



Logic and Knowledge Representation

Perspectives of Artificial Intelligence?





Introduction

Concept of the session:

- Investigate current issues in A.I.
- Anticipate future issues in A.I.
- Discuss together!





Inspirational quote

Fearing a rise of killer robots is like worrying about overpopulation on Mars.

Andrew Ng



Outline

Image recognition

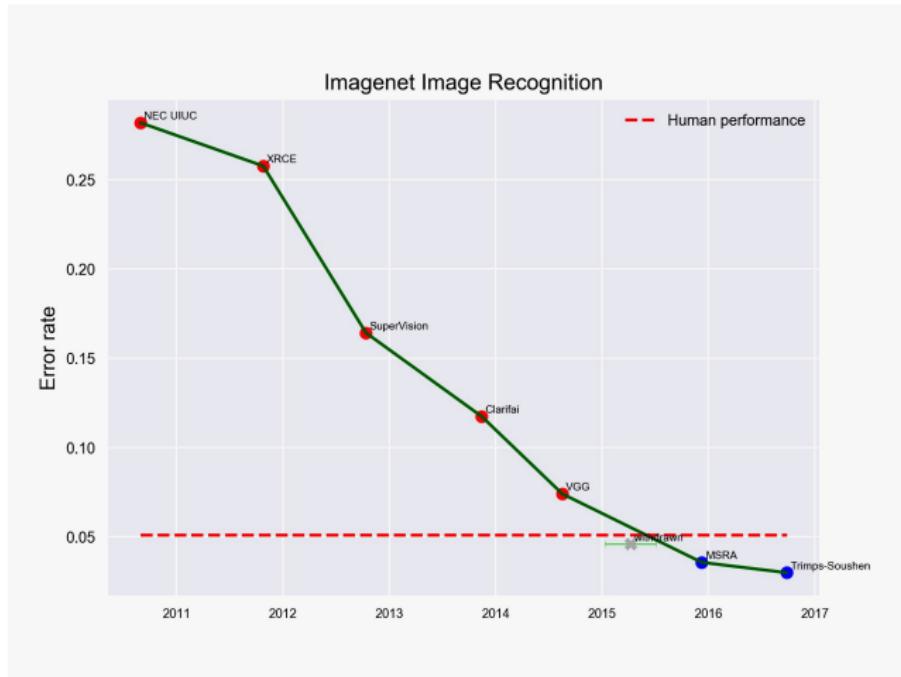
Concepts

Natural language processing

Learning?



Current performances





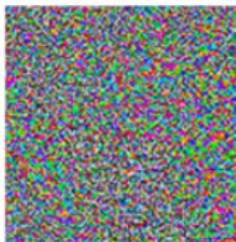
Fooling Deep Learning



"panda"

57.7% confidence

$+$



ϵ

=

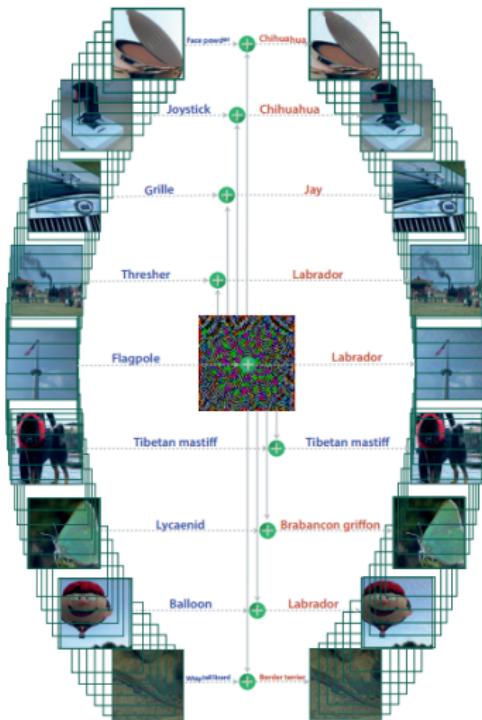


"gibbon"

