The Ultimate Smart Driving Machine: Powering the Connected Car with Machine Learning

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OUTLINE

1. What is a Connected Car?
2. What are the Problems?
3. How can Big Data and Machine Learning Help?
4. What is BMW doing?
5. What are the Remaining Challenges?
6. What is the Future?

01
WHAT IS A CONNECTED CAR?

THREE REASONS AUTOMAKERS ARE CONNECTING CARS

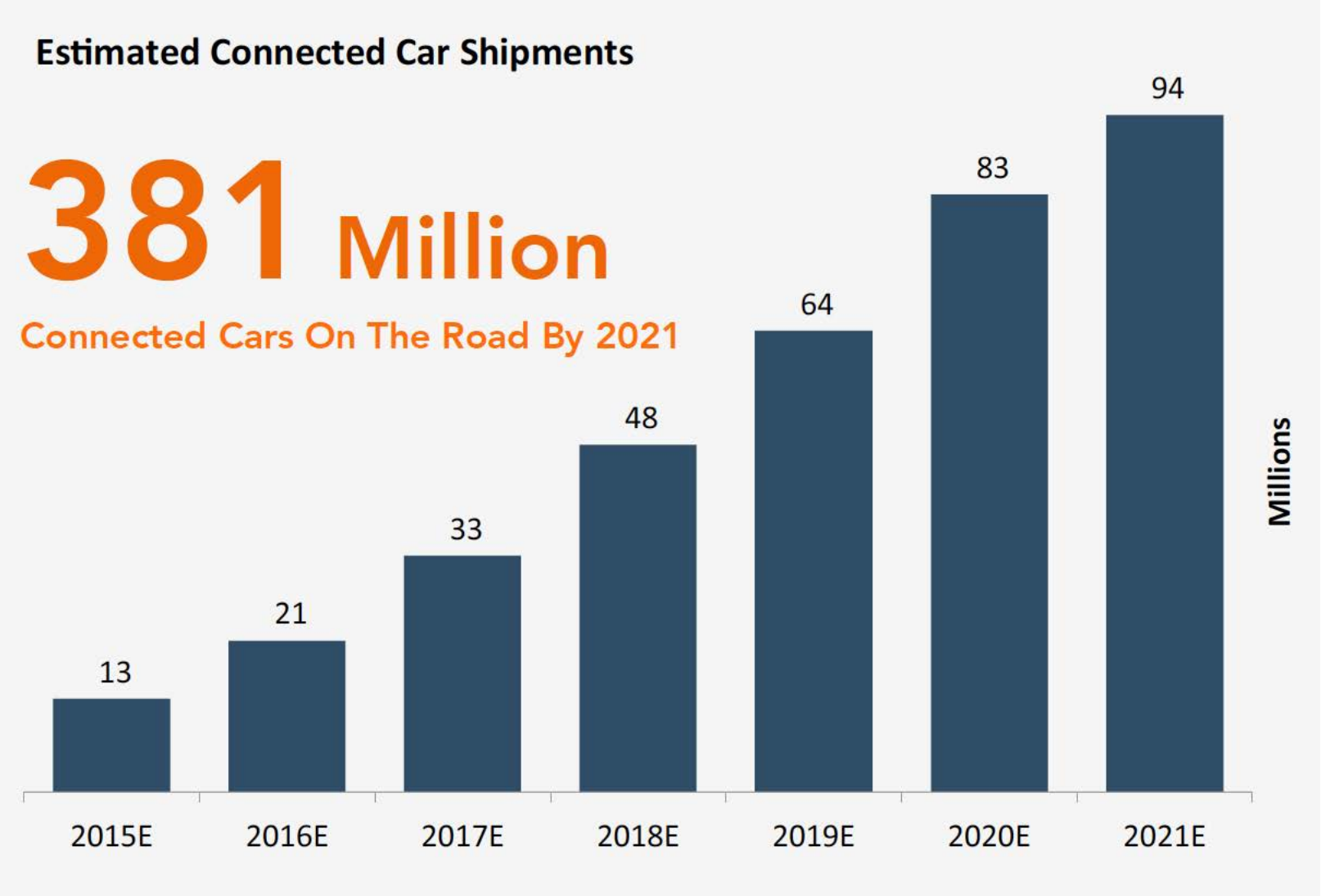
1. Internet connectivity enables over-the-air updates. $35B in savings in 2022.

2. Data generated from the vehicle indicates how efficiently the vehicle is operating and driver usage.

3. Automakers can leverage internet connections to cross sell products and services.

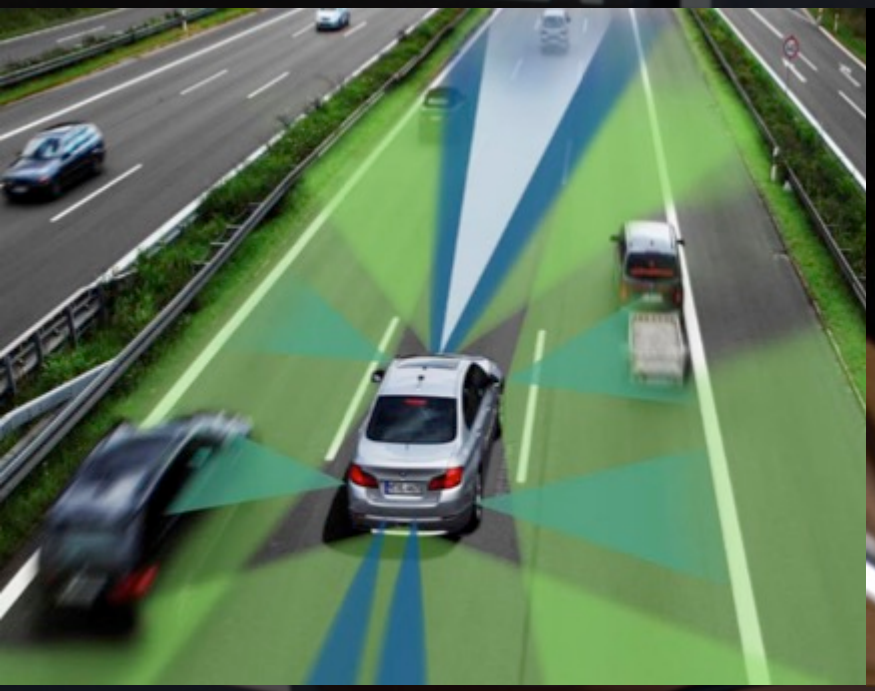
Source: Business Intelligence

THE MAJORITY OF CARS WILL BE CONNECTED IN THE FUTURE



Source: Business Intelligence

THE CONNECTED CAR REVOLUTION ENTAILS HIGHLY AUTONOMOUS DRIVING, DIGITAL SERVICES AND THE INTERIOR OF THE FUTURE.



