Twitter Thread by François Chollet



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One of the most amazing things about the brain is how incredibly slow it is. Nerve impulses travel extremely slowly compared to the speed of electricity, and our fastest neurons can fire *a few* times per second . Compare that to the clock speed of a modern CPU, ~10M times faster

Yet we can produce complex behaviors in response to unexpected events in about 400-500ms (like catching an incoming object). Including muscle-brain roundtrip. This implies that each neuron involved in the computation fires at most a couple of times.

This inherent slowness, coupled with the constraint of real-time responses, must have shaped the algorithms developed by the brain in profound ways (in particular, this is likely why we need *so many* neurons). Intelligence developed on a computer might look very different.

In particular, we are unable to brute-force any problem. We solve constraint satisfaction problems via intuition and analogy. A chess master evaluates millions of times fewer positions than a computer program at a comparable level.

Our biological and experiential limitations *force* our brains to be *intelligent* -- to learn from few examples, to generalize strongly, to build complex solutions in few trials. Everything that is out of reach for AI today.