

ITUKALEIDOSCOPE

SANTA FE 2018

Machine learning for a 5G future

Artificial Intelligence: pros and cons

PhD Milagros Gutierrez

PhD Luciana Ballejos

Eng. Guadalupe Gramajo

CIDISI R&D Center in Information Systems Engineering

Facultad Regional Santa Fe

Universidad Tecnológica Nacional

26-28 November
Santa Fe, Argentina





What is Artificial Intelligence (AI)?

Object of research -> Intelligence

Artificial Intelligence is the field of computer science that makes intelligent machines – whatever that means –

Neil Gershenfeld – MIT



What is Artificial Intelligence (AI)?

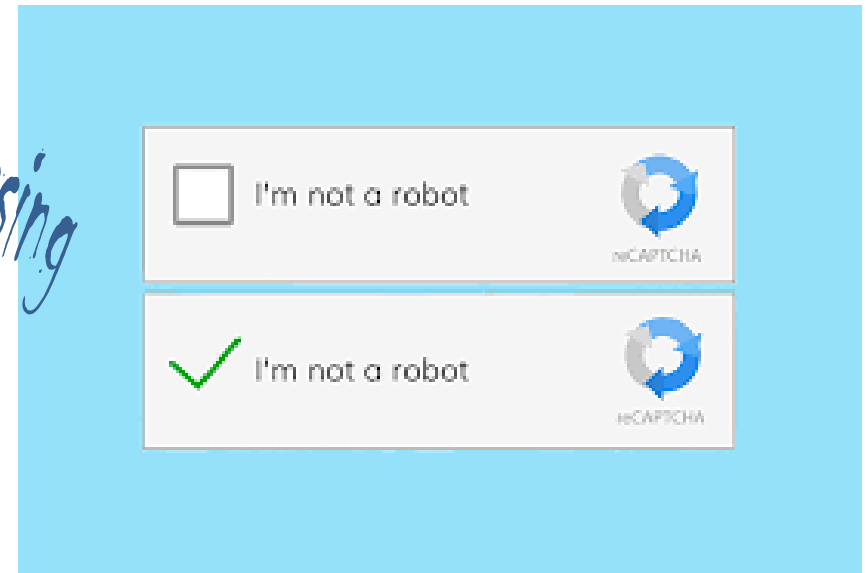
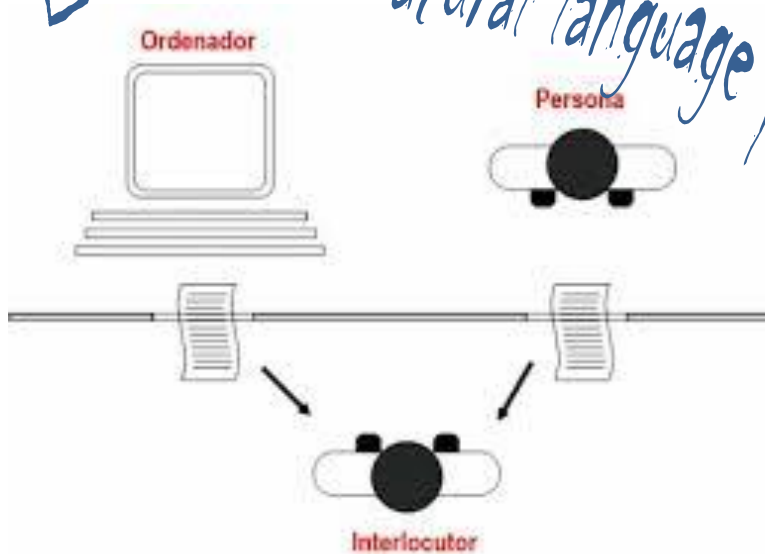


What is Artificial Intelligence (AI)?

Turing test



Thinking
Learning
Knowledge representation
Natural language processing



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smart

smart

smart

smart

smart

smart

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IOT



Cloud



Big
data



AI



Smart

COMMUNICATION!



