

## Artificial Intelligence revolution

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Artificial intelligence is one of the most important topics in the near future. Nowadays this sphere is rapidly progressing and changing. We all have smartphones, which are small Artificial Intelligence factories. Could we imagine owning them 30 years ago?

Human progress is moving quicker and quicker as time goes on — that's a Law of Accelerating Returns. This term was coined by computer scientist and futurist Ray Kurzweil. The progress goes quicker because more advanced societies can discover something new faster than less advanced societies — because they're more advanced and know much more. Scientists believe that the 21st century will achieve 1,000 times the progress of the 20th century. [1] If they are right, then the world in 2050 might be so different than today's world that we would barely recognize it.

It's strange for us to hear such predictions, so we mostly don't believe it. There are reasons we're skeptical:

1. When it comes to history, we think in straight lines. But nothing goes in straight lines, because of the Law of Accelerating Returns. If we know more than a few years ago, it's natural that we can learn faster compared to past. When we imagine the progress of the next 20 years, we look back to the progress of the previous 20 as an indicator of how much will likely happen. The progress is growing exponentially and it would be great, if we could understand that. We shouldn't judge the progress by its past, but by its current rate.
2. The exponential growth of progress isn't totally smooth and uniform. Progress happens in "S-curves". An S is created by the wave of progress when a new paradigm sweeps the world. The curve goes through three steps:
  - Slow growth (the early phase of exponential growth);
  - Rapid growth (the late, explosive phase of exponential growth);
  - A leveling off as the particular paradigm matures. [1]

Example: the idea of hearing music wherever you are and creating of a CD-player is a first phase of growth; manufacturing of players and creation of an mp3-player is a second phase;

now we have players in our smartphones, so not many people want to have a separate device for listening to music.

3. Our own experience makes us skeptical as well. We learn the rules of life and the world around us itself through our personal experience. When we hear a prediction about the future that goes against our experience-based notion of how things work, our instinct is that the prediction must be naive.

So, what is Artificial intelligence? We are a little bit confused of the term, because we are surrounded by science fiction movies and lots of people associate AI with fictional characters like robots. Also AI is a broad topic. It ranges from our phone's calculator to self-driving cars to something that might change the world in the future.

We often don't realize that we use an AI system even if we use it every day. John McCarthy, who coined the term "Artificial Intelligence" in 1956, noted that "as soon as it works, no one calls it AI anymore." [2] Because of this, AI often sounds like a fictional future prediction more than a reality.

There are three major AI categories:

1. Artificial Narrow Intelligence (ANI) or Weak AI. It's AI that specializes in one area. There's AI that can beat the world chess champion in chess, but that's the only thing it does.
2. Artificial General Intelligence (AGI) or Strong AI, or Human-Level AI. It's a machine that can perform any intellectual task that a human being can. Creating AGI is a much harder task than creating ANI, and we're yet to do it.
3. Artificial Superintelligence (ASI): It's an intellect that is much smarter than the best human brains in practically every field, including scientific creativity, general wisdom and social skills.

As of now, humans have reached the lowest level of AI — ANI — in many ways, and it's everywhere. The AI Revolution is the road from ANI, through AGI, to ASI — a road that totally will change everything around us.

The Road from ANI to AGI is quite difficult. Hard things like calculus, financial market strategy, and language translation are easy for a computer, while things like vision, motion, movement, and perception are insanely hard for it.

One thing that definitely needs to happen is an increase in the power of computer hardware. If an AI system is going to be as intelligent as the brain, it'll need to equal the brain's raw computing capacity. On the hardware side, the raw power needed for AGI is technically available now and we'll be ready for affordable, widespread AGI-caliber hardware within 10 years because of Moore's Law. Moore's Law is a historically-reliable rule that the world's maximum computing

power doubles approximately every two years, meaning computer hardware advancement grows exponentially.

But no one really knows how to make AI system smart. There is a bunch of strategies out there and at some point, one of them will work. Here are the three most common:

1. Plagiarize the brain.
2. Try to encode an evolution.
3. Make this whole thing the computer's problem, not ours. The idea is that we'd build a computer whose two major skills would be doing research on AI and coding changes into itself allowing it to not only learn but to improve its own architecture. We'd teach computers to be computer scientists so they could bootstrap their own development. And that would be their main job — figuring out how to make themselves smarter. [3]

Somehow we'll have achieved AGI — computers with human-level general intelligence. But people and computers can't live together in equality.

The thing is, AGI with the same level of intelligence and computational capacity as a human would still have significant advantages over humans like the speed of doing something, thinking, reliability, and lots of others.

AI, which will likely get to AGI by being programmed to self-improve, wouldn't see "human-level intelligence" as some important milestone and wouldn't have any reason to "stop" at our level. It's pretty obvious that it would only hit human intelligence for a brief instant before it'll become even smarter.

It takes decades for the first AI system to reach low-level general intelligence, but imagine that it finally happens. A computer is able to understand the world around it as well as a human four-year-old. Suddenly, within an hour of hitting that milestone, the system pumps out the grand theory of physics that unifies general relativity and quantum mechanics, something no human has been able to definitively do. 90 minutes after that, the AI has become an ASI, 170,000 times more intelligent than a human. [4] Sounds scary.

With intelligence comes power. Which means an ASI, when we create it, will be the most powerful being in the history of life on Earth, and all living things, including humans. We can't predict how it can affect our lives.

Once God created mankind of His own image, and now it's our turn to create something as powerful. The question is: will the God be nice to us?

**References:**

1. Kurzweil R: "The Singularity Is Near: When Humans Transcend Biology", 2006.
2. Moshe Y. Vardi: "Artificial Intelligence: Past and Future", 2012.
3. Nick Bostrom: "Superintelligence: Paths, Dangers, Strategies", 2014.
4. James Barrat: "Our Final Invention: Artificial Intelligence and the End of the Human Era", 2013.