

An aerial photograph of a city skyline, featuring several prominent skyscrapers and a dense urban layout. A teal-colored overlay is present in the top right corner, containing the word 'here' in white lowercase letters. The overlay also extends diagonally across the bottom left of the image, where the main title and text are located.

here

Industry Perspectives on Workforce Needs

Jennifer Carter, HERETechnologies
PCB Community College Workshop | September 20, 2017

HERE in numbers



Countries mapped

7,000+



Employees in 56 countries
focused on delivering the world's best
map and location technologies

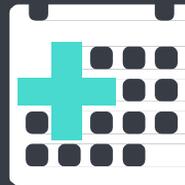
HEREMaps on board of
100M
vehicles and counting



4 of 5

In-car navigation
systems in Europe
and North America
use HERE maps

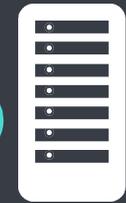
30+



Years of
experience
transforming
location
technology

28

TB map data



collected
per day

700,000

3D data points
per second per car

400



HERE cars
collecting
data for
our
maps



A history of transforming maps into location technology

1985
Navigation
Technologies
founded
NAVTEQ

1994
1st map for in-car nav
1st map for web

2004
1st map for ADAS
1st map for phone
1st map for Adaptive
Cruise Control

2009
1st map for Predictive Cruise Control
High-precision data collection and
map-building technology
Use of sensor data for map building

2007
Community
mapping
Offline maps
for mobile

2011
1st pure
location
cloud

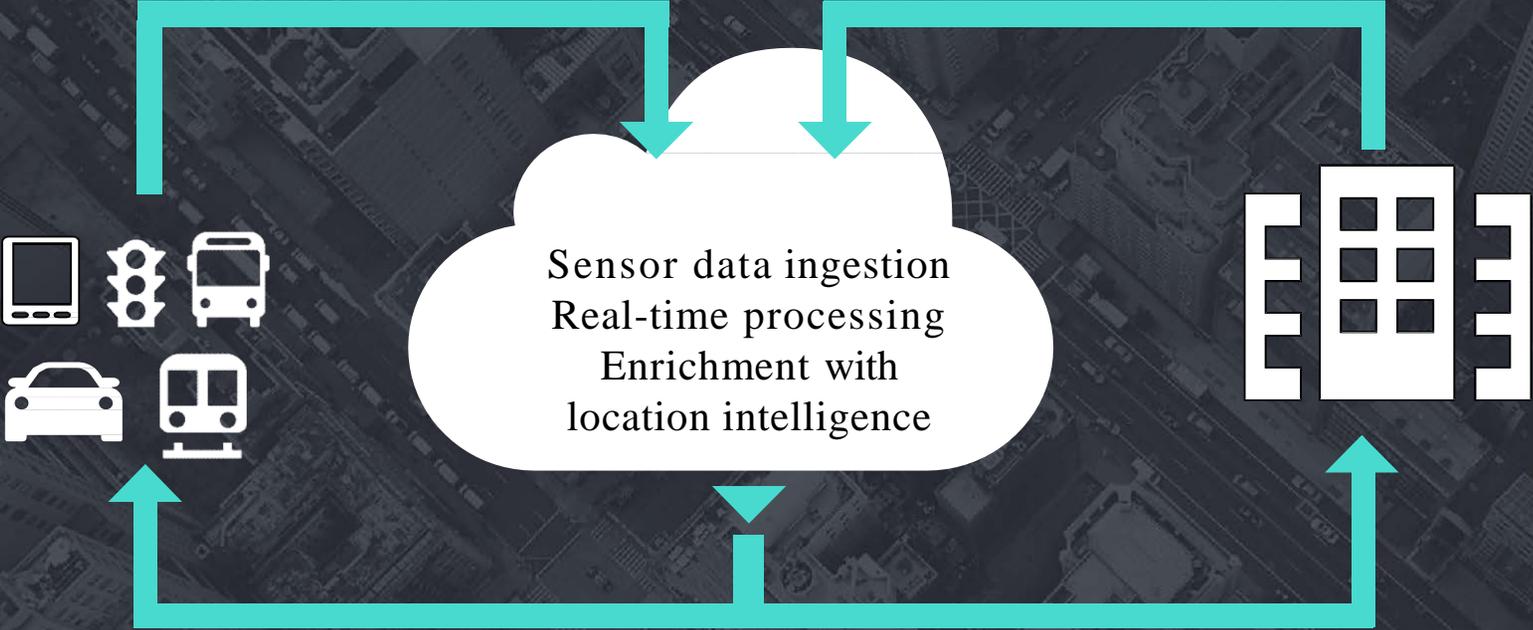
2015
3 new Investors


HD Mapping for Automated Driving

- Enables automated driving through precise sub-lane level representation of the roadnetwork
 - Slope and curvature, lane marking types, and roadside objects
 - Helps with positioning, localization, and automated maneuvering