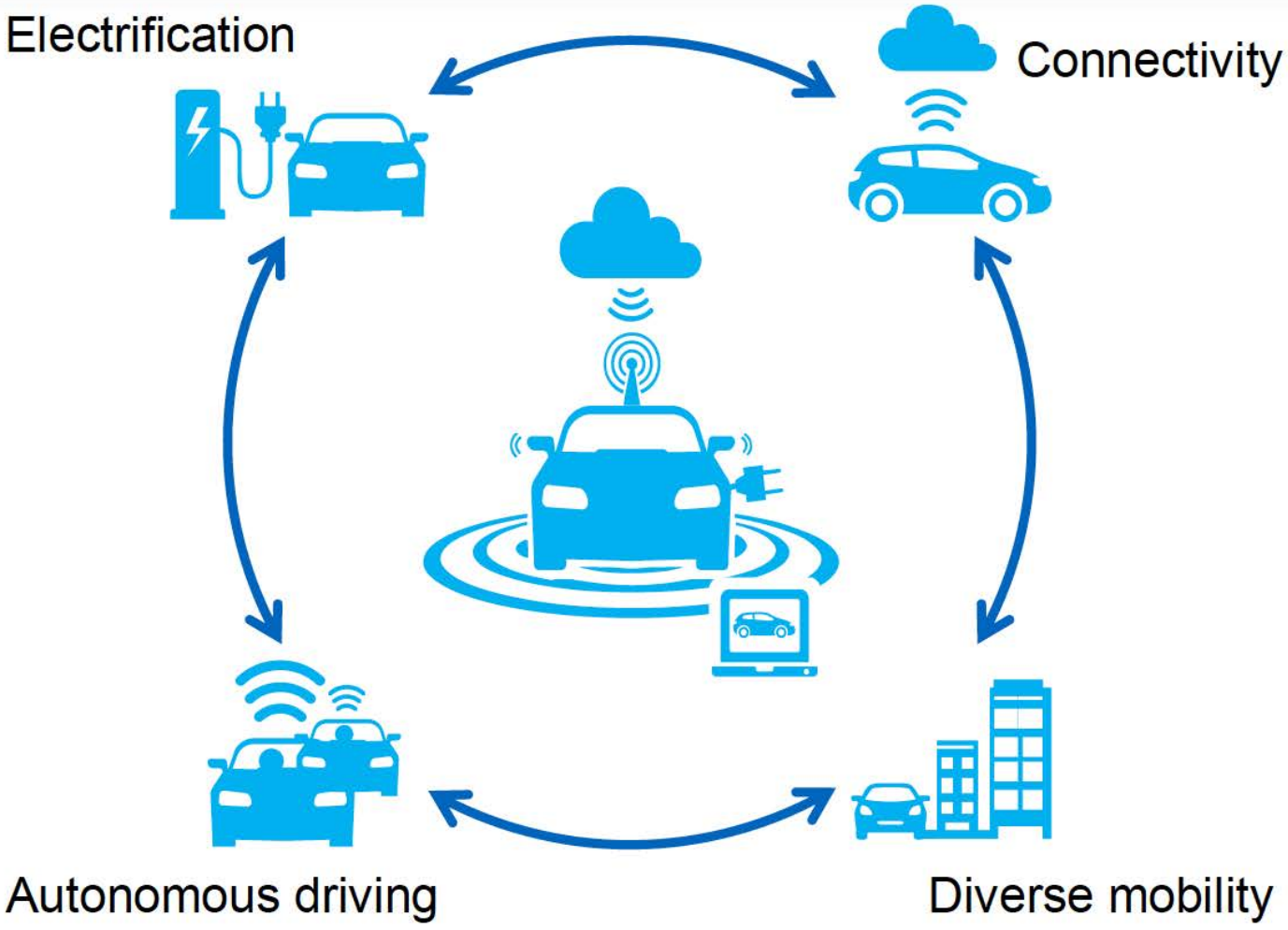
AUTOMATED DRIVING

DIGITAL SERVICES

INTERIOR OF THE FUTURE

02
WHAT ARE THE PROBLEMS?

FOUR DISRUPTIVE TECHNOLOGY-DRIVEN TRENDS… RADICALLY CHANGING THE MOBILITY INDUSTRY



Shifting markets and revenue pools

Changes in mobility behavior

Diffusion of advanced technology

New competition and cooperation

Source: McKinsey & Co.

MOBILITY MODES ARE RAPIDLY CHANGING

In India, Morgan Stanley estimates that shared-mobility players such as Uber and Olacabs will buy 16% of new cars sold in 2030 — up from 3% in 2015.