Illustration: iStockphoto

IOT



Cloud



Big
data



AI



Smart

5G
networks



IOT



Cloud



Big
data



AI



Smart

Higher bandwidth

5G

networks



Higher data rates

Reduce transmission delay

IOT



Cloud



Big
data



AI



Smart

Performance + capacity + speed

5G
networks

interoperability

IOT



Cloud



Big
data



AI



Smart

Internet
Society



IEEE



5G
networks

COLLECT IDEAS AND FEEDBACK

IDENTIFY PROBLEMS

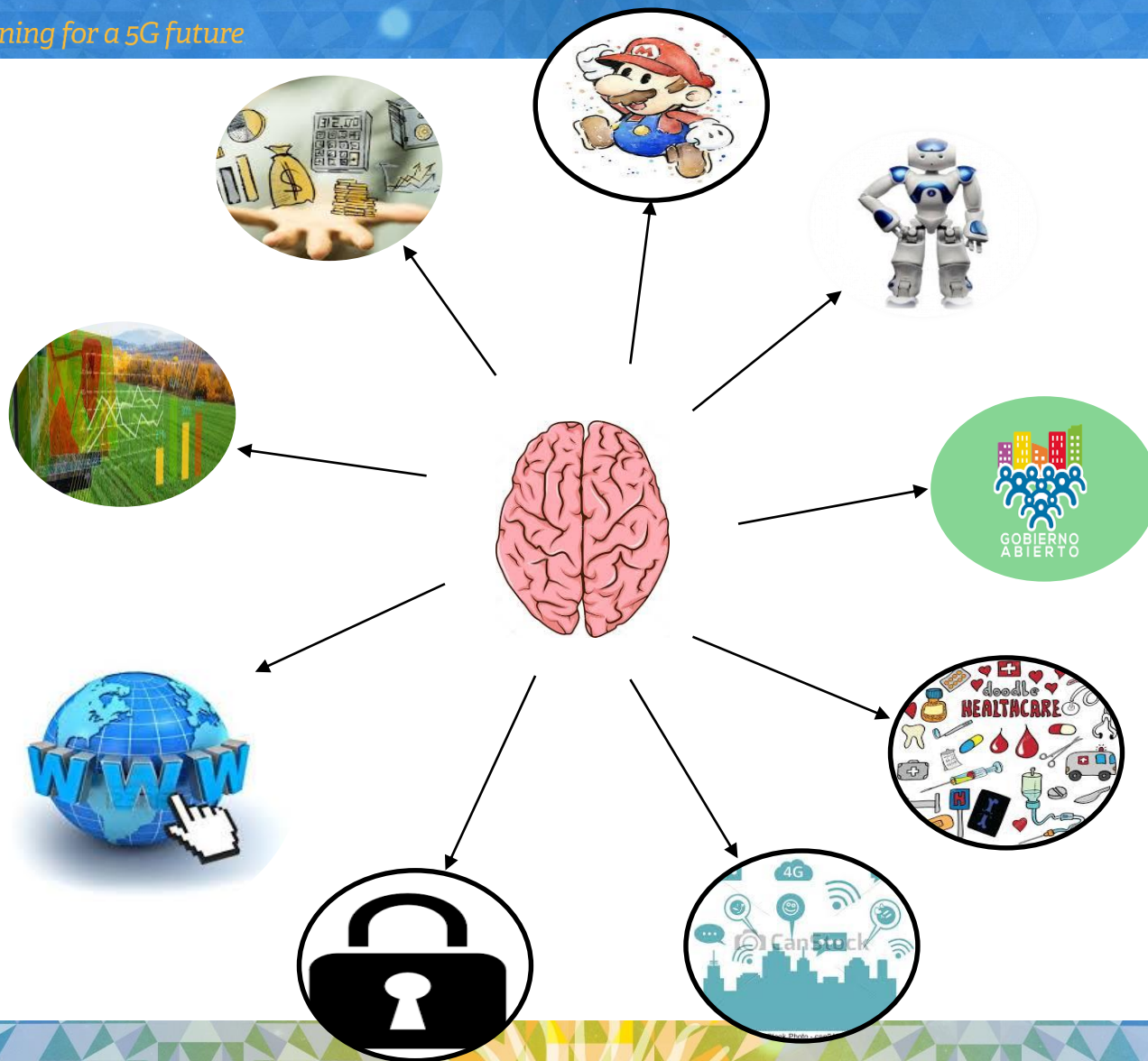
SUGGEST SOLUTIONS

