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CREATE  
CONNECT  
LIVE  
INSPIRE.



# Barriers for AI development

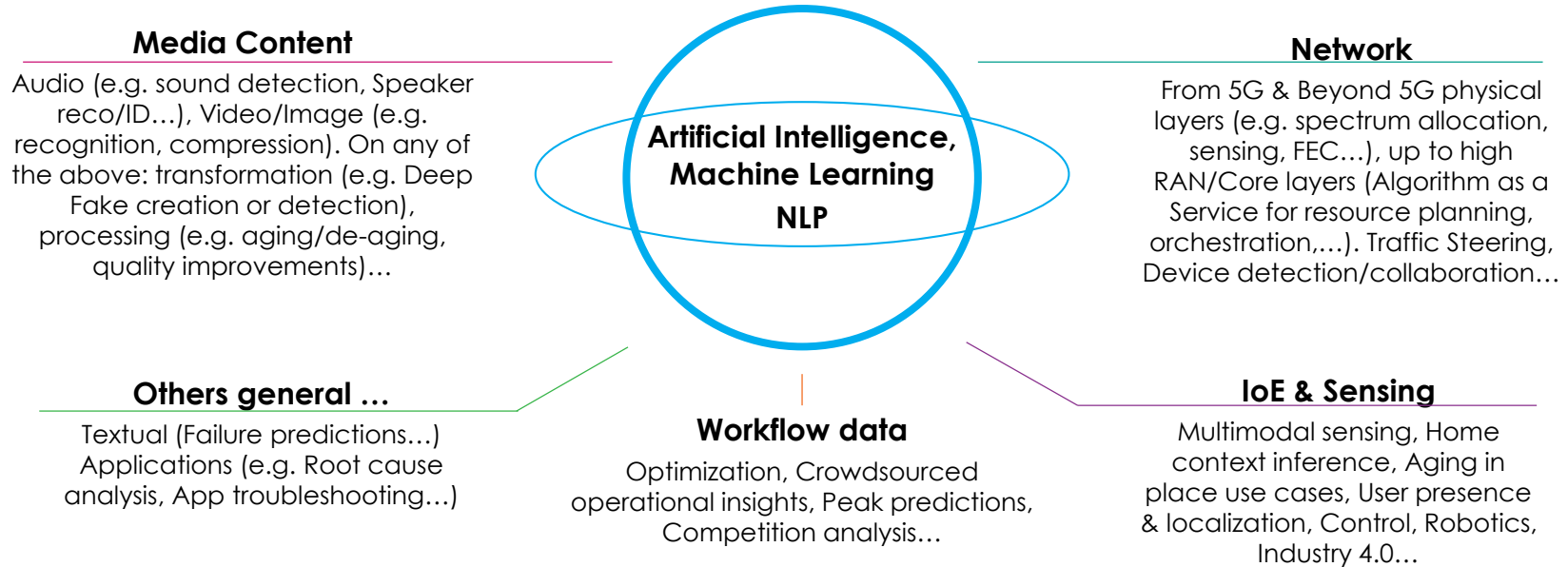
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Home Experience Lab Director, InterDigital

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LF AI Day,  
Orange Gardens, France  
September 16<sup>th</sup>, 2019

INTERDIGITAL®

# We apply AI/ML across a wide range of our technologies



A world of applicable use cases and opportunities...

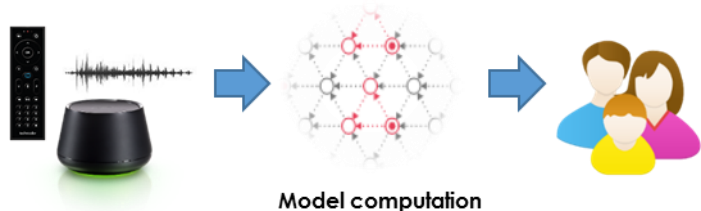
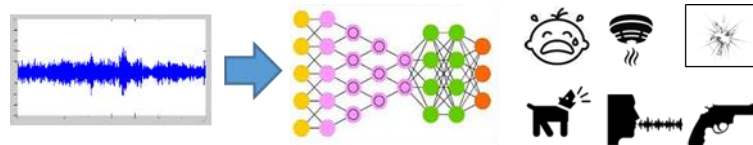
# Examples of past projects <sup>1/3</sup>

Audio / Speech / Text

## Sound detection

*Microphones placed in homes*

Live sound detection (baby cry, dog barking, gunshot, glass break, door bell, smoke detector alarm ...)



