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# The Analysis of Future Robots in Japan: Review article

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## Abstract

Human entertainment bots, androids, animal bots, social bots, guard bots, and many other types of robots are currently popular in Japan. Each sort of robot has distinct characteristics.

This paper aims to encompass the common achievements of robots and compare them in categories like length, width, ability to replicate human behavior, and other characteristics. Consequently, in that discussion, many questions will be asked; where is the future of robotic organisms heading? What is the likely sequence of robot innovations and their use of human technologies? What challenges do robots have to face in today's world?

**Keywords: androids, astronaut robots, assistive robots, humanoid robots, human–robot interaction, domestic robots, personal robots, robot assistant, robot peers, robot societies, social robots, rescue robots, evolution of social robots, history of social robots**

# 1. Introduction

The concept may have started in Japan in the 17th century when art and function were combined in the Karakuri puppets. The doll had a human-like aesthetic appearance whilst serving the function of serving tea [1].

The invention of the robot faced a multitude of challenges in imitating a human face or walking, entertaining, liking, shaking hands, speaking, gesturing, transmitting information, measuring distances, and running. Not to mention, it faced a challenge in all algorithms of emotion. For example, Keepon is a social robot created in 2003 for autism research by Hideki Kozima in Japan [2-8]

Our review paper discusses, how should the robot be in the coming decades, as we discuss the competitiveness and cooperation of robotic organisms and humans, and what was limited to the robot at the beginning of its manufacture, the establishment of its structure, and the modernization of its mechanism. In addition to emotional disturbances and trauma, the distinction between taste, smell, and touch, mastering the look of the robot between hope and pain, optimism and pessimism. Robots' occupations can in the coming years range from construction workers to astronauts.

# 2. Research methodology

The Historical, psychological, and social review has been conducted for all the robots covered by the research.

## 2.1 Brief history of robotics in Japan

The karakuri ningyo, or mechanical dolls, are among Japan's earliest robot precursors. Takeda-za established a mechanical-puppet theater in Osaka's Dtonbori district during the Edo period (1603-1867). [9] Hisashige Tanaka, known as "Japan's Edison," was a Japanese craftsman who created an array of extremely complex mechanical toys, some of which could serve tea, fire arrows drawn from a quiver or even paint a Japanese kanji character. In 1796, the seminal work Karakuri Zui (Illustrated Machinery) was published. [10] Figure 1.

*Figure 1. A karakuri automaton, c. 1800, British Museum and Tea-serving karakuri, with mechanism, 19th century. National Museum of Nature and Science, Tokyo.*

*[Source: File:KarakuriBritishMuseum.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:KarakuriBritishMuseum.jpg (accessed 2023-03-29)]*

*[Source: File:TeaAutomatAndMechanism.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:TeaAutomatAndMechanism.jpg (accessed 2023-03-29).]*

Makoto Nishimura, a biologist, designed and built the Gakutensoku robot in 1928. [11] Astro Boy, also known as Tetsuwan Atomu in Japan, was a popular fictional robot. Osamu Tezuka created Astro Boy. Figure 2.


*Figure 2. Makoto Nishimura (left of Gakutensoku) and one of his assistants, Bōji Nagao, pose with the robot. Atom and Osamu Tezuka appear in the eighth tankōbon book (Osamu Tezuka Manga Complete Works edition).*

*[Source: File:Gakutensokuold.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Gakutensokuold.jpg (accessed 2023-03-29).]*

*[Source: Astro Boy. Wikipedia. https://en.wikipedia.org/wiki/Astro_Boy#/media/File:Astro_Boy-08.jpg.]*

*[Source: Osamu Tezuka. Wikipedia. https://en.wikipedia.org/wiki/Osamu_Tezuka#/media/File:Osamu_Tezuka_1951_Scan10008-2.JPG (accessed 2023-03-29).]*

Professor Ichiro Kato of Waseda University studied humanoid robots in the mid-twentieth century. He started the WABOT project in 1967 and finished the WABOT-1, the world's first full-scale humanoid intelligent robot, in 1972. WABOT-1 moved on two legs, had two arms, and two camera eyes. [12] As a result, it was the first android. Its limb control system enabled it to walk with its lower limbs and grip and carry objects with its hands via tactile sensors. Its vision system enabled it to measure distances and directions to objects by employing external receptors, artificial eyes, and ears. Its conversation system allowed it to communicate with a human using an artificial mouth in Japanese. [13-15] Since then, Japan has been at the forefront of robotics. [16]

## 2.2 Some types of robots in Japan

Humanoid robots are a key factor in the modern development chain, and Japanese companies have created distinct robots in imitating humans, especially in movements, verbal gestures, speaking, understanding, and fulfilling the requests of a human speaking to a robot. And Asimo (Advanced Step in Innovative Mobility), who ascended the throne in 1986 [17], was very distinguished from the first journey of its formation until the year of its production with the latest version. What distinguishes this robot is that its standards for updating and adding features took more than one experimental model from the first E zero in 1986 through E1, E2, and E3 from 1987 until 1991, and from 1991 until 1993, the development of E 3 to E4, E5, and E6. The first and most advanced and experienced model started from 1993 until 1997 with three types of p1, p2 and p3, and in the year 2000 ASIMO was born, going through several developments from walking to running to jumping with task performance capabilities and communication capabilities as well as sound and image recognition, sensing, situational estimation, behavior generation, and field experiments.

