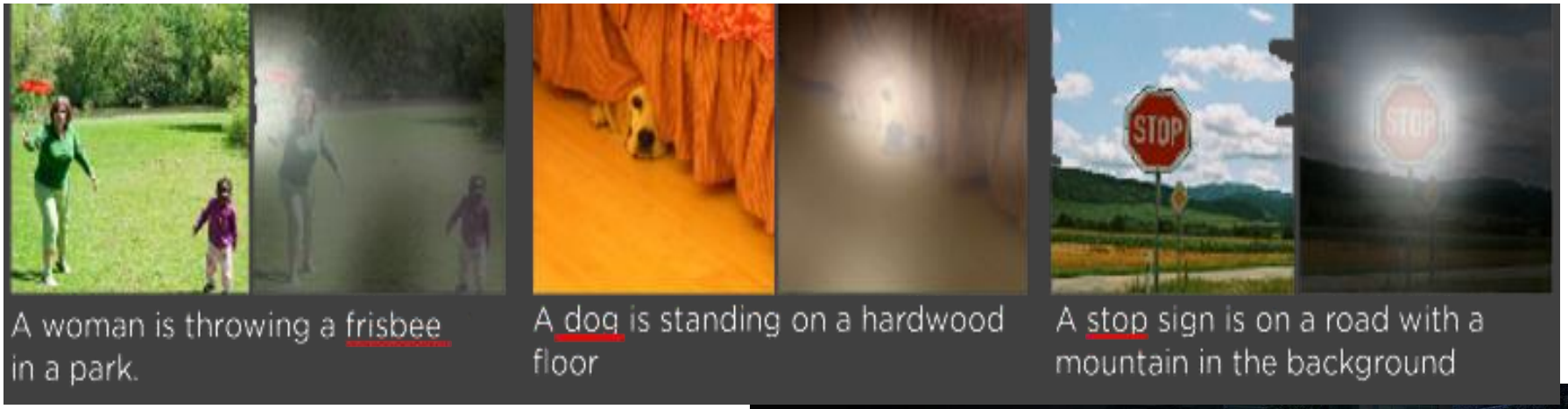
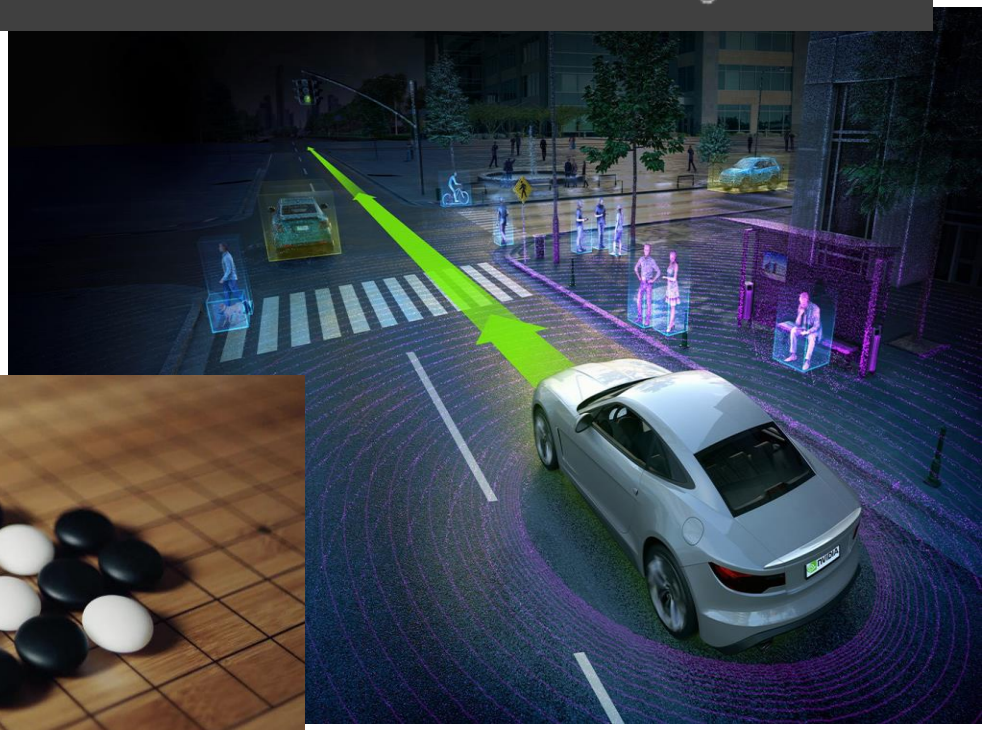
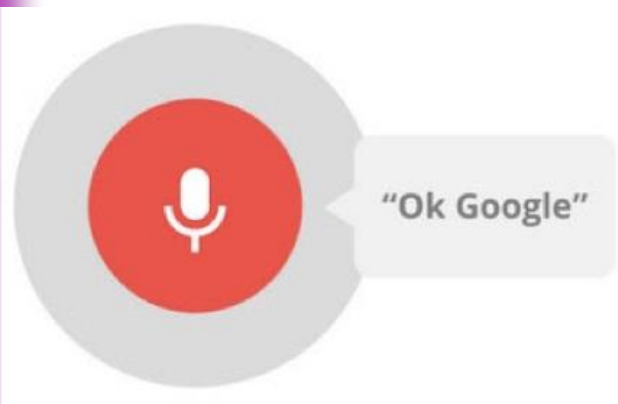
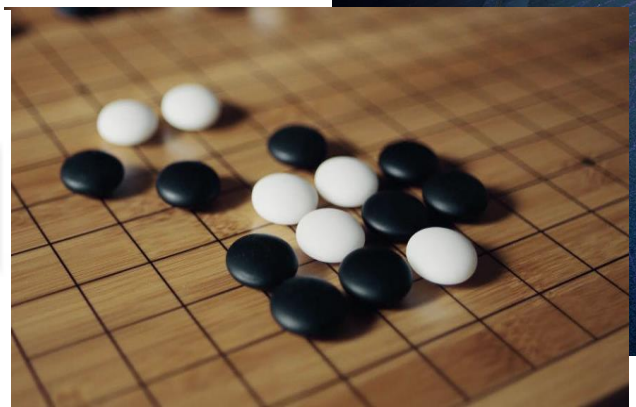
Deep Learning Breakthroughs



Computers have made huge strides in perception, manipulating language, playing games







A new revolution seems to be in the work after the industrial revolution.

And Deep Learning is at the epicenter of this revolution.

How deep learning could be used for medical applications

- Handle high-dimensional inputs which doctors do not have time to look at
  - Genome, mRNA expression levels
  - 3-dim images (e.g. brain scans) or videos (e.g. intestine)
- Handle patient history data
- Handle textual data (e.g. doctors' reports)
- Handle missing data and censored data
- Predict future outcomes or imitate doctors' decisions
- Estimate probabilities of future events
- BUT THERE MUST BE ENOUGH CASES

Challenges

- Collecting enough data, examples
- Data may be incompatible or inconsistent (different devices, hospitals, etc.)
- Confidentiality, anonymity, legal permission issues
- Knowledge gap between healthcare professionals and AI experts
- Incompatible value systems for publications
- Difficulty of interpreting the results of complex predictive models (high-order interactions between many variables) and yield causal conclusions

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