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WHY EFFECTIVE AI TRAINING HOLDS THE KEY FOR UNLOCKING IOT VALUE

Connected, IoT-related devices are becoming more powerful, more plentiful and are generating unprecedented volumes of data. Sensors are capable of ever-higher levels of resolution, and edge devices are creating ever-larger volumes of data. As a familiar example, smartphones have in fewer than eight years gone from capturing simple low-resolution images to delivering high-definition images at more than 200 megapixels per second, while concurrently running apps that control everything from our home energy systems to drones (see Figure 1).

THE UNSTOPPABLE GROWTH OF CONNECTED DEVICES AND DATA

Today, many devices come equipped with a wide array of sensors, capable of capturing inputs ranging from gestures, proximity to ambient temperature and biometric indicators. Autonomous vehicles, for example, have multiple onboard cameras, ultrasonic sensors and sophisticated radar systems that are together capable of generating 40 terabytes of data every eight hours. In the industrial context, the much higher degrees of resolution of sensors in equipment can now support previously-unimaginable predictive maintenance capabilities. The list simply goes on.

This explosion of connected devices and data—key foundations of the Internet of Things (IoT)—is understandably getting businesses excited in all sectors. Of course, without the analytic capabilities to interpret and use the data that is generated, the IoT is simply a chaotic flow of unstructured and useless bytes. But, too often the ability to understand the data takes a lower priority than the technology to collect the data. It's important to ensure that the blistering development of technology does not serve to obscure the real prize—the truly transformational opportunities that the IoT offers. Companies are now using AI to change the way their operations work.

For example, Siemens used AI and IoT to automate its production lines so they can run unsupervised for several weeks. The company is currently working to allow its factories to self-organize, which reduces costs and improves products. In addition, innovative companies are using AI and IoT to create completely new services that disrupt entire ecosystems. Uber, for example, not only utilized AI to match drivers to passengers and disrupt the taxi/black car industry, but it is also using AI to create an entirely new sharing economy through customer behavior recognition and autonomous driving. These are clear examples of what the IoT offers: the chance to run businesses in new ways, achieve huge savings, and create whole new multi-billion dollar markets and operating models.

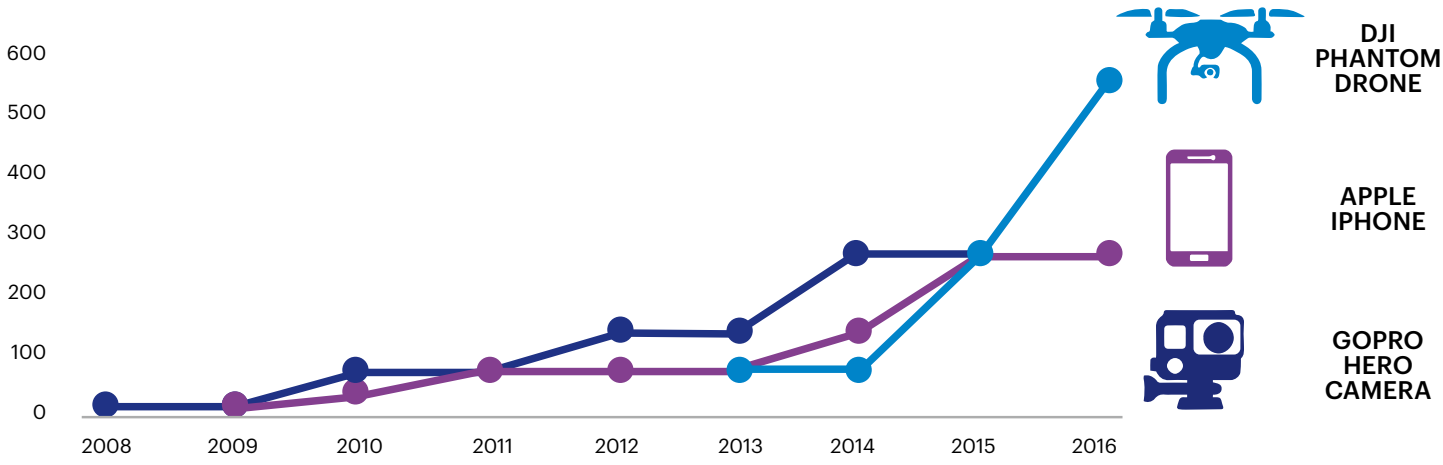
Capturing those opportunities requires analytic capabilities to make sense of the masses of generated data, and to do so in real-time in increasingly complex environments. Crucially, the intelligence often now needs to be contained within the device or product, itself, rather than just being hosted in the cloud. A clear example is autonomous vehicles, which must make sense of many thousands of static and moving elements, and make thousands of decisions instantaneously in order to navigate safely.