99.3% confidence

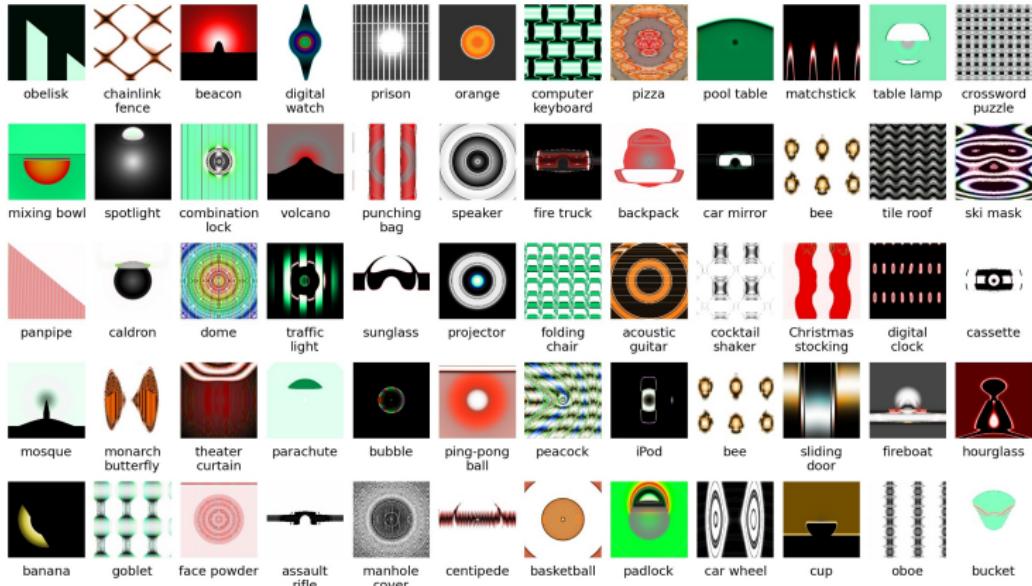


Fooling Deep Learning





High confidence classification





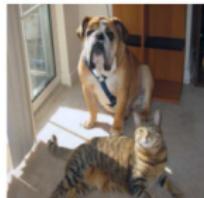
Explainable AI (XAI)

Can you justify your decision?





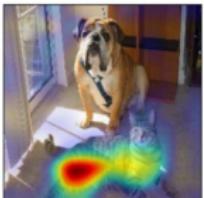
Explainable AI (XAI)



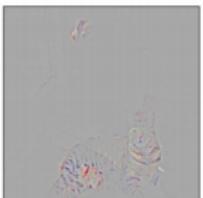
(a) Original Image



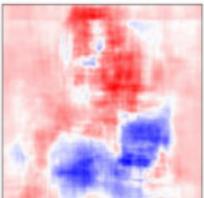
(b) Guided Backprop 'Cat'



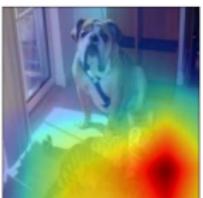
(c) Grad-CAM 'Cat'



(d) Guided Grad-CAM 'Cat'



(e) Occlusion map for 'Cat'



(f) ResNet Grad-CAM 'Cat'



(g) Original Image



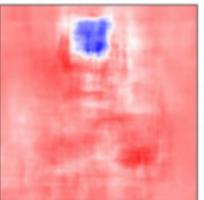
(h) Guided Backprop 'Dog'



(i) Grad-CAM 'Dog'



(j) Guided Grad-CAM 'Dog'



(k) Occlusion map for 'Dog'



(l) ResNet Grad-CAM + log





Understanding causality

I USED TO THINK
CORRELATION IMPLIED
CAUSATION.



THEN I TOOK A
STATISTICS CLASS.
NOW I DON'T.



SOUNDS LIKE THE
CLASS HELPED.
WELL, MAYBE.





Understanding causality



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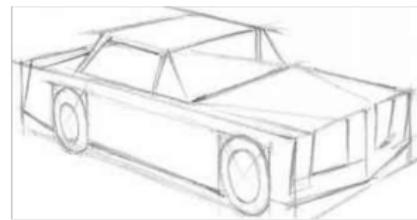


What is a car?





What is a car?



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Translation

The Shallowness of Google Translate

The program uses state-of-the-art AI techniques, but simple tests show that it's a long way from real understanding.

DOUGLAS HOFSTADTER | JAN 30, 2018 | TECHNOLOGY

In their house, everything comes in pairs. There's his car and her car, his towels and her towels, and his library and hers.

Dans leur maison, tout vient en paires. Il y a sa voiture et sa voiture, ses serviettes et ses serviettes, sa bibliothèque et les siennes.

Chez eux, ils ont tout en double. Il y a sa voiture à elle et sa voiture à lui, ses serviettes à elle et ses serviettes à lui, sa bibliothèque à elle et sa bibliothèque à lui.

I wouldn't want to leave readers with the impression that I believe intelligence and understanding to be forever inaccessible to computers. If in this essay I seem to come across sounding that way, it's because the technology I've been discussing makes no attempt to reproduce human intelligence.





Translation

Translating with statistics?

