Triple Analysis of Artificial Intelligence and Robot

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Abstract: With the rapid development of modern society and the strong support of national policies, the development of artificial intelligence has entered a new stage. Meanwhile, the robot is getting closer and closer to the masses of the people. This paper adopts the method of qualitative analysis to analyze them and their association. The chief aim of this paper is to better clarify artificial intelligence and robot, and pave the way for future robot development. Based on artificial intelligence, combine the robot with some emphasis.Then according to the relationship between artificial intelligence and robot, composition of robot, robot development based on ROS and the development of artificial intelligence and robot four aspects to illustrate my point.This analysis shows artificial intelligence is not the same as the robot, but they are inseparable.In conclusion,artificial intelligence gives robot the ability to think, robot accept the outward manifestations of artificial intelligence.And coupled with the knowledge of other subjects will produce a comprehensive field of intelligence. This has important practical significance.

1. Introduction

Both artificial intelligence and robot are branches of computer science, which emerged in the mid-20th century.In many cases, many people confuse the definition of artificial intelligence and robot, simply thinking that they are talking about the same thing.But the definition of them has not been uniform, each has its own characteristics. It is easy if you understand these two branches by definition. On the surface, artificial intelligence and robot are two different disciplines, which have developed independently and achieved good results.With the development of economy and the prosperity of the country, in the development of modern software, artificial intelligence is more and more closely related to robot. In the recent research on artificial intelligence, the development trend of the application of artificial intelligence in special robot is further forecasted, and some assumptions and prospects are put forward.With the development of artificial intelligence technology, robot is applied in many fields, the importance of artificial intelligence to robot is self-evident, especially in the natural language understanding, machine learning, artificial neural networks, machine vision, intelligent scheduling and wisdom study.And the robot are widely used in more and more fields[1].

There are so many subjects involved in the research process of artificial intelligence and robot that the development of them has gradually penetrated into the learning field of high school students.For those of us who are the future leaders of our motherland, we not only need to have a detailed and in-depth understanding of the definition and difference between them, but also need to understand the development and status from ancient times to present.It provides theory and foundation for future research, and to be ready to make contributions to the motherland's science and technology.

2. The Relationship Between Artificial Intelligence and Robot

2.1 Definition

Artificial intelligence is a edge discipline and frontier discipline, belongs to the cross of natural science and social science.It involves computer science, psychology, philosophy, linguistics, mathematics, information theory, cybernetics and other disciplines. On the macro level, it is a new technical science to research and develop theories, methods, technologies and application systems for simulating, extending and expanding human intelligence.Research in this field include robot, speech recognition, image recognition, natural language processing and expert system, etc.. In simple terms, artificial intelligence can only is a program, an algorithm.This artificial intelligence algorithm can solve the problems of learning, perception, language understanding and logic thrust.Generally speaking, artificial intelligence can be divided into strong artificial intelligence and weak artificial intelligence[2]. At present, what we see is weak artificial intelligence, which focuses on a certain field and makes decisions quickly according to parameters such as road condition and speed.While strong artificial intelligence is able to think and solve problems like human beings.One day strong artificial intelligence will be like the robots we see in science fiction movies, possessing judgment, emotion, strong learning ability and so on.

A robot is a machine that performs a task automatically, either fully or semi-automatically.It can be directed by a human, run a preprogrammed program, or act according to a program of principles developed using artificial intelligence.The robot's judgment and decision are determined by the human to limit the conditions. In other words,people create it. Its task is to assist or replace human work, such as production, construction or dangerous work.

2.2.Relationship

Artificial intelligence is not the same as robot.Artificial intelligence is a macro concept, not a working machine. And it seeks to understand the nature of intelligence and to generate a new intelligence that responds in a similar way to human intelligence.Robot, on the other hand, are programmable machines, usually able to perform a series of actions autonomously or semi-autonomously.

With the progress of era, the development of science and technology, artificial intelligence and robot both promote each other, mutual fusion, gradually forms the inseparable relations. Summed up in one word, artificial intelligence gives robot the ability to think, robot accept the outward manifestations of artificial intelligence.In other words, robot is a carrier of artificial intelligence and a specific application of artificial intelligence. Artificial intelligence gives the robot ability to study and think, so the brain of the robot is equivalent to artificial intelligence.By constantly collecting data and reasoning, planning, perception to simulate the activities of some human perception, the robot brain gets more and more smarter. Such as baidu brain and Google brain. The body of the robot, named the mechanical shell, is composed of different shapes of the mechanical body and

various actuators and sensors. After receiving specific instructions, the robot replaces the human to complete specific tasks."Artificial intelligence" robot can make judgments and give reasonable feedback based on random situations, such as a sweeping robot that can avoid obstacles on its own.But even if artificial intelligence is used to control robot, artificial intelligence algorithms are only part of a larger robotic system, which also includes sensors, actuators and non-ai programming.In real life, there are some robots that are not the carrier of artificial intelligence, such as simple dancing robot. In industrial and military fields, there are also some robots that do not contain artificial intelligence, only are the extension of automatic control technology.