ARTIFICIAL INTELLIGENCE (AI) AS *THE IOT ENABLER*

That's where artificial intelligence (AI) and machine-learning come into their own. Of course, AI and machine-learning cover a broad range of technologies and applications that can achieve one or more of the abilities to 'sense, comprehend and act.' These range from robotic process automation (RPA) to chatbots and virtual assistants, and include 24/7 monitoring, biometric identity, or edge devices with fully autonomous decision-making capabilities.

But whatever type of AI is in question, it needs to be able to follow and understand what's happening around the device it's supporting, and respond dynamically. To achieve that, not only does AI have to be deployed in the right way, it also has to be trained effectively. Today, that remains an industry-wide challenge. In short, ***AI training has to improve significantly if the business benefits that the IoT offers are to be comprehensively realized.***

Figure 1: Premium Device Camera Video Capture Rate
Megapixels per second



Source: proprietary Accenture research.

AI STILL HAS A LOT TO LEARN

One of the key obstacles to implementing AI is its long and sensitive training cycles. The more unpredictable an environment is, the more likely it is that an AI system will be trained in a way that creates unanticipated consequences. This reinforces the observation that AI training is just as important as algorithmic or procedural coding is for traditional systems.

Things can, and do, go wrong. For example, last year, one well-known tech business launched an AI bot that was designed to actively learn from 18 to 24 year olds using popular social media sites. To some extent it achieved that goal. But, within hours of going live, it had to be taken down having learned, perhaps a little too well, some of the less acceptable linguistic tropes and provocative attitudes that were in use among its young adult, online demographic. Of course, the right training can also literally be a matter of life and death. If autonomous vehicles misinterpret something in their environment and make the wrong decision, the results could be catastrophic.

AI and machine learning are creating some brilliant tools. But they can be hard to explain, costly to train, and often mysterious—even to their creators. For the IoT to deliver on its promise, overcoming those challenges is essential. Ultimately, better AI training holds the key.

The right type and duration of training is critical. It's very important to ensure a balance between a pragmatic approach, that has human intervention and participation to the fore, and the ability of AI to train itself. Today, the emphasis is likely to be on the former in order to avoid learning human mistakes and repeating the error modes of natural systems.

In the future, however, AI systems training themselves could evolve as a sizeable market. Tesla, for example, recognized early on in its development of driverless systems the importance of using real drivers to train its AI systems, as it crowdsourced its Autopilot feature to see how it would perform with users (see Figure 2). The company logged 100 million miles with Autopilot in at least partial control of the vehicles. Yet, AI has to be able to deliver proactive judgments on a more-or-less human basis, with the ability to discriminate what is meaningful, true and important within a huge amount of sensor data. Of course, crowdsourcing, while a potentially rich source of data to support training, also requires caution. After all, not everyone in a crowd of drivers will be an exemplar for AI systems to follow.