It is clear that the human robots did not stop at ASIMO, other successful attempts such as the second human model Toyota Partner Robot, a line of humanoid robots manufactured by Toyota. At the 2005 World EXPO in Aichi, Japan, they made their debut playing music on drums and trumpets. There are five robots in total, each with a unique movement system. Version 1 (bipedal robot), Version 2 (Segway-like wheels), Version 3 (Segway-like wheels), Version 4 (unique wire system), and the I-Foot are the five robots (mountable with 2 legs). Toyota released a video of their partner robot's running and standing abilities in July 2009. The robot can travel at a speed of 7 km/h, but it can only walk and run on level ground. T-HR3, Toyota's third-generation humanoid robot, was introduced in 2017 and will be utilized in space travel [18].

The T-HR3 is guided by a Master Maneuvering System, which enables the complete body of the robot to be operated automatically via wearable controllers that map hand, arm, and foot movements to the robot. Furthermore, a head-mounted display that allows the user to observe the world through the eyes of the robot. It was developed to look into the prospect of supporting humans at home, in medical facilities, on building sites, in disaster zones, and even in space.

Before we get into the more contentious types, the term "robot" has evolved to apply mostly to mechanical humans, animals, and other beings. [19] The name "android" can refer to either of these, [19], but a cyborg ("online organism" or "robot") is a creature made up of organic and mechanical parts.

While the term "android" refers to robots with human-like appearances in general (not necessarily male-like robots), a female-looking robot is also known as a gynoid. Furthermore, anthrobots or anthropoids can be used to refer to robots without alluding to their sexual appearance. (Short for humanoid robots; the term humanoids is inappropriate because it is already used to refer to organic, human-like species in the context of Science Fiction, Futurism, and Speculative Astrobiology).

The term "android" was used by the writers in a variety of contexts other than that of a robot or a cyborg. In certain works of fiction, the distinction between a robot and a robot is only apparent, as robots are designed to resemble humans on the surface yet have robot-like internal mechanisms. [19] In other stories, the term "android" refers to a completely organic, yet artificial, entity. [19] Other fictional Android graphics can be found somewhere in the middle.

According to Eric G. Wilson, who defines a robot as a "artificial human being," there are three categories of robots based on their body composition:

Mummies, dolls, puppets, and figurines are examples of "dead things" or "solid, inanimate, natural matter."

Golems and homunculi are examples of golems, which are constructed of flexible, possibly organic substance.

Robot type - made up of both living and dead elements, such as robots and automatons [20].

This mechanical humanoid type as we now call it was the Actroid Woman with a great visual resemblance. Osaka University created it, and Kokoro Company Ltd manufactured it. (the animatronics division of Sanrio). It was first shown at the International Robot Show in Tokyo, Japan, in 2003. It has completed its development process since then, and the appearance of the robot reflects a young Japanese woman of average age. It is capable of imitating natural activities such as breathing, blinking, and speaking. and it is one of the robots that has an interactive ability to speak, process it, and respond to it [21-26].

Internal sensors allow Actroid models to react naturally through air actuators placed at various places of articulation in the upper torso. Early models have 42 points of articulation, whereas later models have 47. So far, lower-body movement has been restricted. The operation of the robot's sensory system in concert with its air propelled movements enables it to react to or avoid intruding actions such as a slap or a poke. It can respond differently to softer types of touch, such as a pat on the arm, thanks to artificial intelligence [21-26].

The Actroid may also imitate human behavior by adjusting its position, moving its head and eyes, and breathing in its chest. Furthermore, the robot can be "taught" to emulate human actions by confronting a person wearing reflective dots at critical spots on their body. This motion can then be "learned" and repeated by the robot by using its visual system to track the dots and computing limb and joint movements to match what it sees [21-26].

The HRP-4C, often known as Miim, is a feminine-looking humanoid robot developed by Japan's National Institute of Advanced Industrial Science and Technology. (AIST).

Miim is 158 centimeters' (5 feet, 2 inches) tall and weighs 43 kilograms' (95 pounds) when equipped with the power pack. She has the head and face of a typical young Japanese female, as well as the figure of a typical young Japanese female. (Based on the 1997–1998 Japanese body dimension database). Thanks to 30 body motors and additional eight for face emotions, she can move like a human. Miim can also recognize and respond to environmental sounds and voice using speech recognition software [27].

