A4M33BIA: Exercise #4

ANN Assignments

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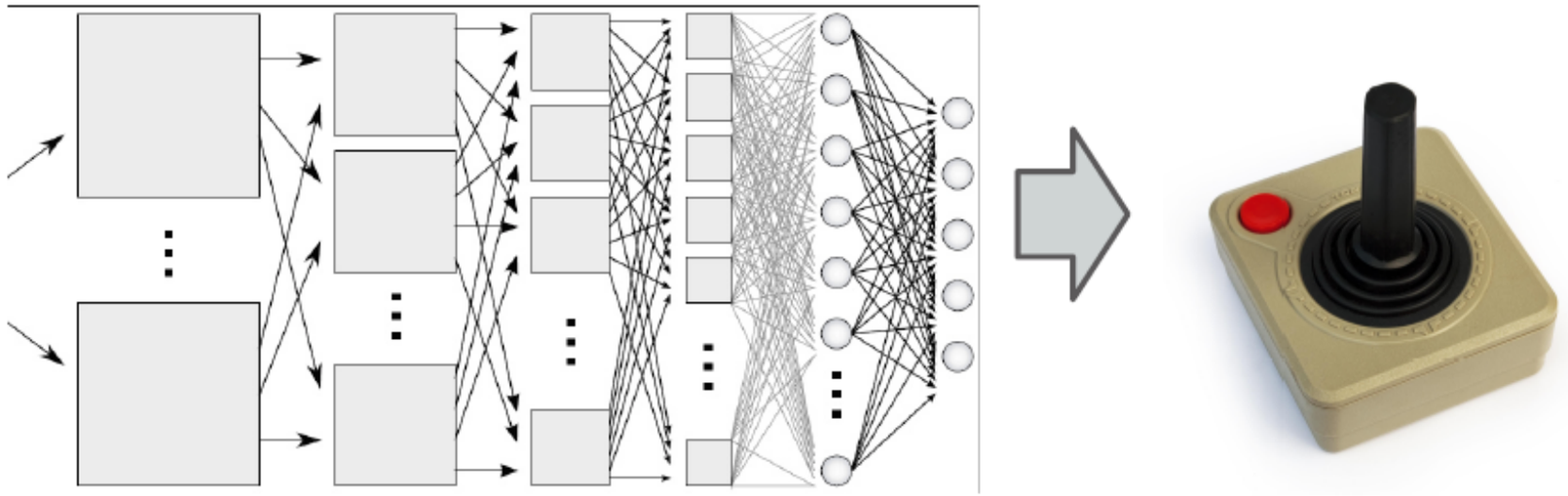
2014

Atari 2600 General Game Playing

- Is it possible to create general game controllers based strictly on visual input?
- Is it possible to make it fully automatic without human hand-selecting features?
- Stepping stone towards general AI...