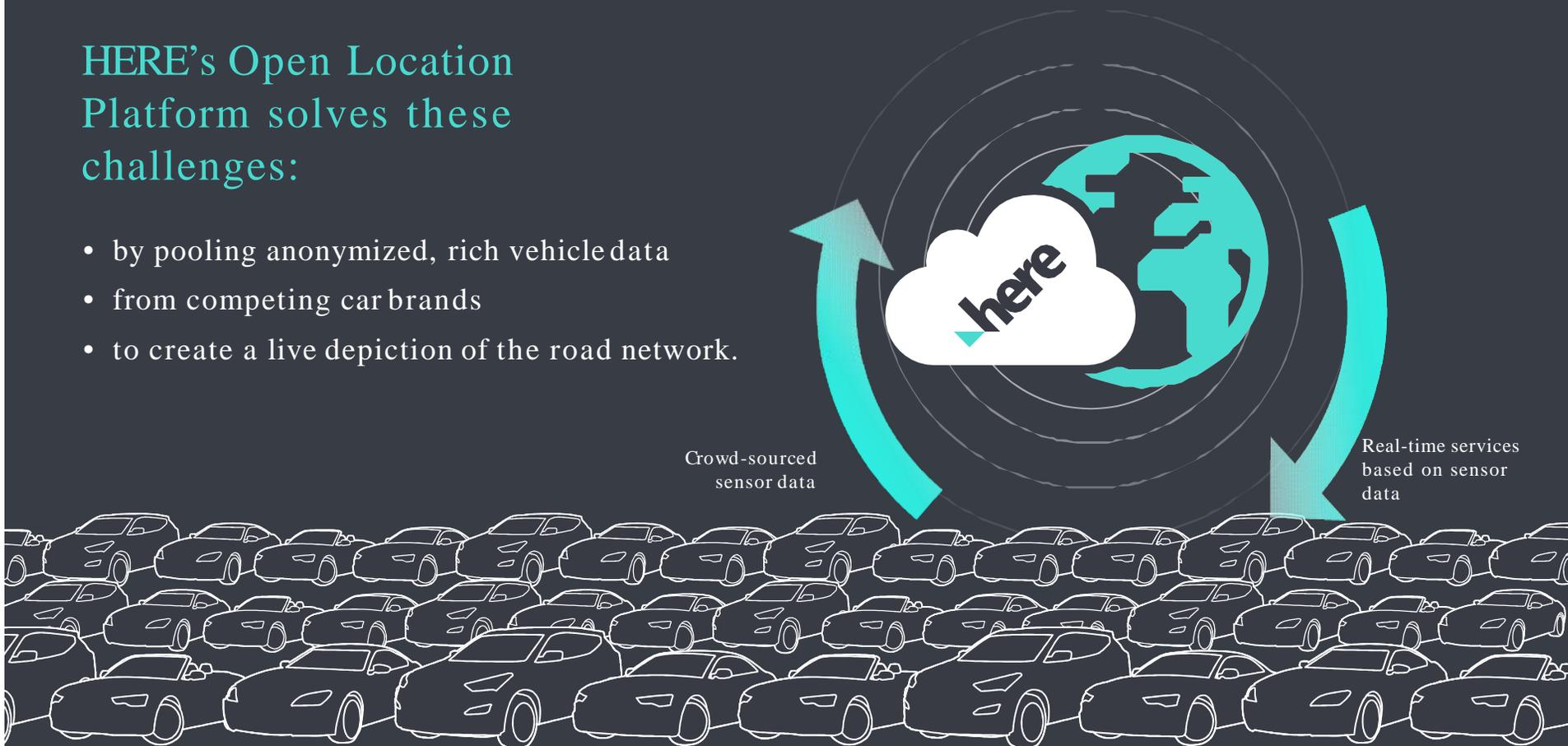


Closing the loop: vehicles, agencies, users



HERE's Open Location Platform solves these challenges:

- by pooling anonymized, rich vehicle data
- from competing car brands
- to create a live depiction of the road network.



Safety



CAUTION
SLIPPERY ROAD
CONDITIONS AHEAD

HERE Road Signs

HERE Hazard Warnings

HERE Safety Cameras

Partnering with leading transportation agencies to harness big data for improved safety and mobility

Michigan
Traffic Management

Colorado
Connected Vehicle Pilot Deployment

Iowa
Automated Vehicle & Freight Movement Technologies

Smart Cities
Toronto, Columbus



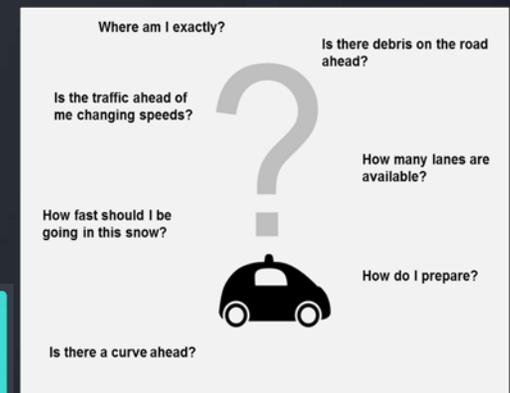
Finland
C-ITS Localized Safety Messages

Belgium
C-ITS Localized Safety Messages

here

Example: Iowa DOT Connected and Automated Vehicle Project

- Vehicle automation will improve safety
- Access to driving environment information beyond on-board sensors will significantly improve the safe operation of AVs
- State DOTs and other public sector infrastructure owner operators uniquely positioned - they already provide much of this data to the public today (e.g., 511)



