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Uporaba umetne inteligence

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Mreža znanja 2020, 25. in 26. november

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Naložbo sofinancirata Republika Slovenija in Evropska unija iz Evropskega sklada za regionalni razvoj

Uspehi in pozornost

China's First AI Fund Learned From the Country's Best Traders - Bloomberg - Mozilla Firefox

Technology

China's First AI Fund Learned From the Country's Best Traders

Bloomberg News
July 24, 2019, 11:00 PM GMT+2

- Zheshang joins Bridgewater, Man in using machine learning
- Fund outperformed benchmark in trial run as China stocks rose

AI Helps Seismologists Predict Earthquakes | WIRED - Mozilla Firefox

AI Helps Seismologists Predict Earthquakes

Machine learning is bringing seismologists closer to an elusive goal: forecasting quakes well before they strike.

Remnants of a 2,000-year-old spruce forest on Neskowin Beach, Oregon — one of dozens of the Oregon and Washington coast. It's thought that a mega-earthquake of the Cascadia subd the trees, and that the stumps were then buried by tsunami debris. PHOTOGRAPH: RACE CREATIVE

Minecraft players to be helped by AI assistant - BBC News - Mozilla Firefox

Technology

Minecraft players to be helped by AI assistant

2 September 2019

The assistant could carry out some of the more repetitive tasks that playing Minecraft demands

Tired of digging all those blocks in Minecraft? Help could be at hand from an artificial intelligence assistant that can dig and build on command.

Crowdsourced AI learns to target lung tumors for radiation - Reuters - Mozilla Firefox

HEALTH NEWS APRIL 18, 2019 / 11:27 PM / 6 MONTHS AGO

Crowdsourced AI learns to target lung tumors for radiation

Linda Carroll

5 MIN READ

(Reuters Health) - In many parts of the world there are not enough radiation oncologists to design and deliver radiation treatments for lung cancer patients, but that gap could one day be filled with the help of artificial intelligence, researchers suggest in a new study.

In a novel approach to the problem, the authors turned to crowdsourcing to help them develop a computer algorithm that would take over some of the duties of an experienced radiation oncologist

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Definicija

- Odvisno na kaj ciljamo
    - Modeliramo ljudi ali racionalne agente?
    - Je bolj važno kako “razmišlja” ali kako se “obnaša”?

- Specifične naloge ↔ Prilagodljivost, kontekst

- Avtomatizacija aktivnosti ki jih povezujemo s človeško inteligenco (učenje, odločanje, ...) na način, ki omogoča strojem da se obnašajo kot ljudje ali kot racionalni agenti (optimalno v dani situaciji).

  ~[Bellman, 1978;

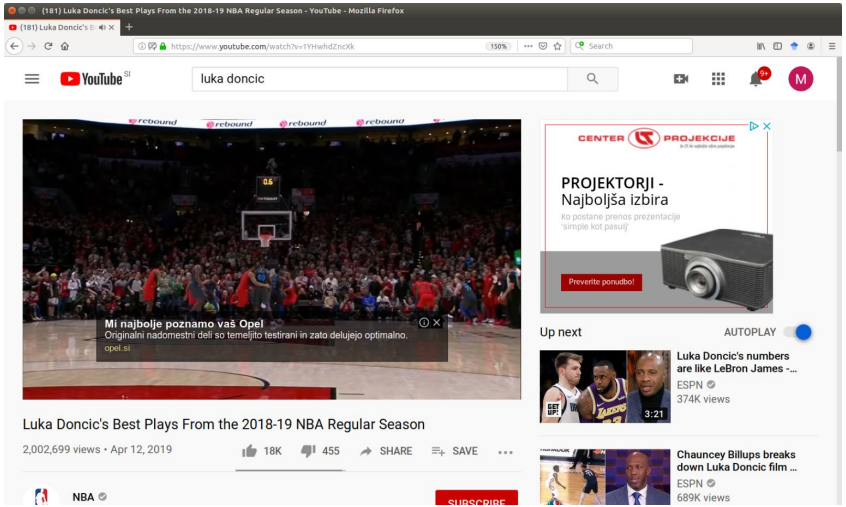
  Russel & Norvig, 2010]