GAME

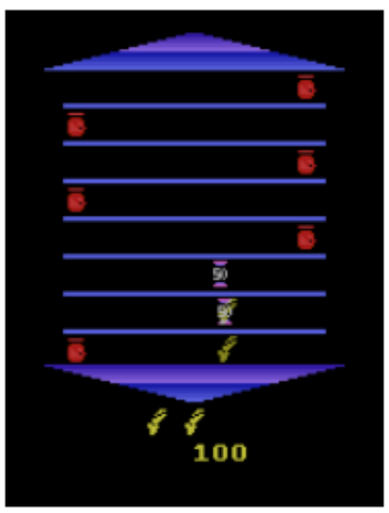
YOUR CONTROLLER

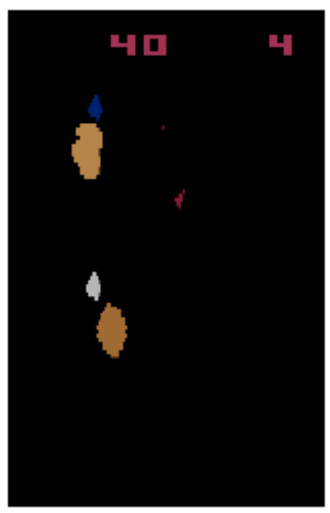


Images from http://www.ais.uni-bonn.de/deep_learning and Wikipedia

Atari 2600: Methods

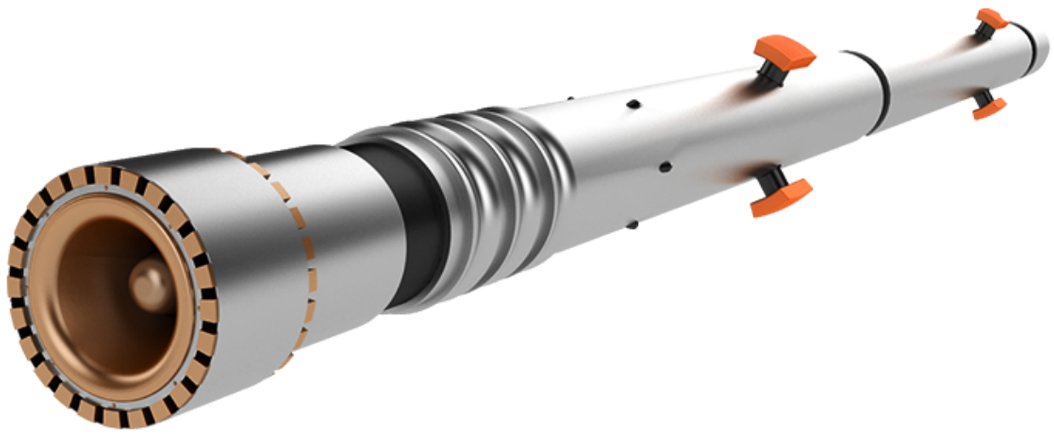
- Use Atari 2600 emulator with 50+ games (more coming...)
  http://www.arcadelearningenvironment.org/
- Learn huge neural network controllers using state-of-the-art methods: indirect encodings, convolutional networks, deep learning, LSTM
- Automatic processing of high-dimensional input data from the game screen
- Possible use of GPU computing (CUDA, OpenCL)
- Read the recent DeepMind paper...
  http://www.nature.com/articles/nature14236.epdf?referrer_access_token=iiYYD-5C7yqtR6NvZDNsHdRgN0jAjWel9jnR3ZoTv0P5kedCCNjz3FJ2FhQCgXkAe9Cfwkf9AtOtmk5GZtok2N1qVk8NSxZeY3e93p_GQzc5qGIkoZ3ySaNe_5-T9sOB

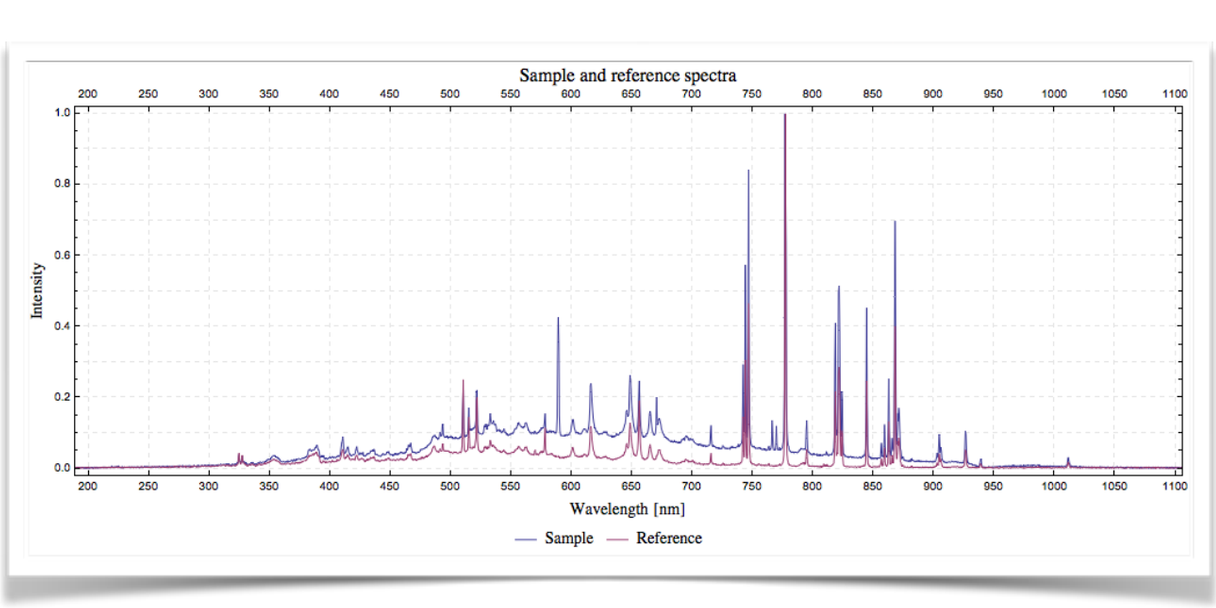



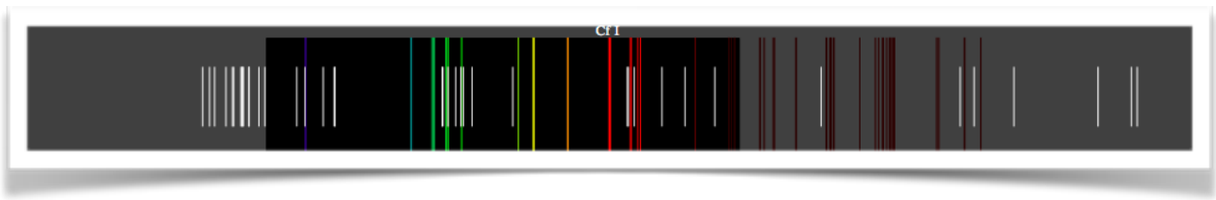


GA Drilling: Spectoroscopy Analysis

- http://www.gadrilling.com/
- Clasify minerals/rock physical properties using spectra
- Use deep-learning, e.g, Convolutional Neural Networks







