DTe· **Departamento de Tecnología Electrónica**

# IAIP: INTELLIGENT SYSTEMS APPLIED TO INDUSTRIAL PROCESSES

SPECIAL SESSION AT INTELLI 2017

Chair and Organizer: Dr. Antonio Martín

July 2017 - Nice, France

We can do following questions.

● **Are digital factories the representation of manufacturing systems** in a virtual environment, which leads to a better understanding and design of production and manufacturing systems?

● **Could intelligent systems complete the entire production process** in an autonomous way from the product conception level down to manufacturing, modeling and maintenance?
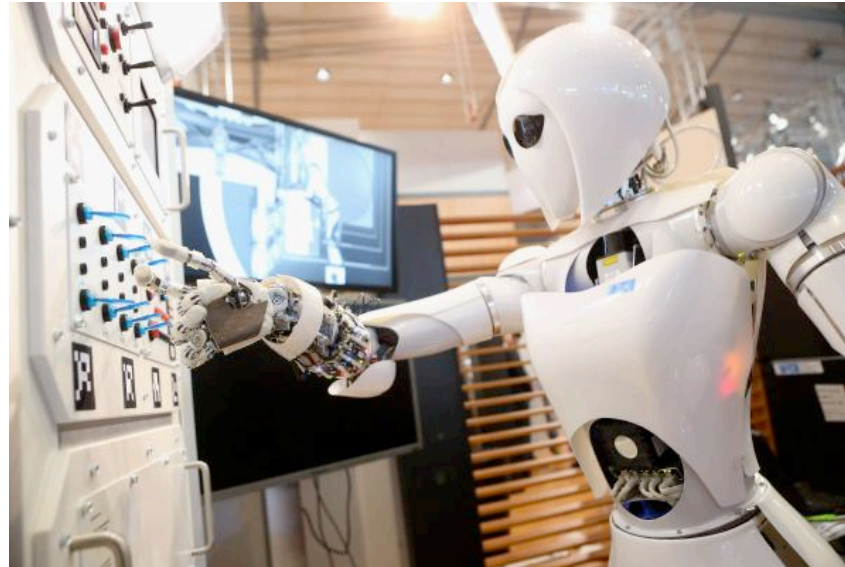
- Could be industry 4.0 an autonomous and unattended scheme?

- Can intelligent systems improve the management efficiency utilities? How can help intelligent systems in the management efficiency of the utilities?

- Can intelligent industry uses virtual representation of a factory to facilitate the distributed management of manufacturing assets?

Artificial Intelligence & Thinking Machines

● **Turing test artificial intelligence**:

- We will observe the results of the thinking, and we will not be able to tell if it is a machine or a human.
- We are **attempting to copy a man in the thinking process.**

● Nowadays we can build intelligent systems that could **think, act, can monitor, like a human.**

★ When we are trying to do something, or find something out, an IS can help to resolve the question with **knowledge from a database.**

◆ **Edsger Dijkstra** said the question of could machine think "is about as relevant as the question of whether submarines can swim."

● Artificial Intelligence build and understand intelligent entities with different approaches.

● Intelligent systems have particular potentialities and strengths to support decisional situations faced by industry and companies, especially those of a strategic nature, where good strategic intelligence is necessary.

Intelligent Systems Development

● What we call the human **function of "thinking"** could be quite different in the variety of possible future implementations of intelligence.

● The **different species of native machine** "thinking" could be quite different.

- Let's copy humans method.
- The use of mathematical algorithms to make intelligent machines.

● To reach an intelligent system it is necessary to watch what expert players did and started to imitate that.

- It can do so faster and more accurately than any human.

- We can teach a machine to track an algorithm and to perform a sequence of operations.

◆ When we say, "machines that think", we really mean: "machines that think like people".

Machines that Think Like People

● **Artificial intelligence requires knowing** why things happen, what emotions they stir up, and being able to predict possible consequences of actions.

● **There are many different ways** to simulate machines that think: Case-based reasoning, Fuzzy logic systems, neural networks, Genetic algorithms, etc.

● Cognitive scientists have discovered functions that are essential to **genuine human thinking**, much of which has not materialized yet.

◆ Nowadays Artificial Intelligence can't do any of that. These variables do not exist for an artificial one.

● Studying the human brain is still our best source of ideas about thinking machines. This all affects our decisions and actions drastically:

  - We can anticipate future outcomes in a way no artificial mind can.

  - Human mind can distinguish between the right and the wrong.

  - We can love, and hate our actions at the same time.

◆ Such prospect warrants a reflection on the **modus operandi** of the intelligent systems **in the industrial control and monitoring area.**
- Smart factory leads to a better understanding and design of production and manufacturing systems?
- Could smart factories help to revitalize industry manufacturing?

● **Computers can learn and adapt, when presented with information in the appropriate way.**
Without any human assistance machine learning allows computers to learn to do things without explicit programming many successful applications.
Could intelligent machines learn and adapt?

◆ Could we create systems that go further and act without human supervision?
 I believe exercising common sense in making decisions and being able to ask meaningful questions are, so far, the prerogative of humans.

Main Open Issues

◆ This session outlines application of intelligent techniques to manage industrial processes. Topics include in this section are:

- **Industry 4.0 an autonomous and unattended scheme.**

- **Intelligent systems in the autonomous production process:** product conception level down, manufacturing, modeling, and maintenance.

- Digital factories like representation of manufacturing systems in a virtual environment.

- Intelligent systems to improve the management efficiency utilities.

- Intelligent industry and virtual representation of a factory to facilitate the distributed management of manufacturing assets.

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