The Open Robotics Platform (OpenRTP), which includes OpenRTM-aist and OpenHRP3, is used to build the robot's software. [28]

On March 16, 2009,[29] a public demonstration was held, followed by another at Tokyo's Digital Content Expo in 2010 to demonstrate current enhancements that allow HRP-4C to mimic human facial and head movements, as well as perform dance steps [30 - 31].

Mimi's human-like walking abilities was upgraded in 2011, as exhibited in a WAIST film, and has been described as "super-realistic"[32].

The entertainment business and a human simulator for device evaluation could be among the applications for the HRP-4C.

Due to the history of natural disasters in the past decade. According to the Center for Research on the Epidemiology of Disasters, the impulse to construct lifesaving robots arose after scientists realized the enormity of the destruction. (CRED).

This resulted in the creation of the T-52 Enryu robot, which is designed to rescue humans in natural disasters such as tsunamis, earthquakes, etc. In addition, the robot rescues them from a man-made tragedy like a fire or a car accident [33].

The robot works hydraulically through the wreckage to travel a certain distance for the same rescue operation in the aftermath of an earthquake or other calamity.

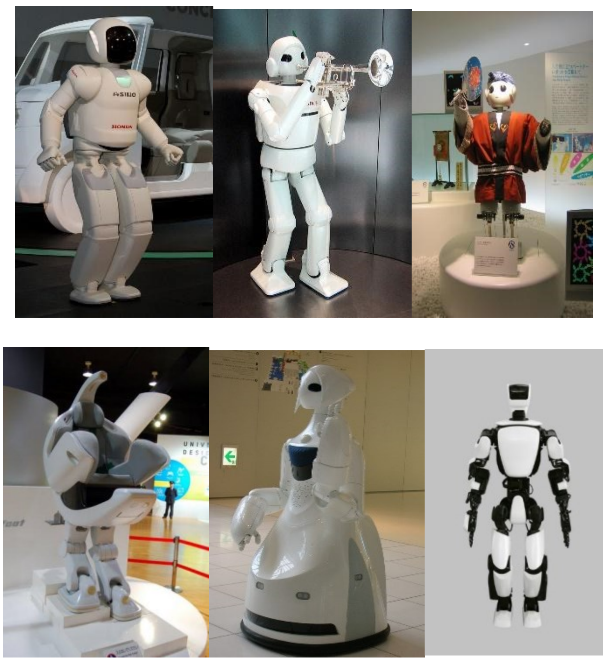
In 2006, the robot successfully lifted from a snowbank during a performance test at Nagaoka University of Technology.

TMSUK created the robot in partnership with Kyoto University, the Kitakyushu Fire Department, and Japan's National Fire and Disaster Research Institute in Tokyo. The 3.5m long robot may be commanded remotely or from a cockpit at the front. It, like its cousin Banryu, features numerous CCD cameras that broadcast to the remote driver - in this case, seven 6.8MP CCD cameras mounted to the "head," "torso," and "arms."

While we are touching on the most advanced species in our digital age, let us discuss the astronaut robot named Kirobo who is the first Japanese astronaut who achieved world records after an 18-month stay aboard the International Space Station. Thus, it was the first robot in space and the first robot to be at such a height while having a conversation [34].

Developed by the University of Tokyo and Tomotaka Takahashi, the first of its kind, Kirobo arrived at the International Space Station on August 10, 2013 from Japan's Tanegashima Space Center. A twin of Kirobo, named Mirata, was also created with the same characteristics, and remained on Earth as a backup member of the crew. The word "kirobo" itself is a portmanteau of "kibō" (希望), which means "hope" in Japanese, and the word "robo" (ロボ), used as a generic short word for any robot [35].

We attach pictures of the robots on which we put a spotlight in sequential order. Figure 3.



