Panel on

Services in Smart Cities: All about Security, Mobility and Autonomy

Moderator and Panelists

Panel Moderator

Kevin Daimi, University of Detroit Mercy, USA

Panelists

Antonio José Ribeiro Neves, University of Aveiro, Portugal
Irina Topalova, Technical University Sofia, Bulgaria
Petre Dini, IARIA, USA
Kevin Daimi, University of Detroit Mercy

Topics

- Smart Cities Security (Kevin Daimi)
- Autonomous Agents in Smart Cities (Antonio José Ribeiro Neves)
- Implementation and Impact of Artificial Intelligence on Smart Cities. (Irina Topalova)
- Mobility as a service: crowd mobility, vehicular flow, and mobility-driven energy balancing (Petre Dini)

Questions that will be answered

- How can mobility-as-a-service cover the spectrum of mobility facets?
- What is the impact of mobility on the energy systems?
- Is the population sufficiently and culturally aware to embrace mobile (self-driving) entities?
- What are the possible areas for improving the AI applications in TMT and achieving high efficiency?
- What are the main challenges of autonomous vehicles in current cities?
- How will smart cities deal with (and accelerate) the use of autonomous vehicles?
- Are smart cities secure?

Implementation and Impact of Artificial Intelligence over Smart Cities

Artificial Intelligence to transform TMT (Technology, Media and Telecoms) smart sities

mart sities

he United Nations' World Cities Report predicts that by 2050 over 0% of the world's population will be living and working in cities .

A smart city is characterised by the integration of technology into a trategic approach to

ustainability,

itizen well-being and

conomic development."

cording to *Scoring methodology, Juniper Research, 2017)*

advanced technologies, such as IoT (Internet of Things:

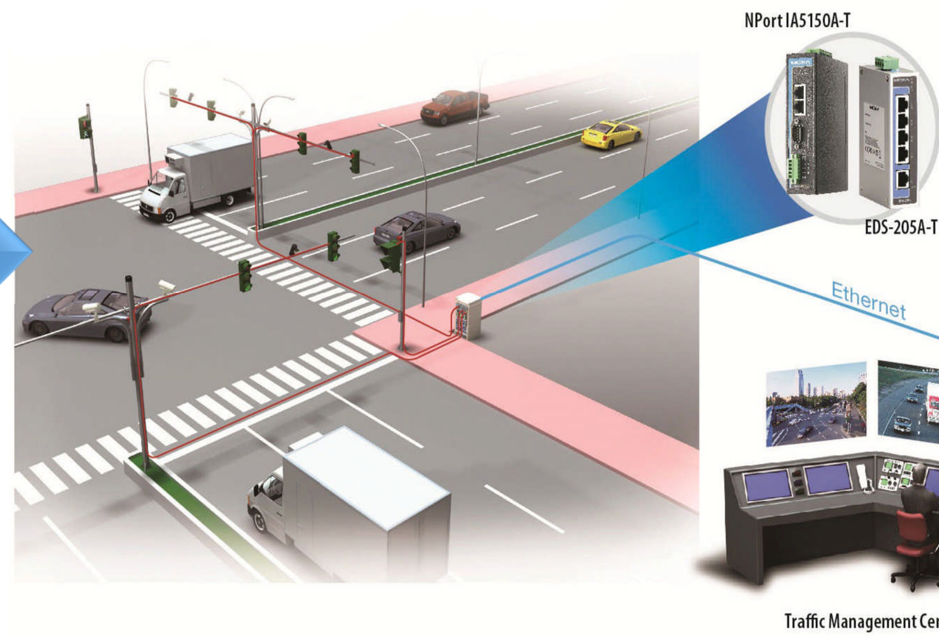
cal devices that are connected with each other and the Internet) to ve their operations and services.

se services are often based on intelligent automation (PLCs) –

ded to control all services, the communication between end sensors gs).

ort: *How connected and efficient* are the services?

city *gathering data from real-time traffic monitoring and using this data to adjust* *flow, based on emergency response* requirements?



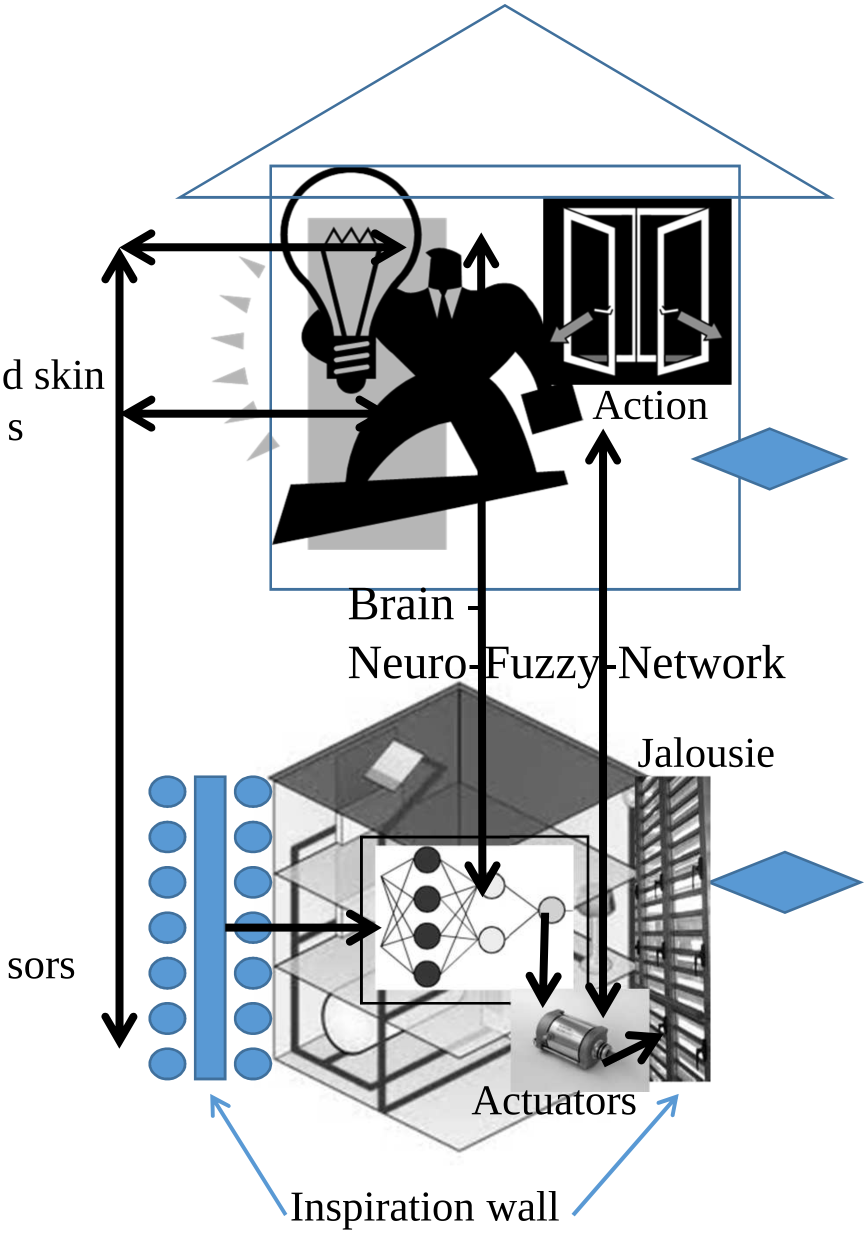
blic Safety: Is intelligent video surveillance analytics or predictive crim
d fire risk software being used?