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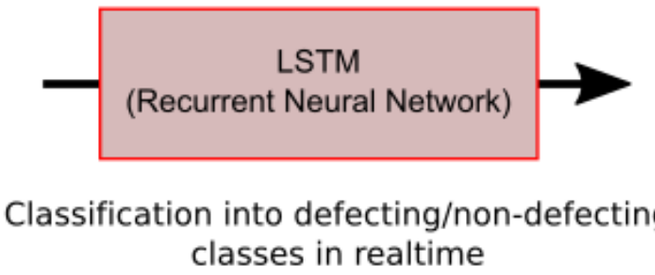
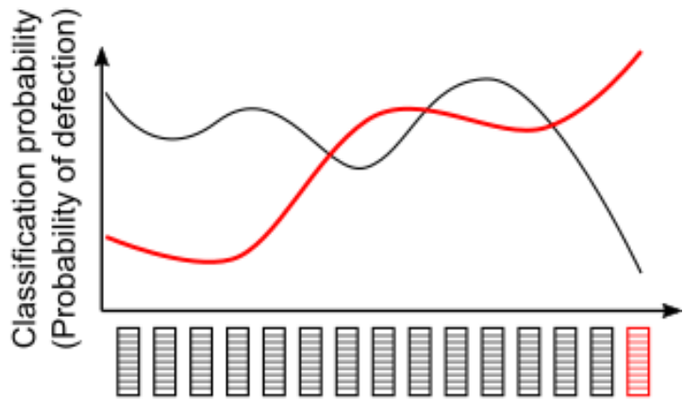
Defection Detection

- Detect leaving customers in B2B
- Analyse transactions using recurrent neural networks (LSTM)
- NDA needed





Robotic Control by NeuroEvolution

http://www.flightgear.org/

Robotic Control by NeuroEvolution

http://torcs.sourceforge.net/

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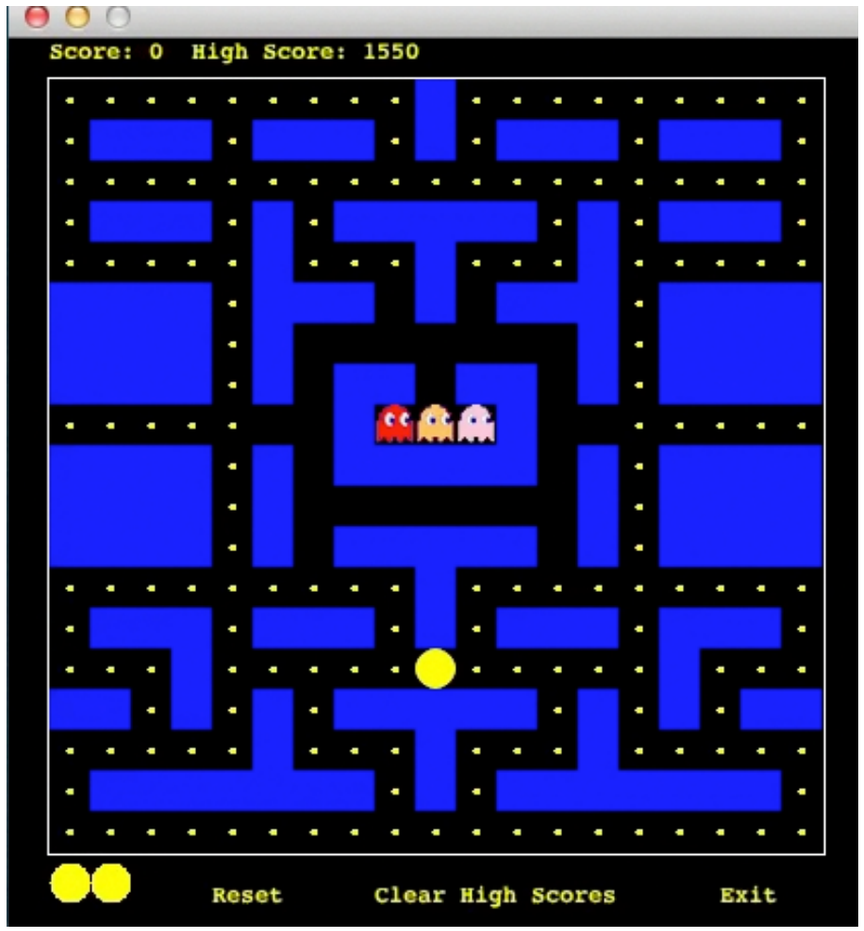
NeuroEvolution

- Design your own neuro-evolutionary algorithm.
- Evolve topology and weights.
- Experiment on simpler reinforcement learning environments.



Data Mining by ANNs

- Choose an interesting dataset.
- Use ANNs for regression/classification/ prediction.
- Compare to other paradigms (SVM, decision trees, etc.).