

Future Humanity Will Name This Era "The Great Transition"

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This paper discusses how generational divisions have become meaningless in the context of the development of AI technology and the Internet. The author, who has personally experienced the evolution of computer technology, points out that the proliferation of the internet and social media since 1995 has generated vast amounts of big data, which forms the foundation of the AI era. As a general-purpose technology, AI is fundamentally transforming future societal systems, and humanity is entering a "generation transition" to adapt to it. The author argues that with the advancement of generative AI and deep learning, our daily lives are increasingly shaped by AI, and society as a whole must be redesigned with AI in mind. The author refers to this technological shift as "The Great Transition" and concludes that it is crucial for humanity to navigate this transition successfully.

Do you know which generation you belong to? I assume most of you are part of Generation X, Y, or Z. However, I have come to believe that such generational divisions are becoming increasingly irrelevant. Born in 1954, I have experienced various technological developments firsthand as a heavy user of computers, from large mainframes to smartphones. In this article, I will reinterpret the last 40 years of the history of computing up until today as milestones leading up to the birth of generative AI. From that perspective, I would like to share my thoughts on where humanity is heading from here.

In the past, technologies like generative AI would have been the kind of advancements developed and controlled secretly by major nations. However, the rise of the internet dismantled this confidentiality culture. With the introduction of the world's first PC browser in December 1994, I believe that 1995 marked a pivotal starting point for a new era. Since then, nearly all cutting-edge computer software technologies have been released in real-time through the Internet. One contributing factor for that to happen was the fact that charging billions of users generates more revenue and influence than relying on national budgets, but I'd argue that it's also the "Power to the People" spirit, rooted in the early days of personal computing and deeply ingrained in the industry as a whole, that has always been the major driving force behind that.

In the 1980s, neural networks, which can be seen as the synapses of artificial intelligence, were already implemented and running on a language called LISP. However, they were unable to handle practical problems, causing AI research to lose momentum. For example, consider a robot arm trying to pick up an object in front of it. On a factory line, the parameters are limited, so a robot arm, integrated with computer vision, would correctly lift parts. But what would happen if you placed it in a human living space? The robot would need to identify what the object is, estimate its shape, weight, surface friction, and breaking strength—otherwise, it wouldn't even attempt to pick it up. In order to create a truly general-purpose artificial intelligence, it has to have a general understanding of every object humans use. It seems possible to infer from the data of representative items, but more common sense would be required. In contrast, however, a four-year-old

child, for instance, would unhesitatingly lift a paper cup filled with soda placed in front of them. This demonstrated that the general knowledge required for artificial General Intelligence (AGI) was so vast that it could not be fully digitized. Even if the data could be gathered, the computational power needed was too immense for computers of the time to handle.

Since 1995, we have been captivated by the creation of homepages, followed by the rise of various social media platforms. People of all ages have been continuously writing and uploading everything imaginable to the internet. No one intended it, yet all of us are sharing our insights, wisdom, knowledge, love, and hate. Now, with the widespread use of smartphones, this phenomenon has extended to all of humanity, showing no signs of slowing down.

All of us on the internet have been contributing to an enormous collective effort—building the ultimate big data. Let's make a bold assumption: if we paid everyone \$10 per hour for their work, and estimated that each person worked 1,000 hours over the last 10 years, with 2.5 billion participants, the total value would be \$25 trillion. That's equivalent to about 3.5 years of the U.S. federal budget or 35 years of Japan's budget. By comparison, Apple's market capitalization is \$3 trillion. It's clear that even the largest corporations could never make such a massive upfront investment to create this scale of big data. This, in essence, represents the value of the collective knowledge uploaded to the internet by its users.

In the early 1990s, Silicon Graphics was the dominant player in the CG industry, being the first company to sell workstations equipped with GPU chips worldwide. At that time, GPUs were not installed in personal computers. Therefore, young people aspiring to create CG had no choice but to attend my school, Digital Hollywood, which was equipped with Silicon Graphics workstations, and endured all-nighters to gain access to the necessary technology.

GPUs quickly became the core technology in home gaming consoles such as the PlayStation. Real-time 3D CG surged into households around the world. People became immersed in game spaces, demanding ever-expanding, beautiful worlds and realistic character movements. This demand rapidly fueled the growth of the GPU manufacturing industry. The core gamers, numbering

in the hundreds of millions globally, were instrumental in the development of NVIDIA. Backed by a market where selling GPUs in the millions was an achievable goal, research, development, and manufacturing advanced, leading to the widespread availability of high-performance GPUs at lower prices.

A breakthrough occurred in 2012 when it was realized that complex multi-layer neural networks could be constructed by connecting numerous off-the-shelf GPUs. This discovery propelled deep learning into the spotlight. For instance, in the realm of Go, a system trained on all recorded games in history swiftly defeated the world champion, shocking us all.

Ten years later, on November 30, 2022, the release of ChatGPT made large language models (LLMs) widely known. The foundational data for these models consists of the vast amount of content we have uploaded to the internet. As of now, numerous generative AIs have entered the market within the past 20 months.

To summarize boldly, both internet users and gamers have laid the groundwork for the advent of the artificial intelligence era. AI is a General Purpose Technology, akin to the steam engine of the 19th century, poised to transform every aspect of human society in the future.

Thirty years ago, I proposed that the 21st century would be an era where computers and their networks exist as seamlessly as air, and that we must redesign everything to fit this new environment. Re-Designing the Future. Over these 30 years, we have surfed the waves of emerging trends— the internet, blogs, smartphones, social media, the metaverse, and blockchain. However, the emerging wave of artificial intelligence is different in quality. It will bring about a new world where humans and AI together create a new kind of human experience.

Returning to the initial question on generation: The answer is that we are all part of the "Generation Transition." This transition carries risks that could potentially lead to human extinction if not managed correctly, but there is no turning back. We must succeed in this transition, contribute to advancing humanity to the next stage, and evolve it further. As participants in a transformative era in human history, let us greatly enjoy living through this period. May future history record this era as "The Great Transition!"

We are the "GENT." Starting today, our motto is: "For the Great Transition."

We have a grand future ahead of us.