ergy Sectors: Is the city applying technologies, such as Artificial
elligence controlled *smart traffic light systems*,

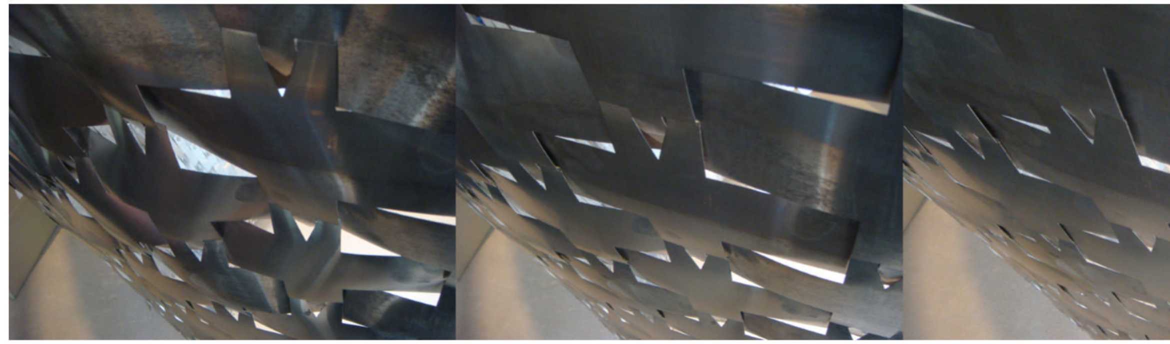
me energy storage solutions, solar panels etc.?

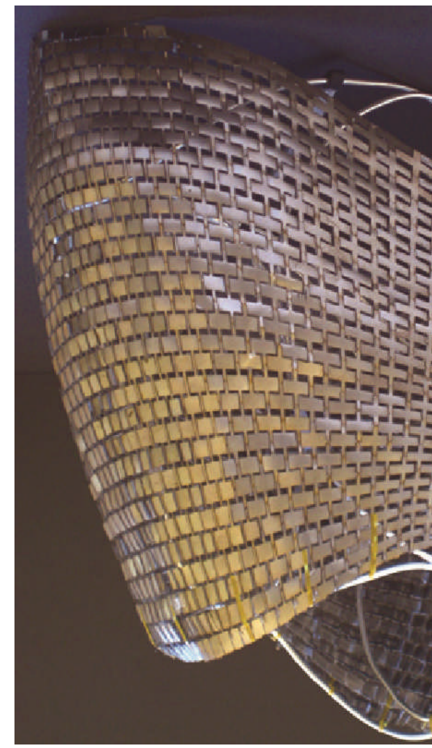
zoelectric pavements – set on the most busiest/crowded areas

ding and architecture area

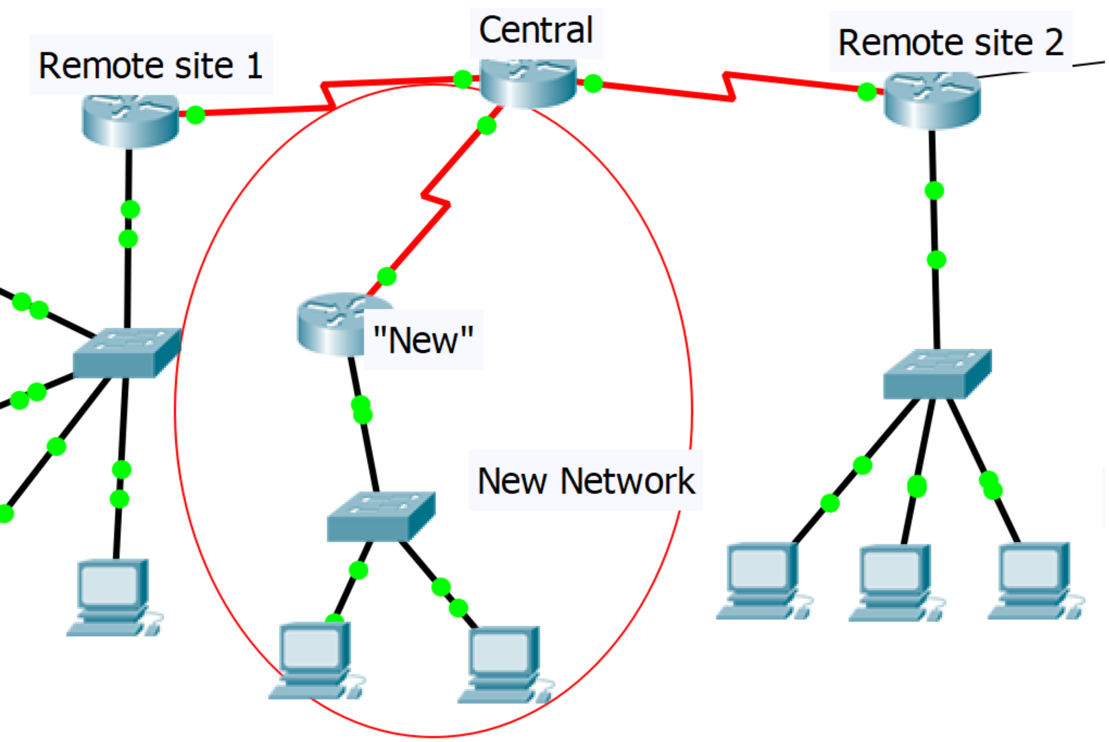


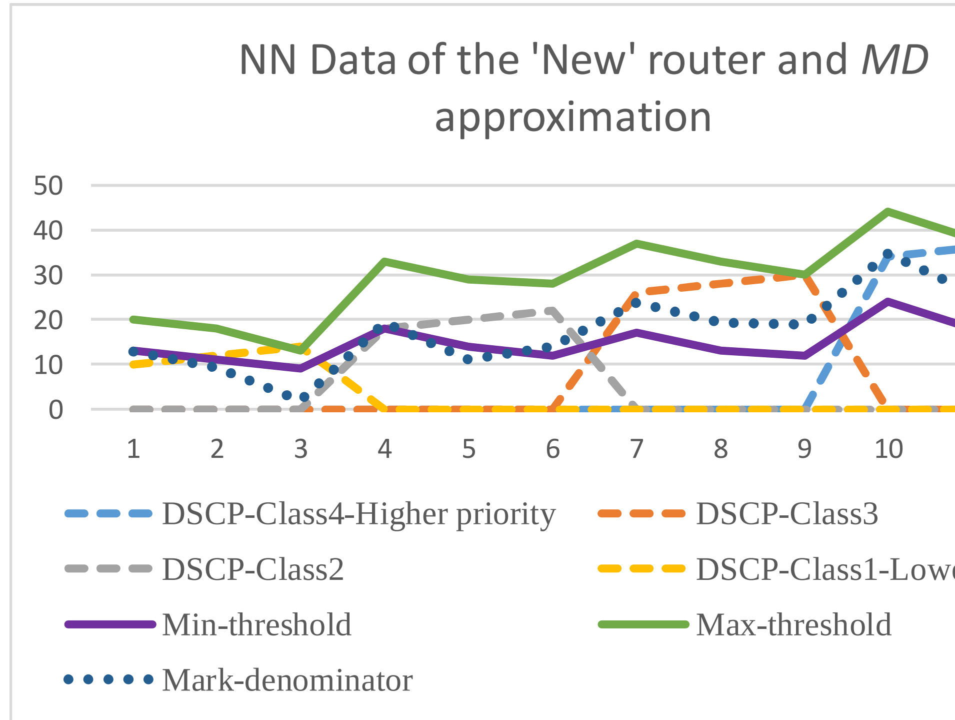
Doris Kim Sung - University of Southern California
bimetal thermal plates for “self ventilation skin of the build





munication area – for traffic prediction and congestion avoidance





he Technology, Media and Telecoms (TMT) industry will be one the first to be transformed.

