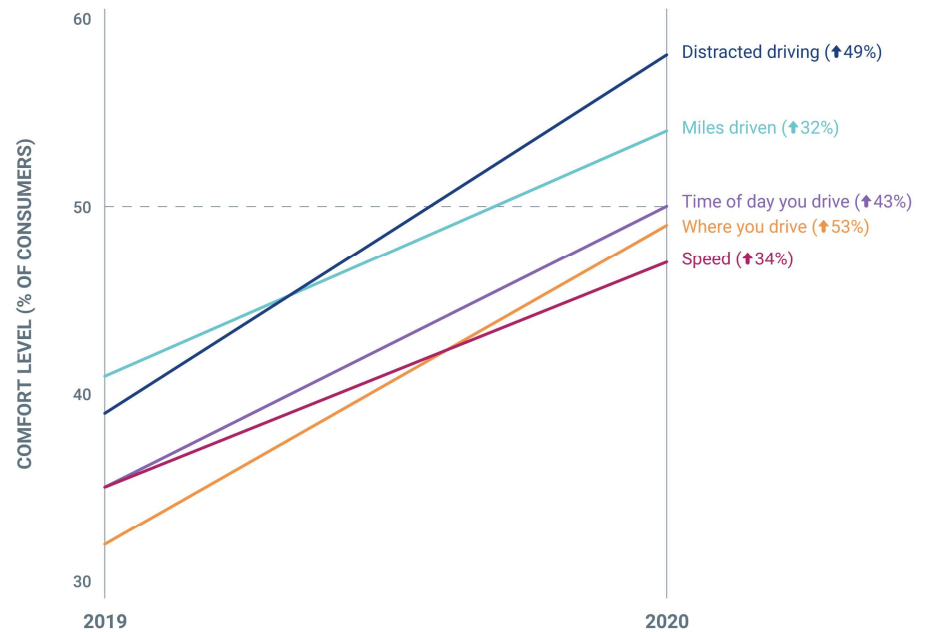
HOWEVER, STUFF IS CHANGING

- : Competition expanding
- : Marketing spend increase
- : Customer comfort increase

Source: Arity Mobility Attributes Survey, May 2020; Allstate Licensed Driver Omnibus May 2019; JD Power, 2020.

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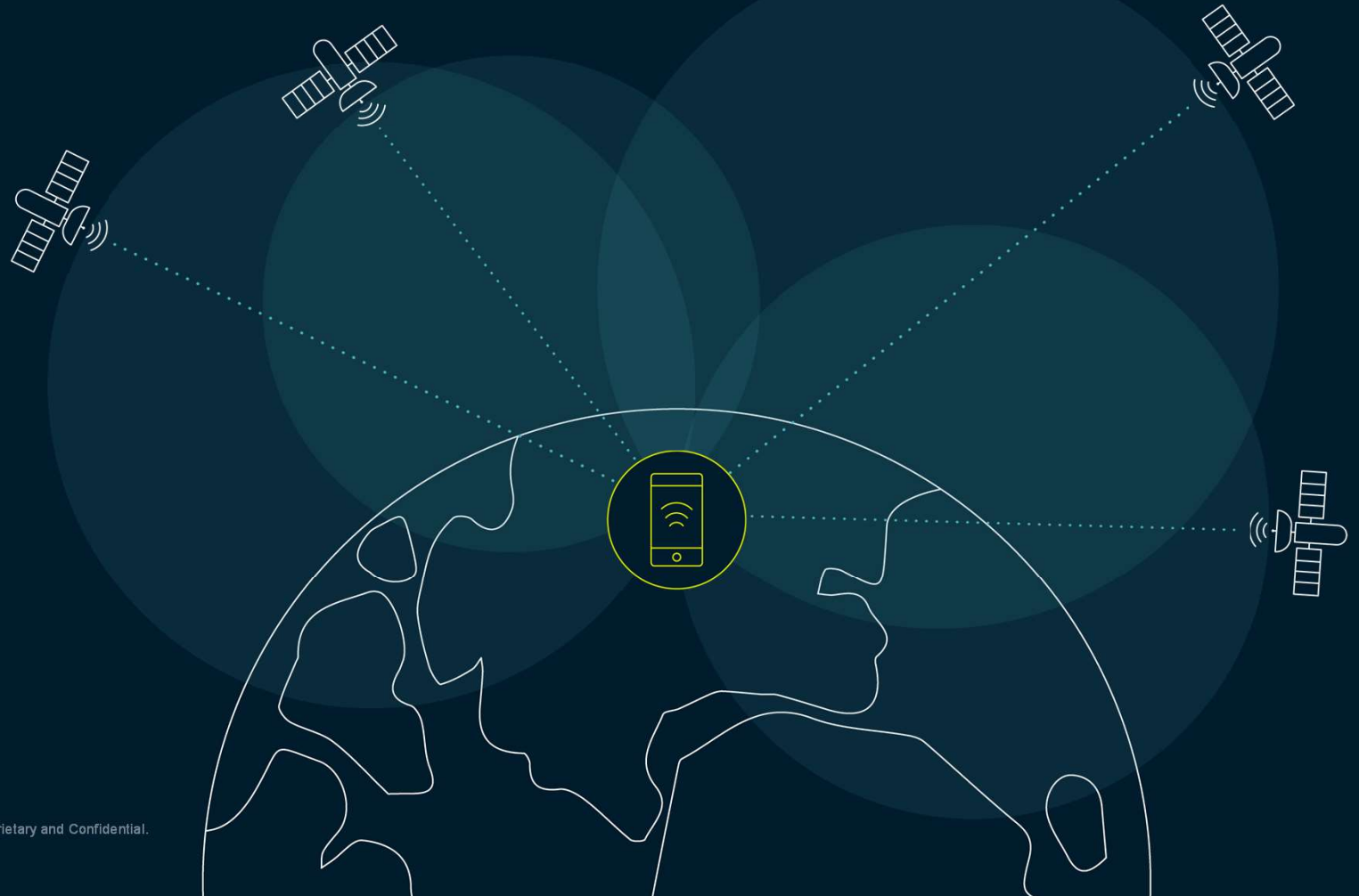
Comfort with insurance company using driving behavior to price auto insurance



