DSS Foundations: How does the Internet of Things (IoT) support decision making?

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Supporting decision making is broadening in its scope and in available capabilities. According to Power and Heavin (2018), the Internet of Things (IoT) refers to "computing or 'smart' devices often with sensor capability and the ability to collect, share, and transfer data using the Internet" (p. 80). Computing devices embedded in objects, people and things that can send, process, and receive data and instructions connected primarily using wireless technology will be the network of persistent, highly available computing devices currently called the Internet of Things (IoT). IoT is an integrated communications, decision and operations system that can support shared decision making with a wide range of decision support and analysis tools.

Ashton (2009) explains the origins of IoT, "I could be wrong, but I'm fairly sure the phrase 'Internet of Things' started life as the title of a presentation I made at Procter & Gamble (P&G) in 1999. Linking the new idea of RFID in P&G's supply chain to the then-red-hot topic of the Internet was more than just a good way to get executive attention." He notes "If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best."

In a ZDNet article, Ranger (2018) states "Manufacturers are adding sensors to the components of their products so that they can transmit back data about how they are performing. This can help companies spot when a component is likely to fail and to swap it out before it causes damage. Companies can also use the data generated by these sensors to make their systems and their supply chains more efficient, because they will have much more accurate data about what's really going on."

Hullum (2018) at Intel see IoT opportunities in intelligent manufacturing, personalization for customers, field service automation, industrial system consolidation, and robotic assembly. He asserts "The rapid growth in automation of routine tasks will free up humans to apply their own unique intuition and creativity to infer associations from disassociated objects. That’s where humans are most effective."

What are examples and capabilities for IoT devices? **Identification** - Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. Help in tracking, updating inventory, loss prevention. **Monitoring** - devices that transmit data wirelessly and real-time, including video cameras, motion sensors, and temperature and moisture sensors.

Uses in healthcare, security, surveillance. **Location services** - Global Positioning Satellite (GPS) locator, finder and tracker devices. Satellite-based radio navigation can help locate, find and track people and other mobile things, e.g.,tracking cars, trucks, pets, kids, and people with disabilities. **Control of distant objects** - teleoperations, telepresence, telemonitoring with remote robotic systems. Providing security, delivering in-home patient care, providing remote consultations and training.

Newman (2017), in a Forbes article, ranked the Internet of Things (IoT) as the top trend for digital transformation in 2018. As Newman points out it is not the "Things" that are interesting, it is the data being managed by the many devices (things) that continues to create new opportunities for business. He identifies both challenges and opportunities for the growing Internet of Things (IoT) network:

Challenge # 1. Security is an increasing concern and challenge. The Internet environment has minimal regulation and as IoT continues to grow protecting the privacy and security of data is important.

Opportunity # 1. IoT and analytics will increase customer engagement and focus marketing strategies.

Opportunity # 2. Better Decision Making. Atlantic BT claims "If you can analyze larger trends from empirical data, you can make smarter decisions. This takes assumptions off the equation. Instead, it's giving you data-backed visibility into every aspect of your business."

With an expanding role for IoT, machine learning and algorithms, it is important to assess the role of people in ambient environments and in networked, distributed decision making settings. Puri (2016) advocates for a hybrid person-computer approach to decision making when there is a "flood of sensor data." He notes "people are good at making decisions that require nuance and judgement ... computerized analytics is better at quickly processing large volumes of data."

In some parts of the World, the Internet of Things (IoT) will be used to create smart cities with smart buildings. These automated, data-intensive environments will be self-regulating and self-sustaining. These cybernetic environments will reduce use of resources and increase quality of life for people. Creating these micro-habitats will be challenging. The benefits will potentially balance the costs, but measuring the cost of 20 years of investments for many years of benefits will be difficult to calculate.

Cybernetic environments require large investments with an uncertain payback. The Internet of Things (IoT) is expanding and that expansion and the increasing sophistication of IoT devices creates new opportunities for supporting decision making and improving quality of life. Algorithms and analytics can help make sense of machine data and use that data to automate and support decision making. For example, machine learning can detect normal and abnormal behaviors. In the near future, smart machines will use data, control rules and logic, and algorithms to make decisions. The right mix of people, analytics and things is important to operations and organization success. IoT thoughtfully implemented can enhance corporate and government decision making processes.

References

Ashton, K., "That 'Internet of Things' Thing", RFID Journal, June 22, 2009 at URL http://www.rfidjournal.com/articles/view?4986

Atlantic BT, "3 Threats and 3 Benefits of the Internet of Things," Atlantic BT Website, May 7, 2018 at URL https://www.atlanticbt.com/insights/3-threats-and-3-benefits-of-the-internet-of-things/

Hullum, C., "IoT-Driven Manufacturing Trends to Look for in 2018," Blogs Intel, | January 11, 2018 at URL https://blogs.intel.com/iot/2018/01/11/iot-driven-manufacturing-trends-to-look-for-in-2018

NetObjex, "Real-time Decision-making and IoT," October 5, 2015 at URL https://www.netobjex.com/real-time-decision-making-and-iot/

Newman, D., “Top 10 Trends for Digital Transformation In 2018.” Forbes, September 26, 2017 from URL https://forbes.com/sites/daniel newman/2017/09/26/top-10-trends-for-digital-transformation-in-2018/#607e8a10293a

Power, D. J. and C. Heavin, **Data-based Decision Making and Digital Transformation**, New York: Business Expert Press, 2018, ISBN-13: 978-1-63157-658-4 (paperback) at URL https://www.businessexpertpress.com/books/data-based-decision-making-and-digital-transformation/.

Puri, D., "IoT decision making improved with impact-sourced human experts," Network World, June 20, 2016 at URL https://www.networkworld.com/article/3085493/internet-of-things/iot-decision-making-improved-with-impact-sourced-human-experts.html.

Ranger, S., "What is the IoT? Everything you need to know about the Internet of Things right now," ZDNet, January 19, 2018 at URL https://www.zdnet.com/article/what-is-the-internet-of-things-everything-you-need-to-know-about-the-iot-right-now/

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