Over the next three to five years, the combination of AI and 5G will power the emergence of a new generation of devices that *will redefine the word 'smart'* by differing from today's.

ible areas for improvement the application of AI in TMT, ain er efficiency?

o many end users and need for increasing the calculation power

romorphic Chips – potentially capable of **accelerating Machine Learn**)

ent in implementing **AI** in **the human-machine interface – include vo tures, emotions.**

plementation of ***AI in API*** (Application Programming Interface)-

*omating the process of **discovering APIs***

*chine behaviour prediction in **machine-machine communication***

-to-PLC)

m industrial machinery to munication,

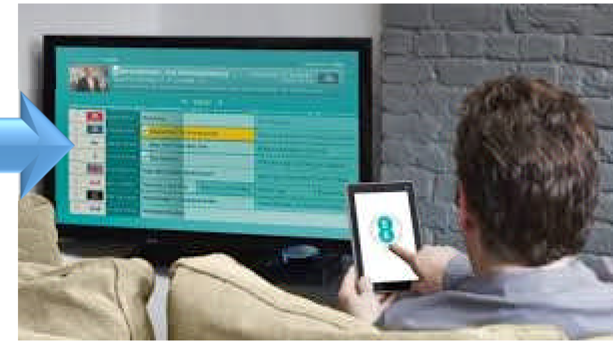
lets innovators reimagine the art of possible and enable decision-king that is better and faster — and ed on vastly more information.

e outcome for the industry will be a rld that's very different from today but which is already taking shape und us.

the past

Voice control

Even during a home off-duty w



ently, the focus of AI in many industries is on developing techniques such as *deep*

g, natural language processing.

ng *need for advanced computing power* — probably from quantum computing

r further understanding of *more advanced cognitive and emotional responses* an

(Programmable Logic Controller)

good method for controlling any

ustrial processing but it did not

e full picture about this process in

time.

