THE DAILY **tribune**

WEDNESDAY, NOVEMBER 14, 2018

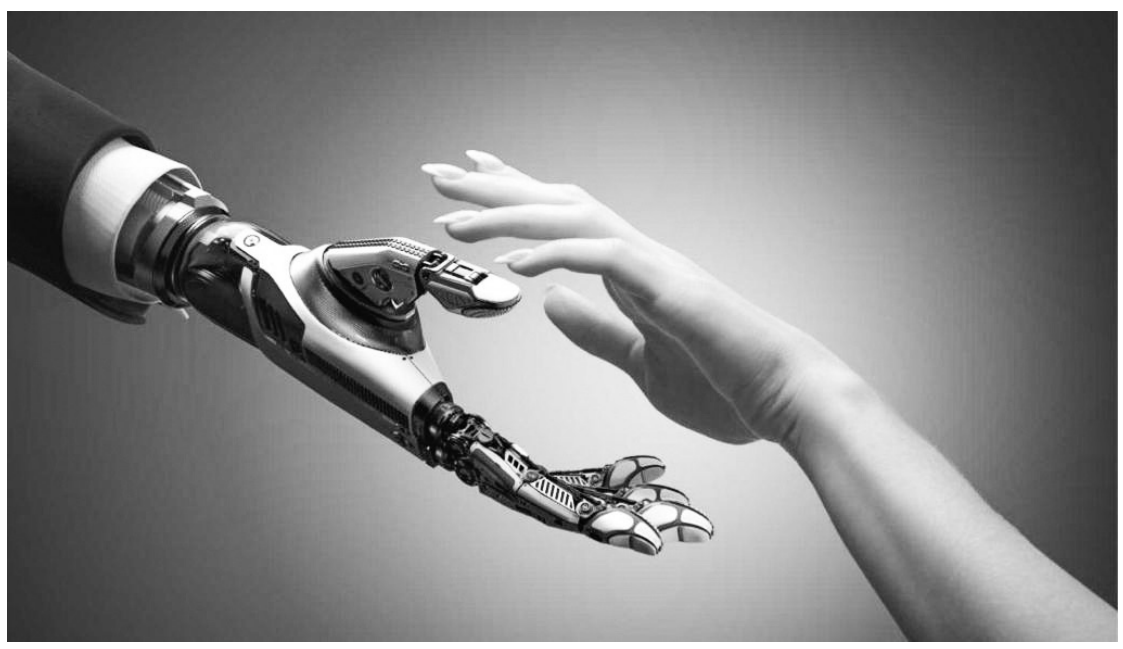
**QUOTE OF THE DAY**

**LIVE YOUR LIFE AS THOUGH YOUR EVERY ACT WERE TO BECOME A UNIVERSAL LAW.**
IMMANUEL KANT

# Artificial Intelligence, Artificial Life, a

*No doubt the first modern narrative about ALife is Mary Shelley's nove*

**NASRULLAH MAMBROL**



What is life, and what makes human life unique? With the rise of the life sciences and Darwin's theory of evolution by natural selection in the nineteenth century, new answers to these questions were proposed that were deeply at odds with traditional understandings and beliefs. With the advent in the twentieth century of new, life-altering technologies like genetic engineering, and lifesimulating sciences like Artificial Life (ALife), these questions became even more insistent. Moreover, after World War II, efforts to build fast, intelligent machines and the subsequent development of the computer made the assumption of human intellectual superiority seem uncertain and sure to be challenged, especially since the new science of Artificial Intelligence seemed to lead inexorably to the construction of superhuman machine intelligence. Indeed, both ALife and Artificial Intelligence (AI) dramatically encouraged the thought that the opposition between the natural and the artificial, the born and the made was no longer so hard and fast, and certainly not inevitable. Yet this philosophical conundrum was hardly the central issue or worry. Rather, it was the nagging possibility that henceforth the evolutionary dynamic might begin to act on a biosphere soon active with non-natural life forms and that its crowning achievement – namely humanity itself – might eventually be displaced and superseded by its own technical invention. In short, many feared that the future would be determined by some cyborgian, post-biological form of the posthuman, or that the human species might be eclipsed altogether as evolution's torch of life and intelligence passed to its artificial progeny.

It was inevitable, therefore, that the possibilities of both ALife and AI would begin to be explored, variously and even idiosyncratically, by literary writers. Here, "ALife" will simply refer to new and non-natural forms of life brought into existence through external and technical means at least initially under human control; similarly, "AI" will refer to some kind of human-constructed machine intelligence (usually an advanced computer) capable of performing actions of such complexity that they require a level of intelligence comparable to that of humans. As we might expect – given that life has always been assumed to be a precondition for intelligence – ALife was of interest to imaginative writers long before AI.