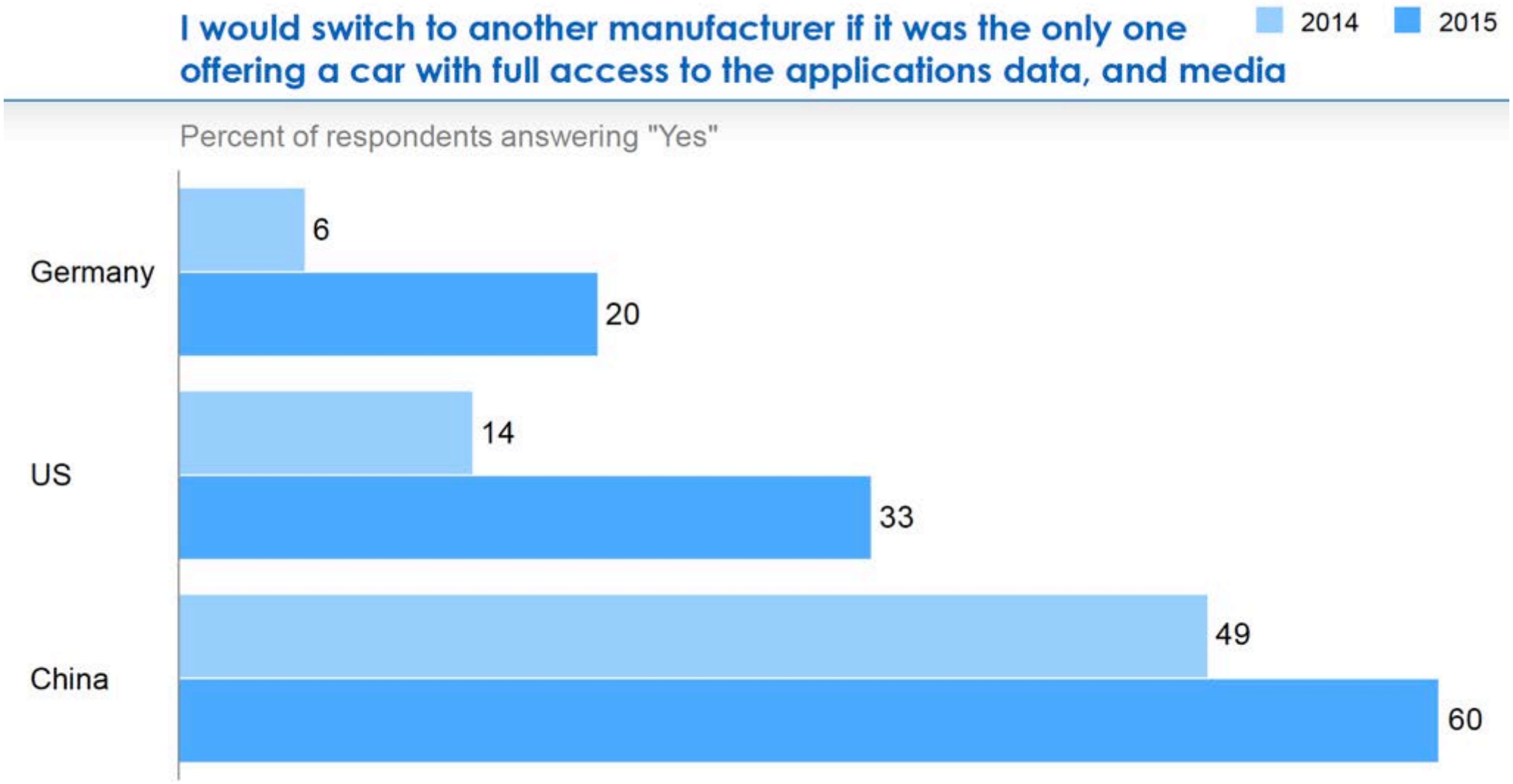
Today:
One vehicle for every trip purpose

2030:
A solution for each different specific purpose

+ non-vehicle modes of mobility

Source: McKinsey & Co.

DATA SERVICES ARE BECOMING A ‘MUST HAVE’



Source: McKinsey & Co.

03
HOW CAN BIG DATA AND MACHINE LEARNING HELP

FOUR MAIN PILLARS DRIVE THE DIGITAL TRANSFORMATION PROCESS

CLOUD

INFORMATION

BIG DATA & PREDICTIVE ANALYTICS

INTELLIGENCE

PERSONAL SMART DEVICES

ACCESS

THE INTERNET OF THINGS

INTEGRATION

COLLECTING DATA

Phone

OBD-II adapter

Car headunit

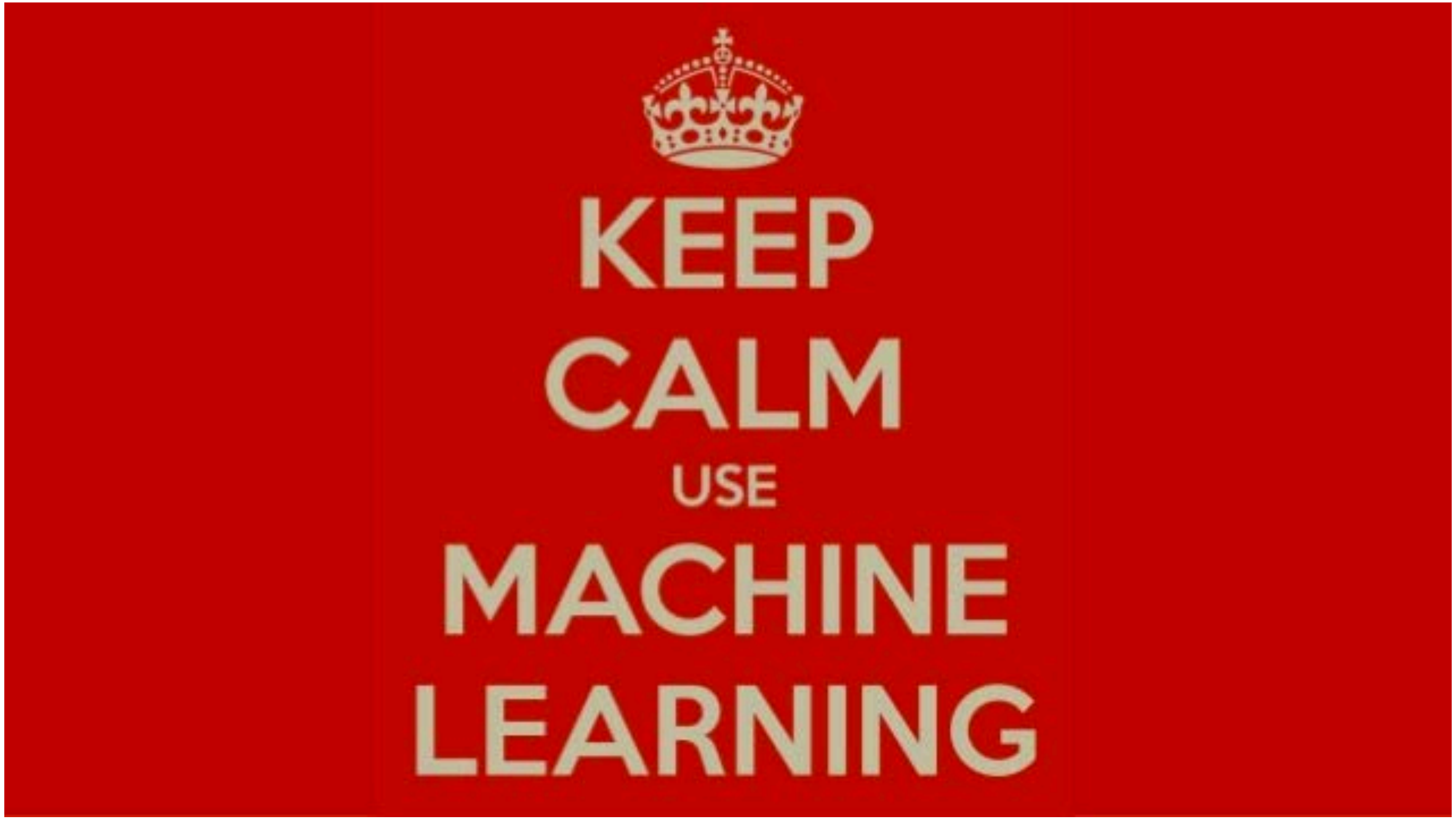
What is big data worth?