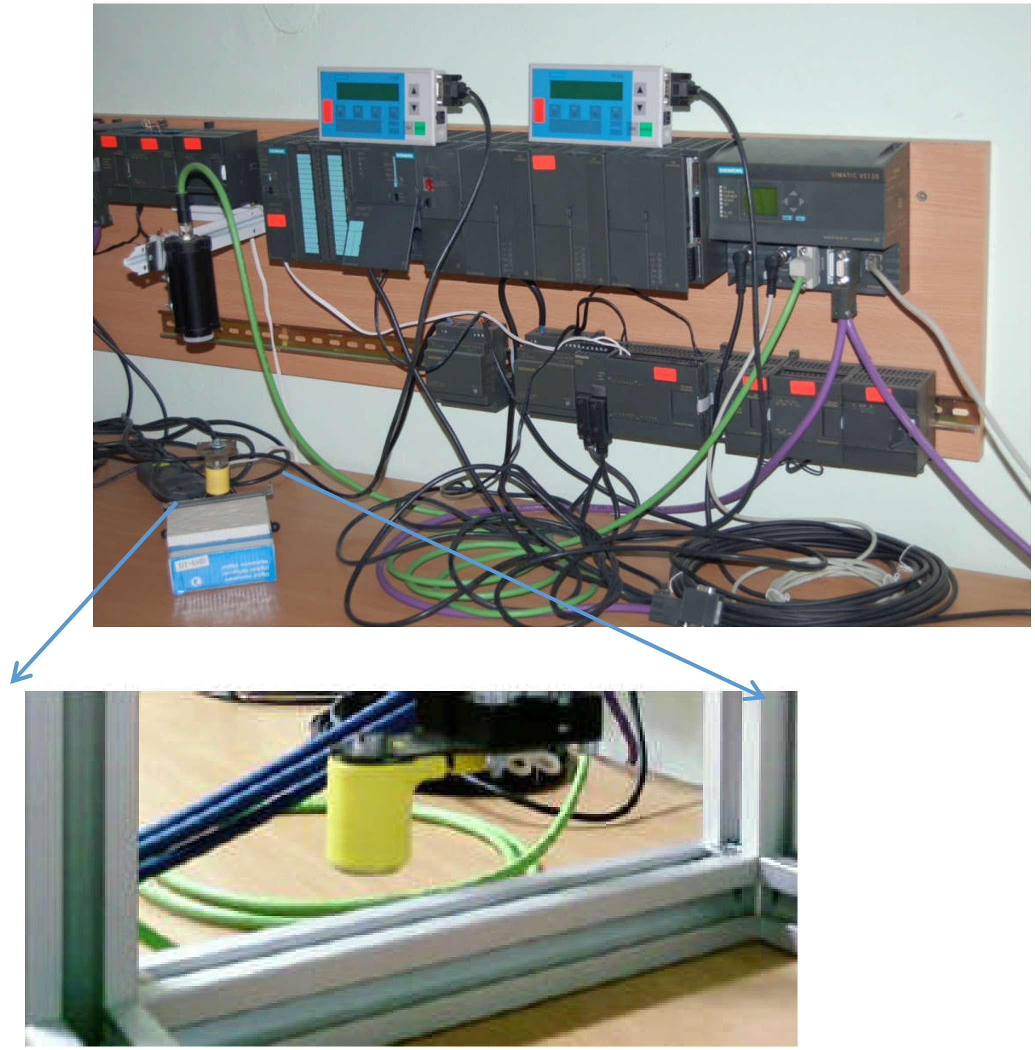
ral network can make a survey on

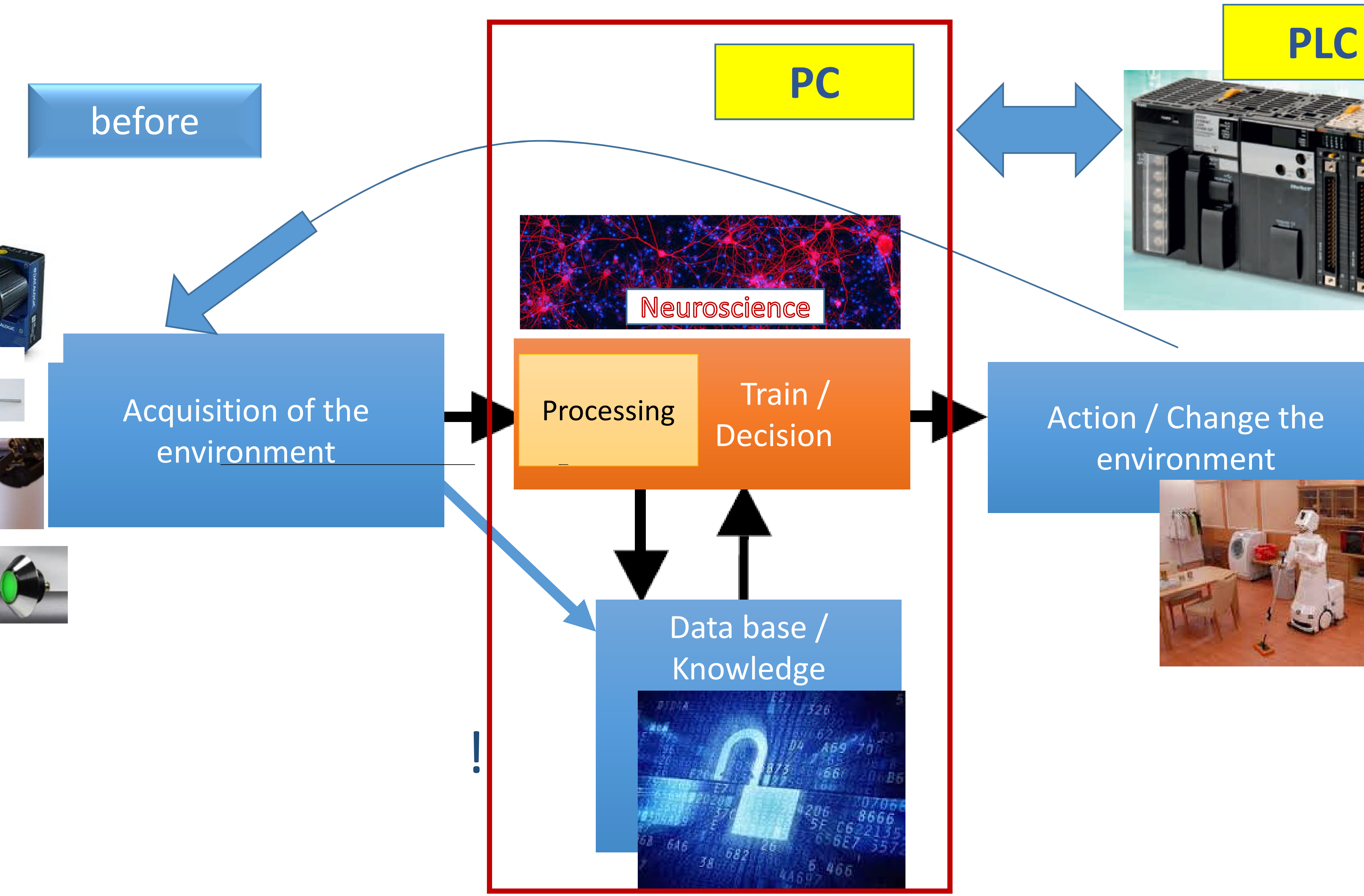
process at all time. Learning NNs

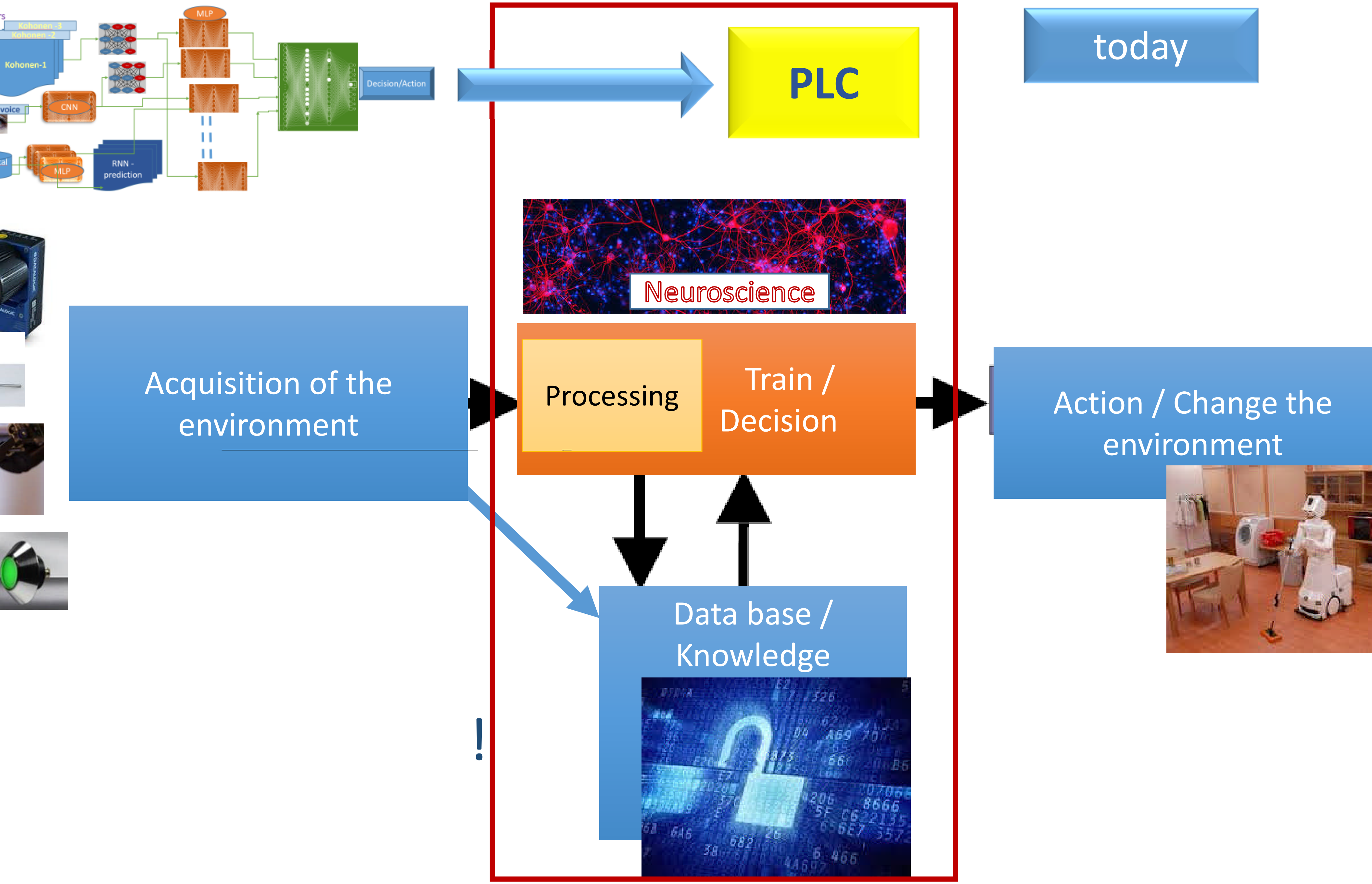
expect the next instruction of the

ustrial operation before applying