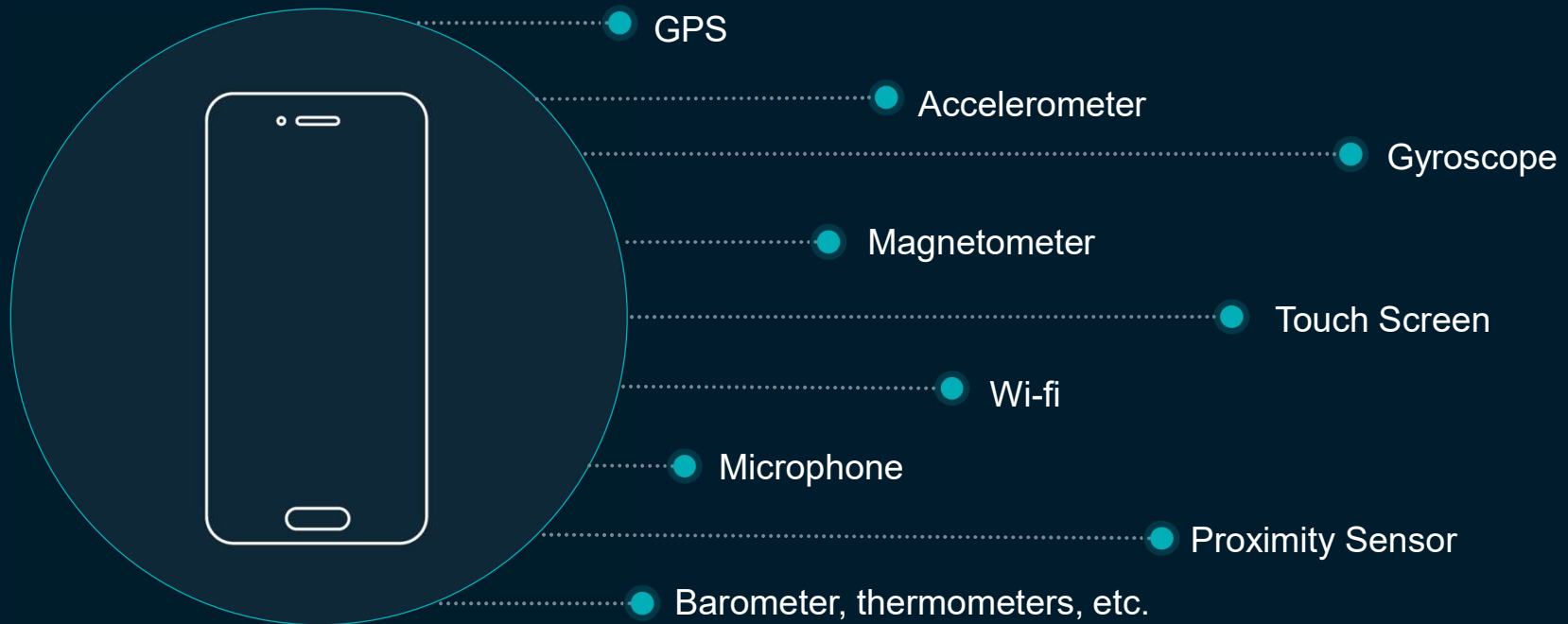
Internal Information

How telematics works

GPS IN A NUTSHELL



Impressive sensor and capabilities on modern smartphones



GLOBAL POSITIONING SYSTEM

GPS captures location and speed based on communication with a network of satellites

GPS data contains the following:

- : Location – Latitude and Longitude
- : Time
- : Speed
- : Bearing, or compass direction
- : Accuracy

From this data, we can derive:



Speed-derived features



Route matching and data enrichment

ACCELEROMETER AND GYROSCOPE

Measures translational accelerations in the phone's reference frame



Braking and acceleration detection



Cornering



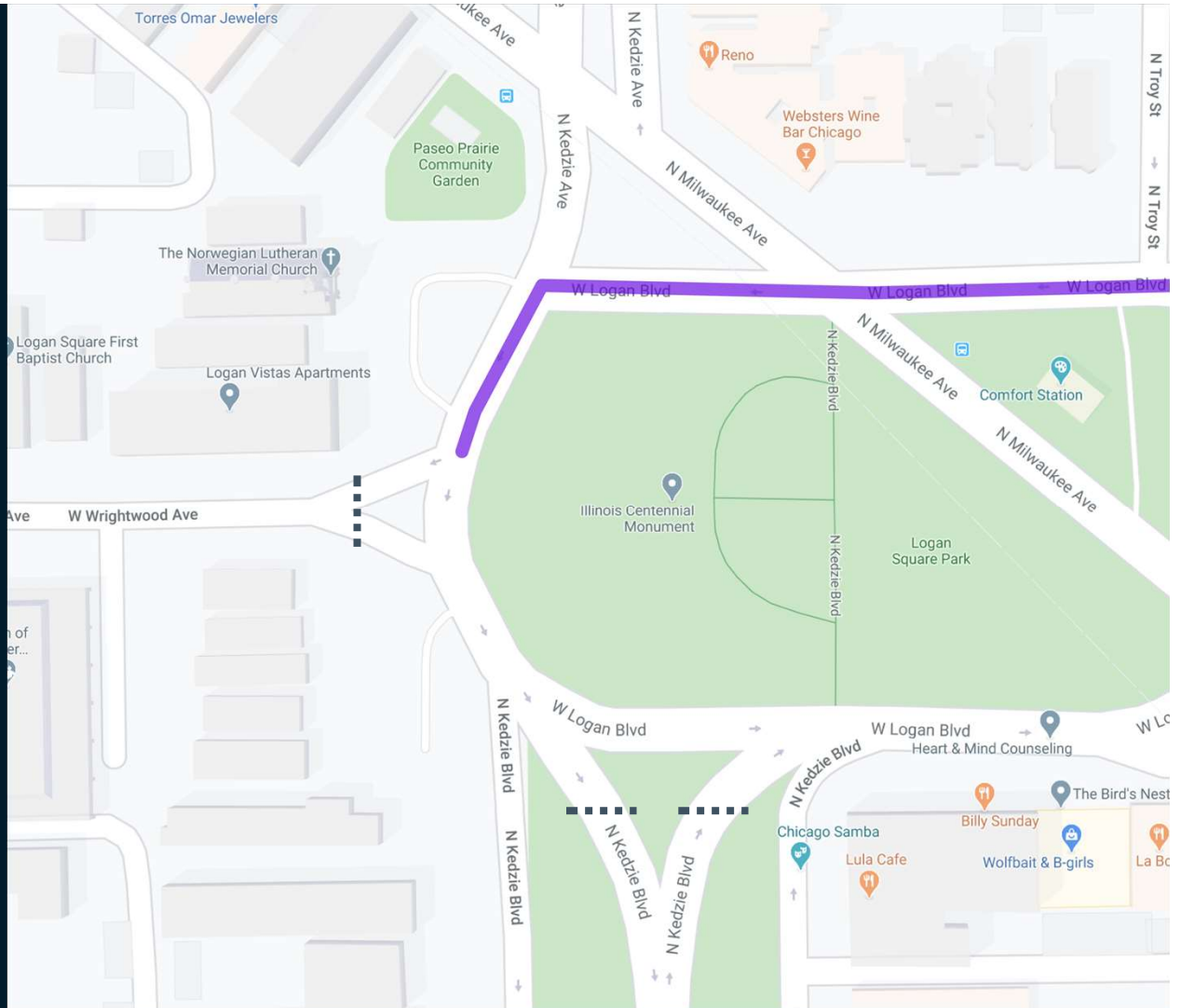
Collision detection

How can we capture risky driving behavior?