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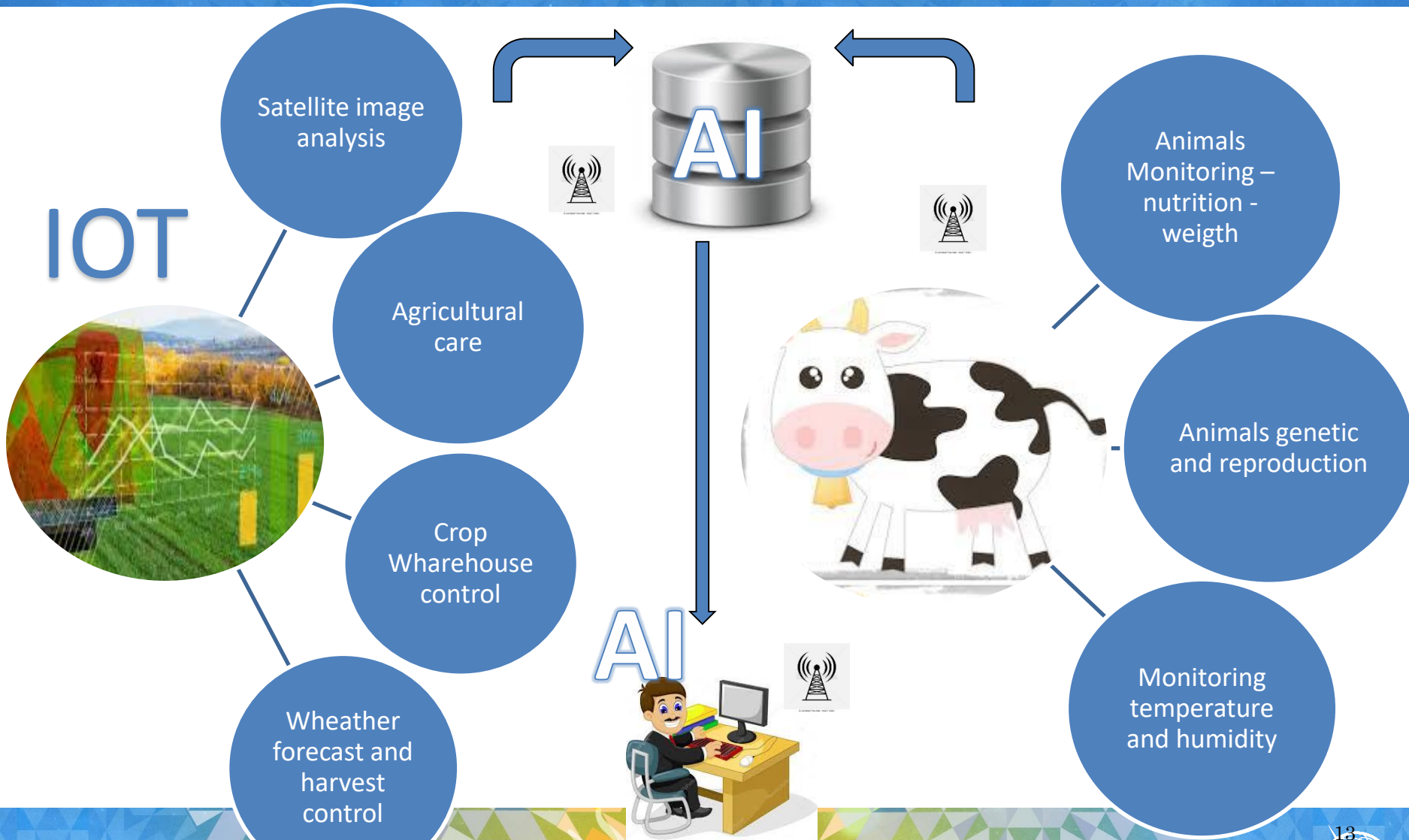
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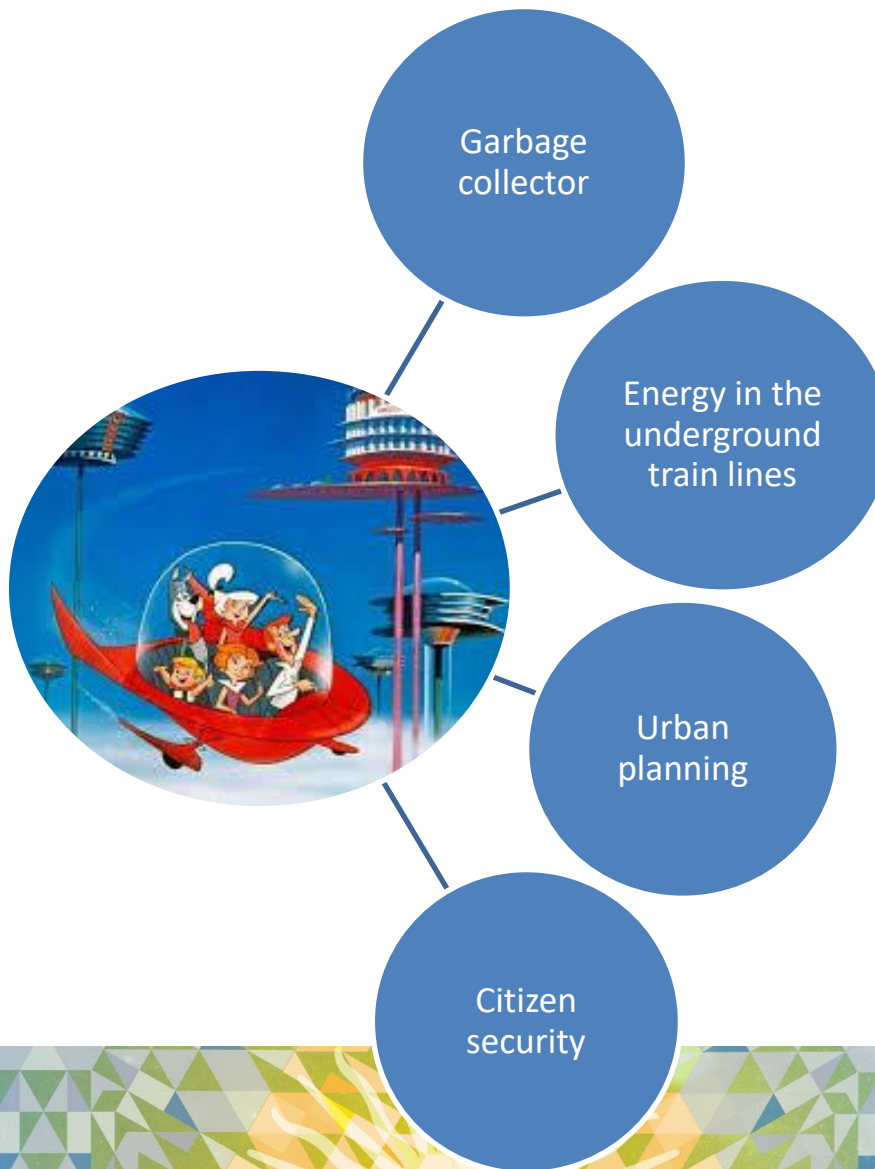
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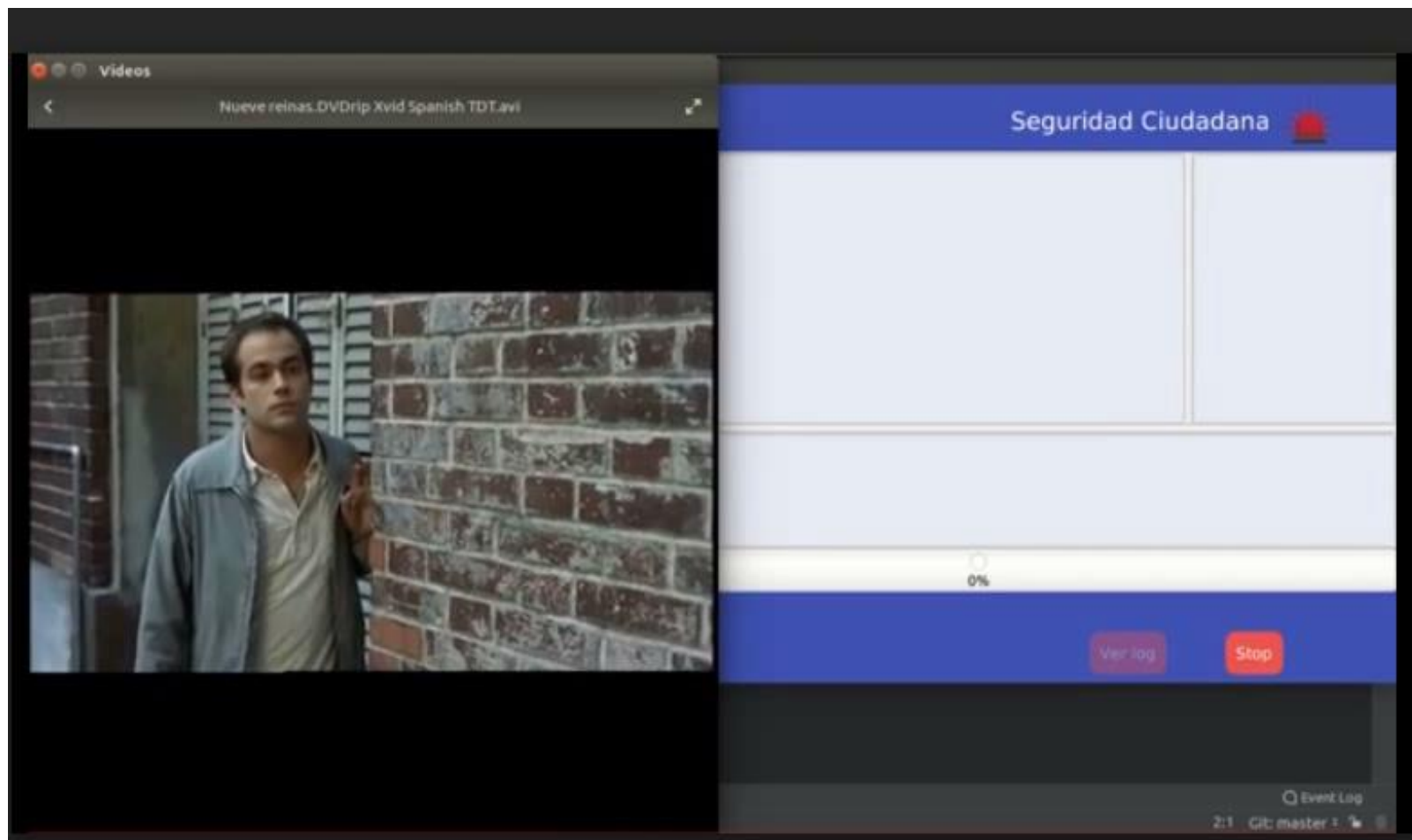


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Learning level

Student learn in they own pa



Helps profesu

Learning path

Student-centered education



What We Talk About When We Talk About **Machine Learning?**

Formally...