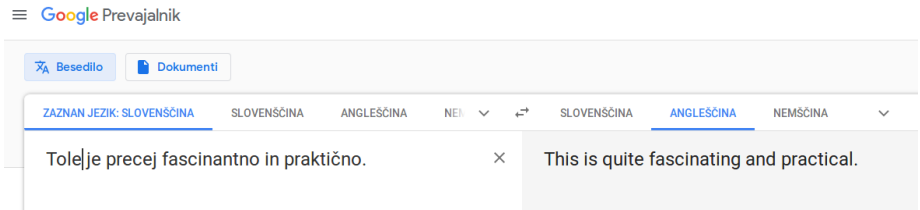
Pogled v zgodovino

- 1950 : A. Turing - "Computing Machinery and Intelligence" (Turingov test)
- 1956 - 1974 : Zlata leta (avtomatski mat. dokazi, ELIZA, optimizem, financiranje)
- 1974 - 1980 : Prva zima UI (kritična poročila, omejitve, razočaranje)
- 1980 - 1987 : Ponoven zagon (uspeh ekspertnih sistemov, Cyc, ...)
- 1987 - 1993 : Druga zima UI (drago vzdrževanje, napake, ponovno razočaranje)
- 1993 - 2010 : “Prikrito” delo in uspehi
- 1997 : IBM Deep Blue premaga prvaka (Garry Kasparov) v šahu
- 2005 : Samovozeče vozilo zaključi DARPA Grand Challenge (> 200km)
- 2011 : IBM Watson zmaga v kvizu Jeopardy
- 2011 → : Sedanji zagon (uspeh strojnega učenja, nevronskih mrež, ogromno podatkov in procesne moči)
- 2015 : Google DeepMindov AlphaGo premaga prvaka (Ke Jie) v igri Go

Stanje

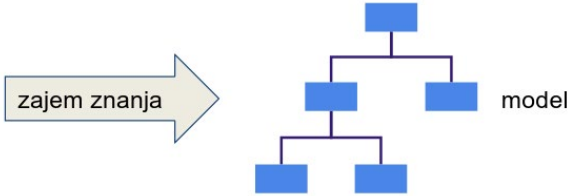
- Ogromne količine podatkov
  in velike računske zmogljivosti
- Uspeh v industriji
  - Sistemi priporočanja
  - Ciljno oglaševanje
  - Zaznavanje napak, goljufij
  - Napovedovanje prodaje
  - Strojno prevajanje, telefonski roboti





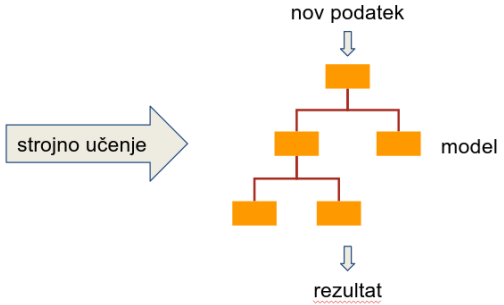
- Zanimivo za javnost
  - Razpoznavanje slik, govora
  - Generiranje: simulacija stila, ponaredki na osnovi globokih nev. m. (deep fakes),..

Metodologija



- Preiskovalni algoritmi, logika
- Ekspertni sistemi
  - Predstavitev znanja, mehanizmi sklepanja
- Strojno učenje
  - Nadzorovano
  - Nenadzorovano
  - Algoritmi
    - odl. drevesa
    - SVM
    - nevronske m.
    - ...

sladica	...	vreme	dan	kuhar	**vege**
2		dež	tor	A	+
6		sonce	čet	B	-
3		sonce	pet	B	+
1		dež	pet	B	+
8		sonce	sob	A	-
8		dež	pet	C	+
2		dež	ned	B	-
...	...	...	...	...	...



