# Aula 2:
# Introdução à Inteligência Artificial
## Objetivos desta Aula:

- **Compreender** o que é a Inteligência Artificial;

Paulo Cortez 2017, Manuel Filipe Santos 2019

# O que é a INTELIGÊNCIA ARTIFICIAL (IA)?

- **ARTIFICIAL**:
  - Artefacto não natural;
  - Máquina;
  - Computador;
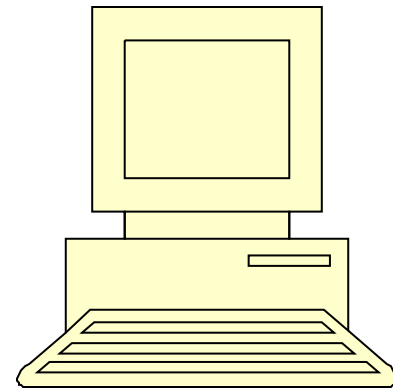
# O Que é a IA?

- Não existe uma única definição universal, diferentes perspectivas.

- Influência de diversos domínios: Filosofia, Ciências Cognitivas, Psicologia, Matemática, Economia, Informática

- Nils J. Nilsson 2010 (ai100report): "**Artificial intelligence** is that activity devoted to **making machines intelligent**, and **intelligence** is that quality that enables an **entity to function appropriately** and with **foresight in its environment**"

# O Que é a IA? (Definição Artificial Intelligence, A Modern Approach – Russel & Norvig, 2005)

|  | **Abordagem Humana** | **Abordagem Racional** |
|---|---|---|
| **Pensamento** | **Thinking Humanly** "cognition"<br><br>"The exciting new effort to make computers think … *machines with minds,* in the full and literal sense." (Haugeland, 1985)<br><br>"[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning .. ." (Hellman, 1978) | **Thinking Rationally**<br><br>"The study of mental faculties through the use of computational models." (Charniak and McDermott, 1985)<br><br>"The study of the computations that make it possible to perceive, reason, and act." (Winston, 1992) "laws of thought" |
| **Ação** | **Acting Humanly** "turing test"<br><br>"The art of creating machines that perform functions that require intelligence when performed by people." (Kurzweil, 1990)<br><br>"The study of how to make computers do things at which, at the moment, people are better." (Rich and Knight, 1991) | **Acting Rationally** "rational agent"<br><br>"Computational Intelligence is the study of the design of intelligent agents." (Poole *et at,* 1998)<br><br>"AI …is concerned with intelligent behavior in artifacts." (Nilsson, 1998) |

# História da IA: https://ai100.stanford.edu/
## http://aitopics.org/misc/brief-history

- 1950: Alan Turing proposes a test to check if a computer behavior is "intelligent".

- 1956: John McCarthy (Stanford) defines the term Artificial Intelligence.

- 1962: Artur Samuel (IBM) creates a self-learning program that defeats top-ranked checkers champions.

