UNIVERSITATEA BABEŞ-BOLYAI
Facultatea de Matematică şi Informatică

INTELIGENȚĂ ARTIFICIALĂ

Studenti InfoRom2
si
Sara Boancă, Alexandru Manole, Sergiu Limboi, Ioan-Daniel Pop, Mihai Nadăș, Bogdan Mursa, Laura Dioșan

Sumar

- Locaţie şi cadre didactice
- Obiective
- Probleme administrative
- Resurse web şi bibliografie

Locație și cadre didactice

- Locaţie curs
  - ?
- Orar
  - https://www.cs.ubbcluj.ro/files/orar/2024-2/disc/MLR5029.html
- Materiale utile
  - https://github.com/lauradiosan/AI-UBB

- Cadre didactice
  - Laura Dioşan (curs, lab)
  - Sara Boancă (lab)
  - Alexandru Manole (lab)
  - Sergiu Limboi (lab)
  - Mihai Nadăș (lab)
  - Bogdan Mursa (lab)

Level 0 – cineva iti face pofta!!!

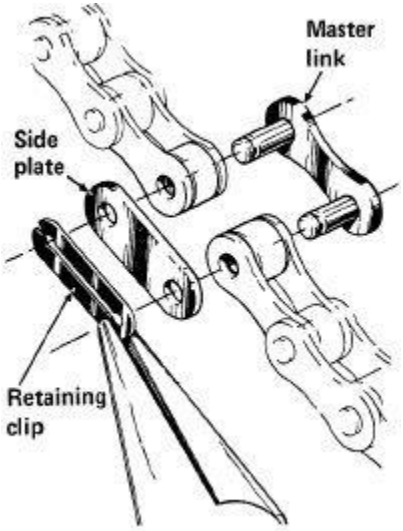
Level 1 – baby steps

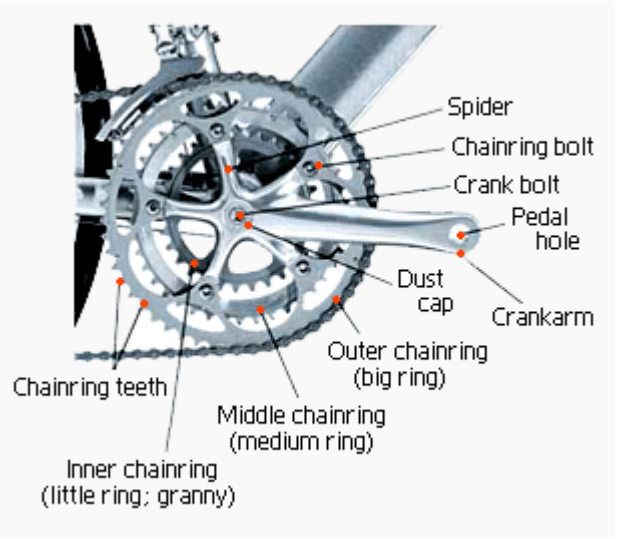
All levels – keep training!!!

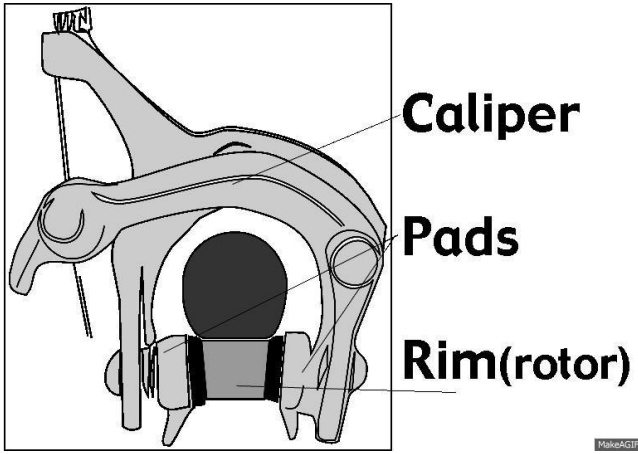
Level 2 – sometimes you need help

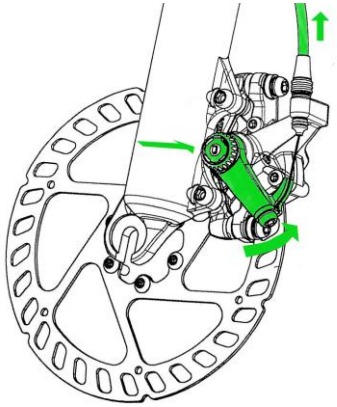
Level 3 – happy kids!