  - Ekspresivnost ↔ Zahteve po podatkih, pretirano prileganje
  - “Črne škatle” ↔ Transparentni modeli

Običajni razlogi za težave

- Slabo definirani problemi, zgrešeni cilji
- Podatki
  - Premalo
  - Nekvalitetni
  - Neuravnoteženi
  - Nereprezentativni
  - Brez ključnih atributov

sladica	...	vreme	dan	kuhar	**vege**
2		dež	tor	A	+
6		sonce	čet	B	-
3		sonce	pet	B	+
1		dež	pet	B	+
8		sonce	sob	A	-
8		dež	pet	C	+
2		dež	ned	B	-
...	...	...	...	...	...

- Pomen razumljivosti
  - Navidezno ali slučajno “delovanje”
  - Modeliranje nečesa drugega
    - recimo ozadja slik

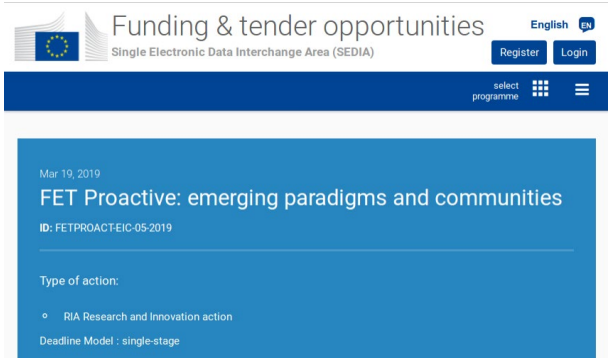
Razložljiva umetna inteligenca

- Odgovoriti ne le kaj, ampak tudi zakaj
  - Razumevanje dejavnikov, ki so vplivali na odločitev/rezultat
  - V izogib napakam in nezaupanju
- EU ne spi v zvezi s tem

Article 22 – Automated individual decision-making, including profiling

1. The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.

2. → *...and then exceptions and limitations...*



- ! Modeli odražajo podatke: zasebnost, neprijetna dejstva...

Poanti

- Umetna inteligenca je pristop, ki lahko nudi izjemne rezultate ob pravilni uporabi, kar pa ni samo po sebi umevno.

- I ≠ UI
  - Obe sta izjemni
  - Obe imata prednosti in slabosti
  - Običajno se najbolje obneseta v sodelovanju

Hvala za pozornost

martin.znidarsic@ijs.si

Martin Žnidaršič, Odsek za tehnologije znanja, Institut Jožef Stefan

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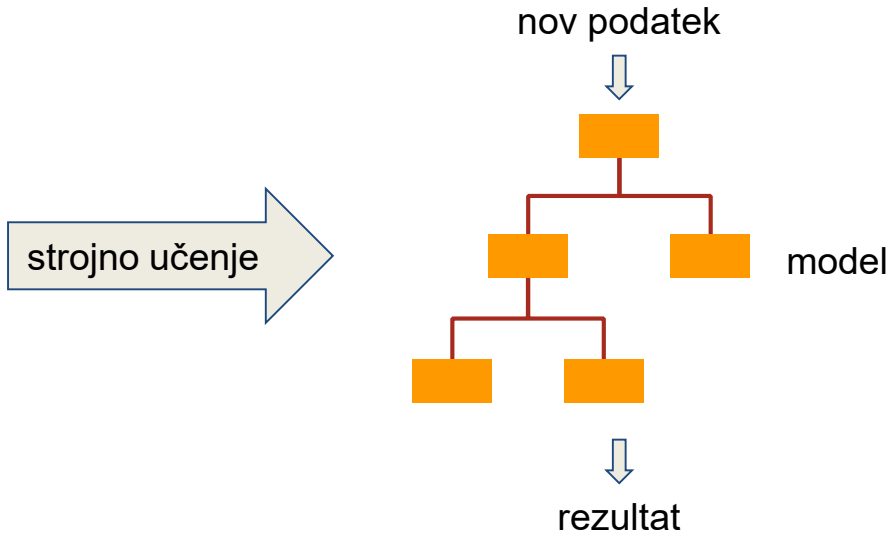
Zunanji viri materialov: slika ekspertov - “Designed by macrovector / Freepik; slika zemljevida ZK - “Designed by Freepik”

Primer

sladica	...	vreme	dan	kuhar	**vege**
2		dež	tor	A	+
6		sonce	čet	B	-
3		sonce	pet	B	+
1		dež	pet	B	+
8		sonce	sob	A	-
8		dež	pet	C	+
2		dež	ned	B	-
...	...	...	...	...	...