To find out, we analysed the following use cases...

Big Personal					
PAYD	PHYD	CRM - sales	CRM - service	Prognosis	Advertising - PULL

Big Vehicle								
Weather	Traffic	Road Maintenance	Warranty	Insurance	Trip Analysis	Advertising	Product design	Advertising - PUSH

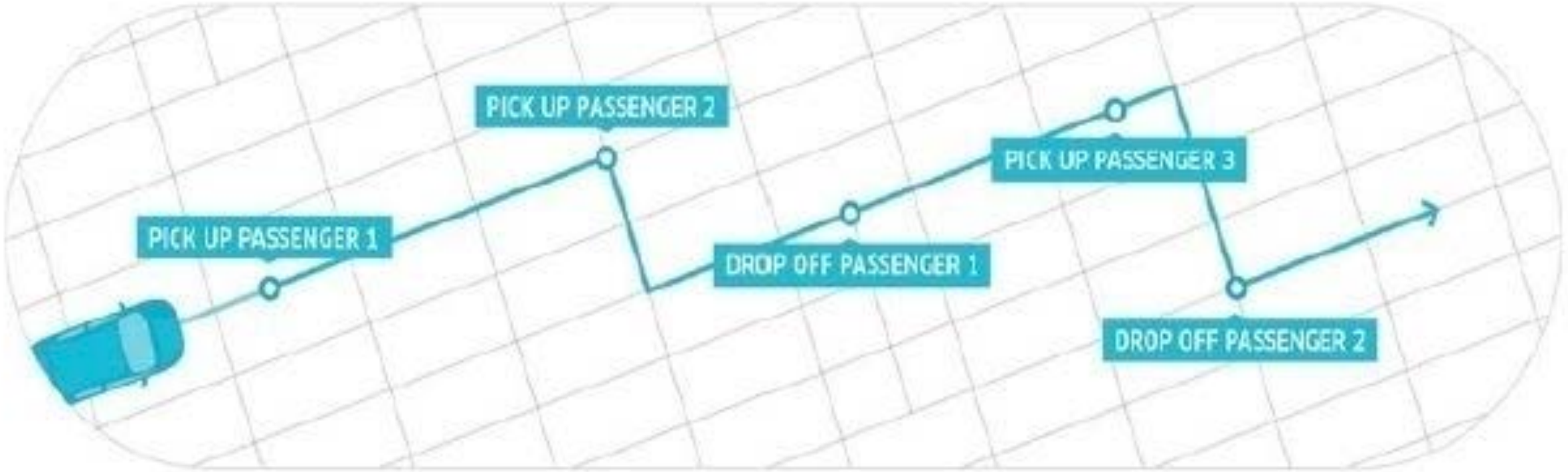
http://telematicsnews.info/2014/02/05/feature-what-is-the-realistic-value-of-automotive-big-data_f552/


KEEP
CALM
USE
MACHINE
LEARNING

MACHINE LEARNING DRIVES THE AUTONOMOUS CAR

MACHINE LEARNING HELPS TO AVOID HUMAN ERROR AND ACCIDENTS

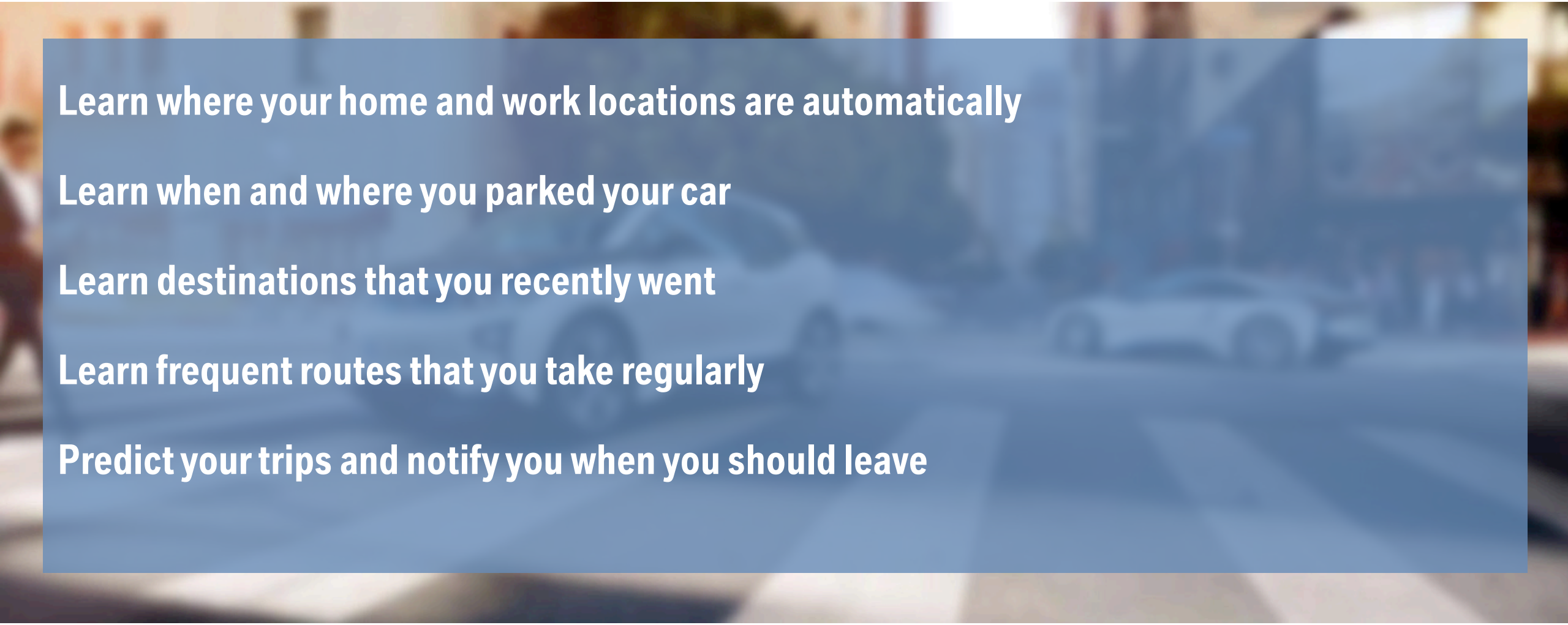
MACHINE LEARNING HELPS TO CREATE EFFICIENT CAR POOLING



04
WHAT IS BMW DOING?

BMW CONNECTED – AVAILABLE IN THE USA SINCE MARCH 31ST.