“Machine learning is an application of artificial intelligence that provides systems with the ability to **automatically learn and improve** from experience, without being explicitly programmed.”

A. Samuel



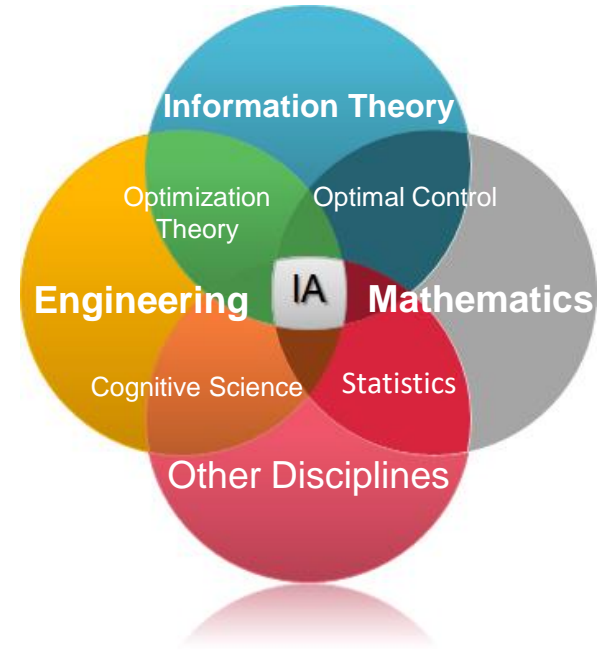
Applications in
Different Domains

Processing Capacity

Big Data

Machine Learning

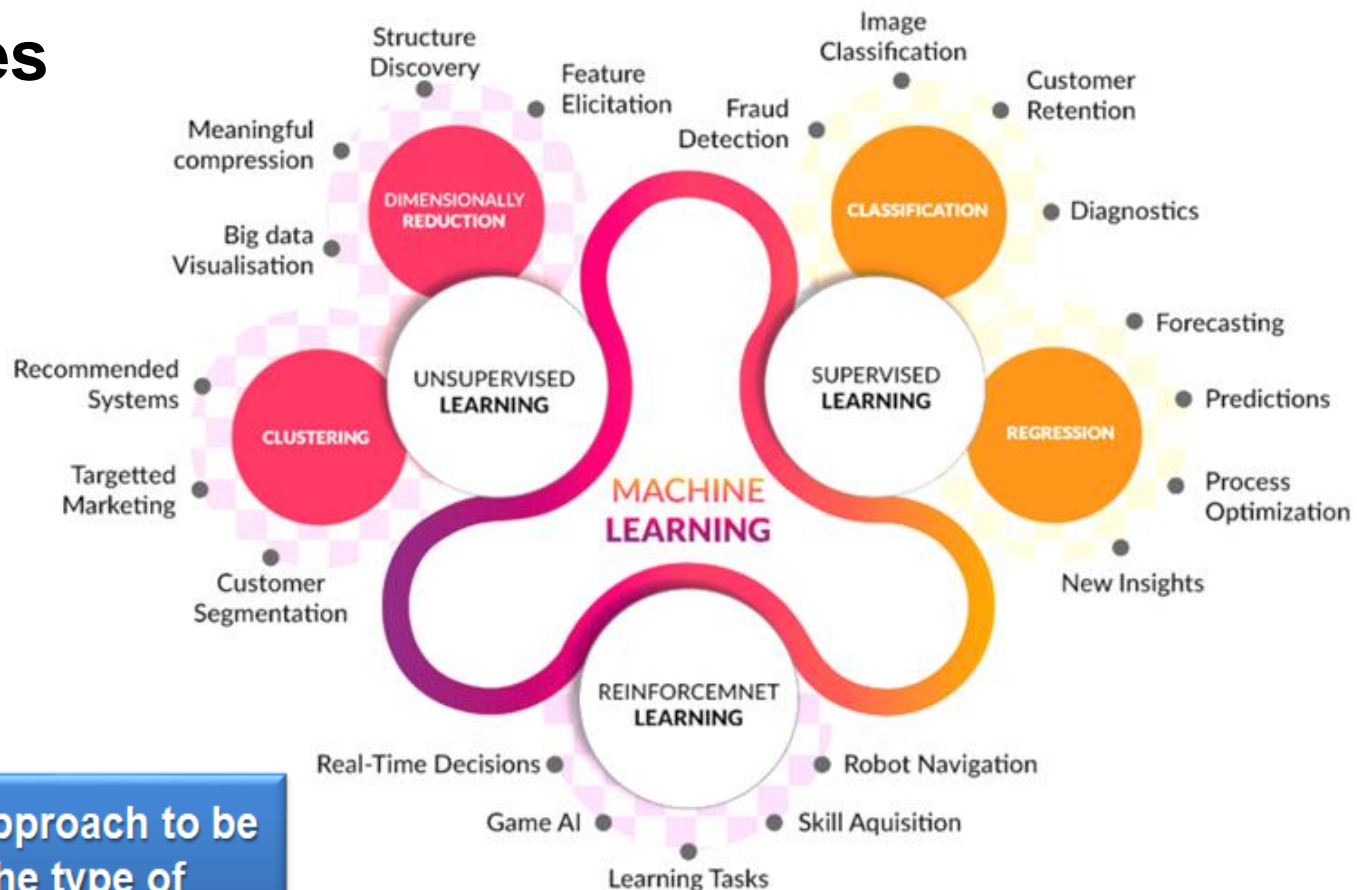
Machine Learning Interdisciplinary Field