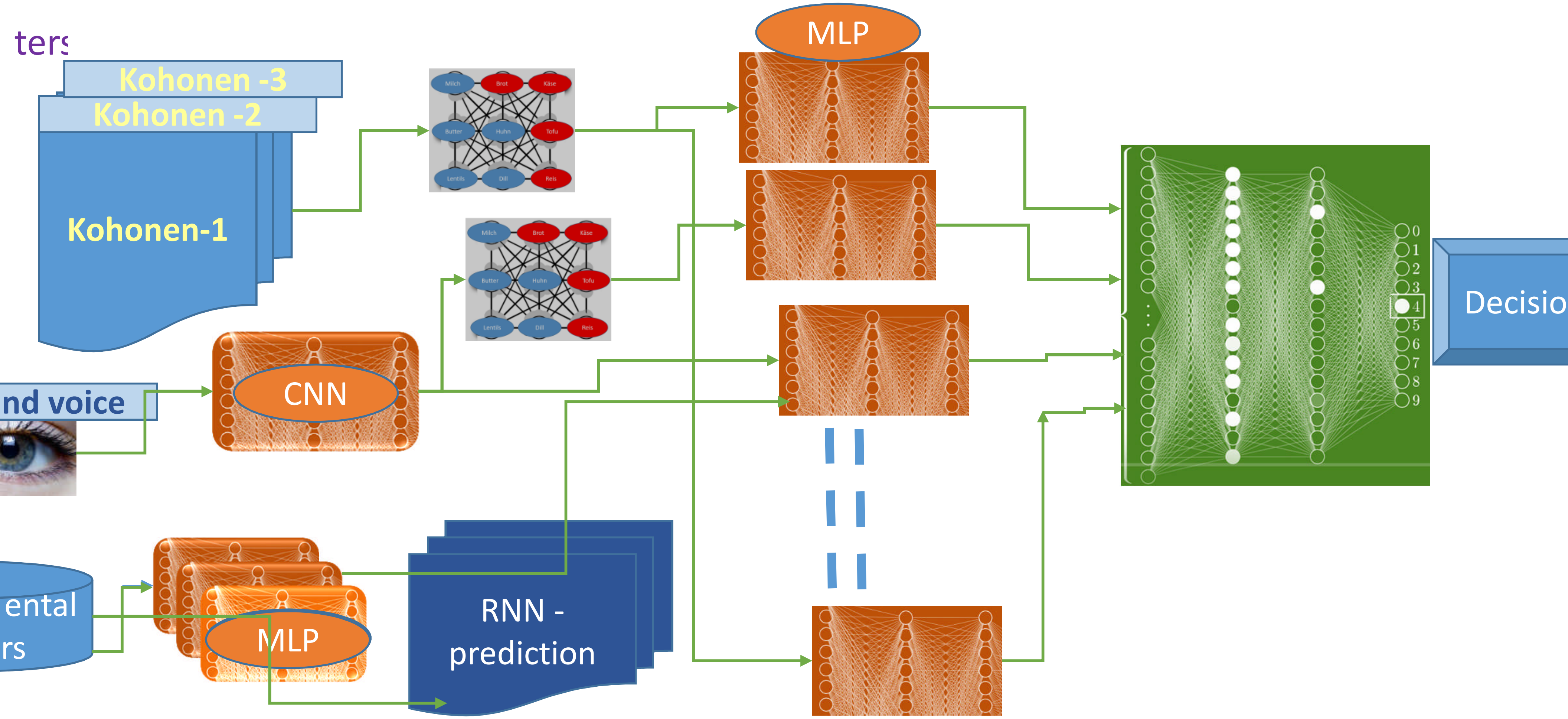
input signal controlling.



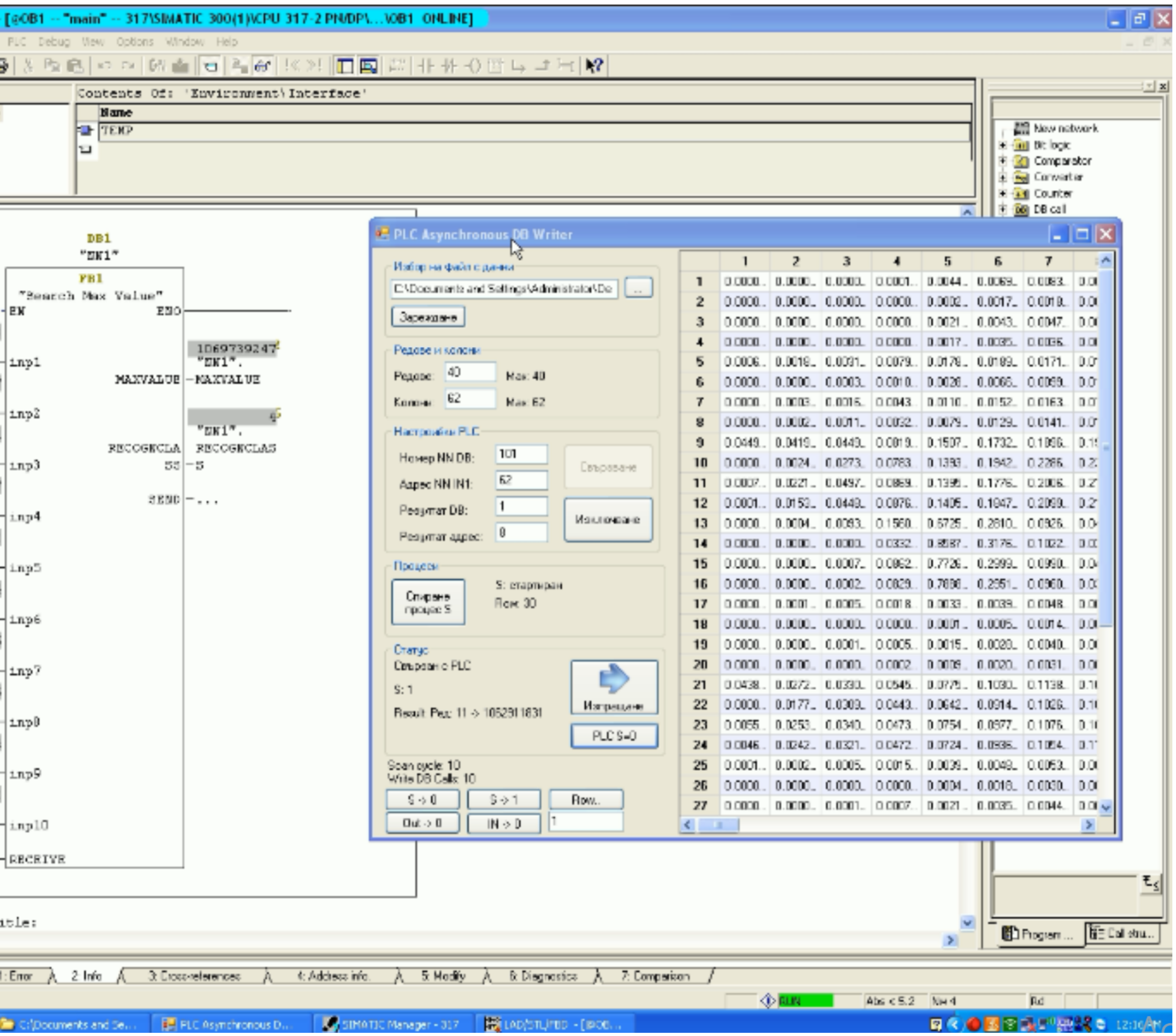

before
PC
PLC
Neuroscience
Acquisition of the environment
Processing
Train / Decision
Action / Change the environment
Data base / Knowledge
!