DATA CAPTURED

: GPS location

: Speed

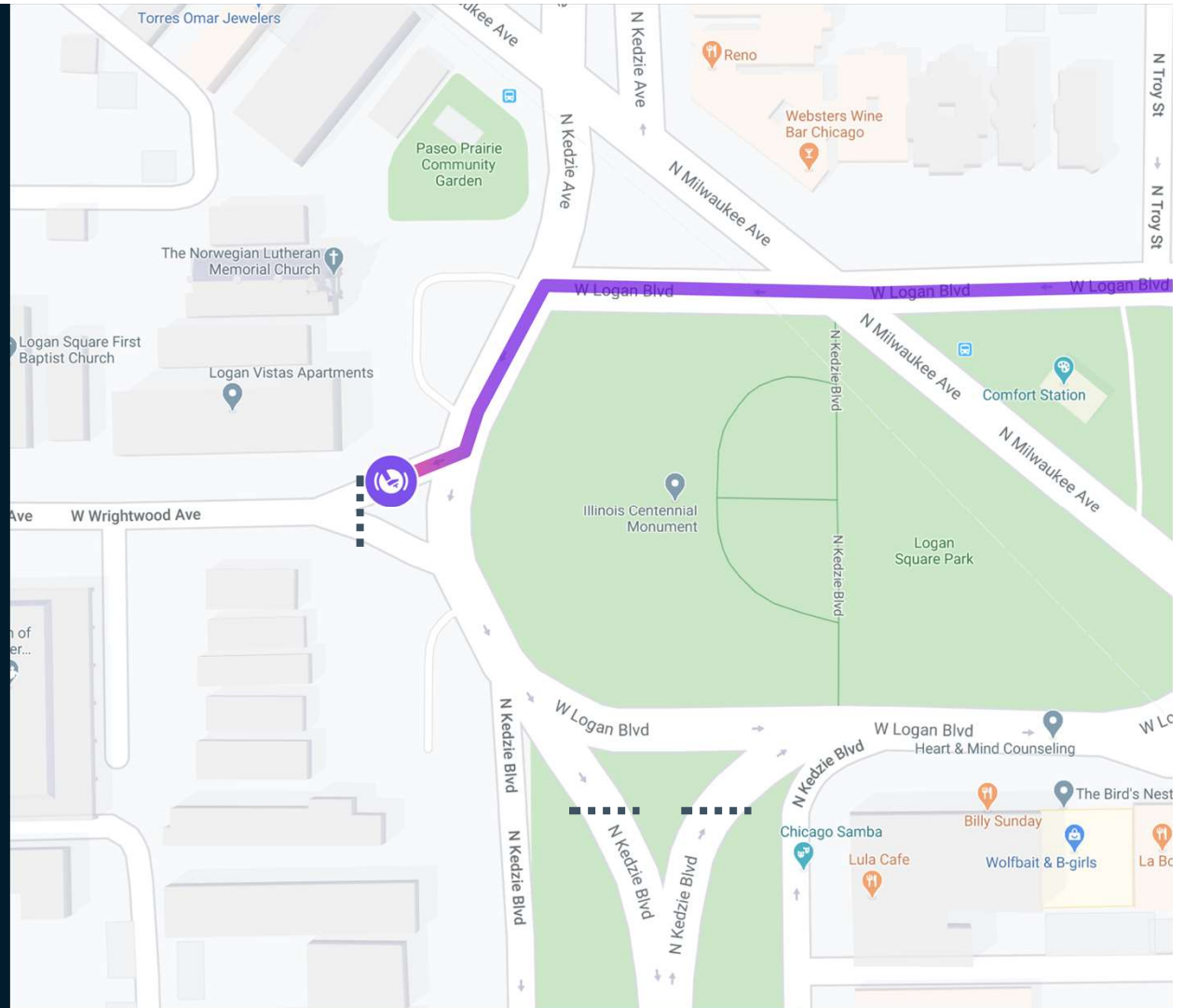


DATA CAPTURED

: GPS location

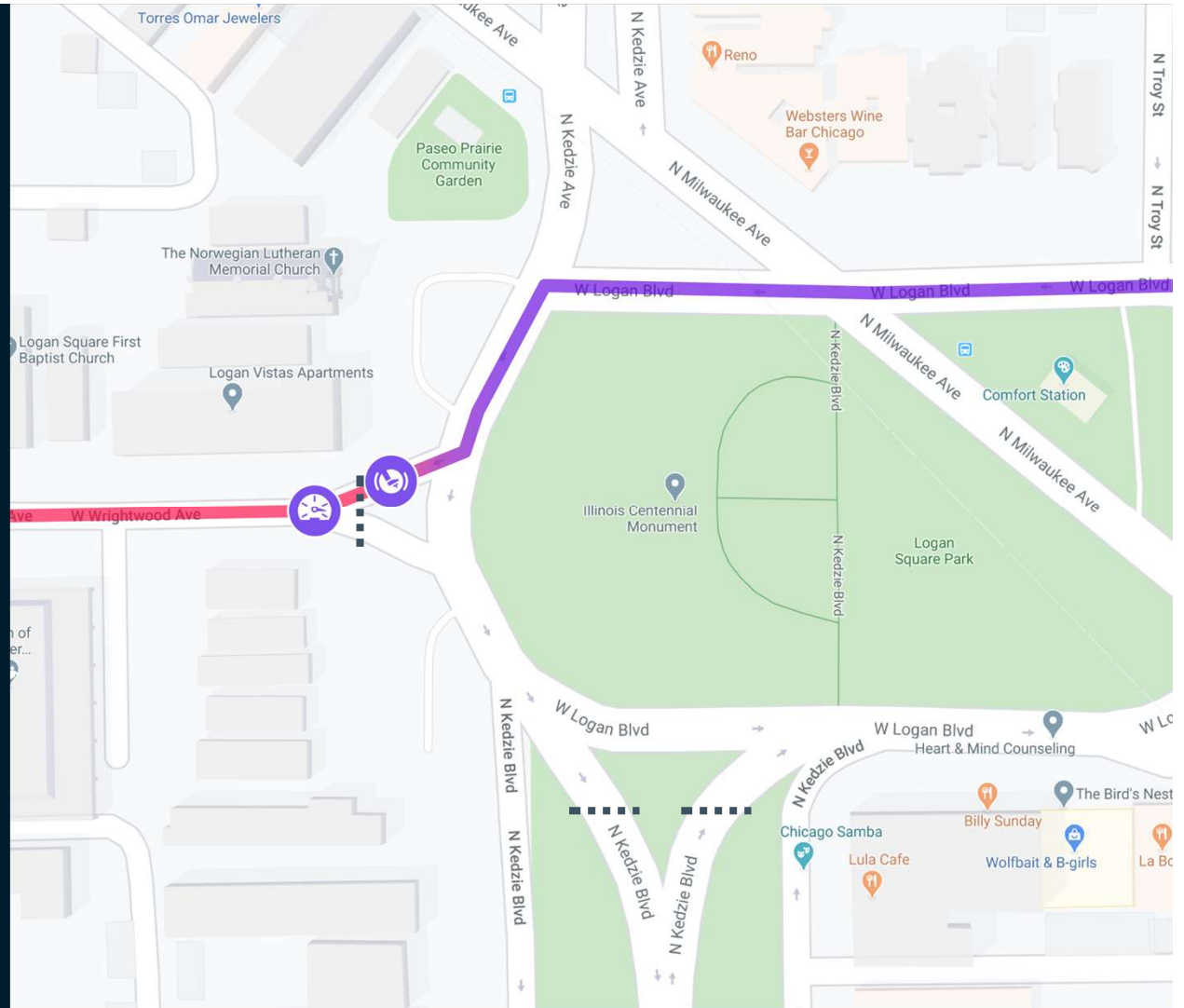
: Speed

: Braking behavior



DATA CAPTURED

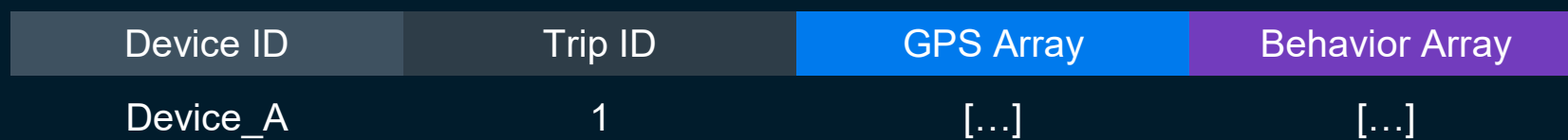
- : GPS location
- : Speed
- : Braking behavior
- : Acceleration behavior



How would this trip's data look?

HOW IT'S STRUCTURED

Trip level



HOW IT'S STRUCTURED

Trip level: GPS array

Device ID	Trip ID	GPS Location	GPS Speed	GPS Time
Device_A	1	41.9286, -87.7057	40.55	2019-07-01 08:28:02
Device_A	1	41.9287, -87.7062	35.21	2019-07-01 08:28:10
Device_A	1	41.9287, -87.7075	23.34	2019-07-01 08:28:18
Device_A	1	41.9284, -87.7078	2.10	2019-07-01 08:28:25
Device_A	1	41.9283, -87.7081	21.21	2019-07-01 08:28:33

Above is a simplified illustrative example of how GPS arrays may look.

HOW IT'S STRUCTURED

Trip level: Behavior array

Device ID	Trip ID	Behavior Type	Behavior Location	Behavior Time
Device_A	1	Braking	41.9284, -87.7079	2019-07-01 08:28:23
Device_A	1	Acceleration	41.9282, -87.7081	2019-07-01 08:28:32

Above is a simplified **illustrative** example of how behavior arrays may look.