MACHINE LEARNING IN BMW CONNECTED



Learn where your home and work locations are automatically

Learn when and where you parked your car

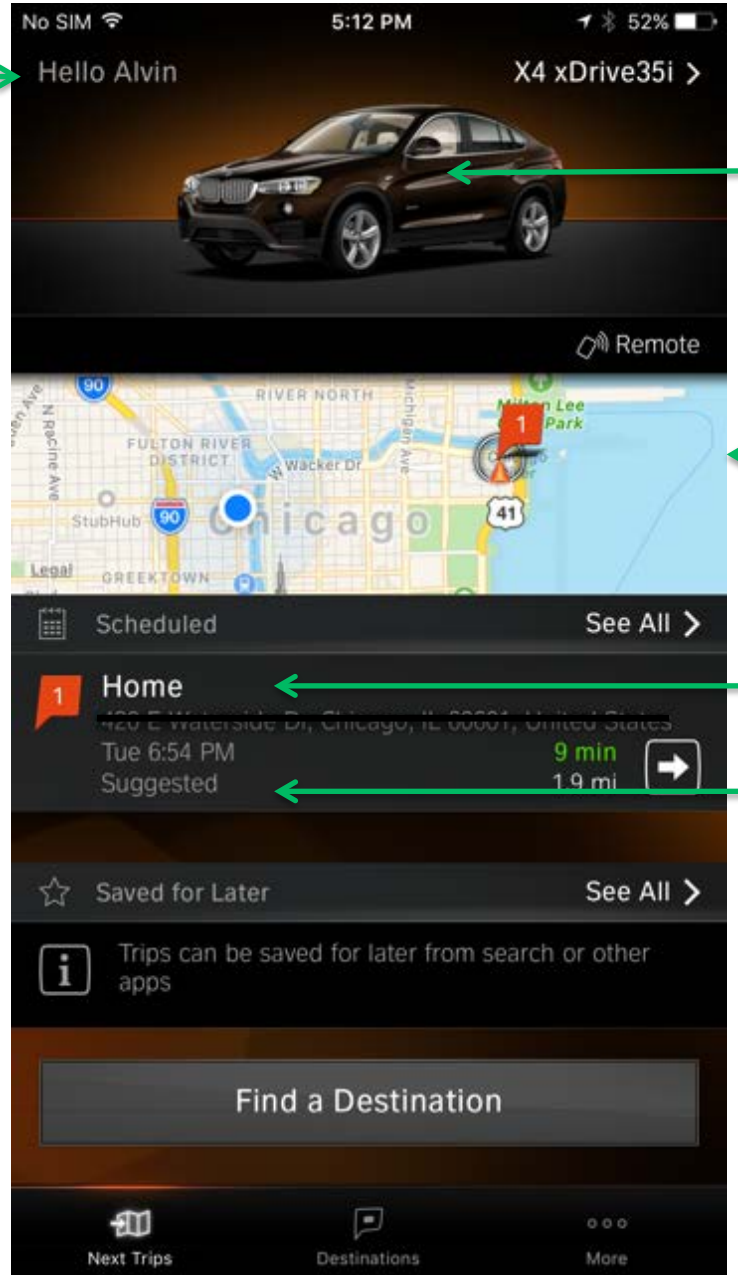
Learn destinations that you recently went