- 1965-1970: DENTRAL – first expert system (molecular structures).
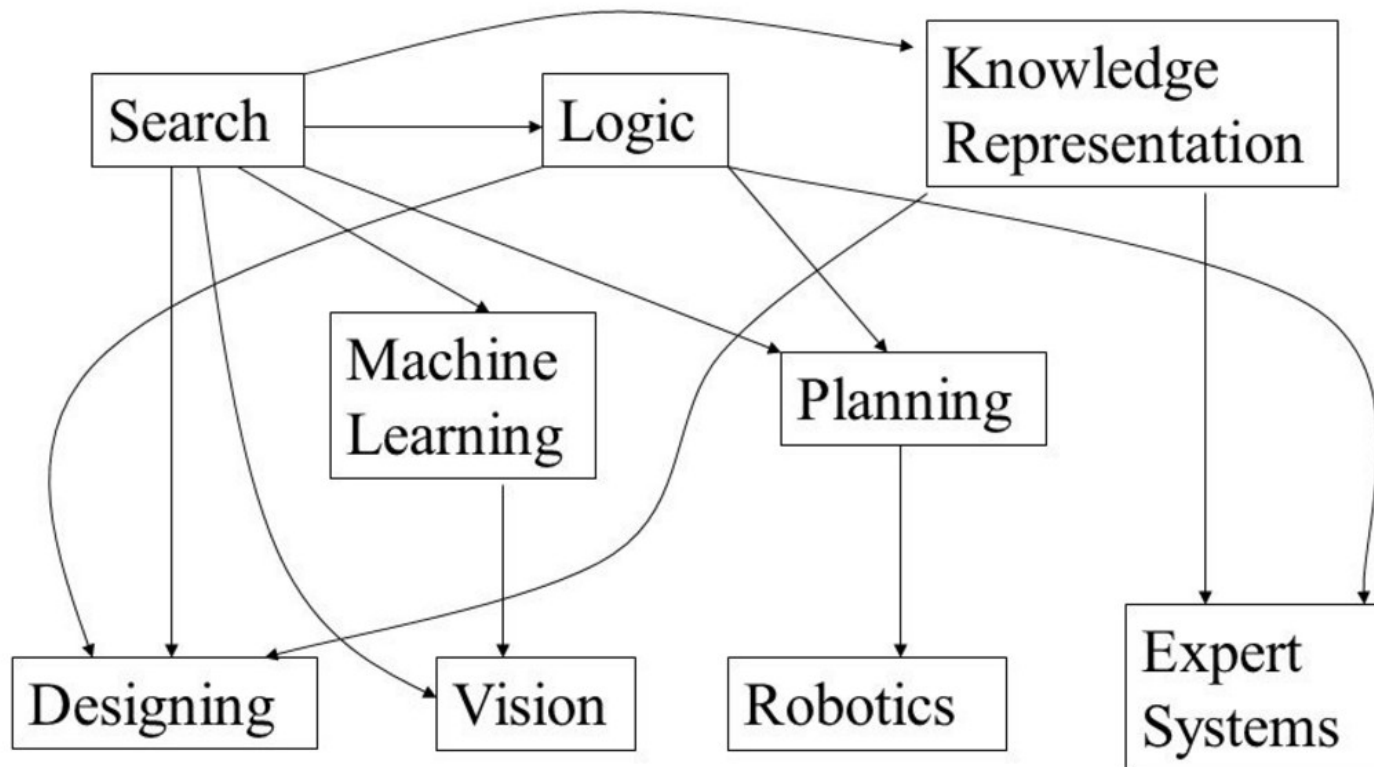
- 1970-80:

Several expert

Systems

# História da IA: https://ai100.**stanford**.edu/

## http://aitopics.org/misc/brief-history

- 1997**:** IBM's Deep Blue beats Garry Kasparov in Chess.

- 2011: IBM's Watson supercomputing system beats two best human players on TV show Jeopardy.