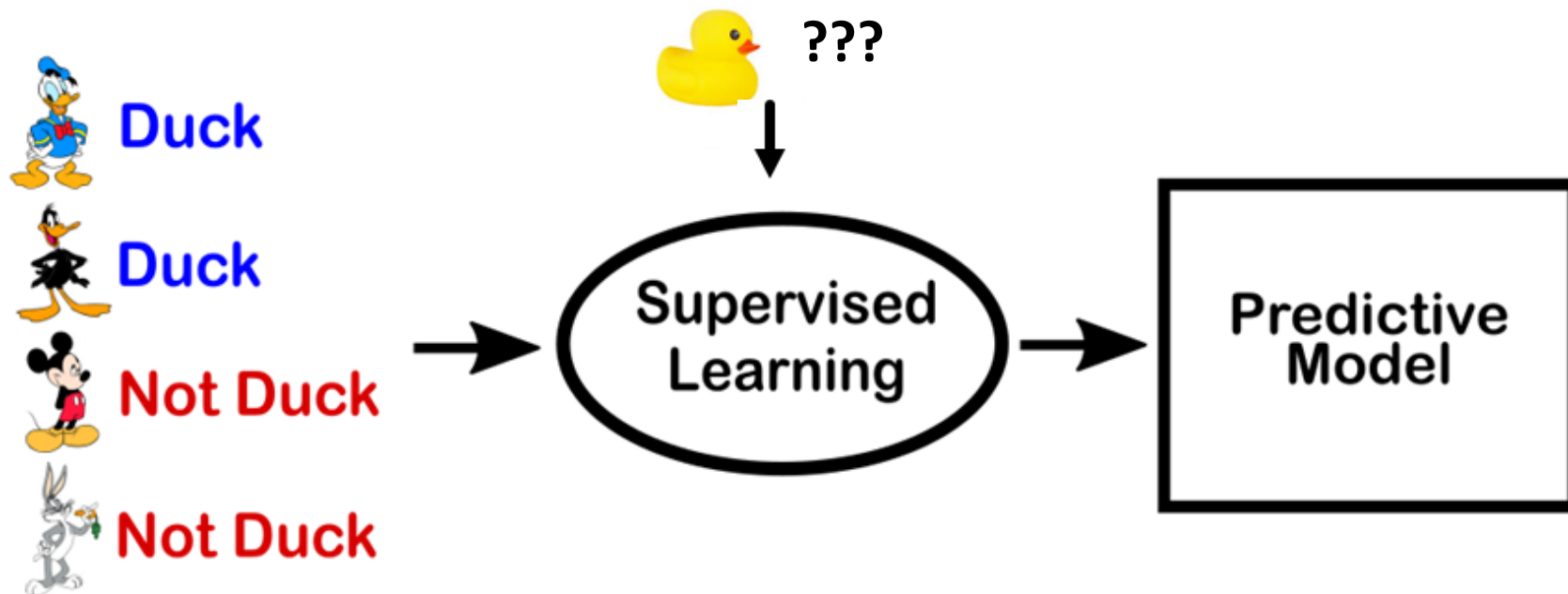
Why we use Machine Learning ?

- Human **expertise does not exist** (exploration of planets, e.g. Marts)
- Humans **cannot explain their expertise** or reduce it to a rule set, or their **explanation is incomplete** and needs tuning (e.g. speech recognition)
- Humans are **expensive to train up** (e.g. zipcode recognition)
- There are large **amounts of data** (e.g. discover astronomical objects)

ML Approaches

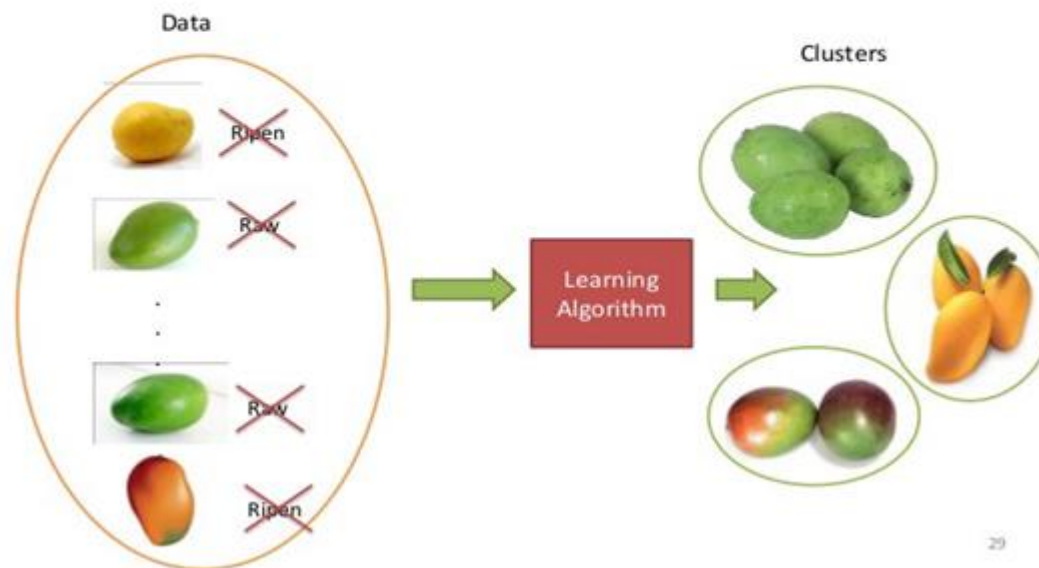


Choosing the learning approach to be applied depends of the type of problem to be solved



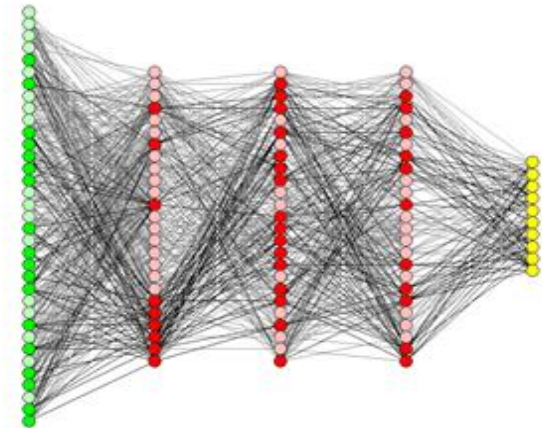
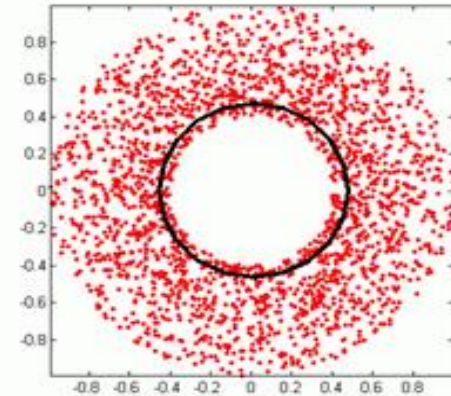
Supervised learning requires training with labeled data which has inputs and desired outputs.