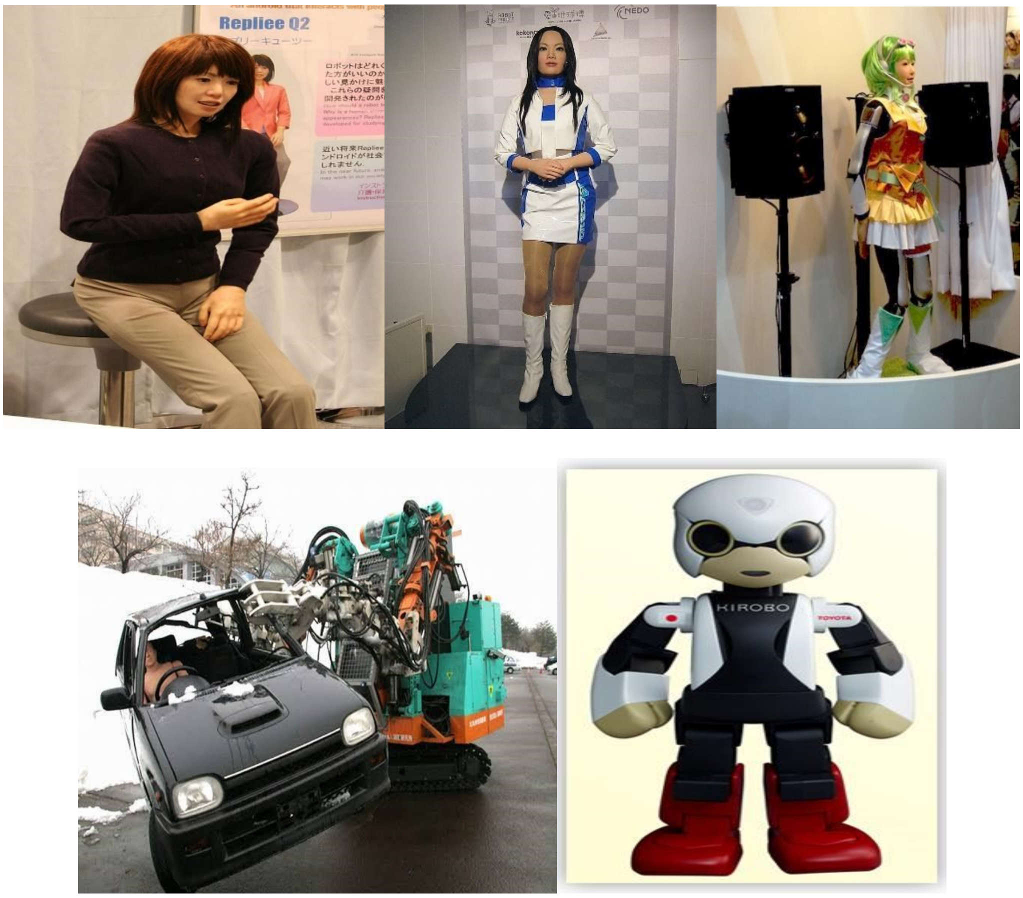



*Figure 3. ASIMO, Toyota pranter robot & T-HR3, actroid & HRP-4C, T-52 Enryu and Kirobo.*

*[Source: File:Honda ASIMO (ver. 2011) 2011 Tokyo Motor Show.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Honda_ASIMO_(ver._2011) _2011_Tokyo_Motor_Show.jpg (accessed 2023-03-29).]*

*[Source: File:Toyota Robot at Toyota Kaikan.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Toyota_Robot_at_Toyota_Kaikan.jpg (accessed 2023-03-29).]*

*[Source: File:Toyota robot.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Toyota_robot.jpg (accessed 2023-03-29).]*

*[Source: File:Toyota i-foot.JPG - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Toyota_i-foot.JPG (accessed 2023-03-29).]*

*[Source: File:TPR-ROBINA.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:TPR-ROBINA.jpg (accessed 2023-03-29).]*

*[Source: CORPORATION, T. M. T-HR3. Toyota Motor Corporation Official Global Website. https://global.toyota/en/download/34530991 (accessed 2023-03-30).]*

*[Source: File:Repliee Q2.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Repliee_Q2.jpg (accessed 2023-03-30).]*

*[Source: File:Actroid-DER 01.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Actroid-DER_01.jpg (accessed 2023-03-30).]*

*[Source: Wikimedia.org. https://upload.wikimedia.org/wikipedia/commons/4/45/Vocaloid_%2B_HRP-4C_Miim_collaboration_%28clip%29%2C_Yamaha_booth%2C_CEATEC_JAPAN_2009.jpg (accessed 2023-03-30).]*

*[Source: Redd.it. https://i.redd.it/z2n5ydkfpcu21.jpg (accessed 2023-03-30).]*

*[Source: Technewsworld.com. https://www.technewsworld.com/images/article_images/78364_250x460.jpg (accessed 2023-03-30).]*

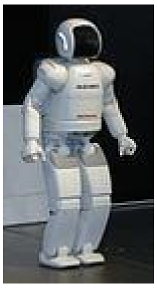
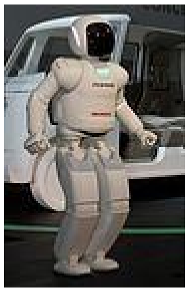
## 2.3 Asimo's comparison [36 – 40]

Table 1. Shows a comparison between Asimo's launches, up until 2011.

This comparison discusses mass, height, width, language, etc.