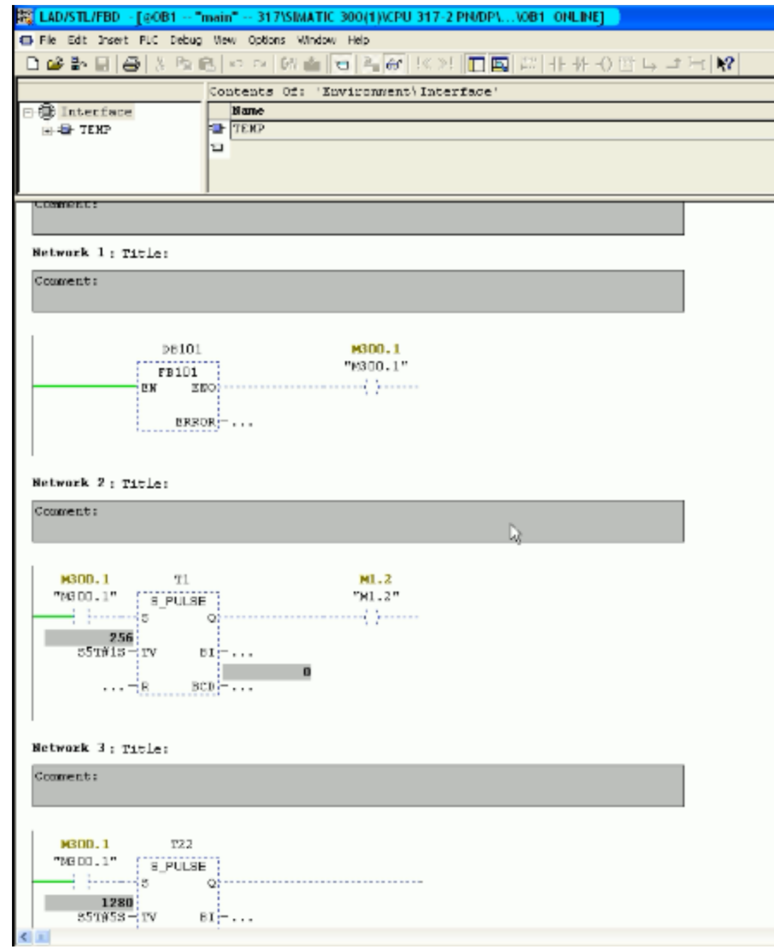

Kohonen -3
Kohonen -2
Kohonen-1
MLP
CNN
voice
MLP
RNN - prediction
Decision/Action
PLC
today
Neuroscience
Acquisition of the environment
Processing
Train / Decision
Action / Change the environment
Data base / Knowledge
!

ferent types of NNs to solve individual subtasks
ted in a network for making a final decision



demonstration – AI – MLP Neural Network in a PLC – make decision in real-tim






ieeta instituto de engenharia electrónica e telemática de aveiro
universidade de aveiro
deti departamento de electrónica, telecomunicações e informática
Talk About Self-Driving Cars
UBER
Autonomous cars...
UBER, Tesla, Mercedes, ...
but also other autonomous agents...
Recent autonomous driving projects
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Autonomous mobile agents in smart cities
António J. R. Neves
(an@ua.pt)
SIGNAL 2018
Nice, France


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Autonomous cars...
UBER, Tesla, Mercedes, ...
but also other autonomous agents...
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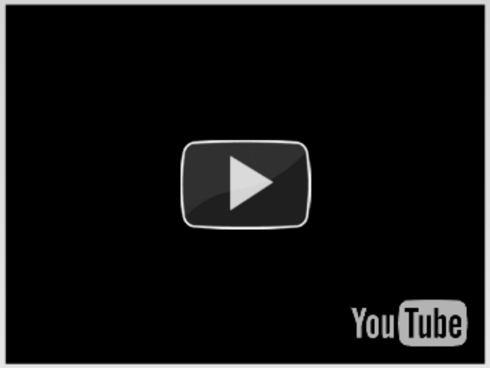
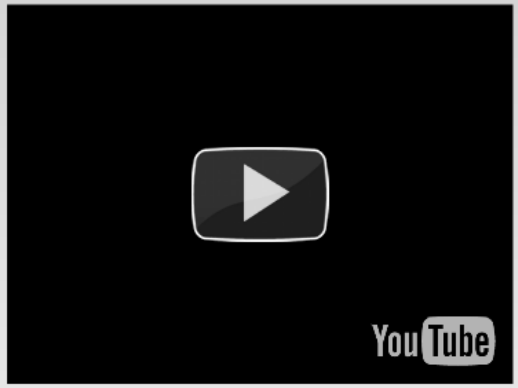
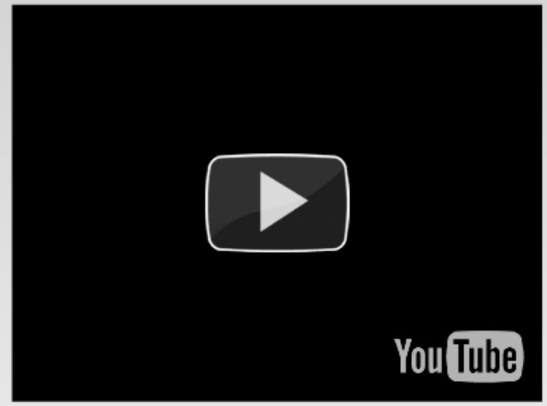
Autonomous cars...







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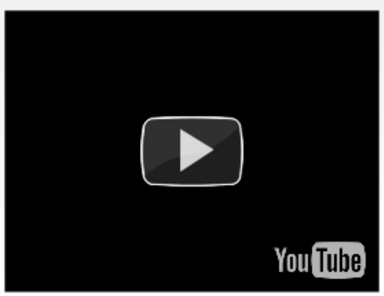
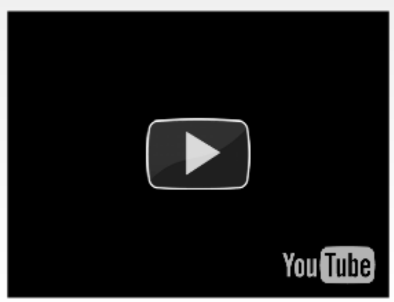
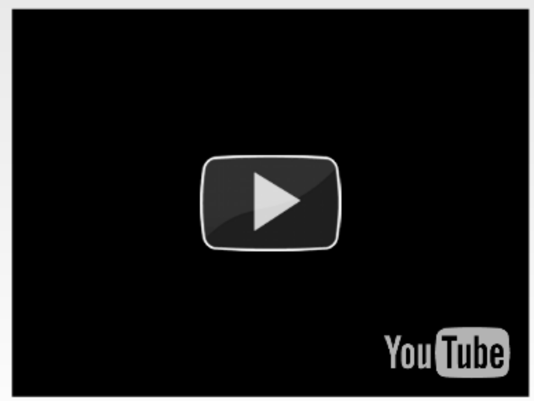
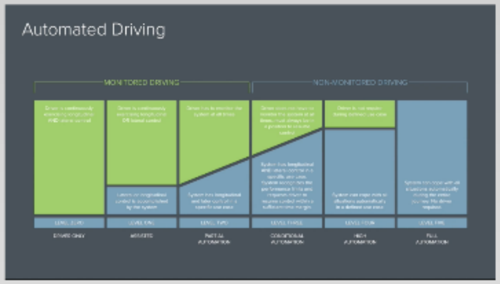
but also other autonomous agents...