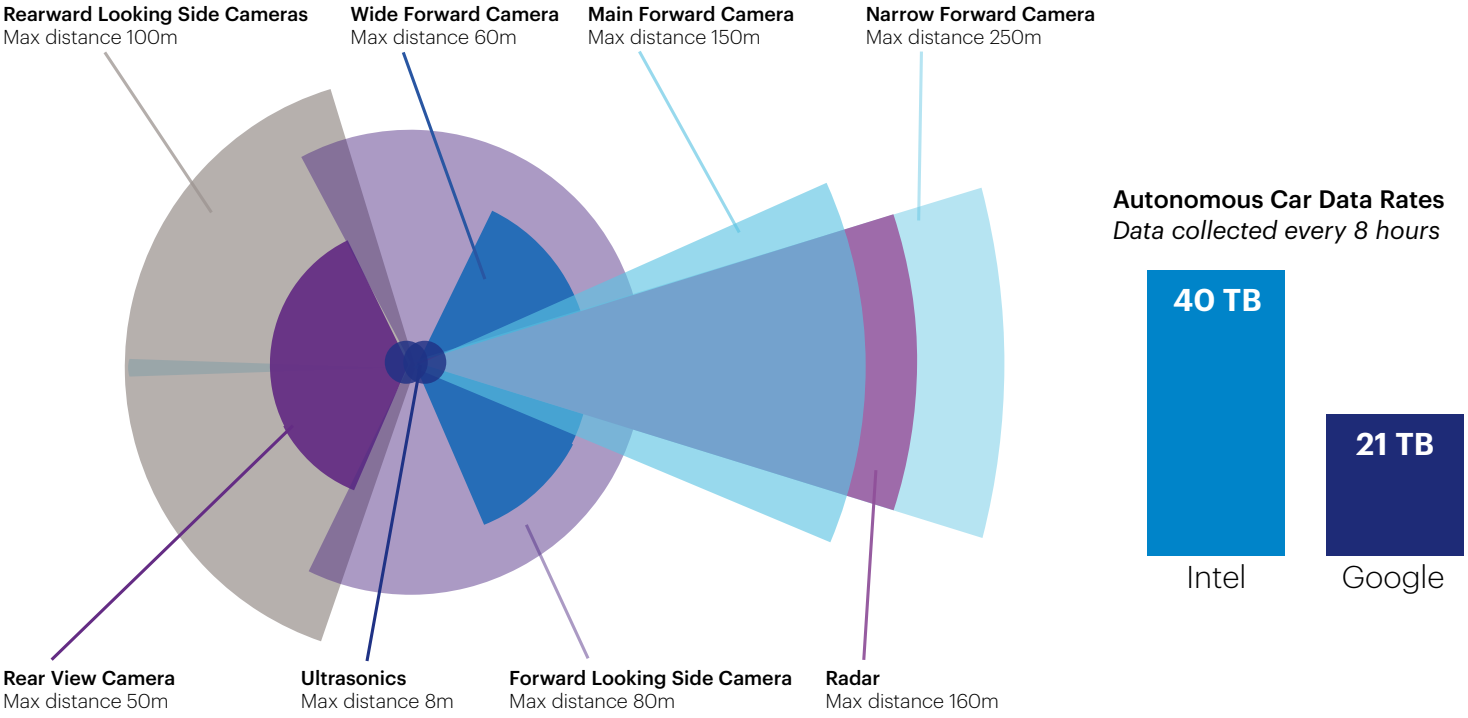
KEY CONSIDERATIONS FOR AI TRAINING

So, what do businesses need to consider as they move to take advantage of AI's ability to drive value from the vast amounts of data now available to them?

First, they need to consider how they will integrate AI training from the outset. Businesses should further ask the following questions: Do they have the means to execute training, to enable humans and AI systems to engage effectively? Secondly, how can they make use of crowdsourcing to constantly refine and improve the AI systems they are using? What controls and approaches to data cleansing and curation do they need to have in place?

Finally, in order to drive continuous improvement, all of this needs to be baked into the business model or the function that AI supports, along with the open-source frameworks that can help make the best use of shared training data and structures.

Figure 2. Tesla Autopilot 2.0 Hardware



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AUTHOR

THOMAS STUERMER
thomas.e.stuermer@accenture.com

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