- 2016: Google's AlphaGo wins Korea's Lee Sedol, one of the world's best Go players.
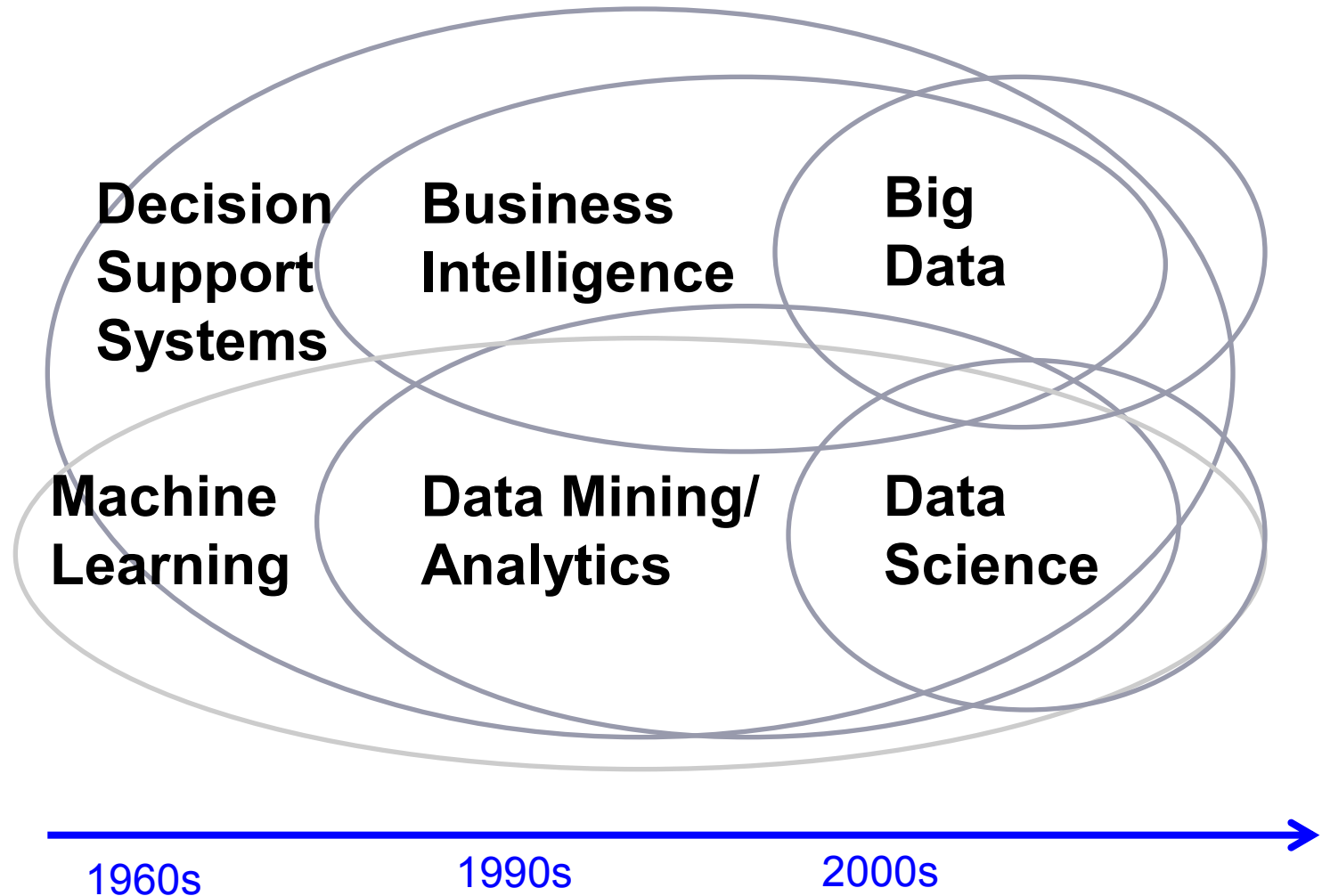
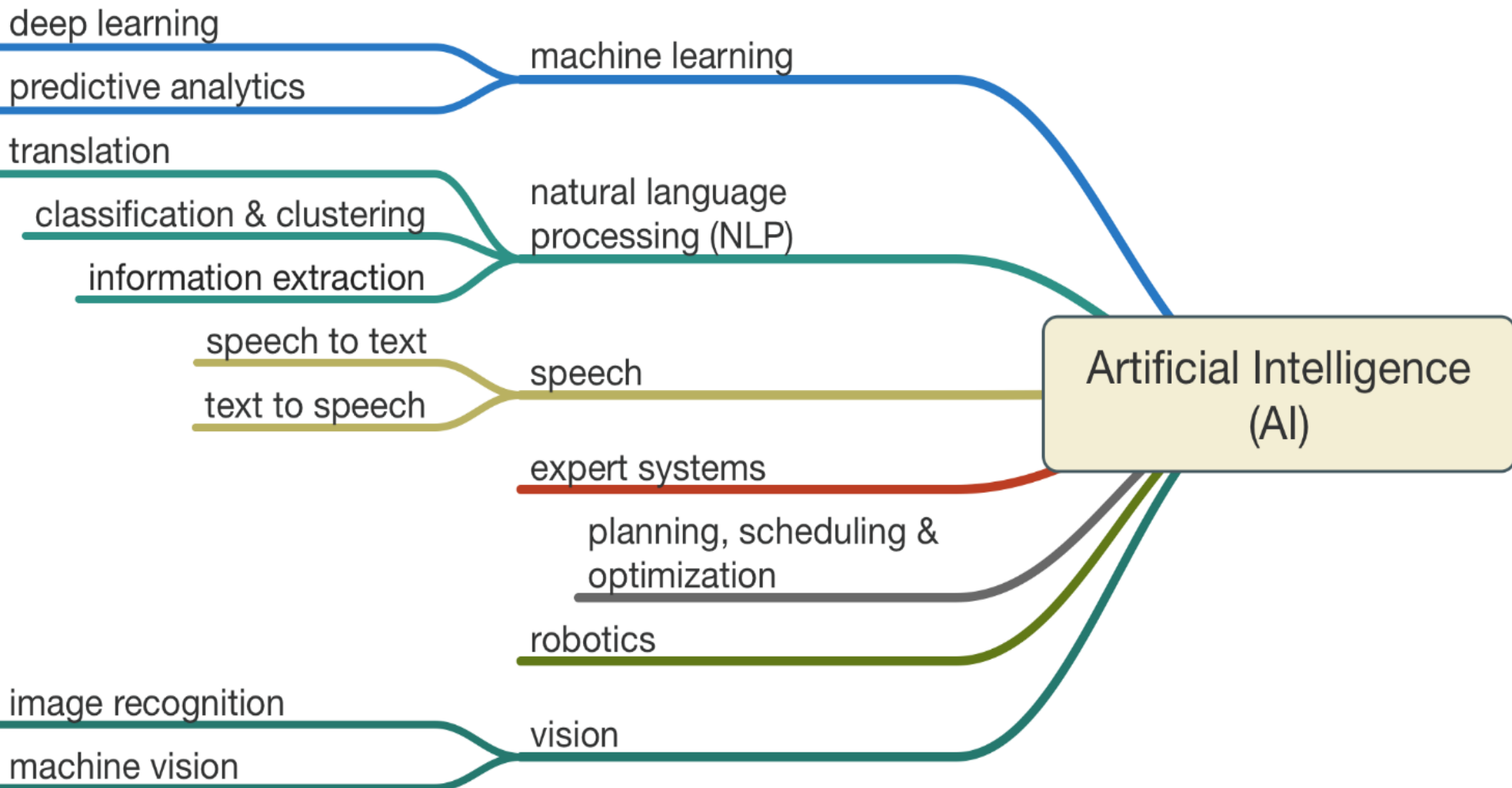