*Table 1. Parameters comparison of Asimos versions.*

| Model | 2000, 2001, 2002 | 2004 | 2005, 2007 | 2011[41-42] |
|---|---|---|---|---|
| Mass | 54 kilograms (119 lb.) | | | 48 kilograms (106 lb.)[43] |
| Height | 120 centimeters (47 in)[36] | 130 centimeters (51 in) | | |
| Width | 45 centimeters (18 in) | | | |
| Depth | 44 centimeters (17 in) | 37 centimeters (15 in) | | 34 centimeters (13 in) |
| Walking rate | 1.6 kilometers'/hour (0.99 mph) | A speed of 2.5 km per hour (1.6 mph) | 2.7 kilometers'/hour (1.7 mph) | |
| Running rate | — | A speed of three kilometers' per hour (1.9 mph) | 6 kilometers per hour (3.7 miles per hour) (straight) 5 kilometers' per hour (3.1 miles per hour) (circling) | A speed of 9 km/h (5.6 mph) |

| | | | | |
|---|---|---|---|---|
| Airborne time (Running motion) | — | 0.05 seconds | 0.08 seconds | |
| Battery | 38.4 V, 10 Ah, 7.7 kg Nickel metal hydride (17 lb.) It takes 4 hours to fully charge. | 51.8 V lithium ion battery, 6 kg (13 lb.) It takes 3 hours to fully charge. | | |
| Continuous operating period | Thirty minutes | 40 minutes to an hour (walking) | | Continuous operating period |
| Degrees of Freedom | 26<br>(head: 2, arm: 5×2, hand: 1×2, leg: 6×2) | 34 [44]<br>(head: 3, arm: 7×2, hand: 2×2, torso: 1, leg: 6×2) | | Degrees of Freedom |
| Languages | ______ | ___ | Languages | ______ |
| Images | <br>*[Source: File:Asimo.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Asimo.jpg (accessed 2023-03-30)]* | <br>*[Source: File:2005 Honda ASIMO 01.JPG - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:2005_Honda_ASIMO_01.JPG (accessed 2023-03-30).]* | | <br>*Source: File:Honda ASIMO (ver. 2011) 2011 Tokyo Motor Show.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Honda_ASIMO_(ver._2011)_2011_Tokyo_Motor_Show.jpg.]* |

## 2.4 Different model comparison

Table 2 shows comparison other between asimo, T-HR3, kirobo, and T-52 Enryu in terms of type, first appearance, mass or weight, height, width, features, languages.

*Table 2. Asimo, T-HR3, kirobo, and T-52 Enryu comparison*

| Name | Asimo | T-HR3 | Kirobo | T-52 Enryu |
|---|---|---|---|---|
| Types | Humanoid robots | Humanoid robots | Astronaut robots | Rescue robots |
| First appearance | On October 31, 2000 | On November 29, 2013 | On August 10, 2013 | 2006 |
| Mass or weight | 48 kilograms (106 lb.)[43] Mass. | 75 kilograms (165 lb.) weight. | 1 kilogram (2.2 lb.) weight. | 5 tons weight. |
| Height | 130 centimeters. | 1.54 meters tall (154 centimeters. | 34 centimeters. | 350 centimeters. |
| Width | 45 centimeters. | ___ | 18 centimeters. | 240 centimeters. |
| Features | Recognize moving objects. Postures gestures. Surrounding environmen t. Sounds and faces, which enables it to | Flexible Joint Control. Whole-body Coordination. Balance Control. Real Remote Maneuvering. | Voice recognition Natural language processing. Voice (speaking) composite. Information and communication operations. | Save people during disasters. Joint training exercise with the Fire Department rescue team. Tests against snow disaster. |

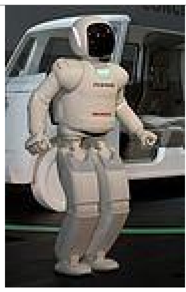
| | | | | |
|---|---|---|---|---|
| | interact with humans.<br>Detect the movements of multiple objects. | | Facial recognition camera.<br>Camera for recording. | Soil surveying by remote control. |
| Languages | English & Japanese | ___ | Japanese | ___ |
| Images | <br>*[Source: File:Honda ASIMO (ver. 2011) 2011 Tokyo Motor Show.jpg - Wikipedia. commons.wikimedia.org. https://en.wikipedia.org/wiki/File:Honda_ASIMO_ (ver._2011) _2011_Tokyo_Motor _Show.jpg (accessed 2023-03-29).]* | <br>*[Source: Toyota Gets Back Into Humanoid Robots With New T-HR3. IEEE Spectrum. https://spectrum.ieee.org/toyota-gets-back-into-humanoid-robots-with-new-thr3.]* | <br>*[Source: Robot Astronaut Kirobo 003. Toyota USA Newsroom. https://pressroom.toyota.com/image/robot-astronaut-kirobo-003/ (accessed 2023-03-30).]* | <br>*[Source: Techeblog.com. https://media.techeblog.com/images/rescuerobot.jpg (accessed 2023-03-30).]* |

Table 3. presents comparison of robots of same type.