Next levels


Master link
Side plate
Retaining clip


Spider
Chainring bolt
Crank bolt
Pedal hole
Dust cap
Crankarm
Outer chainring (big ring)
Chainring teeth
Middle chainring (medium ring)
Inner chainring (little ring; granny)


Caliper
Pads
Rim(rotor)



Obiective

- Rezolvarea problemelor reale cu metode inteligente
  - Înţelegerea problemei şi a problematicii ştiinţifice
  - Utilizarea (adaptarea) unei metode inteligente pentru rezolvarea problemei
- Prezentarea activităţii desfăşurate pentru rezolvarea unei probleme
  - Rezolvări de probleme prin dezvoltarea şi proiectarea unor aplicaţii complexe
    - Limbaje de programare folosite – oricare ☺

Scop

- A înţelege în ce constă IA
  - Scop
  - Abilităţi
  - Metodologie
  - Algoritmi
  - Aplicativitate

- A acumula informaţii despre metode noi de rezolvare a problemelor prin:
  - dezvoltarea de aplicaţii/maşini inteligente
  - introducerea conceptelor şi tehnicilor de bază din IA
  - înţelegerea problemelor şi a dificultăţilor întâlnite în rezolvarea lor
  - cunoaşterea avantajelor şi dezavantajelor unei anumite tehnici de rezolvare a problemelor
  - exprimarea unor opinii critice asupra ceea ce IA poate să facă

Cerințe preliminare

- Familiarizaţi cu dezvoltarea algoritmilor necesari rezolvării unei probleme
  - Specificare
  - Proiectare
  - Structuri de date şi implementare
  - Complexităţi
- Familiarizaţi cu programarea :D

TO DO-uri

- Participarea activă şi “pregătită” la activităţile didactice (curs, laborator)
- Adresarea unor întrebări pertinente
- Formularea unor răspunsuri clare și precise
- Va rog nu dormiţi în timpul orelor ☺
- Efectuarea temelor în termenele specificate

Câteva momente importante

- 1943 - Warren McCulloch & Walter Pitts
- 1945 - von Neumann model & Touring test

Bulletin of Mathematical Biology Vol. 52, No. 1/2, pp. 99–115, 1990.
Printed in Great Britain.

0092–8240/90$3.00 + 0.00
Pergamon Press plc
Society for Mathematical Biology

A LOGICAL CALCULUS OF THE IDEAS IMMANENT IN NERVOUS ACTIVITY*

WARREN S. MCCULLOCH AND WALTER PITTS
University of Illinois, College of Medicine,
Department of Psychiatry at the Illinois Neuropsychiatric Institute,
University of Chicago, Chicago, U.S.A.

Because of the "all-or-none" character of nervous activity, neural events and the relations among them can be treated by means of propositional logic. It is found that the behavior of every net can be described in these terms, with the addition of more complicated logical means for nets containing circles; and that for any logical expression satisfying certain conditions, one can find a net behaving in the fashion it describes. It is shown that many particular choices among possible neurophysiological assumptions are equivalent, in the sense that for every net behaving under one assumption, there exists another net which behaves under the other and gives the same results, although perhaps not in the same time. Various applications of the calculus are discussed.