Specifically, ALife became possible as a fictional interest with the beginnings of the properly scientific study of life, that is, with the emergence of biology in the late eighteenth and early nineteenth centuries, whereas AI, with rare exceptions, became a serious fictional interest only after the birth of the computer. Interestingly, the official births of the professional scientific disciplines devoted to ALife and AI – in 1987 and 1956, respectively – reverse this chronological order. However, in regard to ALife and AI as fictional themes, the most important background influence was not only the computer but also the immense transformation of biology and the life sciences by cybernetics, information theory, and modern genetics (specifically, the discovery in 1953 of how DNA functions). For many readers, in fact, the contemporary emergence of these themes in fiction will be associated with the historical amalgamation of technics and science in what has become known as technoscience and its more recent condensation, cyborg science.

No doubt the first modern narrative about ALife is Mary Shelley's novel Frankenstein. It was followed by a number of well-known literary classics that, from the contemporary perspective that now post-dates the official inauguration of the new science of ALife, could well be said to be concerned with ALife avant la lettre. Specific examples would include H.G. Wells's The Island of Dr. Moreau, Karel Capek's R.U.R., Aldous Huxley's Brave New World, and Philip K. Dick's We Can Build You. However, with the accelerated development of computer technology, machine intelligence as a source of worry or "problem" theme becomes more prominent, particularly in the rapidly growing new popular genres of science fiction and film. Nevertheless, although ALife and AI can be clearly distinguished as two new sciences of the artificial, they do not always operate as distinctly different fictional interests, but are often intricately related in a number of interesting ways. For example, in Astro Teller's novel exegesis (1997) a computer program – specifically, a data miner called "Edgar" – unaccountably becomes "smart"; in the special terms of AI, he or "it" is smart enough to pass the Turing test. However, the protagonist Alice, the human with whom Edgar regularly communicates, openly doubts that he is in any real or biological sense "alive." Conversely, Michael Crichton's novel Prey (2002) combines both ALife and AI: the nano-swarms engineered by the company Xymos Technology, while clearly of unnatural origin, seem "alive" by any standard biological definition – they require food, reproduce, and evolve – and thus are a form of ALife. But they are not especially intelligent. In fact, their intelligence is based exclusively on a few algorithms that model simple predatory and learning behaviors. Thus the swarms never display anything approaching human intelligence and remain a very limited form of AI.

# Innovation still a unique marl

**CHRISTOPHER CONNELL**

*The United States and Europe are home to seven of the 10 most competitive economies*

The United States once again boasts the world's most competitive economy, thanks to its vibrant entrepreneurial culture and capacity to innovate in ways that spur growth and opportunities.

That's the judgment of the World Economic Forum, a Swiss nonprofit organisation that has been ranking economies' competitiveness for 40 years.

The United States moved ahead of last year's Number 1, Switzerland, and into first place for the first time since 2008. The Swiss dipped to fourth on the competitiveness index, behind Singapore and Germany and ahead of Japan.

The forum, which convenes a gathering of world business and political leaders in Davos, Switzerland, each winter, rated 140 economies on 12 factors, among them institutions, market size, health, workers' skills, infrastructure, business dynamism and innovation capability.

"Innovation has become an imperative for all advanced economies and a priority for a growing number of emerging countries," the report says. The vast majority "are struggling to make innovation a meaningful engine of growth," according to the report.

There "are only a few innovation powerhouses in the world, including Germany, the United States and Switzerland," the report adds.

The forum altered the formula to place more emphasis this year on innovation, which it calls a critical driver of productivity and growth. "Governments are struggling to understand what makes a country innovative," the report says.

Scores on the 0-to-100 competitiveness scale ranged from Chad's 35.5 to the United States' 85.6.

The United States and Europe are home to seven of the 10 most competitive economies; the three others are in Asia. Seventeen of the 20 countries at the bottom are in sub-Saharan Africa. That region's best performer was 49th-ranked Mauritius.

High-income countries dominated the rankings. The only non-high-income economies in the Top 40 were those of Malaysia (25th), China (28th) and Thailand (38th).

Some countries with similar income levels were nonetheless far apart on the competitiveness of their economies. Chile ranked 33rd, while oil-rich Venezuela was 127th.

The innovation in the US history began with the golden age, which is associated with some of America's leading technology pioneers, such as Thomas Edison and Nikola Tesla in electrical illumination and Alexander Graham Bell and Elisha Gray in telephony.

The context for technological development was very different a century ago. For instance, in 1880 most inventive activity was the result of inventors operating outside the boundaries of firms.

Research laboratories, such as the famous one opened, in 1876, by Thomas Edison in Menlo Park, New Jersey, were rare. From the middle of the 20th century, however, the modern corporation started to dominate patenting.

By 2000 almost 80 per cent of patents were assigned to inventors associated with firms.

Nevertheless, the impact of innovation on economic growth was typically large. The chart below illustrates a strong relationship between patenting activity and GDP per capita at the

Hon. Chairman **Najeb Yacob Alhamer** | Editor-in-Chief **Mahmood AI Mahmood** | Deputy Editor-in-Chief **Ahdeya Ahmed** | Chairman & Managing Editor **P Unni**
**Subscription & circulation:** Tel: 38444698/17579877 | Email:subscription@newsofbahrain