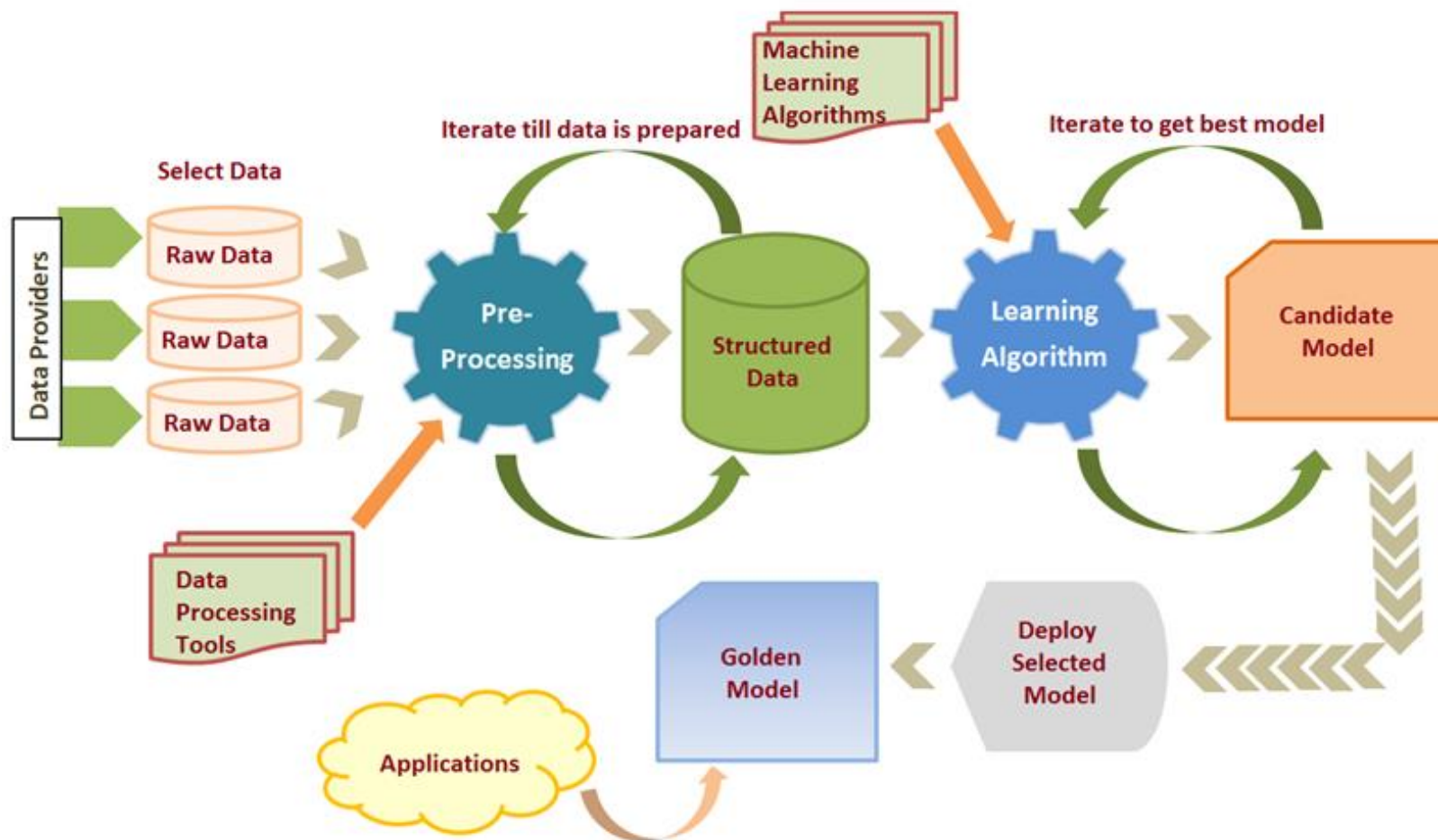
Unsupervised Learning



Unsupervised learning which does not require labeled training data and the environment only provides inputs without desired targets.

What is machine learning workflow ?

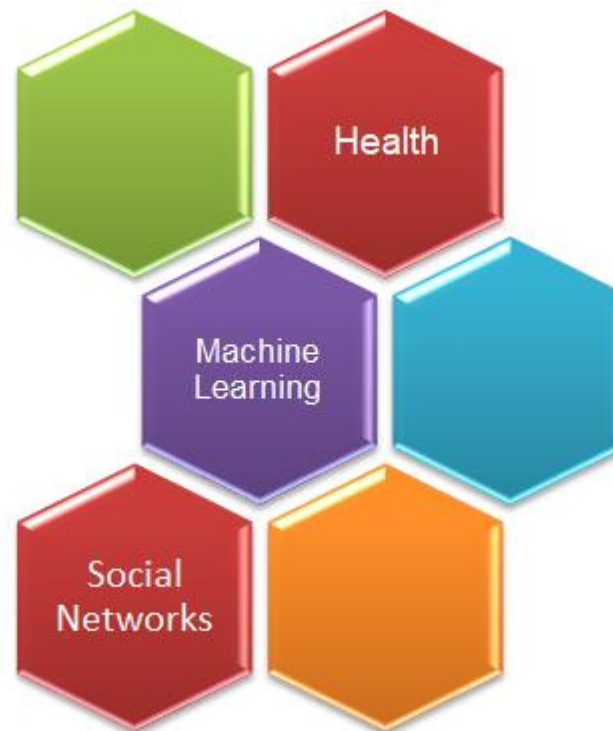




When would we use Machine Learning ?

- **Pattern Recognition**
 - Facial identities or facial expressions
 - Handwritten or spoken words (e.g., Siri)
 - Medical images
 - Sensor Data/IoT
- **Anomaly Detection**
 - Unusual patterns in the telemetry from physical and/or virtual plants (e.g., data centers)
 - Unusual sequences of credit card transactions
 - Unusual patterns of sensor data from a nuclear power plant
- **Prediction**
 - Future stock prices or currency exchange rates