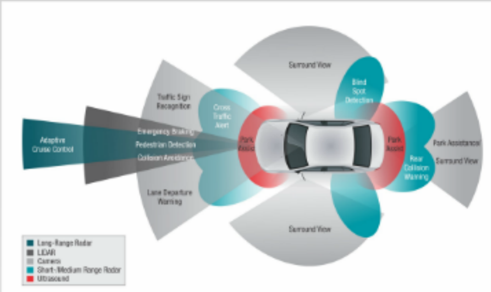


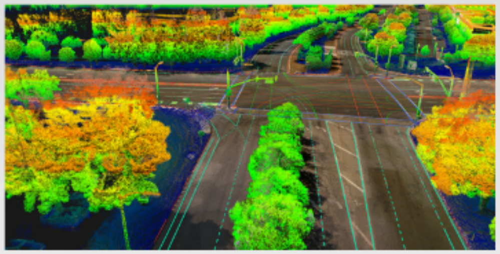


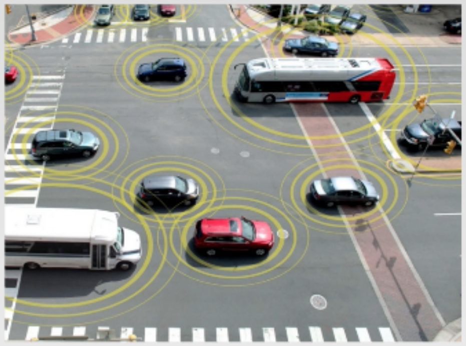


Talk About Self-Driving Cars









DEEP LEARNING	PATH PLANNING
CNNs for scene recognition (lane detection, obstacle detection, road sign and traffic light recognition...); end to end for controls?	I. Route planning II. Behavioral decision making III. Motion planning (graph search) IV. Vehicle control
LOCAL/CLOUD	**DATA & RULES**
Data and code sent car <> cloud, remote control and telemetry, V2X protocols...	Rules of road (speed limit, one-way roads, 4-way intersections safe distance...), what to do in accident, how to handle emergency vehicles

Silicon Valley	Chinese	Incumbents
Google, LUCID, lyft, TESLA, UBER	Baidu, 车和家, FMC, LeEco, NEXTEV	TESLA, TOYOTA
Other/US: ALTA, ZERO		

Service	Buy
滴滴出行	RENAULT NISSAN
lyft	TOYOTA
UBER	

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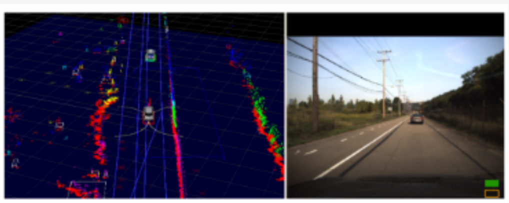

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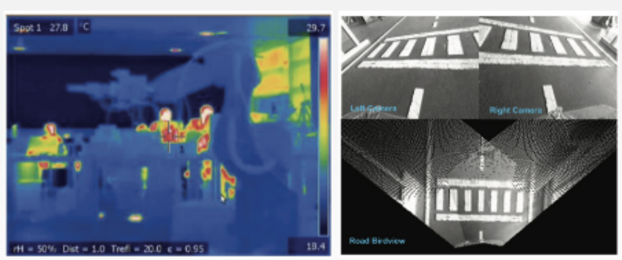

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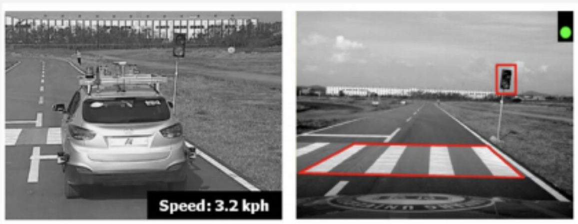

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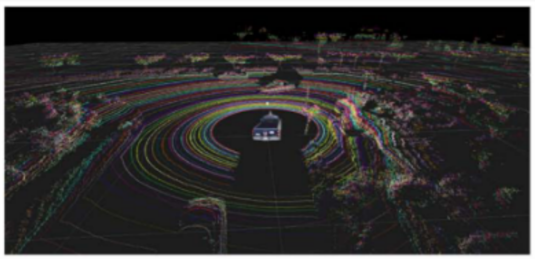

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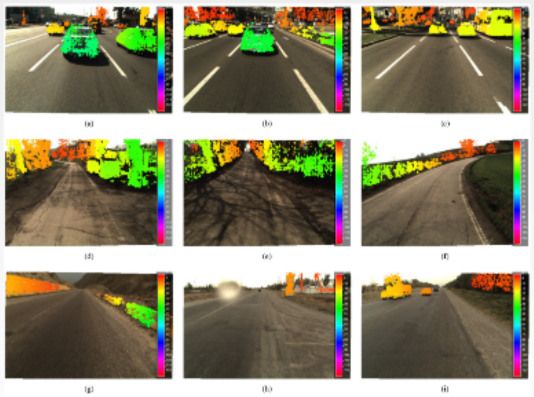