*Table 3. Comparison of robots of same type.*

| Name | Actroid | HRP-4C |
|---|---|---|
| Types | Androids | Androids |
| First appearance | 2003 | 2009 |

| | | |
|---|---|---|
| Features | The Actroid may also imitate human behavior by adjusting its position, moving its head and eyes, and breathing in its chest. Furthermore, the robot can be "taught" to emulate human actions by confronting a person wearing reflective dots at critical spots on their body. This motion can then be "learned" and repeated by the robot by using its visual system to follow the dots and computing limb and joint movements to match what it sees. | HRP-4C can imitate human facial and head movements as well as perform dance steps.<br><br>2011 upgrades to Mimi's human-like walking ability were shown in a video released by AIST, and have been called "super-realistic". |
| Languages | Japanese | Japanese |
| Images | <br>[*Source: Actroid*. Wikipedia. https://en.wikipedia.org/wiki/Actroid#/media/File:Actroid-DER_01.jpg (accessed 2023-03-30).] | <br>[*Source: HRP-4C*. Wikipedia. https://en.wikipedia.org/wiki/HRP-4C#/media/File:HRP-4C_UCROA.jpg (accessed 2023-03-30).] |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## 2.5 Advantages and disadvantages

There are two sides to every coin. As this proverb suggests, to each advantage there is a disadvantage. Brief look at some of the benefits and drawbacks of robots are presented below.

All six types of robots advantages and disadvantage are presented in Table 4.:-

*Table 4. Comparison of advantages and disadvantages.*

| Name | Advantage | Disadvantage |
|---|---|---|
| Asimo | The Asimo has a laser sensor that detects the ground's surface.<br><br>It also has an infrared sensor with automatic shutter adjustment based on brightness that detects pairs of floor markings to confirm the navigable paths of the planned map.<br><br>Other advantages include the Asimo's ability to recognize people's faces and voices, address them by name, and move in the ways they indicate.<br><br>In addition, the shape of Asimo resembles an astronaut robot<br><br>It also responds to questions by nodding. It is fluent in several languages and can recognize and address around ten different faces. | The disadvantage here is that it will cost many people their jobs.<br><br>It is also expensive to build an Asimo on your own, let alone buy one with your own money.<br><br>If the Asimo is not serviced on a regular basis and properly monitored, its operation can go haywire, resulting in destruction and injuries. It is best to proceed with caution.<br><br>Asimo also has limited maps of his surroundings and has the big advantage of being an astronaut but he can't go into space! |

| | | |
|---|---|---|
| T-HR3 | It can safely assist humans in a variety of settings, including the house, medical facilities, building sites, and disaster-stricken areas and even outer space.<br><br>Flexible Joint Control, which allows the robot to control the force with which it makes contact with any individuals. Robots in its environment; Whole-body Coordination and Balance manipulate, which allows the robot to keep its balance if it collides with things in its environment; and Real Remote Maneuvering, which allows humans to manipulate the robot in a smooth and intuitive manner. | Robot can only do what they are told to do – they can't improvise<br><br>Although robots can be superior to humans in some ways, they are less dexterous than humans, they don't have such powerful brains, and cannot compete with a human's ability to understand what they can see. |
| Kirobo | Voice and speech recognition, natural language processing, speech synthesis, and telecommunications are among the capabilities of the robot, as are facial recognition and video recording. | It could not climb into the spacecraft on its own. |
| T-52 Enryu | Preparing for rapid rescue operations under any catastrophic circumstance.<br><br>It also helps to clear the road for other vehicles to pass. Finally, T-52 Enryu | Because it is controlled by a human, the robot does not have a programme. Installed in it, does not need to be taught how to operate, and does not |

| | | |
|---|---|---|
| | can rip doors off cars, allowing people to exit. It is mostly used in areas where people might be too afraid to go. [47]<br><br>Master-slave control: This method transmits human movements directly to the machine from a control center, giving the machine more human-like motion. This method is very efficient when there is a risk of further collapse in the damaged area. To control the robot, the operator does not need to be inside it. [33] | have any sensors to assist it in seeing. It does have a camera to help the human see where it is going when the human is controlling it with a remote. |
| Actroid | Nonverbal methods are used to increase interactivity. When addressed, the interactive Actroids use "floor sensors and omnidirectional vision sensors" to keep eye contact with the speaker. Furthermore, the robots can respond to body language and tone of voice in limited ways by changing their own facial expressions, stance, and vocal inflection. | The skin is made of silicone and appears to be very realistic. The compressed air that powers the robot's servo motors, as well as the majority of the computer hardware that powers the A.I., are located outside of the unit. This is one of the reasons for The robot's inability to move around. The Actroid is always represented seated or standing, with substantial support from behind. |
| HRP-4C | She can move like a human, thanks to 30 body motors and another eight for facial expressions. Miim can also recognize | She is unable to move her hands flexibly and comfortably while dancing. |

| | | |
|---|---|---|
| | ambient sounds and respond to speech using speech recognition software. | |
| | | |

## 2.6 Similarities and differences

Table 5. Illustrates similarities and differences between robots.

