

Robots from Imagination to Reality

From the Tin Man in *The Wizard of Oz* and R2D2 in *Star Wars* to the more recent *Transformers*, robots have inspired many little future scientists. Modern children have played with robot toys, watched robot animations, and read robot stories.

1) 이러한 아이들은 결국 성장하여 미래 세계의 형태를 바꾸며 로봇 기술의 신 분야를 이끌 것이다.

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2) 로봇의 놀라운 역사는 인간의 상상을 따라잡는 과학에 대한 모든 것, 즉 가상의 허구와 실제 과학적 발견 사이의 끊임없는 대화이다.

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The concept of or the desire for robot-like creatures traces far back, almost to the birth of human imagination.

3) 일리아드에서, Homer는 그리스 대장장이의 신인 헤파이스토스에 대한 신화를 말하는데, 그는 금으로 만들어져 실을 만들고 짜는 도우미들이 있었다고 한다.

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This and many other ancient stories show that people have long dreamed of inanimate creatures that can do their monotonous or difficult work.

Then, in early modern times, the first invention that laid the foundation for robotics was perfected—clocks. The mechanisms that ran them were called “clockworks.”

4) 17세기는 ‘시계태엽장치 자동 인형’의 황금기로 유명하다.

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Walking toy soldiers were built, along with toy ducks that drank water and toy boys that over and over would write a single letter with a pen.

5) 이 움직이는 인형들은 오늘날 로봇들의 먼 조상이었다.

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6) 이것들은 똑같은 행동을 단순히 반복할 줄밖에 몰랐다.

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7) 그래도 이것들은 현대 기계 공학의 시초가 되었으며 로봇의 꿈을 살려두었다.

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Further advances of mechanical engineering have given sharper edges to the imaginary machines that work for human beings.

The term “robot,” referring to such artificial creatures, was first coined in Czech writer Karel Capek’s play, Rossum’s Universal Robots (1920).

Robot is a Czech word for slave.

8) 이 희곡에서, 중노동을 하도록 특수 제작된 로봇 덕분에 인간들은 한가로이 편안한 삶을 누릴 수 있게 된다.

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9) 자동 노동자라는 이 비전이 현실화되기까지는 오래 걸리지 않았다.

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In 1937, the earliest known industrial robot was completed, opening the first phase of robotics—the age of industrial robots.

Industrial robots, though having made fast progress since then, are not yet thinking machines which can act independently. They are more like advanced clockworks, although far more precisely operated.

10) 현재는 우리 주위 어디에서나, 특히 공장과 실험실에서 중노동을 하는 산업용 로봇들을 볼 수 있다.

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They perform repetitive and dangerous tasks, lift heavy objects, conduct tests in severe environments, or help medical doctors with difficult operations. Products are manufactured infinitely faster and cheaper than before, thanks to them.

11) 산업용 로봇들은 깊은 바다 속으로, 화산 속으로, 심지어 극한 상황에 처해야 하는 다른 행성에 보내져서 인간이 목숨을 걸고 해야 할 일들을 대신한다.

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Modern industrial robots have significantly contributed to comfort and safety in work environments.

Now, for the first time in human history, robots are about to evolve into independent, “living” creatures.

12) 인공지능(AI)의 발명은 인류의 어떤 세대도 뚫지 못한 장벽을 허물었고, 아무도 이 혁신적 도약이 어떤 결과를 낳을지 확실히 알지 못한다.

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13) 지금까지의 전망은 희망보다는 두려움을 더 많이 초래한 것 같다.

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In 2016, for example, when Google’s AlphaGo beat the world’s elite go players, one by one, the shock and dread that robots might finally assume “life” struck the global population.

The fear was that an independent creature might someday escape human control.

14) 인간들이 통제되지 않는 생명체를 창조할지도 모른다는 두려움은 새로운 게 아니다.

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It is called Frankenstein anxiety and owes its name to the novel—Frankenstein (1818) by Mary Shelley. In this book, scientist Victor Frankenstein collects pieces of dead bodies and from them creates a “Monster.” The Monster turns out to have superb intelligence and eventually turns against its creator, with dreadful results.

After Shelley, in the genre of science fiction, countless artificial beings were depicted as becoming dangerous.

15) 인간들은 자기가 만든 피조물들에게 대체되는 것으로 묘사되었다.

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In the movie The Terminator, released in the 1980s, highly developed AI robots finally decide to wipe the human race off the face of the earth.

If robots are supposed to follow the way of human imagination, we see a horrible future ahead, don't we?

Maybe, but probably not.

16) 로봇에 관한 허구의 상상력은 경고의 종을 울렸을 뿐 아니라 앞으로의 길도 제시했다.

