IoT, Tekoäly ja wearables

Ulkominiisteriön edustajien vierailu VTT:llä
29.1.2018
Heikki Ailisto
tutkimusprofessori
Artificial Intelligence is a part of digitalization trend

Since 2000 we have seen many trends and buzzwords coming.

- Mobile work enabled by 3G, 4G, 5G
- IoT, Industrial internet
- Cloud and cloud services
  - Virtual reality, VR, AR
  - Industrie 4.0
- Big data
  - Blockchain
- AI
  - Machine learning
  - RPA
- Data Analytics
- Platform economy
What AI is

AI is a collection of technologies and methods – not a single technology.

• Recently, deep learning neural networks have given great results e.g. for image recognition

• Other technologies and methods include machine learning, natural language processing, machine vision, robotics, as well as problem solving & searching, logic & planning & ontologies, probabilistic reasoning, fuzzy logic

Al Paradox
(odd paradox, AI effect):
"AI is whatever hasn't been done yet."

Douglas Hofstadter
IoT - Why is it happening now?

Affordable technology is here

Computing power grows
- Smart machines
- **Intelligent analytics**, decision support systems
- **Big data**
- “Store everything” paradigm (dirty cheap GB)

Connectivity like newer before
- Internet IPv6, no limit to nodes
- IoT paradigm – connected objects
- Low power communication
- Identify and track everything (QR, RFID, GPS)

Sensing everything in real time
- Extremely low cost and small
- Connected
- Advanced sensing
- Bio-mimicking

Competences
- Average person has good competences with digital services and products.

Acceptance
- People in all age groups use web, smart phones, car computers at home and on free time.
- Digital natives, Y-generation, not only accept, they expect!
Renewing electricity delivery
“World's most energy efficient grocery store”
(1/2)

NEED

- Solutions for lower electricity consumption and more efficient use of local resources
- Flexible control of the consumption profile
- Ability to communicate with other stores in the grid

The pilot store is Tuira S Market, Oulu.
Co-operation project supported by Tekes.
For more information: Klaus.Kansala@vtt.fi
Renewing electricity delivery
“World's most energy efficient grocery store”
(2/2)

APPROACH

- A novel combination of renewable energy supply and heat pump technology provides a flexible energy resource.
- This backbone is completed by advanced control system which is able to learn from data coming from the system and from the rule base.

BENEFIT

- Smooth and peak free consumption profile reduces the energy cost for the customer – and producer.
- Energy consumption data for the following 3 hours is available for energy market operations leading to predictability.
- Peak and load transfer service also possible for local balancing.
Value proposition: Cost-efficient sensor nodes for industrial environments with IoT interface. Customized sensors for specific measurement needs combined with optimal connectivity solution for a system to fit the application need.

Competitive edge: one stop shop for IoT sensor systems

Specification: Customized sensor combined with IoT connectivity: BT LE, LoRa, WLAN

TRL: 6

Offering: Application demonstrators (hardware and software), prototyping, custom designs for sensor nodes and IoT cloud service for customer applications.
Wearability
Esimerkkejä uusista materiaaleista, jotka parantavat urheiluteknoLOGian puettavuutta
VTT Flex Node

Integrated sensor set includes:
- Acceleration (3-axis), Temperature,
- Relative humidity, Ambient pressure

Wireless connectivity - BTLE
Online data streaming to mobile device
64 Mbit flash memory
25 mAh rechargeable LiPo battery +
Wireless charging
Size: 20 x 90 mm²