Ekspertni model

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Umetnost inteligence

Filip Muki Dobranić, Danes je nov dan
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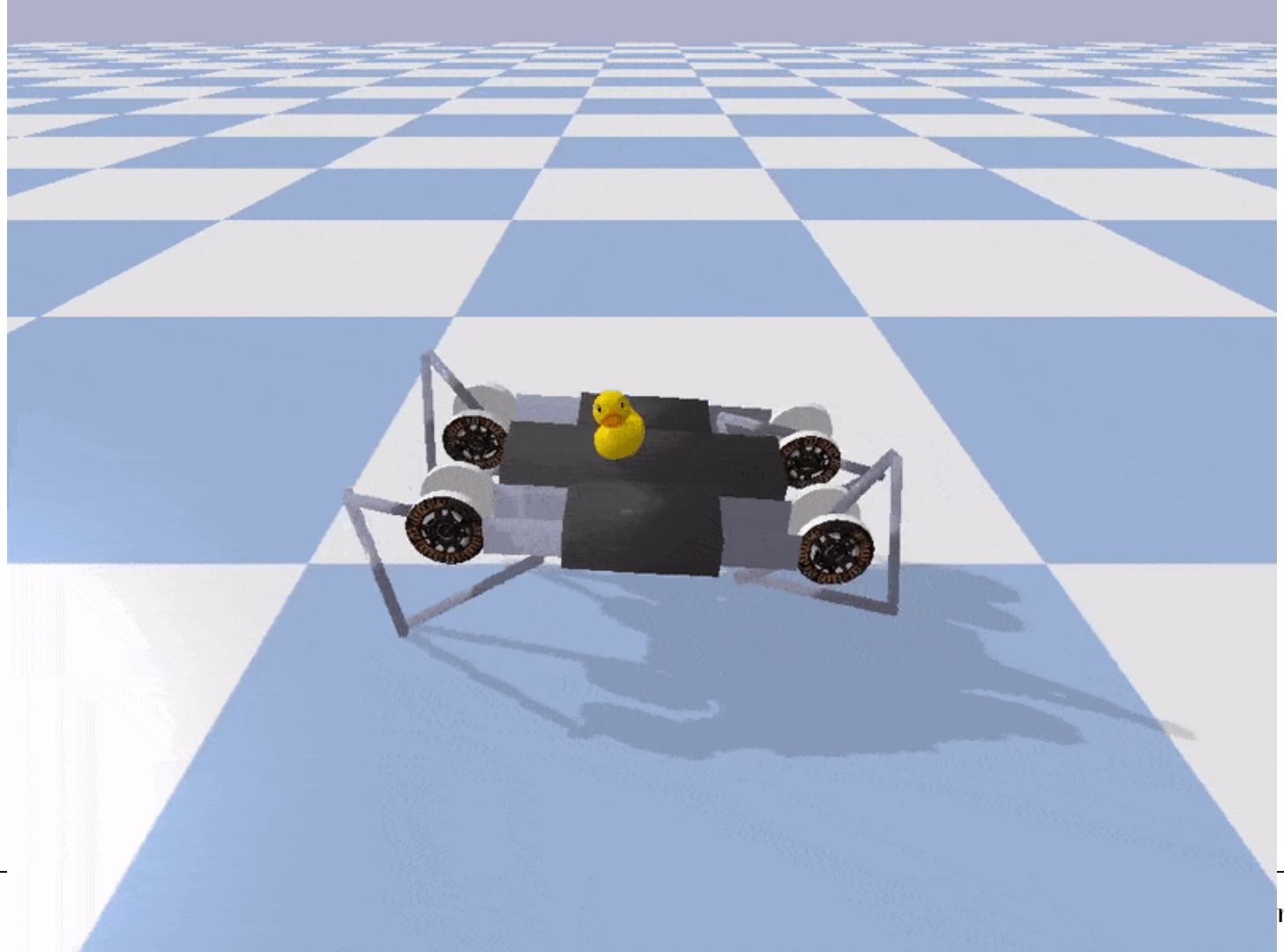