HOW IT'S STRUCTURED

Trip level

Device ID	Trip ID	GPS Array	Behavior Array	Road Array	Weather Array
Device_A	1	[...]	[...]	[...]	[...]
Device_A	2	[...]	[...]	[...]	[...]
Device_B	1	[...]	[...]	[...]	[...]
Device_C	1	[...]	[...]	[...]	[...]
Device_C	2	[...]	[...]	[...]	[...]

Mobile considerations

MOBILE CONSIDERATIONS

Differences in data collection between OBD-II devices and mobile phones



Mode of
transportation



GPS
noise



Constrained
resources

MOBILE CONSIDERATIONS

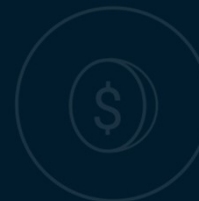
Differences in data collection between OBD-II devices and mobile phones



Mode of
transportation

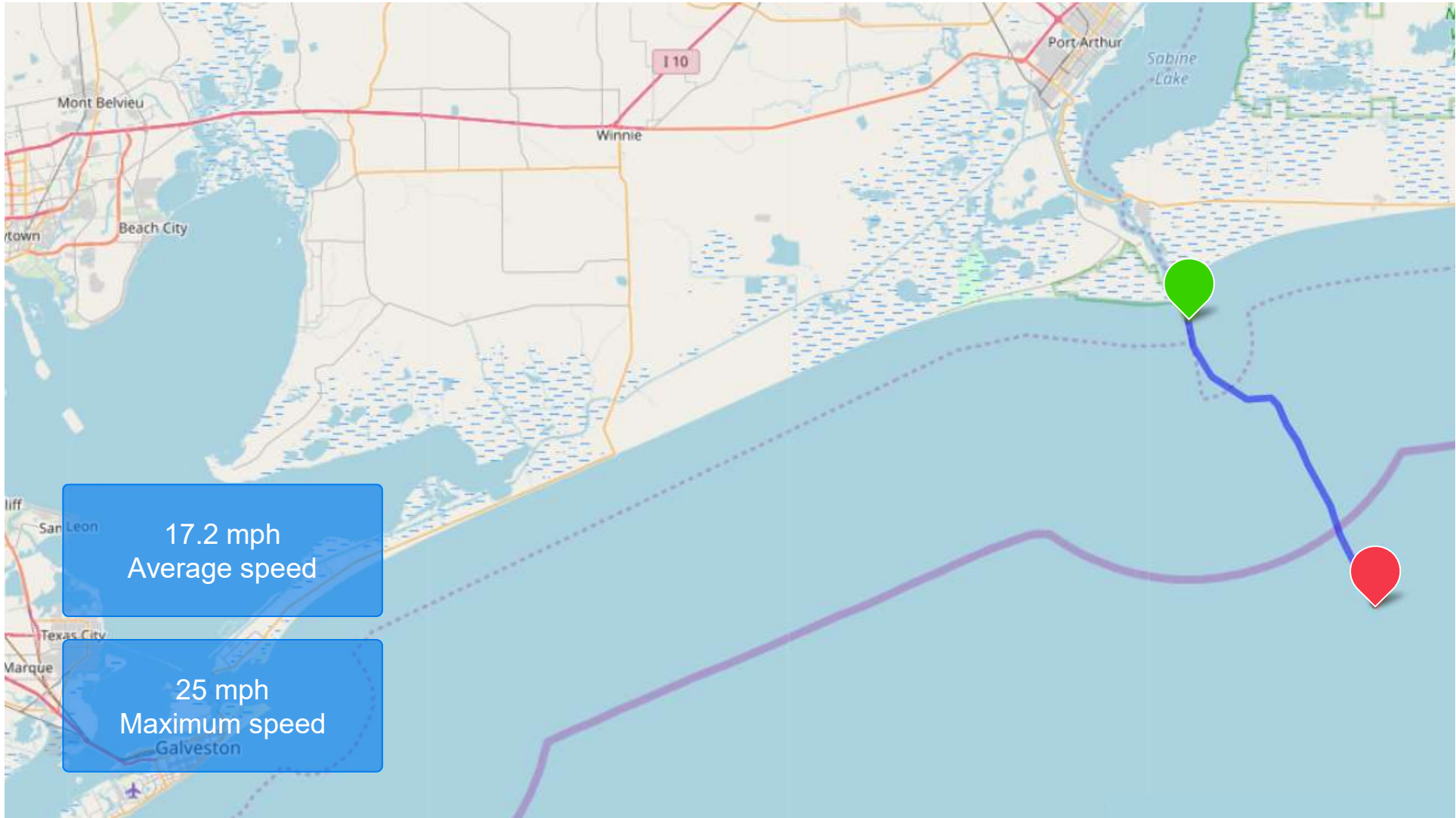


GPS
noise



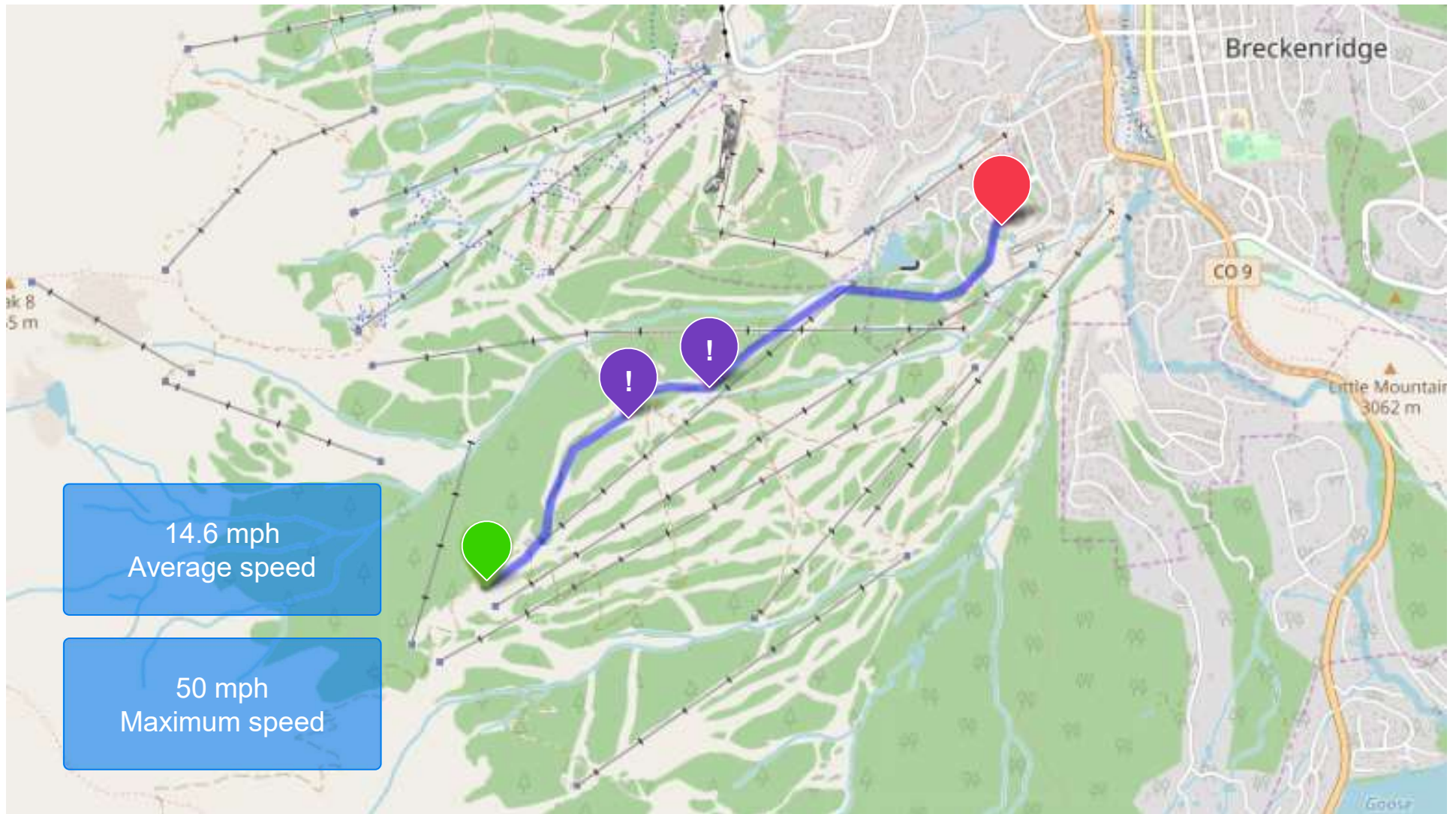
Constrained
resources





17.2 mph
Average speed

25 mph
Maximum speed



Varying modes of transportation create challenges

Other modes of transportation include train, bus, passenger

Vehicle verification not tied to mobile phone

Driving feedback should be based on trips taken as the driver

HOW CAN IT BE SOLVED?

- : Beacons in vehicles
- : Feedback from user
- : Mode of transport and driver detection algorithms

MOBILE CONSIDERATIONS

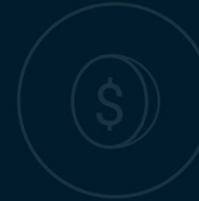
Differences in data collection between OBD-II devices and mobile phones