3. Composition of Robot

Our ideal robot is mainly seen in the movies, and almost the robot is imprinted in our mind with such images. Such as the terminator, the inflatable robot baymax, the transformers bumblebee and the beauty robot Ex Machina and etc.. These robots resemble humans in form.But in real life, the widespread use of the robot is not necessarily the human form. For example, entertainment integrated intelligent sensor robot teaching, clean aseptic sweep and judgment of the robot, a common applied to industrial production of collaborative robot, turtlebot mobile robots and public service robots. The public service robots we will meet in hospitals, shopping malls and other large public places.In addition to these, there are some unusual academic and scientific research robots, such as the bee robot at Harvard University and the automatic blood sampling robot at rutgers university.Moreover, China holds the Chinese robot and artificial intelligence competition every year, and many excellent high-tech robots emerge at the competition.

3.1.Classification of Robot

The various types of robot can be roughly divided into two categories:

One is the industrial robots, the so-called industrial robot is facing the industrial field of multi-joint robotic arm or multi-degree of freedom robot.

The second is special robots. Special robots are all kinds of advanced robots that are not only used in industrial robots, but also used in non-manufacturing industries to serve human beings. Including service robots, underwater robots, entertainment robots, military robots, agricultural robots and air robots. Aerial robot, also known as unmanned machine, is a kind of special robot. In the military robot family, drone is a field that has the most active research activities, the greatest technological progress, the largest investment in research and procurement funds[2].

3.2. Composition

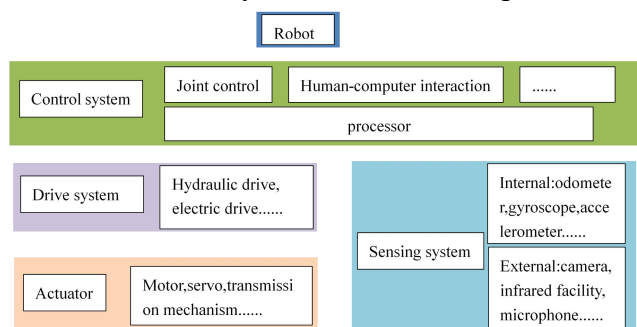From the perspective of control, the robot system can be decomposed into four parts. See Figure 1.

Figure 1: The composition of robot.

1. Actuator: It is equivalent to human hands and feet and this is a mechanical device that is directed at the working object.It includes some devices that can make the robot move, such as motor, servo, transmission mechanism and so on.

2. Drive system: It is equivalent to the human body's muscles and tendons. Its duty is to drive the actuator to convert the commands issued by the control system into signals required by the actuator. Such as electric drive, hydraulic drive, pneumatic drive and other related drive equipment.

3. Sensing system: It is equivalent to the human body's senses and nerves, mainly to complete the signal input and feedback. The sensing system can be divided into internal sensing system and external sensing system. The internal sensing system is used to perceive the robot's own state, such as the robot's speed, acceleration and travel distance. The external sensing system is used by robots to perceive external things, such as camera, infrared facility, microphone and other external sensing equipment.

4. Control system: It is equivalent to the human body's brain. It is used to achieve the tasks and information processing. Then the output control command signal is translated. It has a processor that is a hardware platform for handling various complex algorithms. On top of the processor are various functions to be completed, such as robot joint control, human-computer interaction, system supervision and so on[3].

The driving system drives the operation of actuator. Under the perception of internal and external sensors and through the coordination of the control system, it finally acts on the working object to complete the specified action. This is the control loop of robot.

3.3. Application of Artificial Intelligence in Robot

For the robot system, the problems to be solved by artificial intelligence mainly include the following aspects:

1. Recognition process, the information input from the outside world is transformed into the formal (information storage form in the brain) conceptual logic information. Such as dynamic and static images, sound, speech, text, touch, taste and so on.

2. Intelligent operation process. Input information to stimulate self-learning, information retrieval, logical judgment and decision making.Then produce corresponding response.