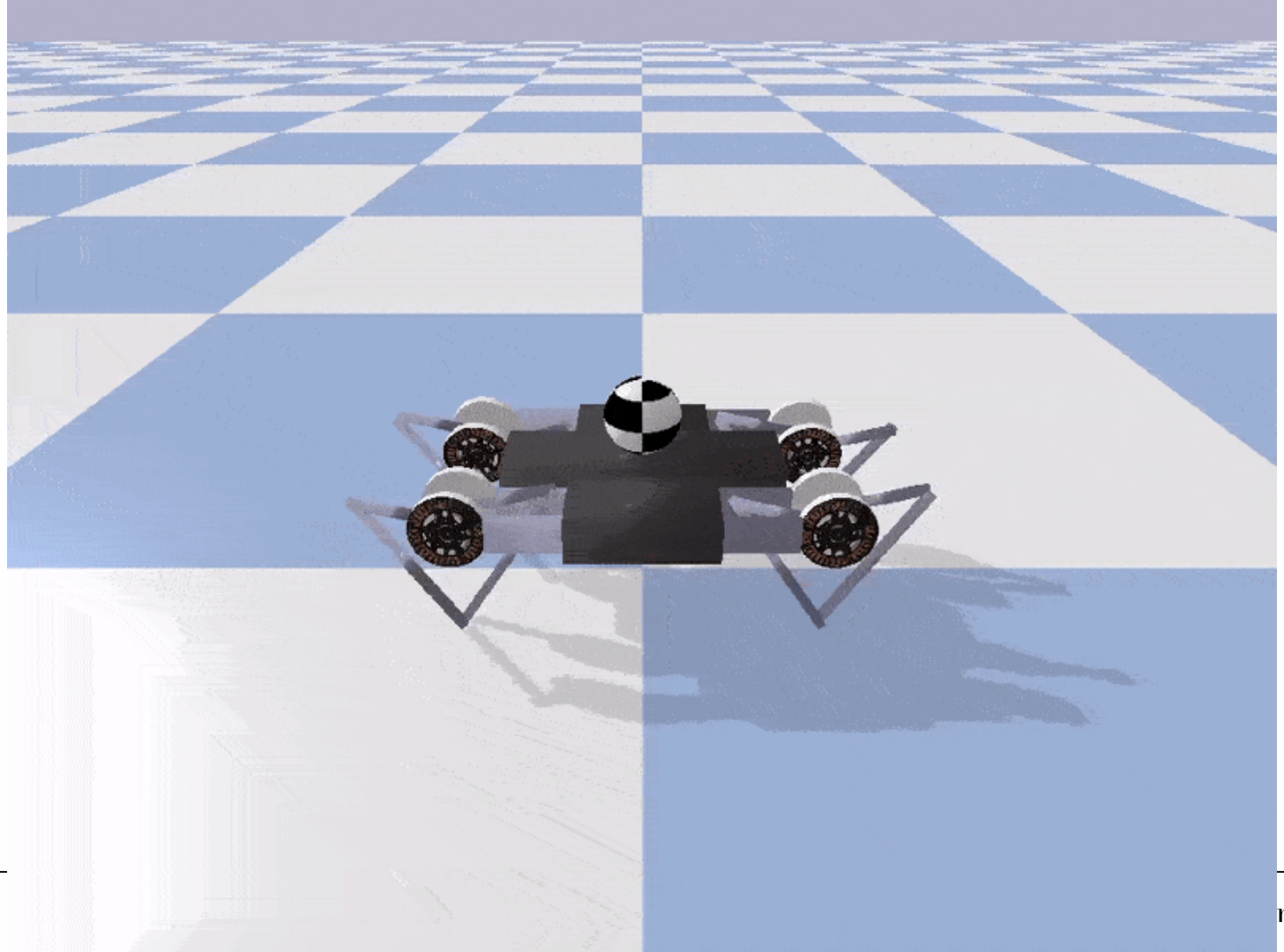
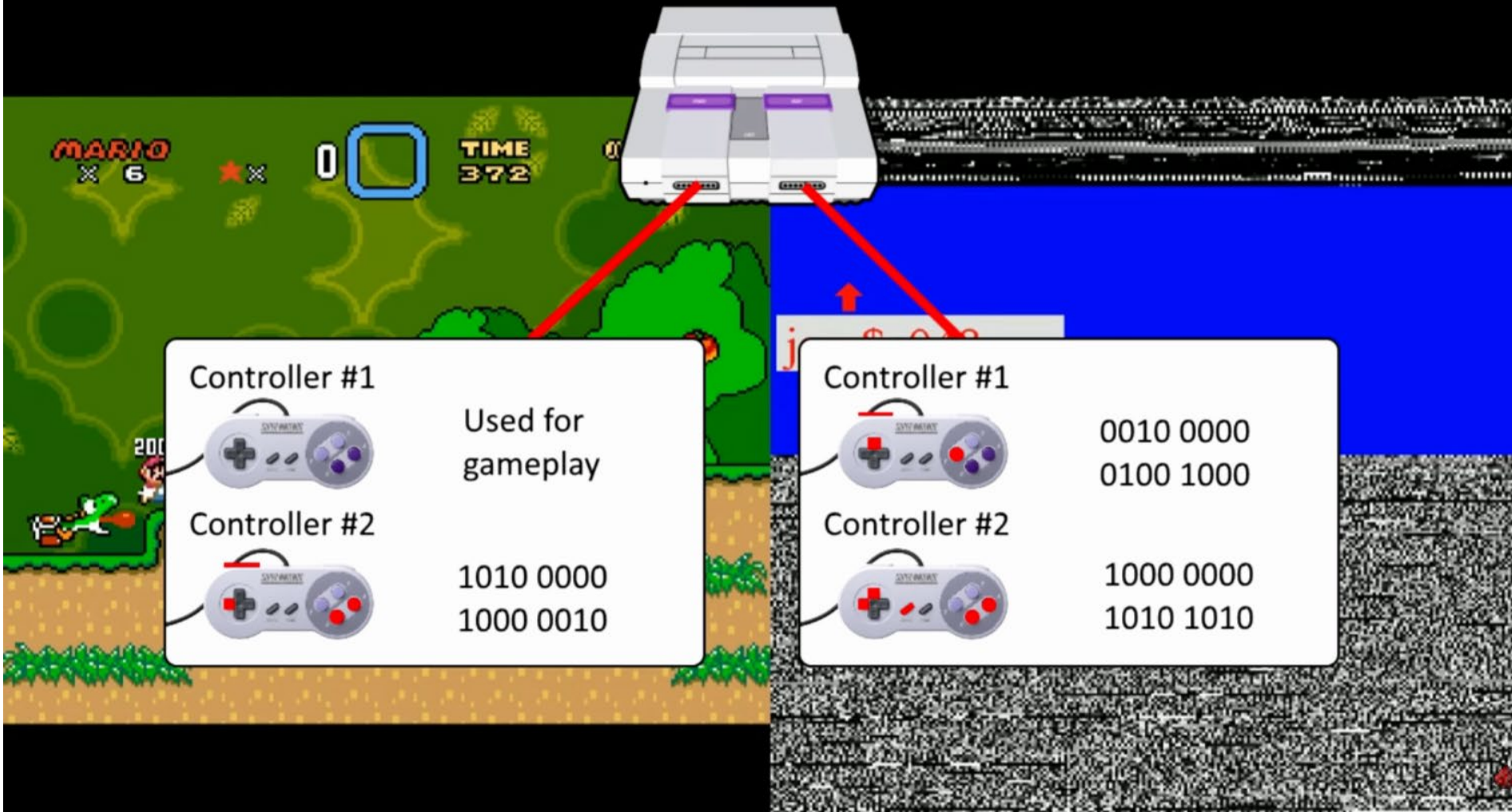