Jeremy Norman's
HistoryofInformation.com
Exploring the History of Information and Media through Timelines

Home Maps Tour Recent Addition

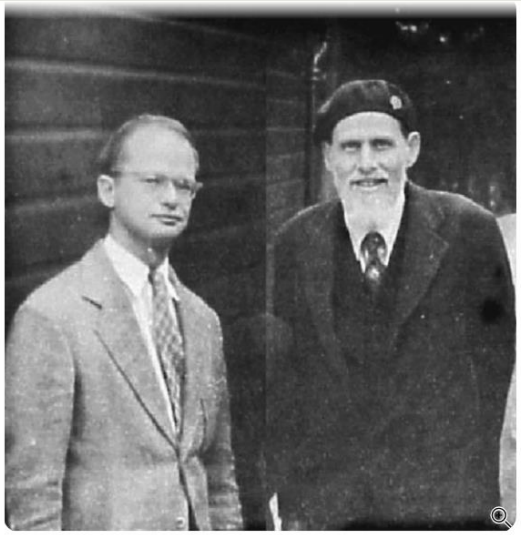


Image Source: www.semanticscholar.org

McCulloch (right) and Pitts (left) in 1949

In 1943 American neurophysiologist and cybernetician of the University of Illinois at Chicago Warren McCulloch and self-taught logician and cognitive psychologist Walter Pitts published "A Logical Calculus of the ideas Imminent in Nervous Activity," describing the "McCulloch - Pitts neuron", "the first mathematical model of a neural network.

Building on ideas in Alan Turing's "On Computable Numbers", McCulloch and Pitts's paper provided a way to describe brain functions in abstract terms, and showed that simple elements connected in a neural network can have immense computational power. The paper received little attention until its ideas were applied by John von Neumann, Norbert

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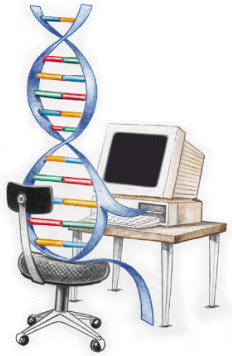
- 2004 – John Koza & Genetic Programming

Welcome to

`www.genetic-programming.org`

(a source of information about the field of genetic programming and the field of genetic and evolutionary computation)



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ABOUT

Navneet's cofounder & CEO of Matician, a startup building CV+ML+AI led truly autonomous robots that save people time & energy.

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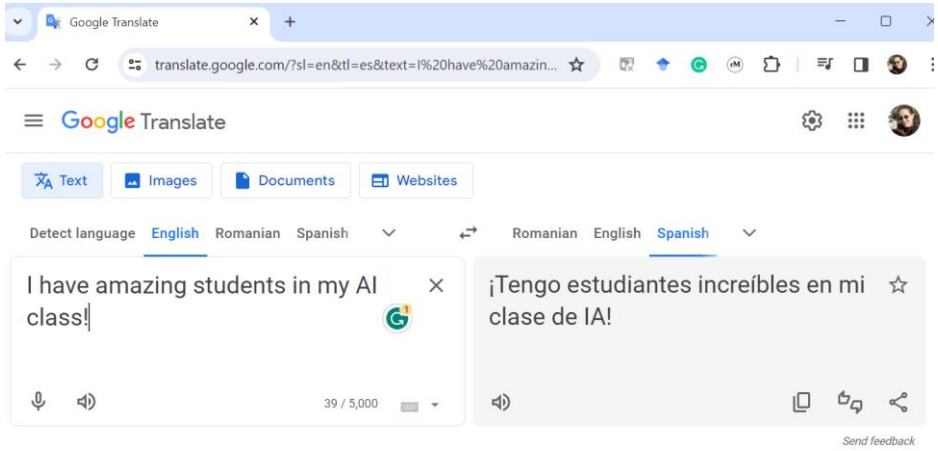

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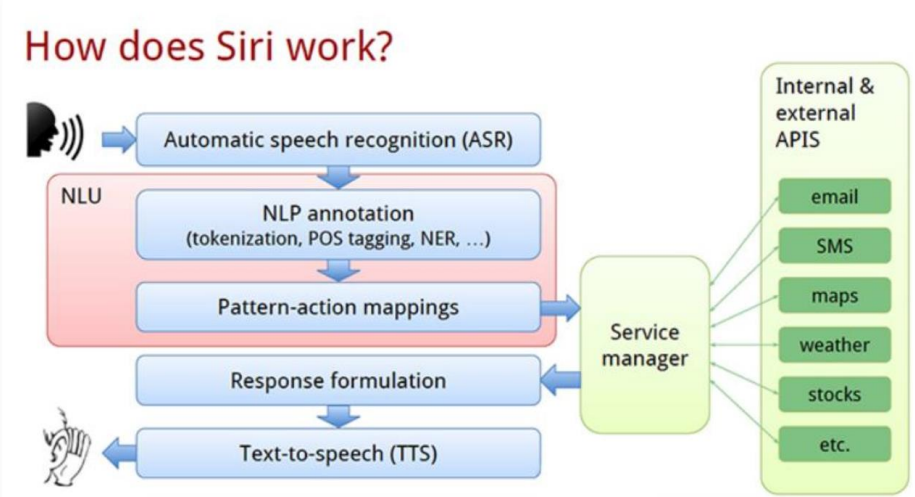
- 2006 – Google Translate
- 2011 – Siri ("beautiful victory")



