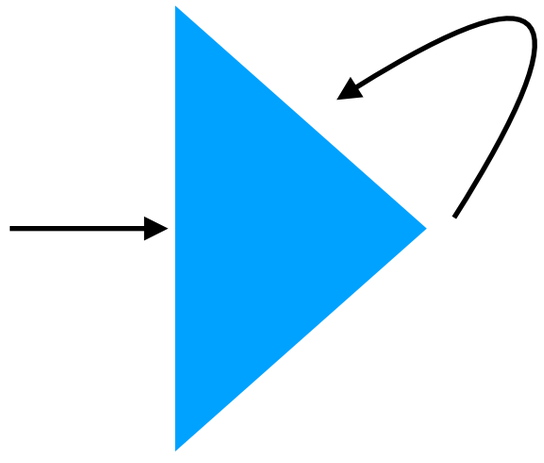
ML vs (classical) Algorithms

Two paradigms

ML

1. Gather a lot of data
2. Train a neural net
   A. Run it on data
   B. Update parameters
   C. Repeat
   D. Stop when accuracy stops increasing

Data



Algorithms

1. Think really hard
2. Invent an algorithm
3. Prove that it is fast
4. Prove that it is correct

Two paradigms

ML

1. Gather a lot of data
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Cons

1. Don’t know “why” it works
2. Very hard to get worst case guarantees
3. Need a lot of data

Pros

1. Result runs Fast
2. Easier to design

Algorithms

1. Think really hard
2. Invent an algorithm
3. Prove that it is fast
4. Prove that it is correct

Pros

1. Know “why” it works
2. Worst case guarantees

Cons

1. Sometimes extremely fast, sometimes slow
2. Much harder to design