Machine Learning Applications



More and More



Research Topics at CIDISI



Software Engineering



Natural Language Processing

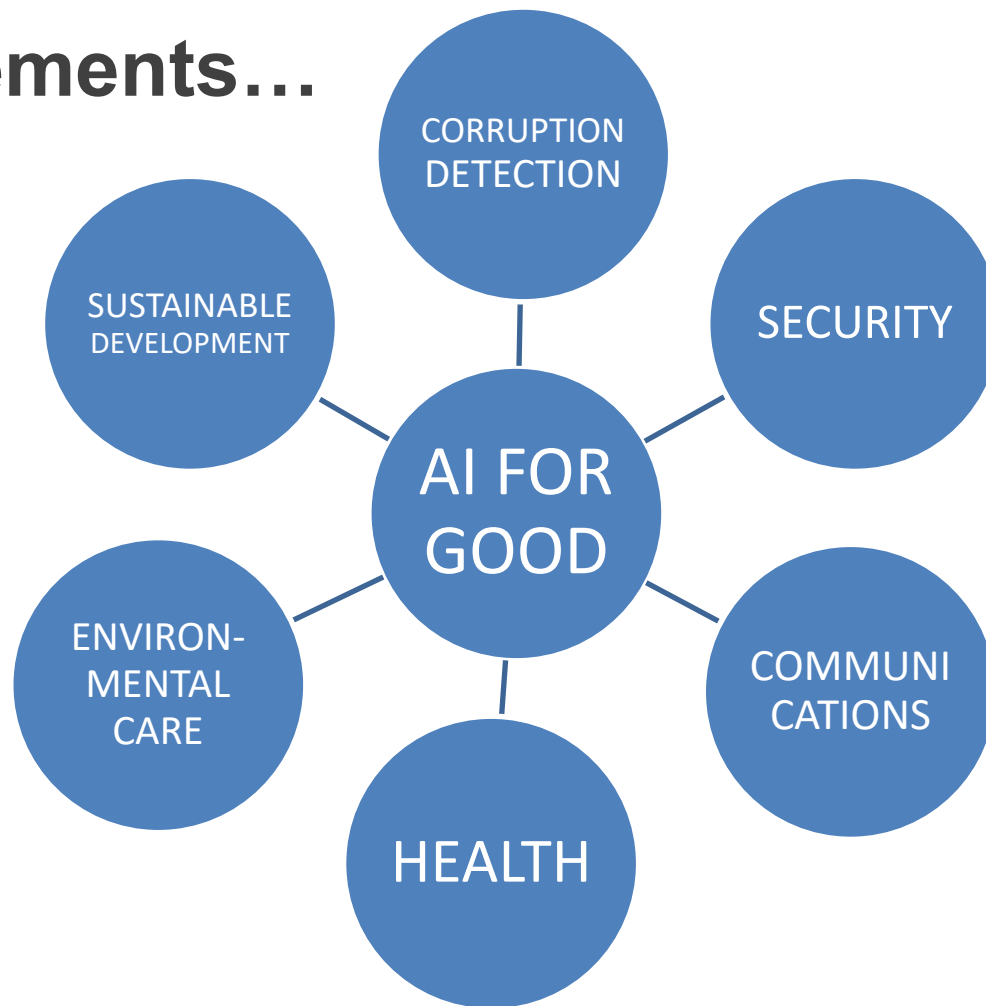


Energy



Bioinformatics

AI achievements...



Devices and machines → more practical
and smarter

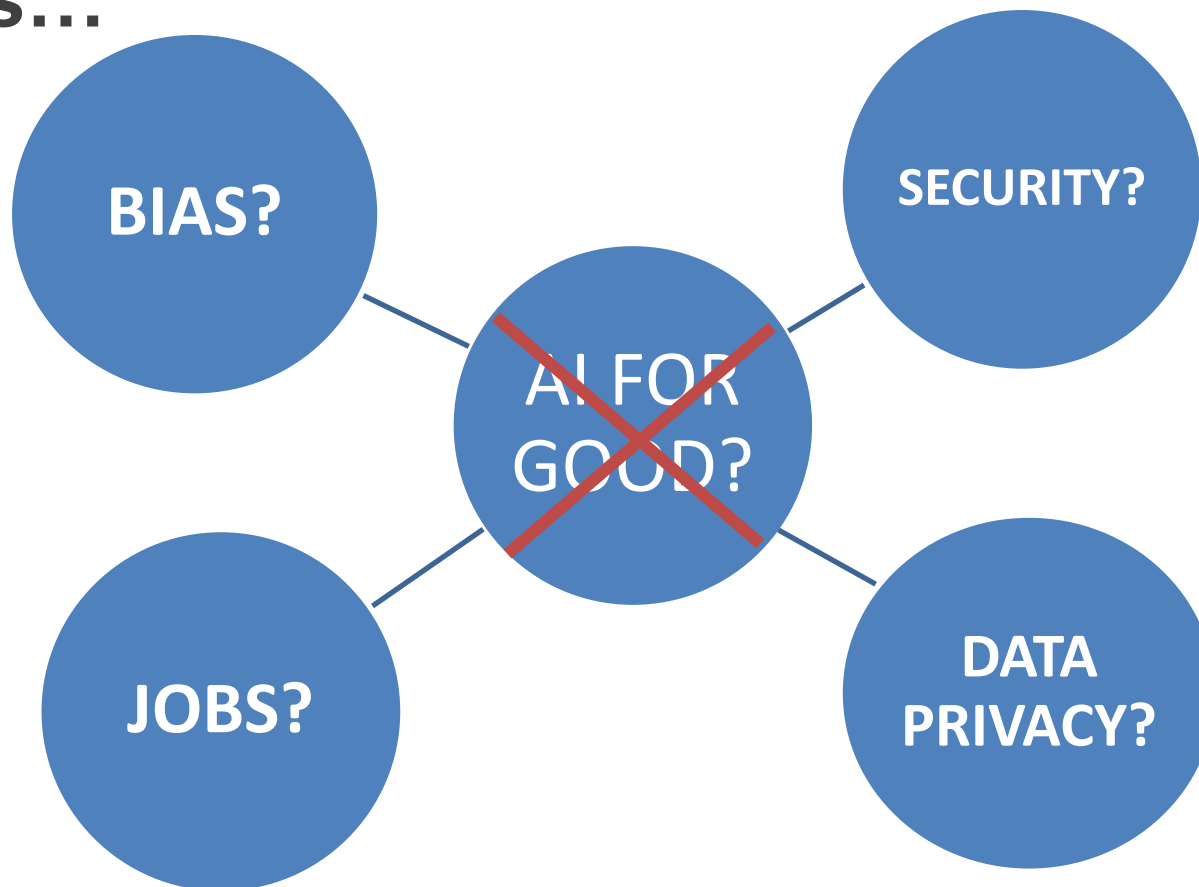
Many examples show bad use of AI...

Thus, “Destructive AI”?

How much should we fear
the rise of artificial intelligence?