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Isaac Asimov, sometimes referred to as the father of science fiction, who first coined the word "robotics," saw no point in too much worry. He pointed out that robots are machines—advanced, but still machines.

17) 그는 자동차나 비행기 같은 다른 기계들처럼 안전을 보장하는 요소들이 로봇에 장착될 수 있다고 보았다.

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The safety measures Asimov devised for his fictional robots were the famous "Three Fundamental Laws of Robotics." The Laws set the priorities for robotic behavior.

18) 어떤 대가를 치르더라도 인간의 생명은 보호해야 한다.

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In his fictional world full of robots, the Laws are enforced without exception.

Asimov's fictional vision has proved insightful and has helped global leaders to plan and prepare for the future.

19) 2011년에 영국의 과학자와 공학자 그리고 학자들은 로봇 설계자와 제작자, 이용자들이 5개의 윤리적 원칙을 따라야 한다고 제안했다.

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20) 이 원칙들은 로봇이 인간을 위해 봉사해야 한다는 점을 분명히 하면서 인간의 안전에 초점을 맞춘다.

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Similar actions have followed.

In February, 2017, the European Parliament approved a resolution calling for the creation of laws on robotics, based on Asimov's Three Laws of Robotics.

Our future with thinking robots is now upon us.

21) 우리는 지나친 두려움 때문에 로봇 제작을 그냥 중단할 수는 없다.

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22) 꿈이 될지 악몽이 될지는 우리의 의식적 선택과 행동들에 달려 있다.

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23) 철저한 논의와 꾸준한 감시가 우리를 로봇 개발의 올바른 방향으로 인도하는 데 필수적이다.


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We do not have to be too afraid, but we should be wiser and more considerate in picturing and planning for a future with robots, carefully weighing many different possibilities.

Imagination, a uniquely human characteristic, will prove helpful once again. As a famous robotics engineer once said,

24) “로봇들은 인간의 상상력이 데려갈 수 있는 곳까지 따라갈 것이다.”

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◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시

1) 제작연월일 : 2019년 10월 07일

2) 제작자 : 교육지대㈜

3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「콘텐츠산업 진흥법」외에도「저작권법」에 의하여 보호되는 콘텐츠의 경우, 그 콘텐츠의 전부 또는 일부를 무단으로 복제하거나 전송하는 것은 콘텐츠산업 진흥법 외에도 저작권법에 의한 법적 책임을 질 수 있습니다.

정답

- 1) [정답] Those kids have eventually grown up to lead the frontiers of robot technology, changing the shape of the future world.
- 2) [정답] The incredible history of robots is all about science catching up with human imagination, a constant dialog between imaginative fiction and actual scientific discoveries.
- 3) [정답] In The Iliad, Homer tells the myth of Hephaistos, the Greek god of metal working, who has helpers made of gold that spin and weave.
- 4) [정답] The 17th century is known to have been the golden age of "clockwork automatons."
- 5) [정답] These moving dolls were distant ancestors to today's robots.
- 6) [정답] They were merely capable of repeating the same action.
- 7) [정답] Still, they marked the beginning of modern mechanical engineering and kept alive the dream of robots.
- 8) [정답] In this play, robots are specifically made to do the hard labor so that human beings can live lives of leisure and comfort.
- 9) [정답] This vision of automatic workers did not take long to be realized.
- 10) [정답] Now, industrial robots can be seen to do hard labor everywhere around us, especially in factories and laboratories.
- 11) [정답] They are sent deep into the sea, into volcanoes, and even to other planets where they are subjected to extreme conditions, doing what humans might be supposed to

do at the risk of their lives.

- 12) [정답] The invention of artificial intelligence (AI) broke a barrier no human generation had ever reached before, and nobody knows for sure what might become of the innovative leap.
- 13) [정답] So far, the prospect seems to have stirred more fears than hopes.
- 14) [정답] The fear that human beings might create a living thing that cannot be controlled is not new.
- 15) [정답] Human beings were seen to be replaced with their own creation.
- 16) [정답] Fictional imagination concerning robots not only rang warning bells but also offered a way forward.
- 17) [정답] He believed that safety factors should be built into robots, as well as into other machines like cars and planes.
- 18) [정답] At all cost, human life should be protected.
- 19) [정답] In 2011, British scientists, engineers, and scholars suggested that designers, builders, and users of robots follow five ethical principles.
- 20) [정답] The principles focus on human safety, making it clear that robots should serve human beings.
- 21) [정답] We cannot just stop developing them because of undue fears.
- 22) [정답] Whether it will turn out to be a dream or a nightmare depends on our conscious choices and actions.
- 23) [정답] Thorough discussions and constant monitoring are essential in guiding us in the right direction for robot development.
- 24) [정답] "Robots will go as far as human imagination can take them."