Learn frequent routes that you take regularly

Predict your trips and notify you when you should leave

LEARN YOUR PARKING, HOME AND PREDICTED DESTINATIONS

User's name



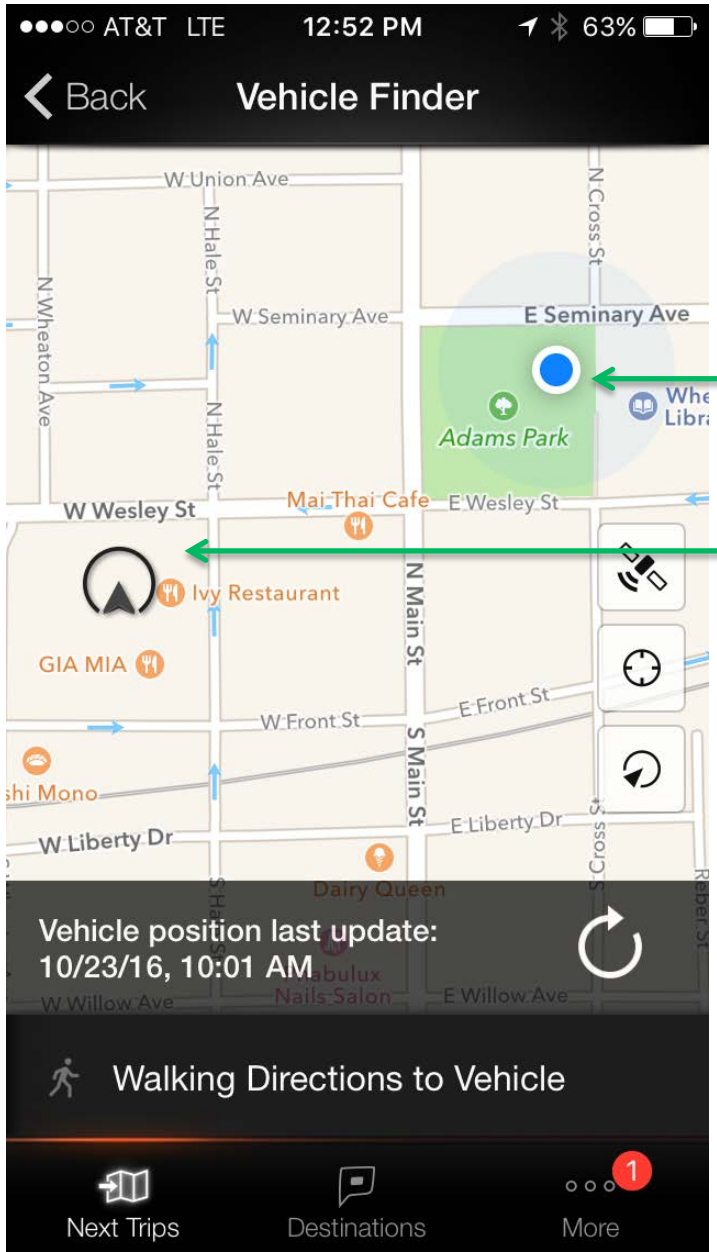
User's car

Map of user's location and parking location

Learned home

Predicted trip

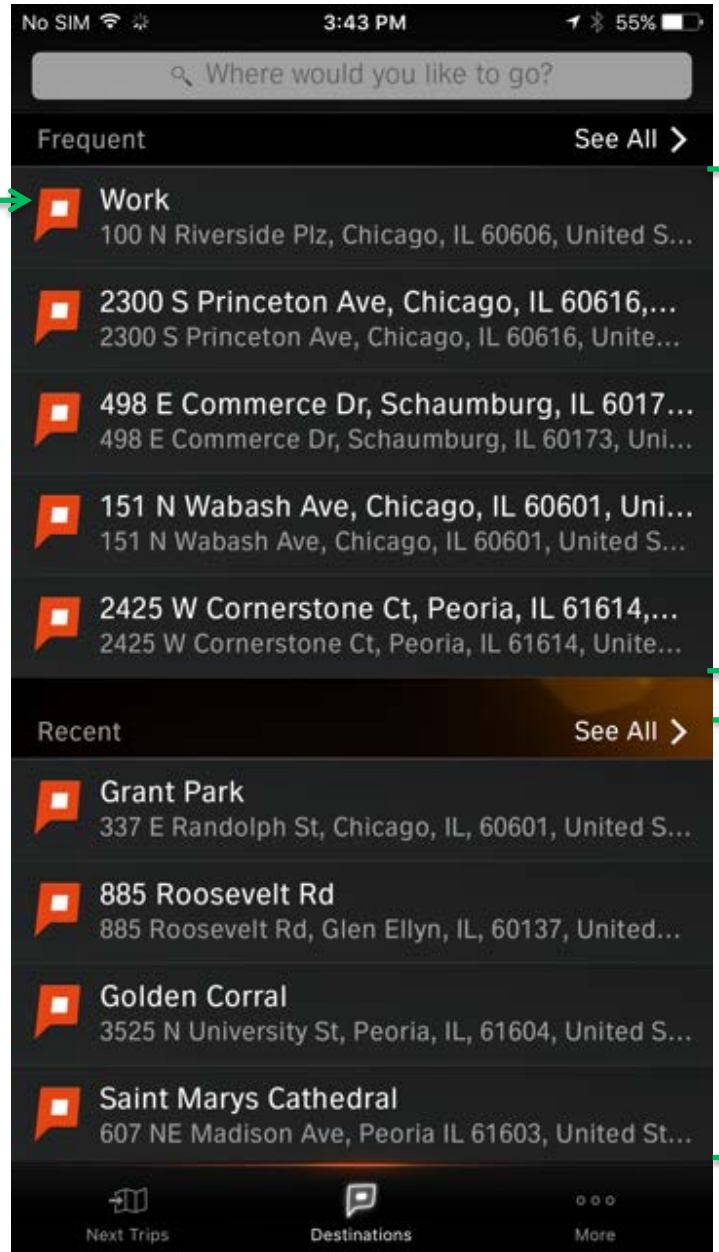