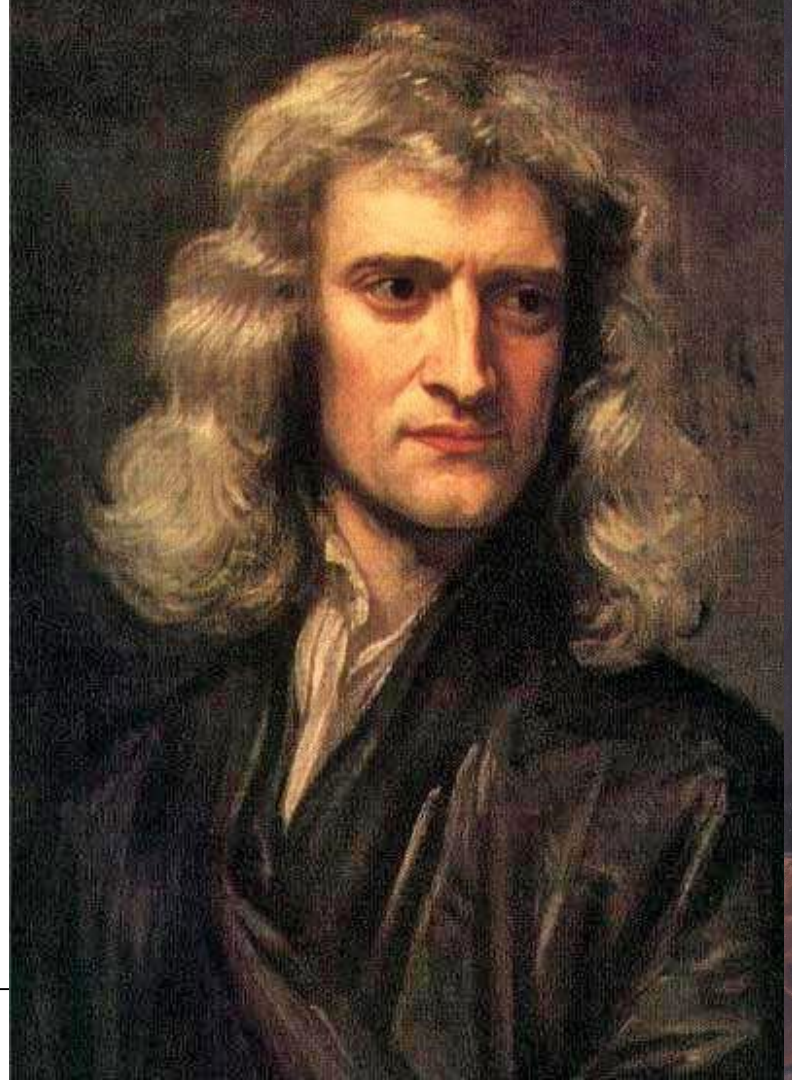
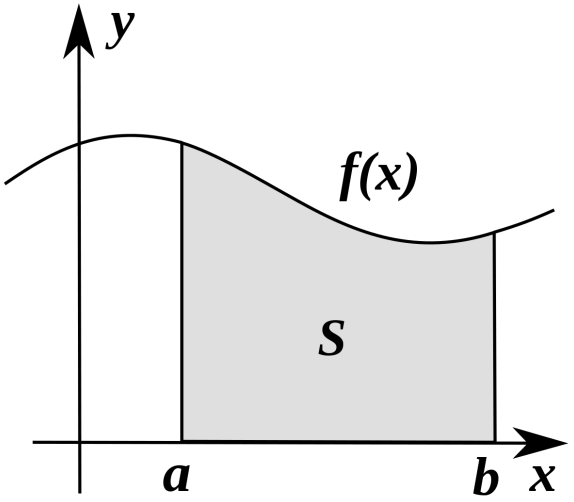
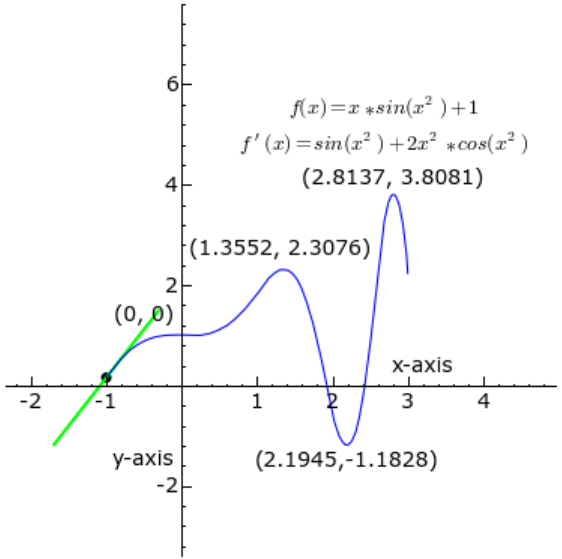