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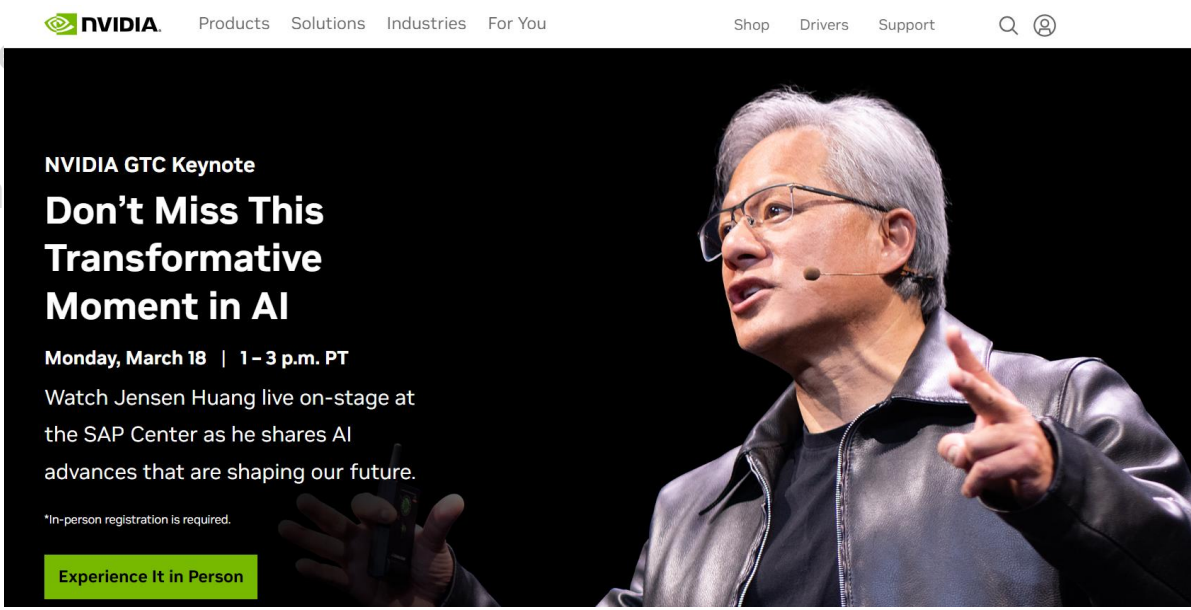

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- 2011 – Siri
- 2012 – GPU – Nvidia
- 2017 – Transformer Era
  - Iunie 2018 – GPT
  - Octombrie 2018 – BERT
  - Februarie 2019 – GPT-2
  - Octombrie 2019 - BART
  - Mai 2020 – GPT-3
  - 2023 – GPT-4, Gemini
  - 2024 – SORA (sky is the limit)

Attention Is All You Need

Ashish Vaswani* Google Brain avaswani@google.com
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Illia Polosukhin* ‡ illia.polosukhin@gmail.com

Auto-regressive Transformers

Auto-encoding Transformers

Sequnce-to-sequnce Transformers

Sa ne amintim si de

- Impactul asupra mediului

A ChatGPT query takes 100x more energy to execute than a Google Search query

Llama 2 (a ChatGPT-like model from Meta) training produced 539 metric tons of $C0_2$

Larger models use more energy during their deployment!

- please check https://mlco2.github.io/impact/#compute

Bibliografie

- https://github.com/lauradiosan/AI-UBB
- www.google.com