AI Fears...



AI Fears...

BIAS?

... SYSTEMS LEARN
BASED ON THE DATA
WHICH WE FEED THEM
WITH ...



- It is possible to train neural networks with a set of data that make systems learn what we want...
 - Systems can be racists...
 - Systems can learn from gender segregation...
 - Systems can be subjective and partial...

AI Fears...

SECURITY?



- Intelligent systems are responsible for
 - Monitoring safety,
 - Participating in wars,
 - Controlling soldiers,
 - ...

AI Fears...

SECURITY?



Colonel Stanislav Petrov

What happens when the human is not part of the control loop?



- Computers reported american attack with missiles.
- Protocol → respond with nuclear attack.
- Radar controllers confirmed radar had not detected anything.

AI Fears...

SECURITY?



What happens when the human is not part of the control loop?

Self-driving car hit and killed a woman



AI Fears...

DATA
PRIVACY
?

Social Networks



Influencers

trolls

Fake news

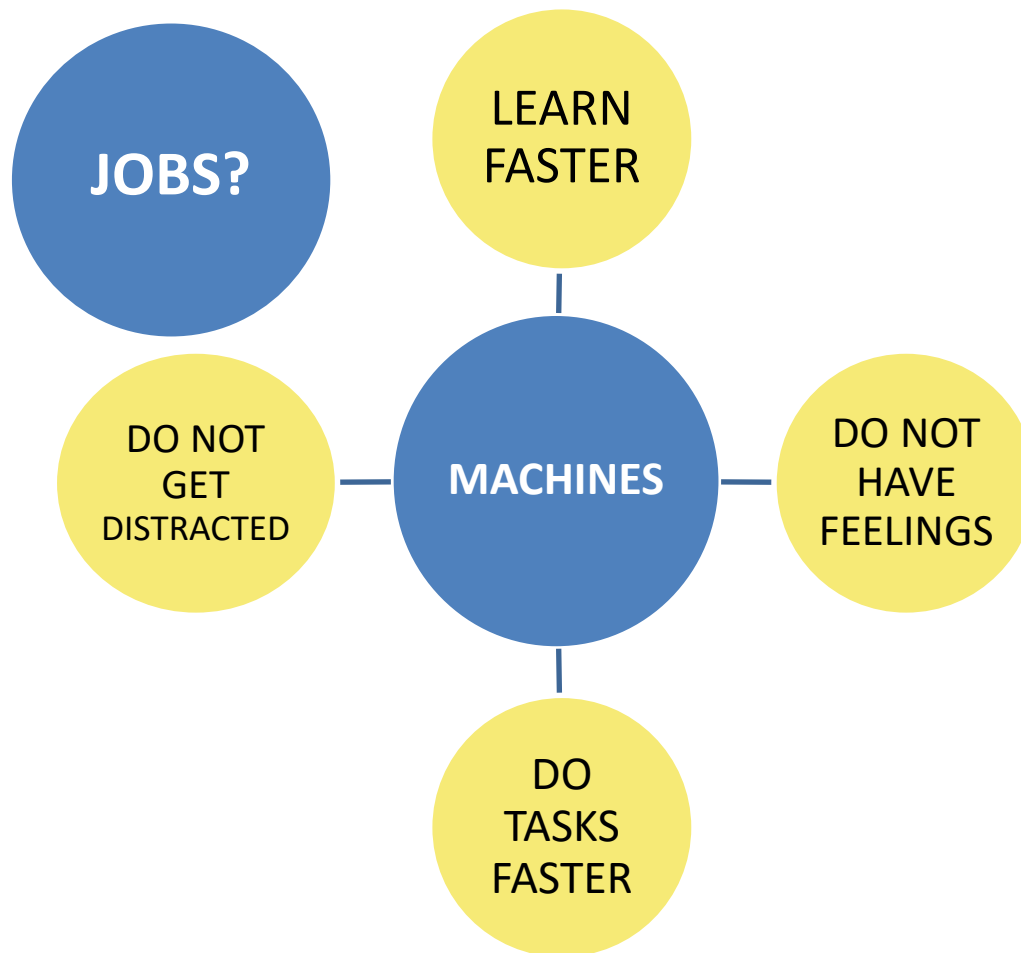
ML algorithms feeded with bias data

False information

Elections in the USA



AI Fears...



AI Fears...

JOBS?

AI stealing our jobs?

Will human work continue existing?

Could I lose my job to a machine?



AI Fears...

JOBS?



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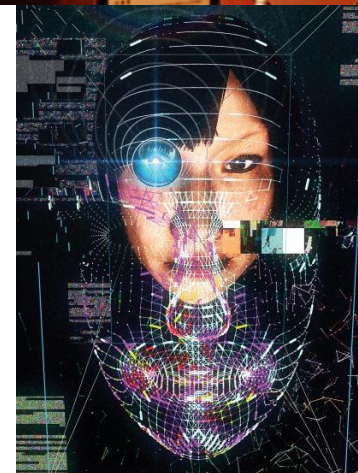


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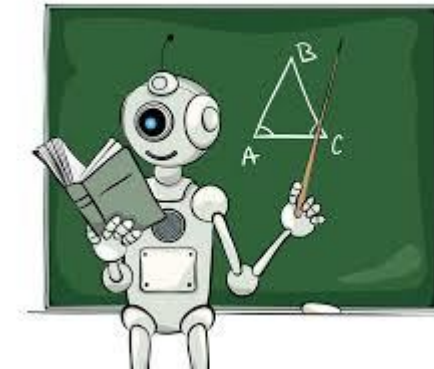
AI Fears...

JOBS?



AI Facts

- **Machines are capable of learning**
 - they also have limits and their technologies need to be constantly improved.



Human beings will have to tackle the design of these machines

AI Facts

- **AI wouldn't destroy jobs**
 - but would substantially alter the employment landscape **by stimulating the creation of highly qualified positions** requiring advanced technical skills.

New forms of work

...Every time machines were created, they also generated new types of work....

AI Facts

- **We must not fight against an AI that could replace humans...**
 - We must try to find alternative ways of working, with humans that are able to “collaborate” with facilitating machines.

AI Facts

- AI is not science fiction
- AI is all around, everywhere

AI, as all new trends in technology,
is not **good** or **bad** by itself...

**It all depends on the use we give to it...
that is the challenge!! ...**

**Diverse trends in AI and ML for a 5G future
will be presented in this event**

**So, let's start contributing to
the future!**

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Thanks!

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