# Áreas da IA: diferentes perspectivas (visão antiga):
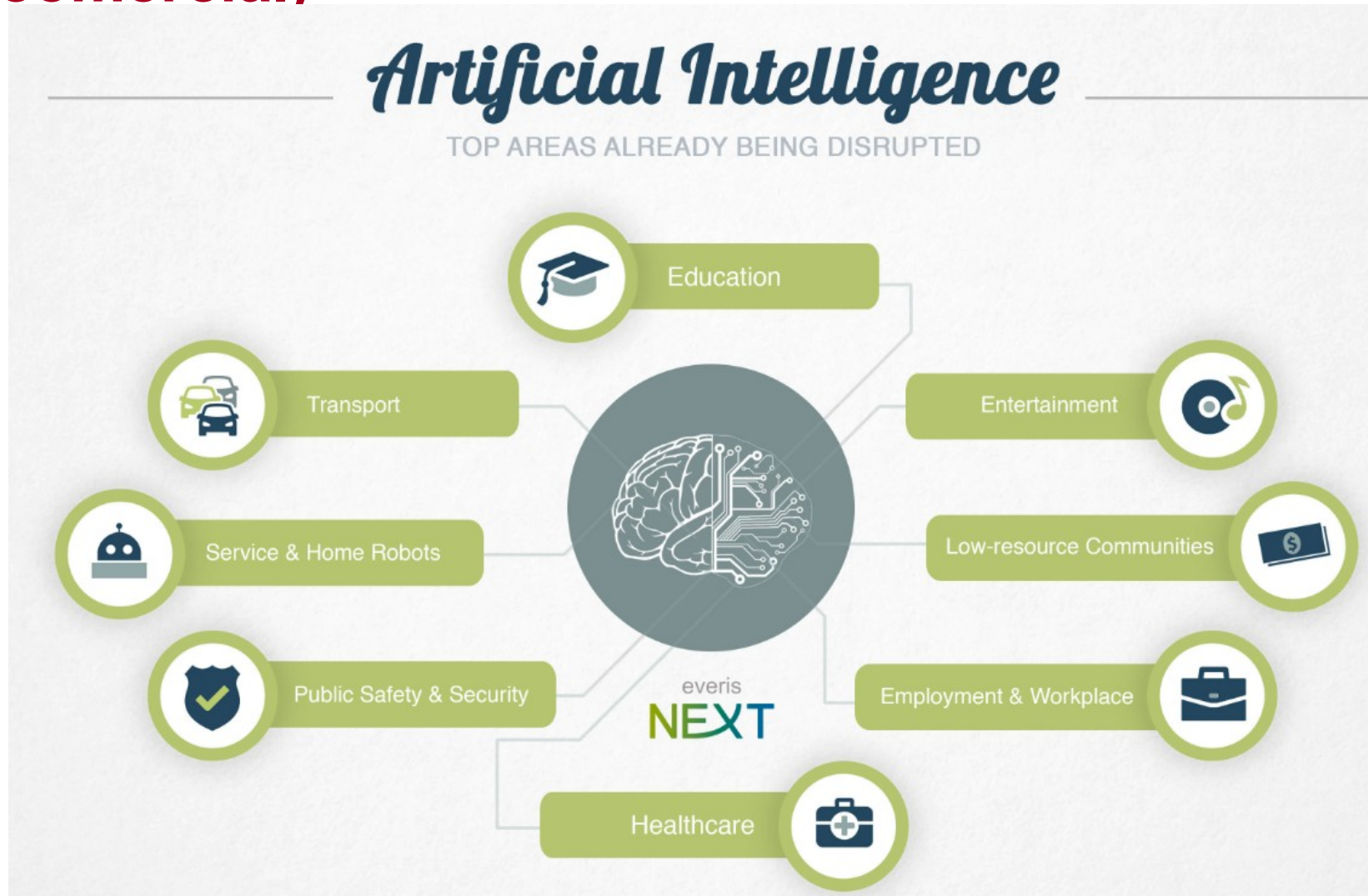
## Areas of AI and Some Dependencies