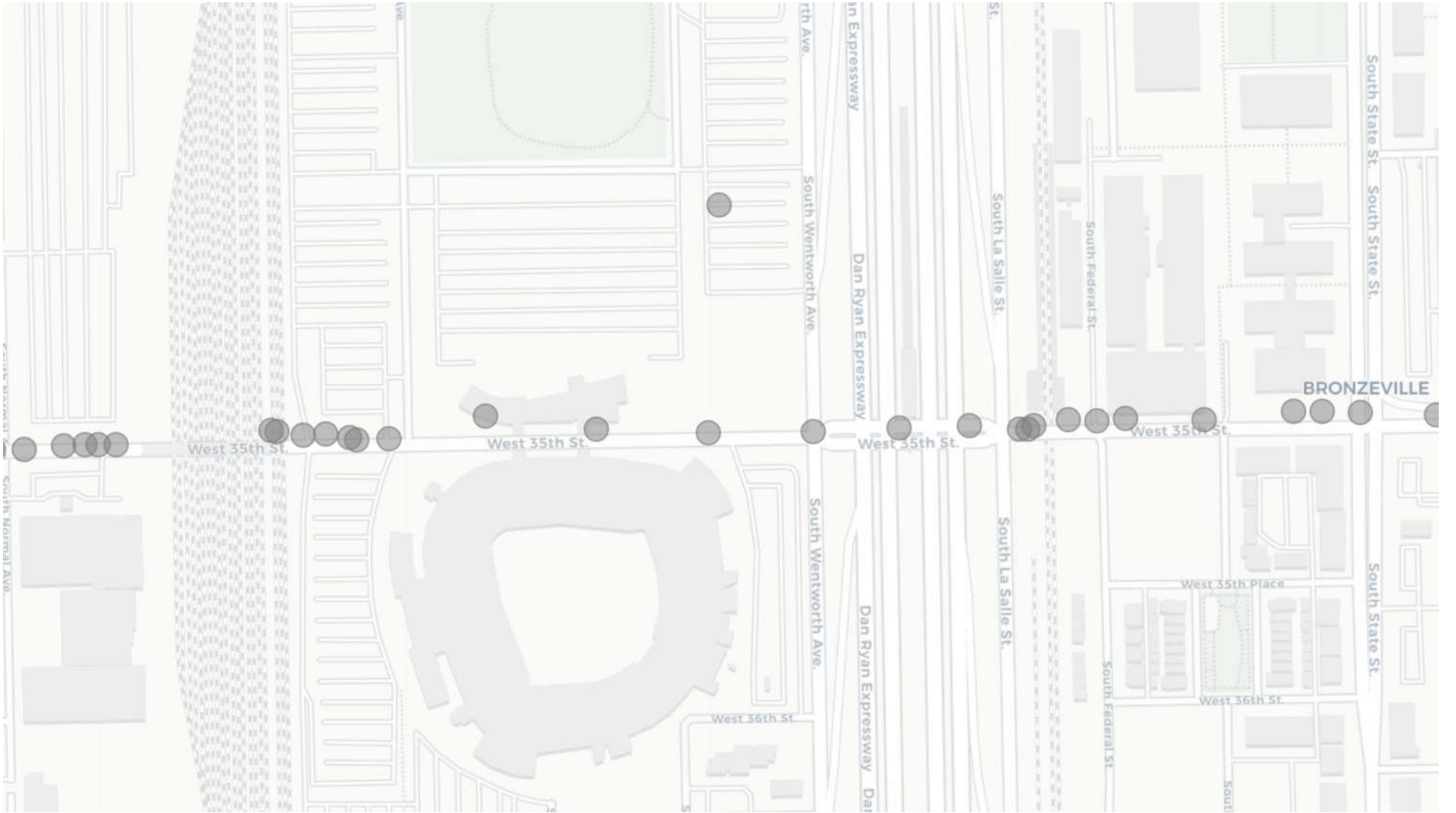
Mode of
transportation



GPS
noise



Constrained
resources



BRONZEVILLE

West 35th St

West 35th St

West 35th St

West 35th St

West 35th Place

West 36th St

South State St

South State St

South La Salle St

South La Salle St

South Federal St

South Federal St

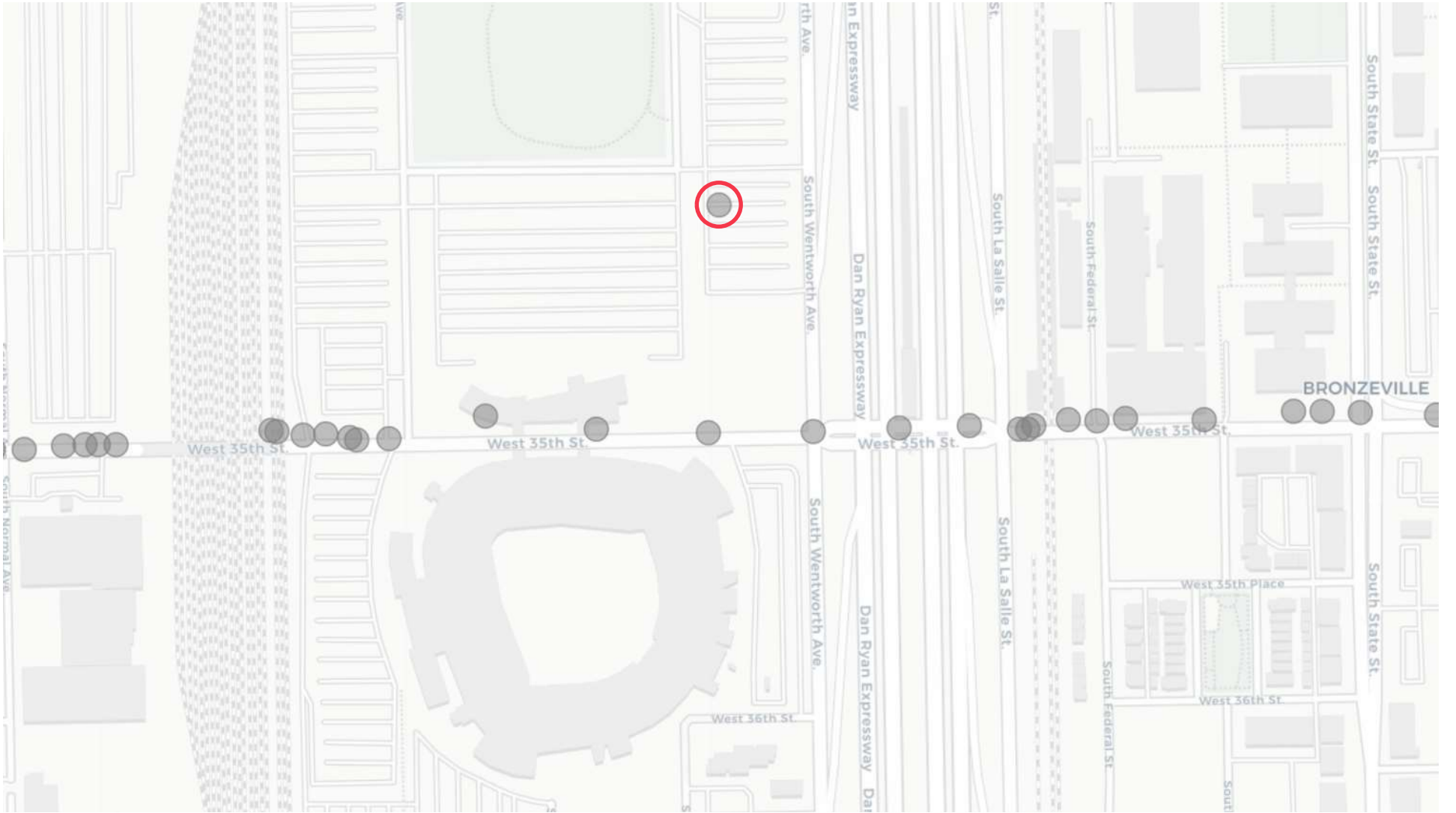
South Wentworth Ave

South Wentworth Ave

Dan Ryan Expressway

Dan Ryan Expressway

South Normal Ave



MOBILE CONSIDERATIONS

Differences in data collection between OBD-II devices and mobile phones



Mode of
transportation



GPS
noise



Constrained
resources

CHALLENGES

Constrained resources



Respecting low
battery levels



Having the
required storage



Finding a
good connection

Mobile Benefits

Mobile benefits



Ubiquitous

Mobile benefits



Ubiquitous



Low cost

Mobile benefits



Ubiquitous



Low cost



Continuous
Engagement