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Panel on ICAS/ICNS

Services in Smart Cities: All about Security, Mobility and Autonomy

On Mobility

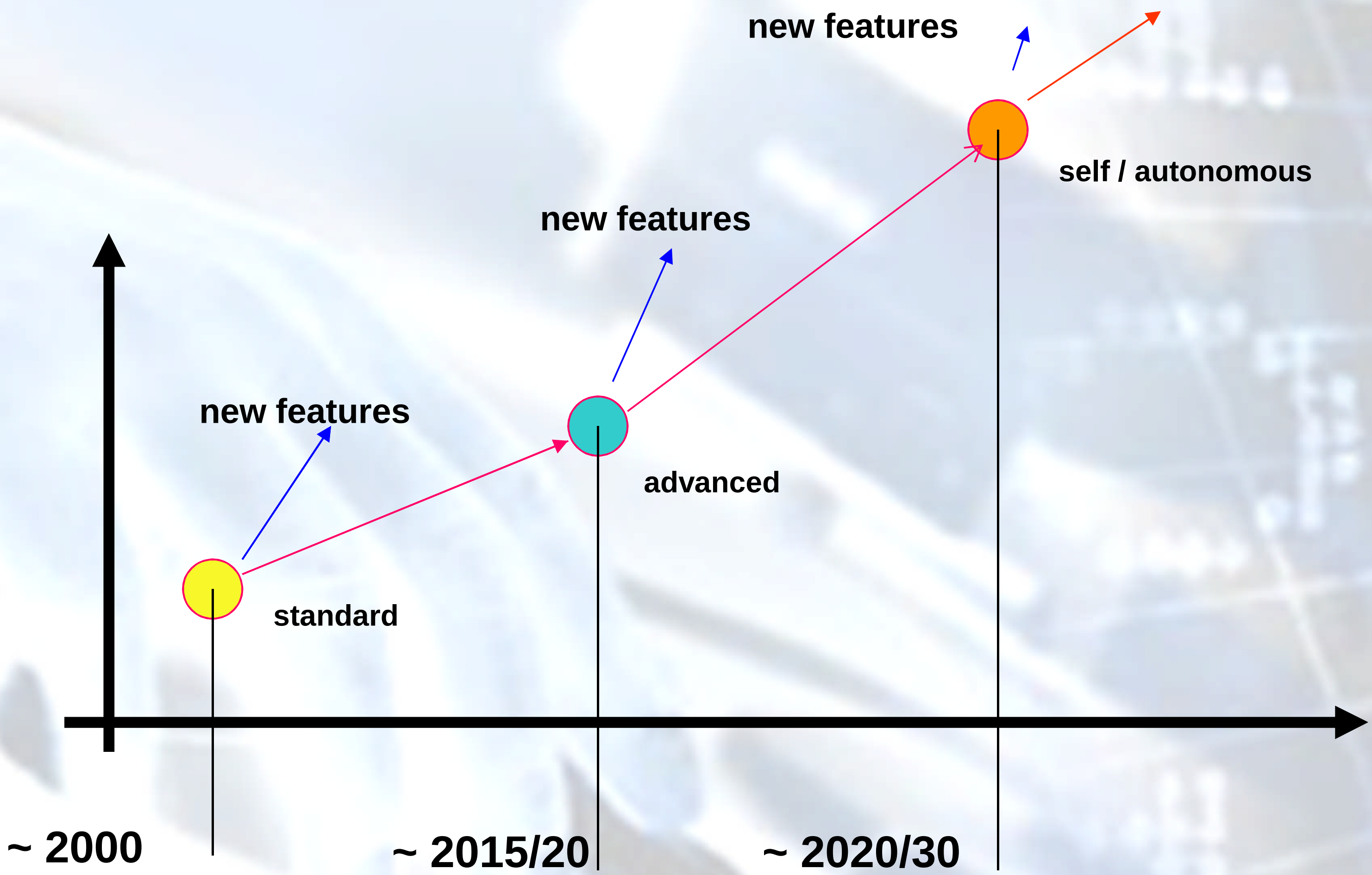
Petre Dini, IARIA, USA

petre@iaria.org

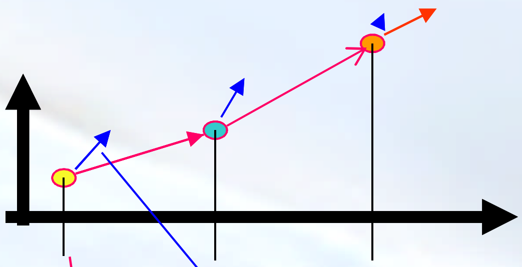
Monday, May 21st

InfoSys 2018, May 20-24, 2018 Nice, France

MOBILITY AS (a FUTURE) REALITY



Standard

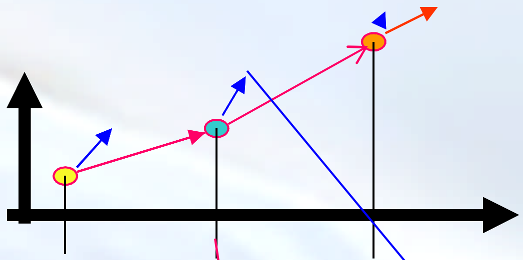


- optimal path, car size, etc.
- rapidity/covered region
- order a taxi
- parking a car

- access disable peoples
- uber service
- FedEx
- postal delivery from home
- waste-by-request
- etc.

- transportation systems
- fire/health emergency
- waste mgmg
- postal services

Advanced

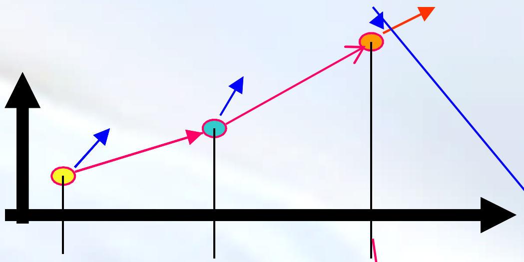


- individual tracking
- children tracking
- self-parking cars
- electrical-based vehicles
- pollution/noise sensing
- waste / weight sensing

- wearable devices
- alarms for elderly peoples
- etc.

- gps-based tracking
- water-plane services
- traffic re-routing
- drone-based delivery
- drove-based surveillance

Self / autonomous



- real-time pollution metering
- ?
- ?

- on-demand fleet deployment for metering
- ?

- mobile surgery lab
- environmental monitoring services
- on-demand deployment of pollution sensors
- ordering/delivering personalized taxi
- smart transportation | impaired passengers
- self-sizing fleet

Facets of Mobile Smart Environments (Cites)

– Urban traffic safety apps | security/communication

– Traffic optimizing services | special algorithms/real-time

– Localizing street services (gas, stations, electrical, foods, etc.) | graphics/visual/interfaces

– Tracking citizen | elderly | geolocation | geolocaiton in IoT |

– City service mapping/location | cartography software | cloud-based services | interactive software | dedicated apps

– Wearable smart devices | special screen/interface | special body-related software | body sensing apps | … chip for monitoring alcohol/drugs

– Body systems | special software execution systems | balancing procedures execution/data volumes

– Sensing and data processing | data fusion, data mining, pattern recognition

– Accessibility services | special interfaces | distributed software for bus/pedestrian/disabled drivers

– Forecasting services | databases, datasets, information mining techniques, machine learning

– Sensing and dissemination info on pollution and noise | surveillance, alarm systems, optimal traffic rerouting

– Public services | waste management |mobile sensing | waste estimation | redirecting services where needed

– City evolving services/systems | version software managements, rule-based systems, run-time updates and testing

– Smart utility control/measurement/payment | gas + electricity + | special/dedicated networks + software

– Goods/products delivery | drones systems

–Self-driving cars + electric cars | artificial intelligence + cognitive modeling +

- etc. | etc.

Yet to consider

- **Q1: How can mobility-as-a-service cover the spectrum of mobility facets?**
- **Q2: What is the impact of mobility on the energetic system?**
- **Q3: Is the population sufficiently and culturally aware to embrace mobile (self-driving) entities?**
- **Q4: What is the drawback on citizen well-being, considering accessibility**

Mobility-as-a-Service might take advantage from a Mobility-Platform, where

- Services are offered and ordered on a personal or corporate basis

- Services are developed, maintained, … by a Smart-City entity

Thanks

Q&A

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Conclusion

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Panel Conclusion

- Smart cities have complex connectivity infrastructure.
- AI is used to make these cities intelligent
- Autonomous vehicles will be a reality in smart cities infrastructure
- Because of their connectivity and complexity, smart cities will inherit all the currently available security attacks in addition to any specific future attack
- The hardware limitation (speed and memory) makes devices in smart cities unresponsive to a number of security techniques currently used in our computers.