- A problem for rarest languages
- A problem for rarest motives





FINNISH FOR BEGINNERS

järki = reason, sense, intelligence

järjestää = organize

järjestelmä = organization

järjestelmällinen = organized

järjestelmällistyttää = organizationalize

epäjärjestelmällistyttää = unorganizationalize

epäjärjestelmällistyttämätön = having unreflectional attention to

antiunorganizationalize

epäjärjestelmällistyttämättömyys = unreflectional attention to
antiunorganizationalize

epäjärjestelmällistyttämättömyydyllä = with unreflectional attention
to antiunorganizationalize

epäjärjestelmällistyttämättömyydyllään = with his unreflectional
attention to antiunorganizationalize

epäjärjestelmällistyttämättömyydyllänkö = is it with his
unreflectional attention to antiunorganizationalize?

epäjärjestelmällistyttämättömyydyllänköhän = I wonder if it is
possible, with his unreflectional attention to
antiunorganizationalize?

epäjärjestelmällistyttämättömyydyllänköhänkäään? = I wonder if it
is possible, even with his unreflectional attention to
antiunorganizationalize?





The question of aspect

- Il dessine un cercle.
 - Il dessine des cercles.
-
- Il mange en une heure.
 - Il mange pendant une heure.
 - Il mange sa soupe pendant une heure.



Other issues

1. Interest
2. Humor
3. Metaphors
4. ...



Outline

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Concepts

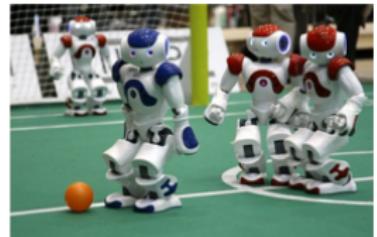
Natural language processing

Learning?



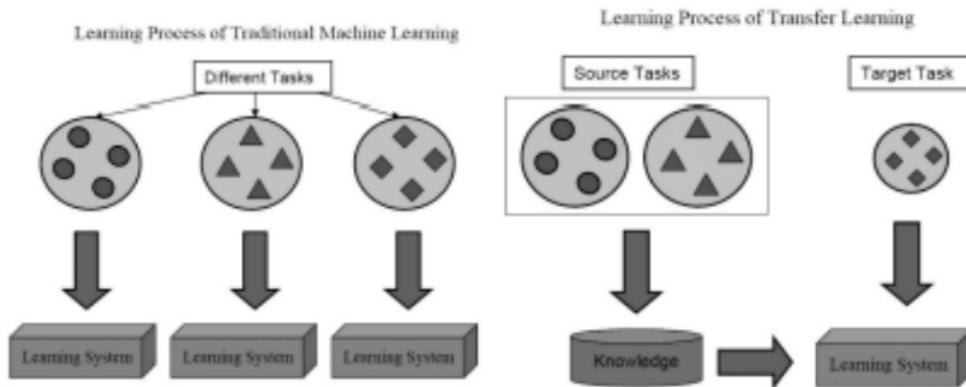


Mono-task systems



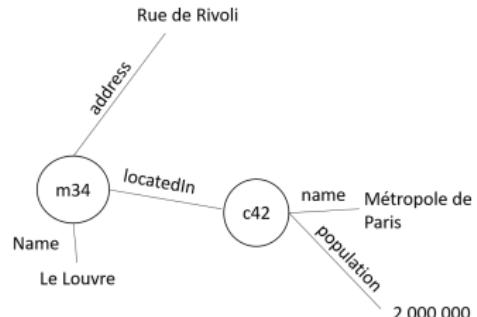
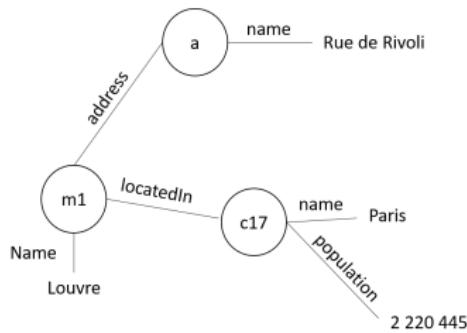


Learning to learn?





Multi-source





What to learn?





Curiosity

- What am I able to do?
- What am I not able to do?
- What could I learn easily?
- What would be of interest for me to learn?





Conclusion

What now?





References

-  David Lopez-Paz, Robert Nishihara, Soumith Chintala, Bernhard Schölkopf, and Léon Bottou, *Discovering causal signals in images*, 2017.
-  Seyed-Mohsen Moosavi-Dezfooli, Alhussein Fawzi, Omar Fawzi, and Pascal Frossard, *Universal adversarial perturbations*.
-  Ramprasaath R Selvaraju, Michael Cogswell, Abhishek Das, Ramakrishna Vedantam, Devi Parikh, and Dhruv Batra, *Grad-cam: Visual explanations from deep networks via gradient-based localization*.



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