Mobile benefits



Ubiquitous



Low cost



Continuous
Engagement



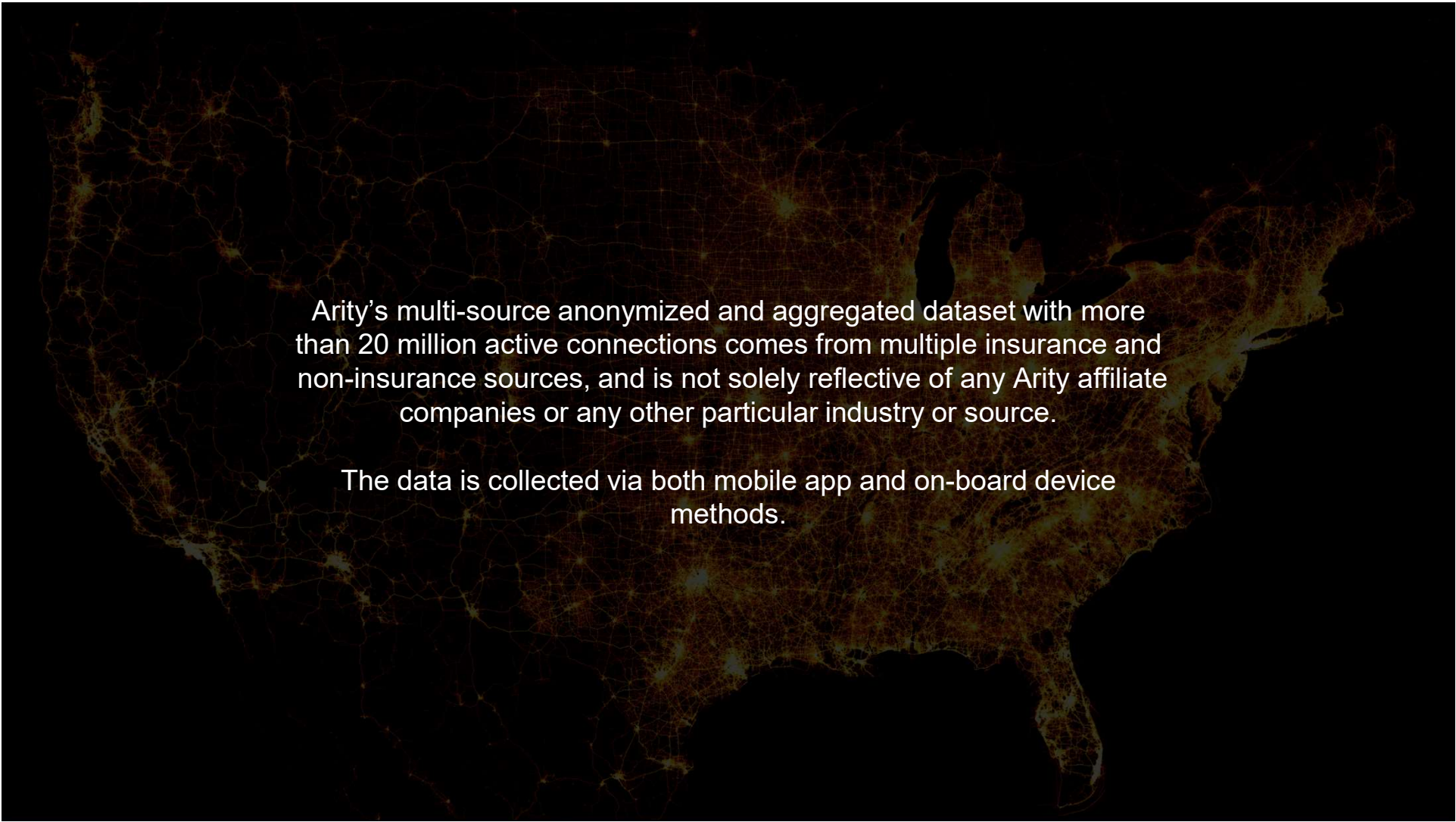
Additional
Insights

A map of Texas and surrounding regions (Arkansas, Mississippi, Louisiana, and Coahuila) showing the impacts of COVID-19. The map is dark blue with green and yellow areas indicating different levels of impact. Major cities are labeled, including Lubbock, Norman, Fort Worth, Dallas, Abilene, Midland, Odessa, Austin, San Antonio, Houston, Galveston, Corpus Christi, Laredo, Beaumont, Shreveport, Jackson, Lafayette, and New Orleans. The text "Impacts of COVID-19" is overlaid in white. The map shows a concentration of yellow and green areas in the central and eastern parts of Texas, particularly around the Dallas-Fort Worth and Houston areas, and extending into Louisiana and Mississippi. The western and southern parts of Texas appear mostly dark blue, indicating lower impact levels.