# Áreas da IA: diferentes perspectivas (visão de dados):



Decision Support Systems — Business Intelligence — Big Data

Machine Learning — Data Mining/Analytics — Data Science

1960s — 1990s — 2000s

# Áreas da IA: diferentes perspectivas (visão recente)

# Áreas da IA: diferentes perspectivas (visão comercial)

# Áreas da IA: conferencia EPIA 2019

AIEd - Artificial Intelligence in Education
AI4G - Artificial Intelligence for Games
AIoTA - Artificial Intelligence and IoT in Agriculture
AIL - Artificial Intelligence and Law
AIM - Artificial Intelligence in Medicine
AICPDES - Artificial Intelligence in Cyber-Physical and Distributed Embedded Systems
AIPES - Artificial Intelligence in Power and Energy Systems
AITS - Artificial Intelligence in Transportation Systems
ALEA - Artificial Life and Evolutionary Algorithms
AmIA - Ambient Intelligence and Affective Environments
BAAI - Business Applications of Artificial Intelligence
GAI- General AIIROBOT - Intelligent Robotics
KDBI - Knowledge Discovery and Business Intelligence
KRR - Knowledge Representation and Reasoning
MASTA - Multi-Agent Systems: Theory and Applications
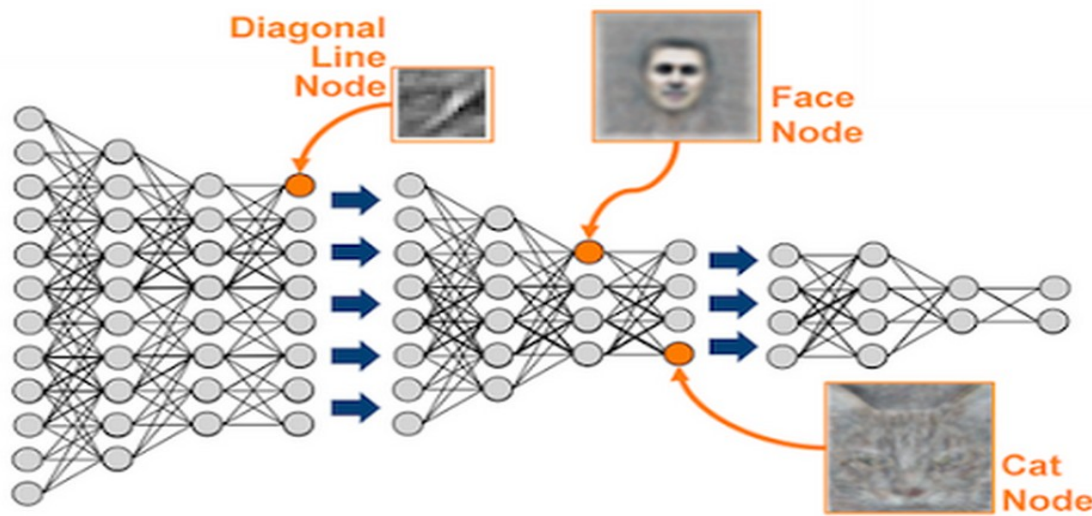SDIA - Doctoral Symposium on Artificial Intelligence
SSM - Social Simulation and Modelling
TeMA - Text Mining and Applications

# Futuro da IA? Tendências (AI100 report)

- Large-scale Machine Learning (Big Data) and Internet of Things (IoT)

- Deep Learning and Neuromorphic computing

- Reinforcement Learning

- Robotics and Computer Vision

- Natural Language Processing

- Collaborative Systems, Crowdsourcing and human computation

- Algorithmic Game Theory and Computational Social Science

# O Que é IA?

https://youtu.be/kWmX3pd1f10

https://www.youtube.com/watch?v=WFR3lOm_xhE

https://youtu.be/lLBCUZAG4KE?list=PLpoIPNlF8P2PFPZFhYVaUsZrIxcQr6Bhx

https://youtu.be/5J5bDQHQR1g