3. Control process. Translate the response to be output into body movement and media information[3].

4. Robot Development Based on ROS

4.1. Introduction of ROS

The full name of ROS is Robot Operating System. The designers of ROS express ROS as ROS= Plumbing + Tools + Capabilities + Ecosystem[4].

1. The core of ROS is a distributed and low-coupling communication mechanism;

2. ROS provides a variety of robot development tools, such as MoveIt!, Rviz, Gazebo and etc.,.That can help quickly achieve data visualization, robot simulation and other functions;

3. ROS open source community contains a large number of robot application functions. Such as control, planning, vision, mapping and son on, which can help us rapidly develop functional prototypes;

4. ROS has become a huge ecosystem, covering all aspects of the robot field, and is also supported by more and more third-party tools. ROS provides programming interfaces for languages

such as C++ and Python, which can import artificial intelligence algorithms. And it can provide systematic solutions for robot development.

4.2. ROS Drives the Robot

Taking the navigation of smart car as an example, from the complex algorithm to the specific steps of the car movement:

1. The user uses the mouse to select a navigation target point in rviz;

2. The global planner starts path planning to obtain an optimal path from A to B;

3. The local planner starts to calculate the optimal speed of the robot in each cycle, and tries to get close to the optimal path and avoid dynamic obstacles;

Smart car is also a kind of robot, although the sparrow is small.All the robot movement principles follow the following four steps, but in the specific details will be different:

1. Run ROS function package (algorithm);

2. Control data transmission to the controller of the car;

3. Finish the bottom control in the controller;

4. The control signal becomes an electrical signal and the motor turns.

ROS are not perfect. It is not the whole robot. It mainly operate in the control system.The biggest advantage of ROS is that we can quickly realize the prototype of the system by splicing the interface without paying attention to the internal implementation of functional algorithm. Interfaces are the channel for data transmission. How to send the calculated data from ROS functional package to the real robot and make it move is a key problem.

5. The Development of Artificial Intelligence and Robot

Artificial intelligence is the algorithm and technology needed for "humanoid" robot, which means that the subject of our research is the nature of advanced intelligence, rather than its appearance and auxiliary parts. The application of artificial intelligence in robot is mainly manifested in two aspects, the first is artificial intelligence system integration, the second is multi-information collection.

1. The machine itself responds to external stimulus, this is a original model of combining artificial intelligence with robot.

2. The combination of artificial intelligence and robot, together with knowledge of other disciplines such as bionics. Then there are robots with artificial intelligence, and real robots with humanoid bodies and facial features. Artificial intelligence robot mainly refers to the use of information technology, make the robot poccess human intelligence. Then this robot learn to learn knowledge and master advanced technology. This is a comprehensive field of intelligence. The emergence of advanced artificial intelligence robot has brought rapid development to human society, but people will also worry about whether artificial intelligence robot will use human intelligence to threaten human beings.There has been a heated discussion at home and abroad about how to balance them. For this reason, asimov, a famous American science fiction writer, put forward the "three rules of robotics": Robot must not harm humans; Robot must be absolutely obedient to humans; Robot must protect itself from harm[5]. If we can follow this principle, we can better accept this kind of robot.

6. Conclusions

To sum up, the development of artificial intelligence robot has to go through a long and tortuous process. The main challenge for China's artificial intelligence robot companies is that most of their products are concentrated in the low-end market, and they are sometimes unable to produce more

complex robot. They still lag behind developed countries in Europe. Therefore, China should attach great importance to it, clearly understand the development goal, recognize the international situation, train excellent talents, and effectively use artificial intelligence. It is worth our continuous exploration to find out where the future of robots lies, what exactly is "fake intelligence" and what is "real demand"[6]. With technology changing so much these days, you need to be prepared for the future while enjoying the benefits of technological progress.

References

[1] Sun, Y. L.(2016). On the development trend of artificial intelligence and robots. Journal of Electronic testing, 23, 24-25.

[2] Anthony, E.(2019). The Culture of AI: v. London: Routledge.

[3] Bian, M.J.(2017). Development of artificial intelligence and robotics does not conflict with human employment. Labor security world, 16, 62-73.

[4] Zhen, Y.D.(2019). ROS-based Humanoid Robot. Horizon of science and technology. 6, 57-60.

[5] Sun, J, Zhang, F. & Wang, G.Q. (2017). Proceedings of Discussion on the development trend of artificial intelligence robots in the era of Internet of things(pp. 12-20). Beijing: Higher Education Press. 1.

[6] Xin, J.W.(2018).Artificial intelligence and robots. Science and technology information. 13, 126-130.