Impacts of COVID-19

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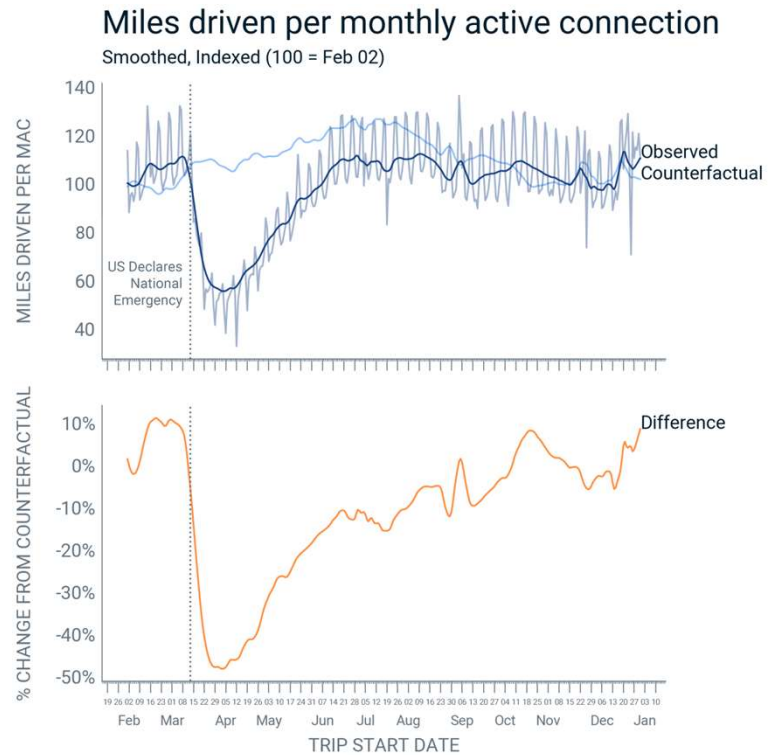
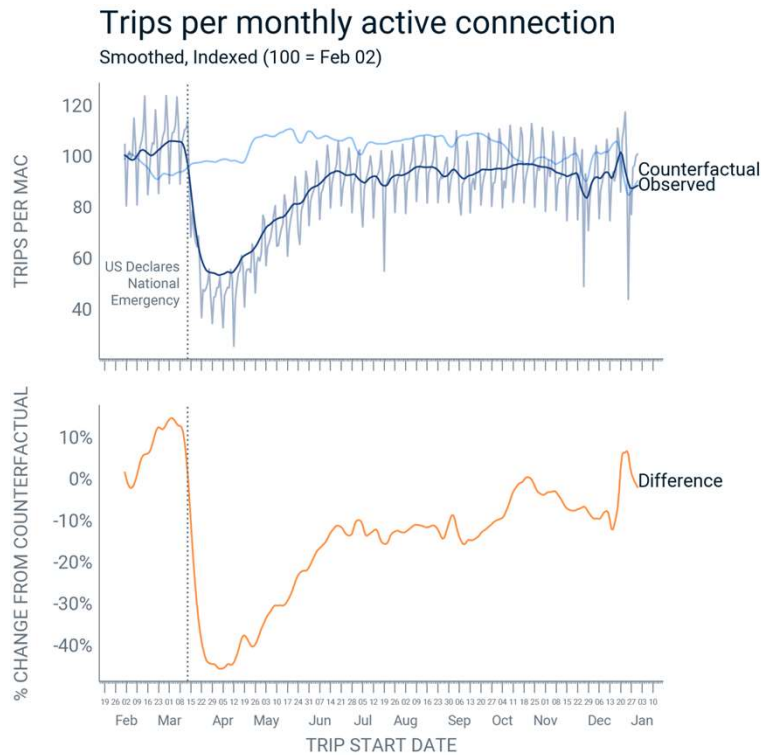
Arity's multi-source anonymized and aggregated dataset with more than 20 million active connections comes from multiple insurance and non-insurance sources, and is not solely reflective of any Arity affiliate companies or any other particular industry or source.

The data is collected via both mobile app and on-board device methods.

Mileage trends

Driving was down, but returned to 'normal' seasonal ranges

Miles driven reduced more than 40% in the spring



Source: Arity's anonymized and aggregated multi-source driving behavior dataset

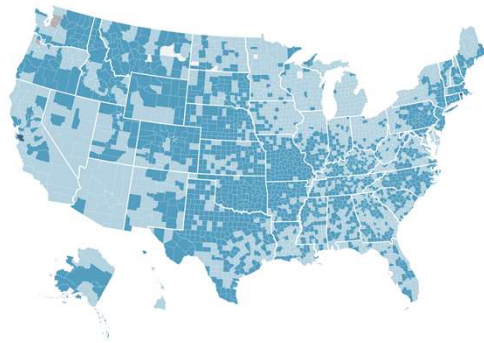
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How has driving evolved compared with COVID-19 cases throughout the pandemic?

A look at the U.S. by county throughout the year

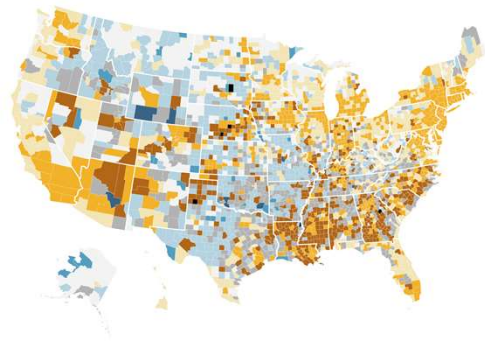
Driving miles and covid cases by county

On March 01, 2020



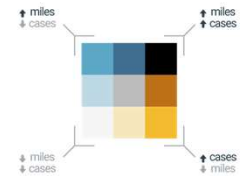
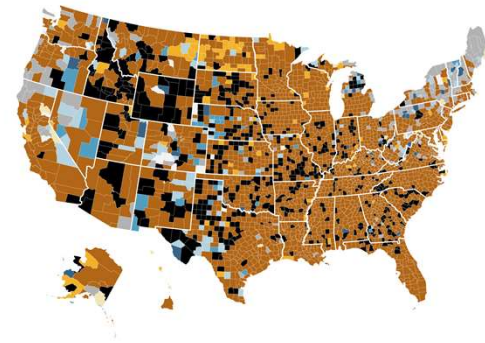
Driving miles and covid cases by county

On May 01, 2020



Driving miles and covid cases by county

On September 26, 2020

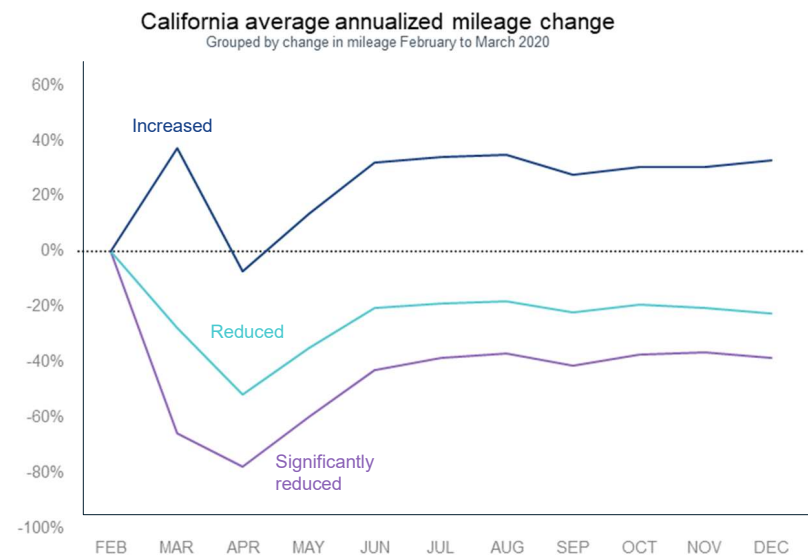
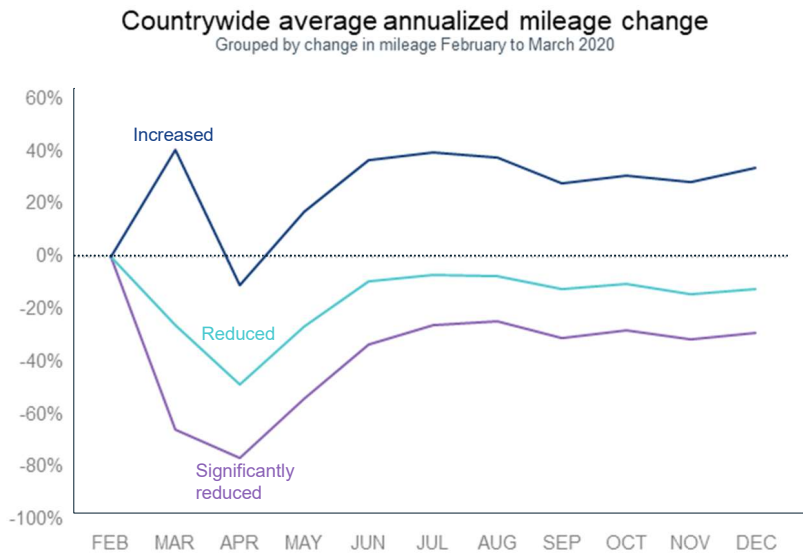