*Table 5. Similarities and differences between robots.*

| Name | Similarities | Differences |
|---|---|---|
| Asimo | Bots are similar in that they carry out their own operations in their own environment. The vocalization process in bots is similar. | Robot algorithms differ in the programmed analysis of performing tasks related to each robot separately, as well as the method of performing tasks, and each robot differs from its robot friend in terms of shape, color, type, weight, and size. |
| T-HR3 | | |
| Kirobo | | |
| T-52 Enryu | | |
| Actroid | | |
| HRP-4C | | |

# 3. Results of the review

In total, the comparisons resulted in a study of the differences, similarities, advantages, and disadvantages between the robots, in addition to presenting a brief history of robots in Japan, and their communication with humans. However, in this era, robots did not communicate with robots like them! Here we suggest adding an algorithm for the robot to recognize its robot friend, for example, the robot T-HR3 talks with the robot Kirobo about the data recorded by Kirobo at the space station. A person intervenes in their conversation by participating, not by interrupting, or by programming codes that will impose dialogue between them. The dialogue will be similar to the process of identifying, then perceiving the recipient, and finally transmitting the analyzed data through the dialogue.

And perhaps the machine should be freed from its maker so that it can improvise automatically by asking and answering, which will take a random time in the journey of the cameras that express the sight.

So we draw the process of talking between the robot and its robot friend, whether they are of the same type or different from each other. Creating possibilities for collecting and analyzing previous data and storing its information, then creating an increasing relationship between the two parties and engaging them in a dialogue, so the programmed algorithms will intertwine, and the dialogue between them will flow into an acquaintance with the types of experiences available to robots. Thus, a whole world of robots capable of communicating with each other and with humans will be created.

Then, the study of the behavior of machines with each other, their pattern of thinking between each other and humans, the method of making the necessary decisions, as well as their support for each other and their dealings in certain situations by transmitting verbal information and the ability to improvise and simulate the thinking of algorithms that recognize the surrounding world through them, will be achieved.

From here, the sequence paths start to form the robot's journey in the future, and indeed it will include three abilities: the first: the ability to learn, which results in observation, conclusion, and analysis, and second: the ability to recognize, which results in distinguishing between physical objects, and making names and familiar gestures. Third: The ability to discover the surrounding world, and Herein lies the problem of determining the place, as the robotic maps of places are still confined to certain places, and only open specific horizons for the robot, because the robots need huge data to identify the surrounding place, deal with them, and solve them in the coming years. It results in an ability that every robot lacks, which is improvisation, and so the robot will come to recognize data outside of its framework around it.

Algorithms are the building block of a robot, and an algorithm is a map that defines how a specific, well-defined task can be accomplished. It is a way to solve a problem. It depends on a set of mental and mathematical operations, whether simple or complex. Takes into account a specific value or set of values as input, and outputs a specific value or set of values as the final output.

Simply put, the algorithm is a problem-solving skill, and it is a set of steps that can be taken to solve a specific problem or finish a specific task.

A robot algorithm's main objective is to explain a process for manipulating a portion of the real world—the workspace—in order to accomplish a specific objective, like the spatial arrangement of several physical objects.

The robot's thinking brain is generated by algorithms, and the functions of the algorithms are to prioritize and draw attention to specific things. Similarly, to be able to classify and associate variables in certain categories, find relationships between variables, and then filter by extracting the required information.

# 4. Discussion on projects future

## 4.1 Feelings, emotions and sensations

Sometimes feelings fuel actions and sometimes feelings have nothing to do with actions.

Several kinds of reception are expressed through sensation: smell, taste, touch, sight and hearing. All of these convey to humans information.

Sensations come directly from the senses and are somewhat limited. If you feel love for a person, you should embrace or kiss him, but if you love him and you don't, this does not mean that you do not love him. So, love is a feeling and its sensations must be felt physically, such as smelling the scent of your loved one, the smell of your parents, your wife, or your grandfather's house. The sense of smell is connected to feelings. For instance, if you see someone who resembles someone you prefer, you can love them in principle, even if you do not know him. Philosophers say this is similar to love. Similarly, the sound of music or singing, whether with preferred or disliked music, is what determines or instigates feelings. Love, as a model, is a symbol, representing many feelings. However, it is separate from life. For example, if someone we love dies, and we still love him after his/her death.

Emotions are the key controllers of people. They are a direction or inclination of feelings towards a specific thing that may be love or hate. Emotion pushes a person to do a certain behavior in favor of the thing he loves or hates. Emotion is also a relatively stable emotional regulation that is accompanied by some pleasant experiences. What is hated and what revolves around it is the emotional outbursts that may be an image, a person, a group or an idea.

The above does not define the feelings, emotions, and sensations of the robot, because the robot does not have the senses of taste or smell yet. Rather, we can plan for storage, that is, we keep juice, water, a drink, or a plate of food that accepts storage in the robot.

Love is instinctive for a robot because it is a friend to any human being who recognizes it, and this results in a serious defect with time. The robot does not recognize its real owner. And the questions here will be as follows: Can a robot feel an urgent need to communicate when loneliness permeates it? Can a robot be in complete need of safety when it is overwhelmed by fear? Does the robot rebel against its owner's request by completely rejecting it if it had a choice between acceptance and rejection? Can a robot tolerate emotional turmoil if it exists in its algorithms?