LEARN YOUR FREQUENT, RECENT, WORK AND PARKING LOCATIONS



Learned work

User's location

Parking location

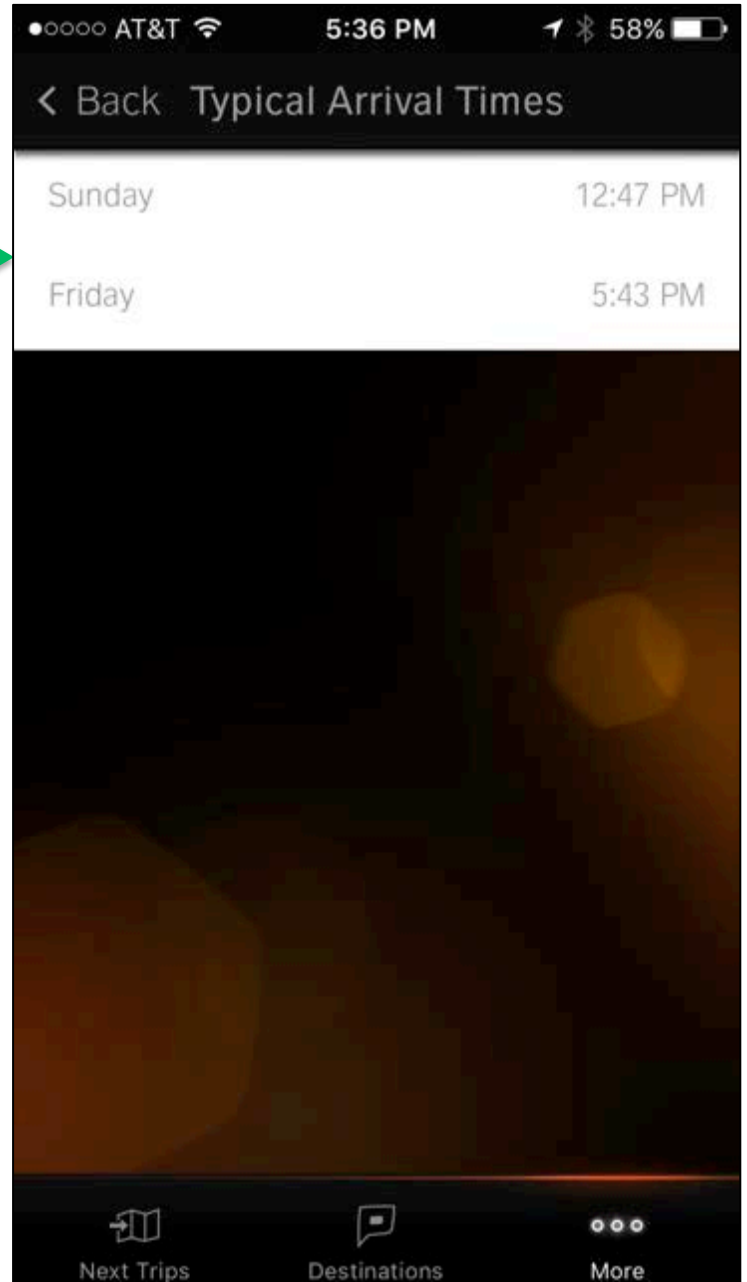


Frequent destinations

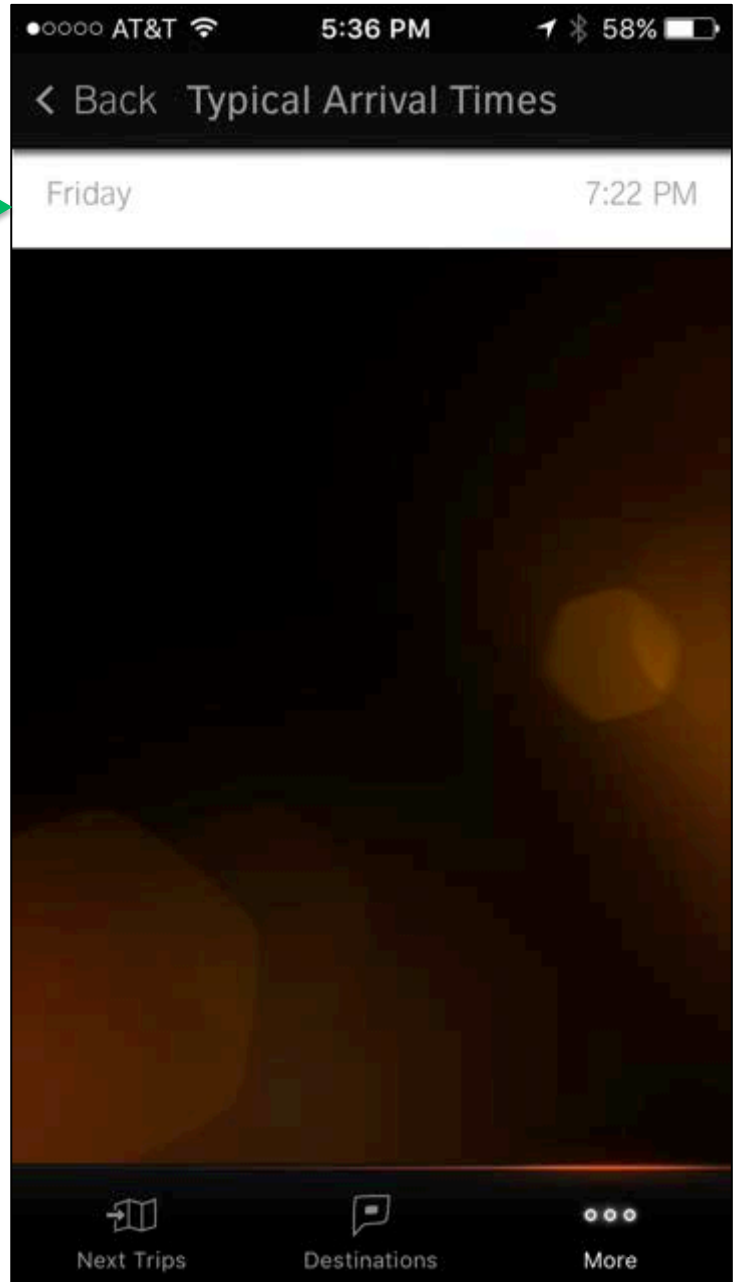
Recent destinations

LEARN YOUR TYPICAL ARRIVAL TIMES FOR A LEARNED DESTINATION

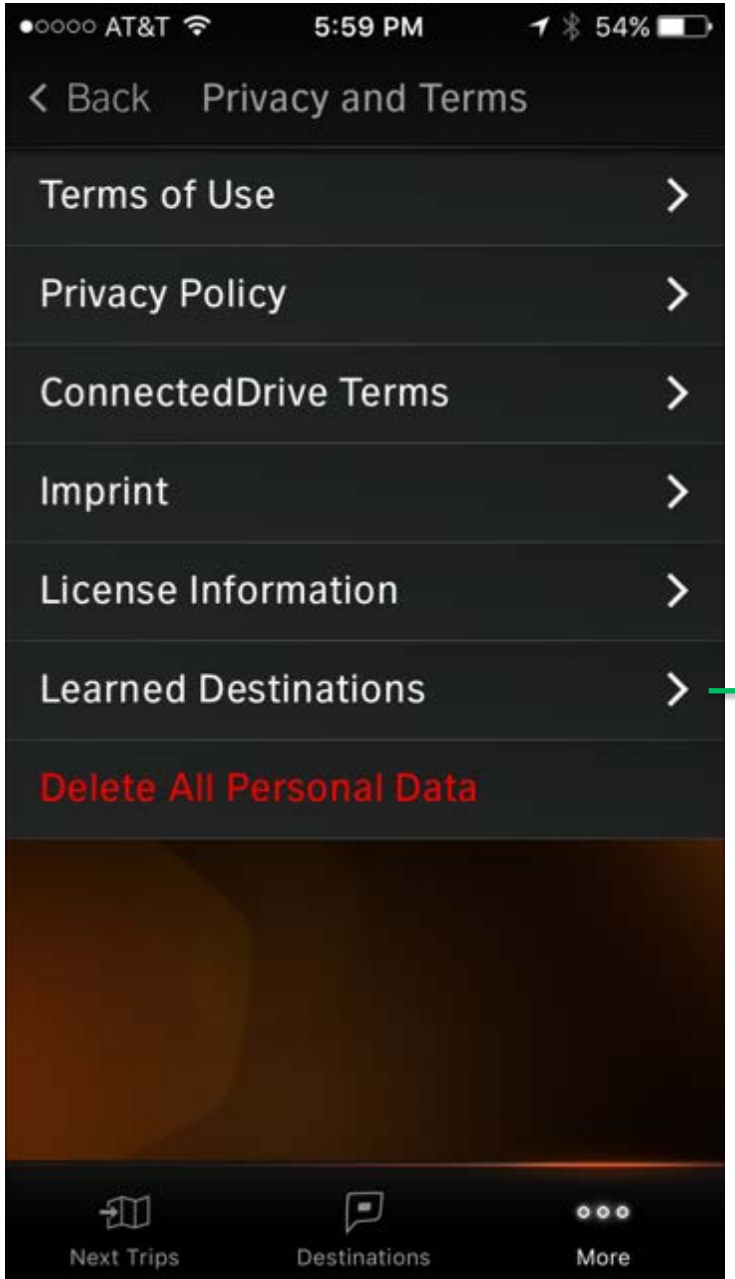
Estimated predicted arrival times to Home