Source: Arity's anonymized and aggregated multi-source driving behavior dataset
Covid case rates from: <https://usafacts.org/>

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Drivers who sheltered early are still driving less months later

Differences in mileage change by initial response to lockdown



Driving behavior trends

Our daily commutes looked very different in 2020... and weekend nights were very quiet
 Shifts in when people drive remain, even when lockdowns lifted and school was back in session

Change in trip activity by time of day

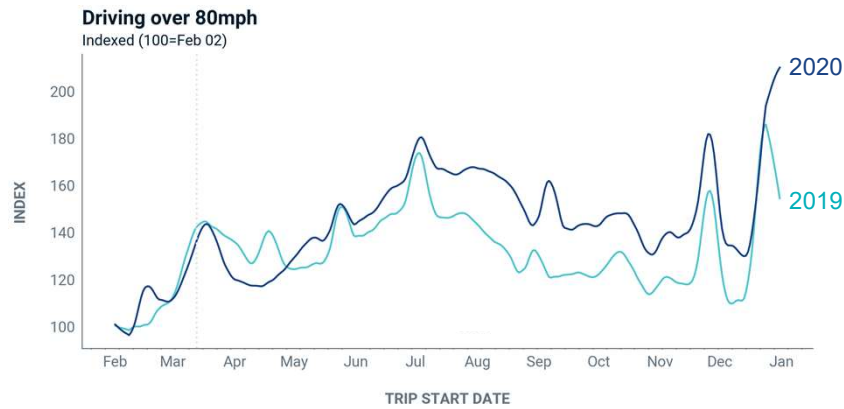
Number of trips per active user, indexed (100 = Feb 02)



Source: Arity's anonymized and aggregated multi-source driving behavior dataset
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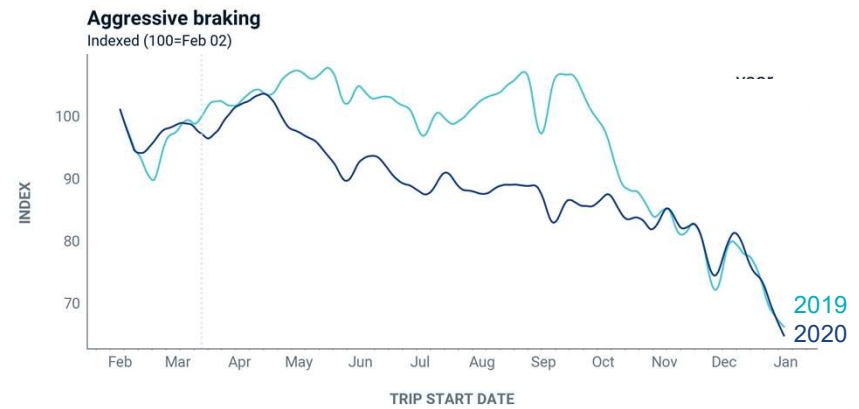
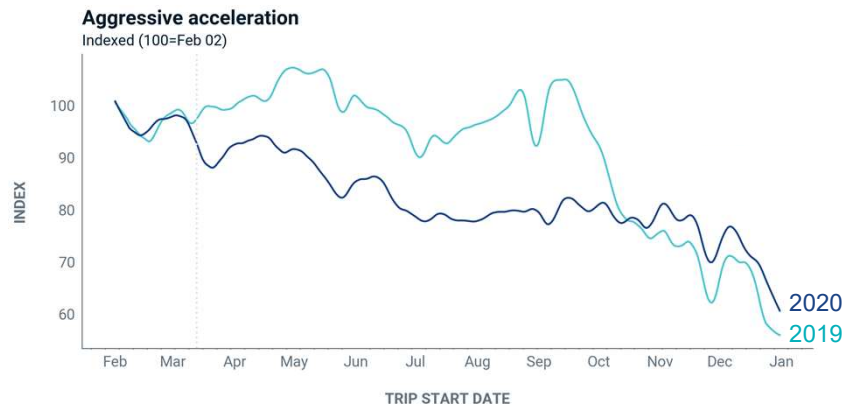
In the fast lane: People are taking advantage of the empty roads

High speed driving was up in 2020 vs. 2019



Despite higher travelling speeds, drivers were accelerating and braking less aggressively

Aggressive acceleration and braking was down in 2020 vs. 2019 though near seasonal differences now



Other impacts on insurance

Implications of the pandemic on the industry

Claim costs

Theft and fraudulent
claim behavior

Customer shopping
and policy changes

Implications of the pandemic on the industry

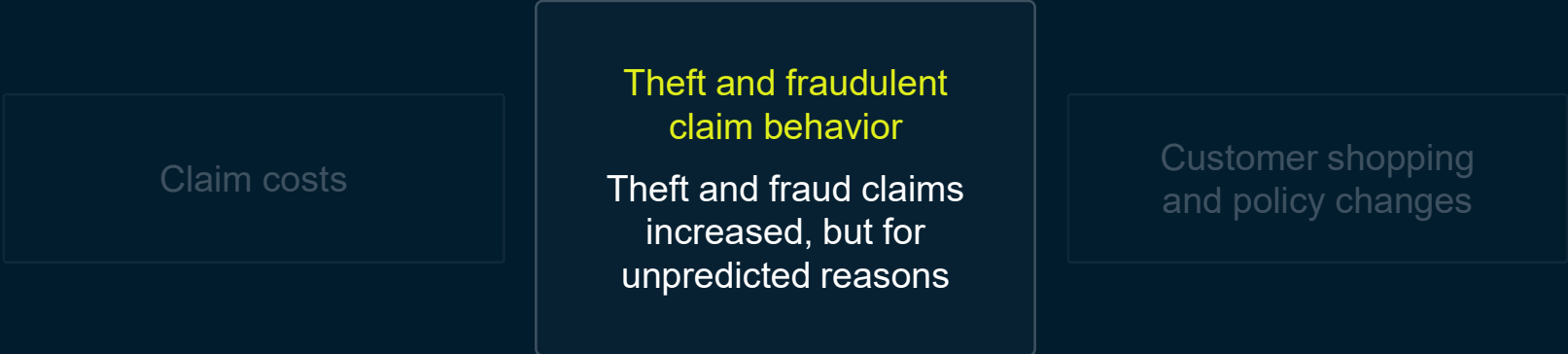
Claim costs

Despite fewer accidents and faster payouts, costs continue to rise

Theft and fraudulent claim behavior

Customer shopping and policy changes

Implications of the pandemic on the industry



Implications of the pandemic on the industry

Claim costs

Theft and fraudulent claim behavior

Customer shopping and policy changes
Shopping increased with greater focus on saving money in new ways

Wrap up

- : Where we've been
- : Here's how we do it
- : 2020 impacts

Thank you.



Megan Klein, FCAS
Megan.Klein@arity.com

Brian Faber, FCAS
Brian.Faber@arity.com