## 4.2 Robot race

The ASIMO was first shown running in 2004 [48, 49]. Since then, it has increased its running speed year after year, and the 2011 model ASIMO can travel at a speed of 9 km/h. making a humansized robot like ASIMO run, to move forward by kicking and jumping against the floor like a human being, is a huge challenge.

To address these issues, a new technology was applied to the hardware as well as the gait generation technique [50-53]. High-speed processing circuits, highly responsive and powerful motor drive units, and lightweight, highly rigid leg structures were all part of the hardware. These changes improve the system's overall responsiveness to situational changes.

Honda could create a racing challenge for robots called ASIMO to retrofit the robot and it's not-so-distant return.

## 4.3 Flexing the hands

The problem of flexing the hand occurred with HRP-4C during her dance in the digital content expo. She was able to make acute angles in the first minute and six seconds. Hence, she both needed stretchable material on her elbow to fix programming matters within the tissues of the robot. [SOM 1-2]

## 4.4 Building Construction Robotics

Robotic technology research and use in the construction business has been a promising trend.

By simplifying assignments, establishing a safer work environment, enhancing end product quality, and making the entire process more cost effective, this technology can increase the productivity and efficiency of numerous construction jobs [54-55]. Construction robotics research began in Japan in the 1980s with the introduction of single-purpose robots to answer concerns about Japanese construction labor shortages [56].

Following that, robotic technologies were developed progressively and employed to conduct some building activities [54]. Single-task construction robots can conduct a single construction operation such as excavating, concrete leveling, or concrete finishing. Because these robots can only operate in an environment apart from construction workers, they cannot be incorporated into a broader network, rendering the bulk of them incompatible with the construction process. As a result of the advancement of integrated systems, the employment of single task robots gave way to the adoption of parallel robots [56].

The question here is whether this robot can save the building itself from destruction, whether in natural disasters or disasters based on human error?

And could he be able to build on his own without the direct or indirect intervention of humans as well as restoration?

## 4.5 Reach the moon

The robot can go up to the moon accompanied by an astronaut as long as the robot is on top of a spacecraft, it can reach the moon decisively and land on it. For example, the shape of Asimo, the features of Kirobo, and the characteristics of the T-HR3, after the appropriate update of the lunar atmosphere, all can make a full landing on the surface of the moon.

## 4.6 Suicides prevention

In Japan, suicide (自殺, jisatsu) is seen as a big social concern. [57-58] in 2017, the country had the OECD's seventh highest suicide rate, at 14.9 per 100,000 inhabitants, [59], and in 2019, it had the G7 developed nations' second highest suicide rate. [60] However, on a global scale, Japan ranks 49th in terms of suicide rate, having a lower suicide rate than several other wealthy nations. [61]

Suicide rates skyrocketed after the 1997 Asian financial crisis, increasing by 34.7% in 1998 alone and remaining quite high for more than a decade. [57] Suicide rates have consistently fallen since peaking in 2003, reaching their lowest level on record (since 1978) in 2019. [62] Suicide rates in Japan increased by 16% between July and October 2020, attributable to a combination of COVID-19-related variables. [63] Suicide is the primary cause of mortality in men aged 20-44 in Japan [64], accounting for 70% of all suicides [65]

The robot will play an active role in preserving the life of his friend, and perhaps a robot will be made that represents a rescue web in the form of a cobweb under Mount Fuji to save what can be saved.

**Note**:

In all discussions of future projects, there is competition between robots and humans. However, on the contrary, what prevails in the image is cooperative, because the number of robots is still few compared to the population of Japan only.

Competition is not possible unless the number of bots increases dramatically.

The collaborative scene is what has dominated the world of robots and humans.

## 5. Conclusions

In this paper, there are various scenarios from the first robot formation journey in the brief history of robots until reaching a proposal for the expected results of including an algorithm that introduces the robot to its robot friend, and allows for ideal communication between them.

Previously, we have discussed various comparisons, analysis, and informative details related to the robot planet in Japan. Thus, we have achieved a comprehensive review of what will happen in the psychology of the robot and the expected sequence for the production of robots. Furthermore, we have understood its use of human technologies such as feelings, emotions, sensations, and the challenges we face in the cooperation between it and humans so far.

## Author contributions

Conceptualization [M.S.]; methodology [M.S.]; software [M.S.]; validation [O.E.]; formal analysis [M.S.]; investigation [M.S.]; resources [M.S.]; data curation [M.S.]; writing—original draft preparation [M.S.]; writing—review and editing [M.S.]; visualization [M.S.]; supervision (O.E.];

project administration [M.S.]; funding acquisition [M.S.]

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## Conflict of interest

The authors declares no conflict of interest.

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