Technical Challenges of IoT Deployment in the Agri-food Sector



IoT Week 2019 IoT Deployment and Business Challenges for the Agri-Food sector: What lies ahead ?

Aarhus, 19.06.2019 - Harald Sundmaeker - ATB, IoF2020 Large Scale Pilot Project



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IoF2020 – What does it mean?

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IoF2020 – what does it mean?

- Diverse agri-food sectors addressed for IoT validation
- Heterogeneity of IoT based solutions
- From large industry to small farmers
- From small scale experimentation to large scale deployment
- Complexity!



UC1.1 Within-field Management Zoning	UC1.2 Precision Crop Management	UC1.3 Soya Protein Management	UC1.4 Farm Machine Interoperability	UC1.5 Potato Data Processing Exchange	UC1.6 Data-Driven Potato Production
Sensors for precise field management	Precision of satellite images by sensors	Production DSS for higher protein levels	Data exchange btwn machinery & FMIS	Data exchange btwn field & processing	Smart farming using telemetric stations
NL, DE, BE, FR, UK, PL	FR	AT, IT	NL, DE, DK, BE, FR, AT, RS, RO, UA, IT	NL, BE, PL	CY, PL, UA, EL
UC1.7 Traceability for Food and Feed Logistics	UC1.8 Solar-powered Field Sensors	UC1.9 Within-field Management Zone Baltics	UC2.1 Cow Grazing Monitor	UC2.2 Happy Cow	UC2.3 SilentHerdsman+
Secure transport of bulk goods	Sensor-based farm management	Macro- and micro-nutrient analysis	Roaming herd tracking, grazing manager	Improve dairy farm productivity	Health monitoring of dairy cows
BE, NL, PL, FR, BG, RO, ES, SI	DE, RO, HU	LT, LV, NL	BE, NL	NL, BE, DE, IE	UK
UC2.4 Remote Milk Quality	UC2.5 Lameness Detection through Machine Learning	UC2.6 Precision Mineral Supplementation	UC2.7 Smart Precision Cow and Cattle Monitoring	UC3.1 Fresh Table Grapes Chain	UC3.2 Big Wine Optimization
Remote sensor calibration for dairy labs	Early lameness detection in cattle	Precision livestock farming at dairy farms	Animal welfare monitoring	Precision farming, shelf-life extension	Sustainable high quality wine production
NL	IE, PT, IL, ZA, UK	DK, LT, LV, DE	HU, PL, CZ, SK	IT, EL	FR, IT
UC3.3 Automated Olive Chain	UC3.4 Intelligent Fruit Logistics	UC3.5 Smart Orchard Spray Application	UC3.6 Beverage Integrity Tracking	UC4.1 City Farming of Leafy Vegetables	UC4.2 Chain-Integrated Greenhouse Production
DSS and quality tool for olive oil	Smart sensing in whole logistic chain	Optimize plant protection spraying	Monitor whole distribution channel	Full automated vertical farming	Data integration in greenhouses
ES, EL	DE, NL	ES, HU, PL, PT	IT, PT, RO	NL	ES, IT, NL, EL, TR
UC4.3 Added-value Weeding Data	UC4.4 Enhanced Quality Certification System	UC4.5 Digital Ecosystem Utilization	UC5.1 Pig Farm Management	UC5.2 Poultry Chain Management	UC5.3 Meat Transparency and Traceability
Edge-computed plant sensing on video	Sensing as data sources for certification	DSS with data sharing farm-to-fork	Feed conversion & health optimization	Flock uniformity, feed conversion, health	Trustful event tracking
NL, AT	IT, ES	EL, SI, CY	BE, NL	ES, BE	NL, DE
	UC5.4 Decision Making Optimization in Beef Supply	UC5.5 Feed Supply Chain Management	UC5.6 Interoperable Pig Tracking	ΙοF2020 ι	use-cases
	Data exchange across value chain	Integral feedstock management	Livestock health monitoring for pigs	Here is an overview of the use-cases	
	BG, HR, IE, IT, ES, PT	ES, UK, DE	SE, ES, CH		

Categories of Functional Components

Structure for UC Analysis

- Aiming to understand the degree of reusability, outside the use case scope.
- Are there potential synergies between use cases?





Type of Results vs. Realistic Possibility for Reuse!?





Smart Farm Management Systems: an open approach



- FIWARE Orion Context Broker technology as open, neutral and standard-based data integration technology
 - Easy integration in architecture
 of Farm Management systems
 - "only once" integration of farm vertical solutions
- Common Information Models easing interoperability and replaceability of solutions:
 - Farm Management systems
 - Vertical solutions
- Integration with data publication and marketplace platforms based on open standards



Key Technical Challenges for IoT Deployment

- Interoperability and granting/limiting access to data
- Costs vs. quality
- Accuracy of sensors & Battery lifetime
- Availability of communication networks
- Communication bandwidth
- Size of components
- Harsh environment (e.g. impact of vibration, humidity, temperature)



Reusable components relevant in the IoF2020 use cases



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IOF2020 NOW CASE STUDIES AVAILABLE IN IOT CATALOGUE

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This diagram represents all the actual relations that IoT Catalogue currently has. The proportion of the bubble represents the number of relationships that every element have.

Sustainable IoT Catalogue presenting components & lessons learnt that facilitate realisation of IoT based solutions



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Different ways to access information

- Listing the IoF2020 use cases
- Enabling search by components
- Mapping of solutions with value propositions, ICT problems, functions and target scenario
- Identifying the team behind

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Let's also discuss detailed questions directly

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