## Speaker identification

*Microphones on remote controls, gateways and set top boxes (STB)*

For personalized services, parental control  
Library fine tuned for real-time operation on commercial STB

## Crowdsourced operational insights

*Web forums, internal operational data*

Quality indicators derived from after sales and manufacturing processes. Early feedback on field issues



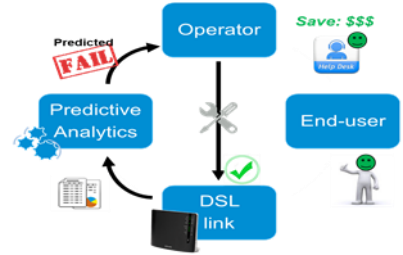
# Examples of past projects 2/3

Network / Workflow data / General

## Failure prediction for operators

Home gateway internal data - DSL link quality indicators

Prediction of DSL link failures for preventive maintenance  
Based on machine learning models learned from trial deployments



## App troubleshooting: why is my video freezing?

Passive traffic monitoring in the home gateway

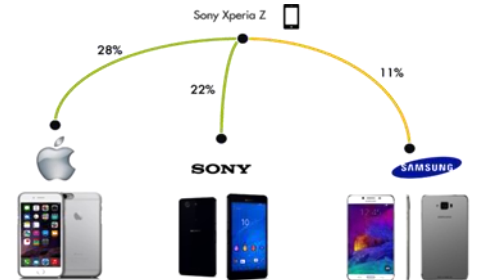
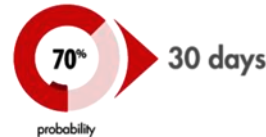
Identify cause of streaming problems: end-device, server, LAN, WAN?  
No collaboration with third party video streaming application required

## Device presence and identification

Home gateway internal data – device connection data

Inference of device type (tablet vs smartphone vs laptop ...)  
Prediction of device replacement

Smartphone replacement prediction





# Examples of past projects 3/3

## Internet of Everything (IoE) & Sensing

### Home Context Inference

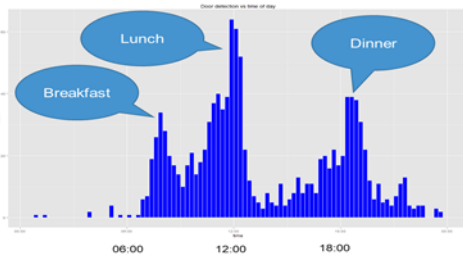
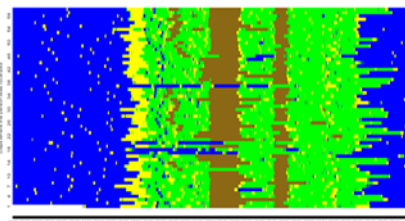
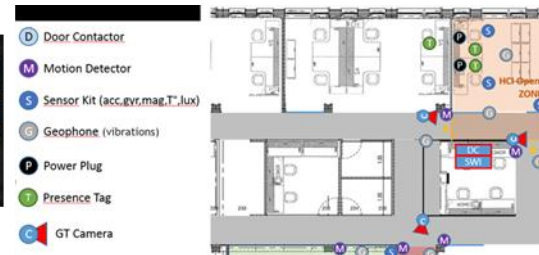
*Vibration sensors - accelerometer, acoustic and seismic sensors*

Gait recognition with acoustic and seismic sensors

Activity detection (sit, walk, stand, watch TV, drink...)



Geophone dev kit



### Aging in place

*Door and motion sensors*

Room presence classification, Activity level evaluation, Fridge door monitoring...

### Device presence and identification

*Radio signal*

From basic user presence to human or object detection / tracking, heartbeat detection, gesture recognition,



Machine Learning  
classification of  
the RADAR Signal



# Challenges in introducing AI/ML

## **Not Invented Here (NIH) syndrome**

- Although it is now easy to jumpstart technology for specialists, it can take years to deliver a proper model. It is sometimes better to do a partnership than crash a production.

## **Preventing misbeliefs and overstatements**

- Not mastering the technique can lead to unpredictable and sometimes surprising results.
- Models only do what they have been developed to do and not more.

## **There is not a one-size-fits-all solution**

- Depending on the targeted use case, an original blend of signal processing, AI/ML technique and the model will have to be tailored to deliver best in class results.

## **Finally, Data is Key**

- Feeding a large amount of up-to-date data is critical to ensure the model is robust enough to embrace a representative version of the possibilities.



**Thank you**