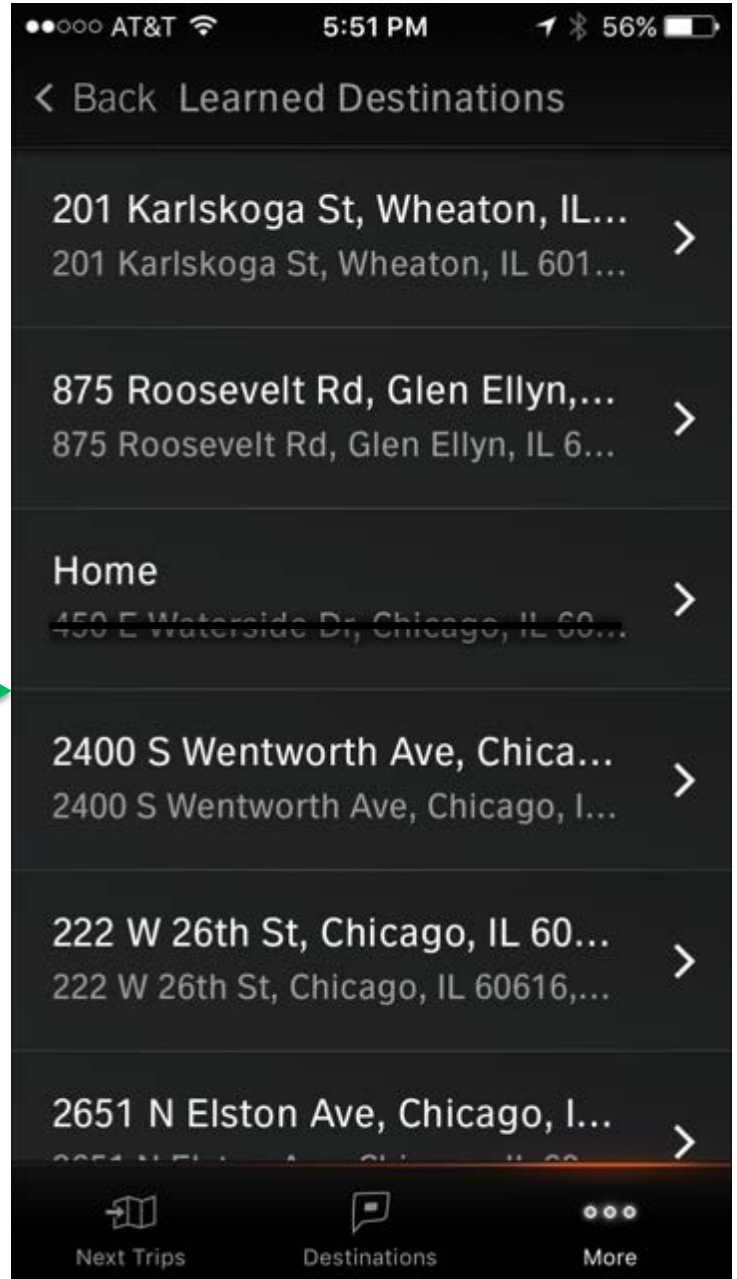


Estimated predicted arrival time to Grand Palace Chinese restaurant



ENSURING USER PRIVACY

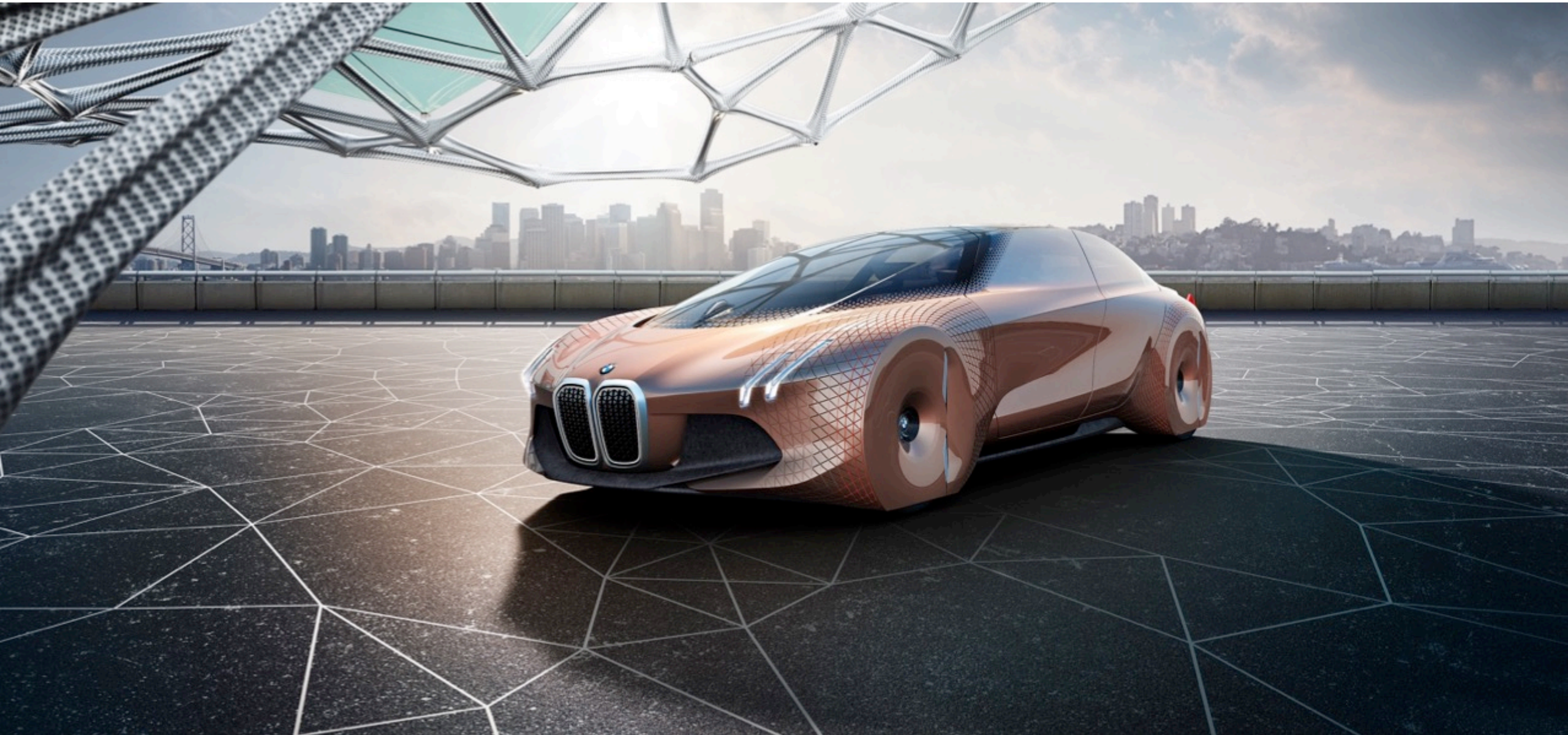




05
WHAT ARE THE REMAINING CHALLENGES?

ENSURING USER AND CAR SECURITY

INTEGRATE THE CONNECTED CAR TO YOUR DAILY LIFE

https://youtu.be/JuaiCf6MHa0

MACHINE LEARNING – COMING TO A BMW NEAR YOU