

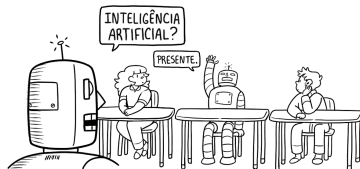
# *Inteligência Artificial, 18-19*

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## Conteúdo

- Métodos baseados em busca ou procura:
  - ▶ básicos (largura, profundidade etc)
  - ▶ informados ( $A^*$ , guloso etc)
  - ▶ melhoramento iterativo (simulated annealing, algoritmos genéticos, hill-climbing etc)
  - ▶ satisfação de restrições
- Algoritmos para jogos (2 jogadores: min-max, alfa-beta)
- Representação do Conhecimento
- Geração de Planos
- Lidando com Incertezas (redes de crenças ou redes de Bayes)
- Aprendizagem de Máquina
  - ▶ não supervisionada (clustering, regras de associação etc)
  - ▶ supervisionada (classificação, regressão)

## *Bibliografia*

- *Artificial Intelligence: a Modern Approach*, by Stuart Russell and Peter Norvig, 3rd edition, Prentice Hall
- *Artificial Intelligence: a new synthesis*, by Nils Nilsson
- *Artificial Intelligence*, by Elaine Rich and Kevin Knight

## *Avaliação*

- testes (2): 13 de Abril e 1 de Junho
- trabalhos (obrigatórios), com dois momentos de entrega:
  - ▶ até a data marcada: máximo 100%
  - ▶ final do semestre: máximo 70%
- exame
- critérios de avaliação na unidade curricular

## *Meios de comunicação*

- favorito: email (ines@dcc.fc.up.pt) **não utilizem  
dutra@fc.up.pt**
- página da disciplina no Moodle

Página da disciplina:

<http://www.dcc.fc.up.pt/~ines/aulas/1819/IA/IA.html>

# *Introdução*

- IA (Inteligência Artificial): trata de comportamento inteligente
- Percepção, raciocínio, aprendizagem, comunicação e ação em ambientes complexos.

# *Introdução*

- Aplicações:
  - ▶ Processamento de Linguagem Natural
  - ▶ Recuperação de informações em BDs
  - ▶ Sistemas Especialistas
  - ▶ Prova de Teoremas
  - ▶ Robótica Inteligente
  - ▶ Programação Automática
  - ▶ Problemas Combinatoriais e de Escalonamento
  - ▶ Problemas de Percepção Visual
  - ▶ etc...

# Introdução

## Inteligência Artificial

- Além de estudar entidades inteligentes, tenta construí-las

|   |   |
|---|---|
| Sistema que <b>pensa</b><br>como o ser humano | Sistema que <b>pensa</b><br>racionalmente |
| Sistema que <b>age</b><br>como o ser humano   | Sistema que <b>age</b><br>racionalmente   |

- Linha 1: Raciocínio
- Linha 2: Comportamento
- Coluna 1: desempenho comparável ao humano
- Coluna 2: desempenho ideal de inteligência: racionalidade



## *Exemplo*

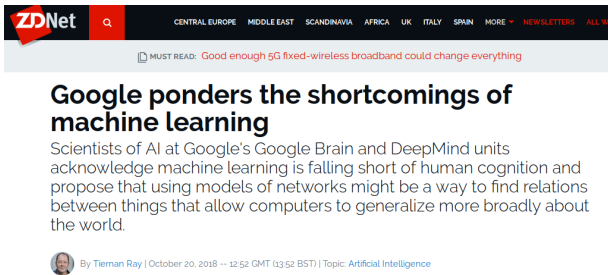
**The New York Times**

### ***Google's A.I. Program Rattles Chinese Go Master as It Wins Match***



The Chinese Go master Ke Jie during his second game against AlphaGo, an artificial intelligence program, in Wuzhen, near Shanghai, on Thursday. China Stringer Network, via Reuters

# Modelos de IA new sempre funcionam :(



The screenshot shows the ZDNet website header with navigation links for various regions: CENTRAL EUROPE, MIDDLE EAST, SCANDINAVIA, AFRICA, UK, ITALY, SPAIN, MORE, NEWSLETTERS, and ALL W. Below the header is a 'MUST READ' section with the headline 'Good enough 5G fixed-wireless broadband could change everything'. The main article title is 'Google ponders the shortcomings of machine learning'. The article text states: 'Scientists of AI at Google's Google Brain and DeepMind units acknowledge machine learning is falling short of human cognition and propose that using models of networks might be a way to find relations between things that allow computers to generalize more broadly about the world.' The author is identified as Tiernan Ray, with a date of October 20, 2018, and a topic of Artificial Intelligence.


**ZDNet**

CENTRAL EUROPE MIDDLE EAST SCANDINAVIA AFRICA UK ITALY SPAIN MORE NEWSLETTERS ALL W

**MUST READ:** Good enough 5G fixed-wireless broadband could change everything

## Google ponders the shortcomings of machine learning

Scientists of AI at Google's Google Brain and DeepMind units acknowledge machine learning is falling short of human cognition and propose that using models of networks might be a way to find relations between things that allow computers to generalize more broadly about the world.