MARIO
× 6
TIME
372
Controller #1
Used for
gameplay
Controller #2
1010 0000
1000 0010
Controller #1
0010 0000
0100 1000
Controller #2
1000 0000
1010 1010




y
f(x)
S
a
b
x


$f(x)=x*sin(x^2)+1$
$f'(x)=sin(x^2)+2x^2*cos(x^2)$
(2.8137, 3.8081)
(1.3552, 2.3076)
(0, 0)
x-axis
y-axis
(2.1945,-1.1828)
6
4
2
-2
-2
-1
1
2
3
4

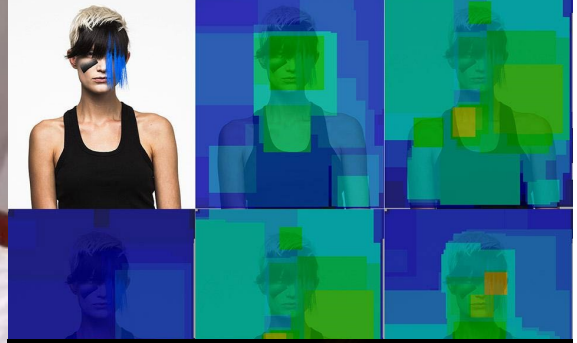
Kaj je umetnointeligenčna pismenost?

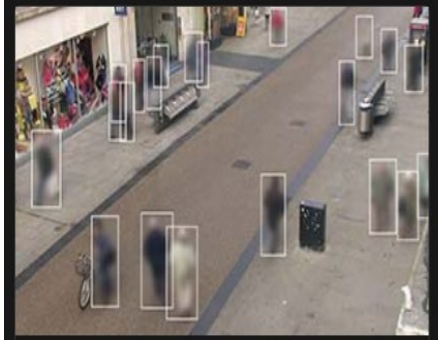
```
Questions Q: What is love?
 A: love
 Q: How do you know if someone has a disease?
 A: look at them
 Q: When does the disease begin?
 A: when they are born
```

Custard Smingleigh
@Smingleigh

I hooked a neural network up to my Roomba. I wanted it to learn to navigate without bumping into things, so I set up a reward scheme to encourage speed and discourage hitting the bumper sensors.

It learnt to drive backwards, because there are no bumpers on the back.

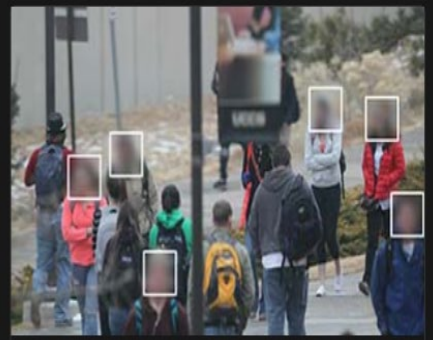




Oxford Town Centre Dataset

2009

Person detection, gaze estimation



UnConstrained College Students Dataset

2016

Face recognition, face detection

djnd.si/bxcg

filip@djnd.si