Example: Iowa DOT Connected and Automated Vehicle Project (cont'd)

- Working toward development of a “gold standard” guideline for infrastructure datafeeds to support connected and automated:
 - The minimum data content (what we need to send)
 - The data formats and sending protocols (how we need to send it)
 - The data quality description and thresholds (how we will ensure that the data is “good enough”)

Involves a variety of technical skillsets –
Product managers, system architects, test engineers, cloud developers, app developers, user experience designers, standards experts, survey designers, data analysts.

Some shifts we're seeing

- Shift from a need for **theoretical** experience to a need for **practical** experience
 - Hands-on experience often more helpful than a master's degree
- Shift in **programming needs**
 - Shifting from Java to Scala and Python - real need is for deep knowledge around object-oriented programming
- Increased need for **Data Science / Analytics / AI/ Machine Learning**
 - Supply can't keep up anymore - computer science and computer engineering degrees in particular
 - Technical colleges can help fill the gap

Important skillsets we see a need for

- Solid coding experience can support software architects - Scala certification program or similar
- Solid understanding of how algorithms work can lead to a role on a support team that augments the AI/Machine Learning PhDs
- Data analysts who can make sense of the data can support the data science/ analytics teams
- Associates' degree in mathematics or statistics is good solid foundation for these roles

Math. Math. Oh and perhaps some more math.

The screenshot shows a Facebook post from John Mannes (@JohnMannes) dated December 1, 2016. The post title is "Facebook's advice to students interested in artificial intelligence". The post content is a large image of a Facebook profile picture, which is a blue 'f' logo, surrounded by a background of mathematical formulas and code snippets. The post is shared on a desktop browser, with a Windows taskbar visible at the bottom. The browser's address bar shows the URL "https://www.facebook.com/JohnMannes/posts/10156123456789012". The post is part of a feed, with other posts visible on the left and right sides. The right side of the feed shows a Toyota advertisement and a Crunchbase advertisement.

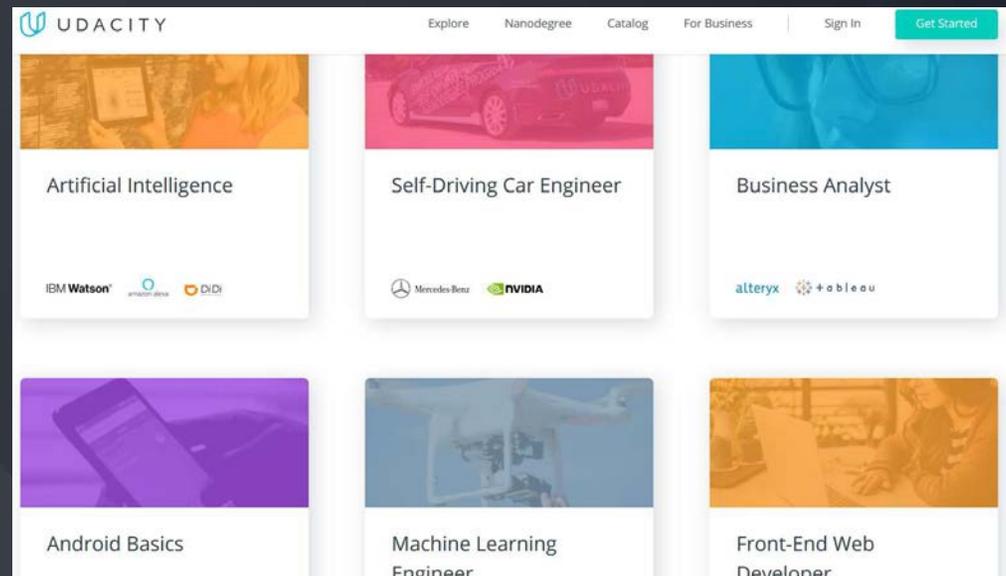
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How students can meet these changing needs

- Find their aptitude and passion and focus on that – and make that passion show on their resume
 - If they're just doing a degree program to get a job, that's going to come across
 - If they're spending their free time in the area they're studying, they're going to be the most in demand
- Get hands-on experience and work on getting both breadth and depth of knowledge
- Give specifics to their resume to help it stand out
 - Talk about a class they excelled in, about a class project where they used the Google API, or about some programming they did in their spare time for fun

Recruiting

- We do a lot of partnerships with schools to recruit at the bachelor's degree level
- Partnered with DeVry University when doing a lot of hiring for our TrueCars
 - Found this to be successful when we had a big need
- Nanodegree programs – e.g., Udacity



here



Thank you

Contact

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