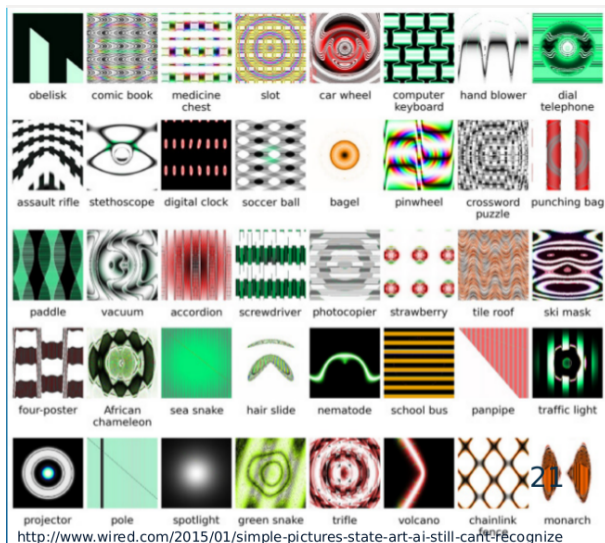
 By [Tiernan Ray](#) | October 20, 2018 -- 12:52 GMT (13:52 BST) | Topic: [Artificial Intelligence](#)

## *Modelos de IA new sempre funcionam :(*

“The research acknowledges that current **deep learning** approaches to AI have failed to achieve the ability to even approach human cognitive skills. Without dumping all that’s been achieved with things such as convolutional neural networks, or CNNs, the shining success of machine learning, they propose ways to impart broader reasoning skills.”

“...they argue for ”blending powerful deep learning approaches with structured representations...”

# Modelos de IA nem sempre funcionam :(



## *Exemplo: Robótica*



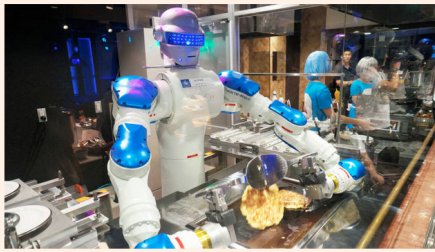
AT ROBOT RESTAURANT 20 ROBOTS DELIVER FOOD TO THE TABLE, COOK DUMPLINGS AND NOODLES, USHER DINERS AND ENTERTAIN THEM IN HARBIN, HEILONGJIANG PROVINCE IN CHINA.

## *Exemplo: Robótica*

Artificial Intelligence and Robotics

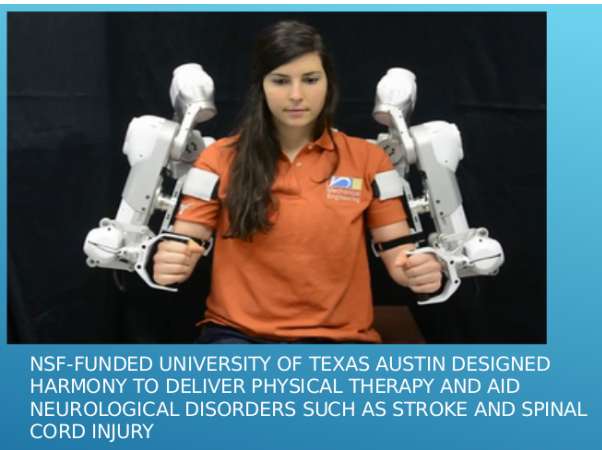
### Japan's robot chefs aim to show how far automation can go

Machines replacing humans in country's hospitality sector to meet staff shortfalls



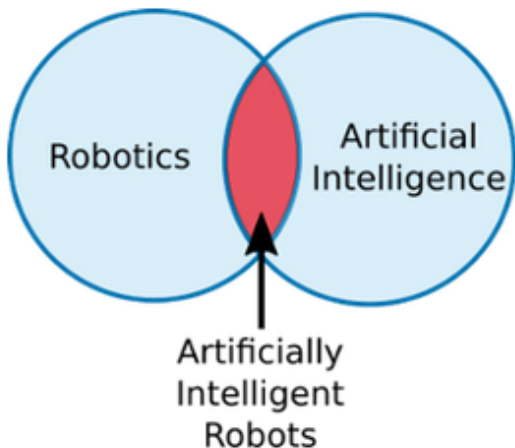
Head chef: robot Andrew flips a pancake in the Henni-na restaurant at the Huis Ten Bosch amusement park in Sasebo, Nagasaki  
© The Asahi Shimbun/Getty Images

## *Exemplo: Robótica*



## *IA x Robótica*

São duas áreas diferentes!



<https://blog.robotiq.com/whats-the-difference-between-robotics-and-artificial-intelligence>