



What AI cannot do (yet?)

<https://github.com/cmanovit/what-ai-cannot-do>



Disclaimer

- Speaker is not an AI expert.
- Personal bias applied.
- Not a comprehensive list.



Scope

- Software aspect only.
- Hardware aspect not considered.
 - Robotics
 - Unmanned vehicles



The rise of AI

- AI has been around for decades.
- Recent boosts:
 - GPUs (and TPUs)
 - Big data
 - Successful new techniques
 - Word2vec, Deep learning, etc.
 - Development tools and tutorials
 - TensorFlow, Microsoft CNTK, etc.
 - Popular applications
 - AlphaGo, self-driving car, virtual assistant, etc.

AI can't: Do magic

- Problem has to be computable.
- Classic non-computable Halting problem.
 - Given *any* computer program and *any* input, determine if the program will halt on that input.
 - Proof by contradiction.
 - Assume `halt(f, i)` exists, construct:

```
def g():  
    if halt(g, []):  
        loop_forever()
```
 - `halt(g, [])` can't be either true or false.

AI can't: Make sense of things

- AI can identify objects in pictures.
- But what it sees are just a bunch of numbers.



1.	grey whale	91.0%
2.	killer whale	7.5%
3.	great white shark	0.7%
4.	gar	0.4%

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1.	great white shark	66.7%
2.	baseball	7.4%
3.	grey whale	4.1%
4.	sombrero	3.2%



AI can't: Make sense of things

- AI can identify objects in pictures.
- But what it sees are just a bunch of numbers.
- What has a neural network actually learned?
 - AI looks for curtains on the floor, not on the windows.

[<https://www.theverge.com/2016/10/10/13224930/ai-deep-learning-limitations-drawbacks>]



AI can't: Think outside the box

- Literally and metaphorically.
- Always function as programmed.
- Think inside a big box with big data at best.
- AI can compose music, write code, etc. but can it write its own code and invent its own algorithms?
- Imply no free will.



AI can't: Self doubt

- False positives/negatives always exist.
- AI can give confidence scores.

[<https://www.technologyreview.com/s/609762/google-and-others-are-building-ai-systems-that-doubt-themselves/>]

- Still, AI doesn't know what it doesn't know.



Final words

- So many useful/powerful things AI can do.
- But be wary of grandiose claims. :-)



Quote

- “If a typical person can do a mental task with less than one second of thought, we can probably automate it using AI either now or in the near future.” – Andrew Ng