

Computer-Assisted Consumer Electronics in Manufacturing and Service Industries: Present Status and Future Challenges

INTRODUCTION

C.Y.J. Chen

King Abdulaziz University, Jeddah 21589, Saudi Arabia
St Petersburg State Univ, St Petersburg 199034, Russia
Taiwan Water Corporation, Taichung 40455, TW R.O.C
Corresponding author's email: jc343965@gmail.com

Abstract: *Developmental robotics for consumers is a significant new discipline that lies at the intersection of biology, engineering, psychology, manufacturing and intelligent robotics. The aim of our study is to provide a robotics review giving engineering professionals and general readers an impression very similar to open procedures, to enable autonomous understanding of delicate photo materials.*

Keywords: *robotics; autonomous sequences; knot tying; force feedback.*

1. INTRODUCTION

Industrial revolution, as the technology advances, machines become human faithful tool, as long as there is sufficient driving force source, it can be day and night does not stop working, but modern technology day by day progress, busy society, there is order instead of Labor force of the machine also is not enough, so machinery is given wisdom, unlike in the past simply to reduce the human labor force, and now, robots will replace humans to complete difficult and complicated, or management tasks, such as use of the submarine robots, space exploration robots, and even Will guide future robotic, mechanical housekeeper and so on [1-7].

Past few years, in Japan, a variety of continuous research and development and human beings engaged in hazardous work and improve human life, intelligent robots have become indispensable in daily life of a link. How they are the way humans use to produce high- tech capabilities with their own robots, and, like humans have the ability to think, but the human and the robot mode of communication is still limited. If the robot to software upgrades, or can automatic learn the human dialogue in order to increase the diversity of human and robot interaction, it might be able to create a world of coexistence between man and robot.

Intelligent robot is a versatile multi-axis automatic or semi-automatic mechanical device can be programmed implementation of production activities, combination with artificial intelligence and sensing technology, to bring human life, health, security, entertainment and other needs.

Intelligent robotics industry is a combination of mechanical, automation, electrical, optical, electronic, information software, communications, security systems, creative content, and other related technologies for a highly technical integration, high relevance and high value-added industry, the future use of the wide range, application, in addition to industrial robots, there are service robots, the upgrading of domestic economic efficiency has an important position.

Asimov robot's three "Law"(law)

The first law - the robot may not injure people or harm while doing nothing fancy. Second Law - the robot should obey all orders of people, but the command when in conflict with the first law of exception. Third Law - the robot must protect its own existence, but not with the first and second law of conflict.

"Three Laws of Robotics" is to protect humans from harm, but Asimov also explored without violating the premise of the three laws of robotics the possibility of harm to human beings. In reality, the "Three Laws of Robotics" as the basis for machine ethics, the current machinery manufacturing industry have followed these three laws.

2. THE JAPANESE PROTOTYPE ROBOTS HONDA

Simulated robot is to integrate high-control theory, mechanical electronics, computers and artificial intelligence, a product of materials science and bionics, is current moving in this direction of the scientific community. Topics related to robots, is common in science fiction works..In 2001, Massachusetts Institute of technology to break the historical tradition, which research and development the world first robot of human feelings Kismet.

2.1 Industrial robot

Today, humans, dirty and tired, too dangerous, too precise, too heavy or too repetitive boring job, often by the robot do the job. In the manufacturing sector in the factory assembly line on the application of a number of industrial robots, and other application areas include: construction, oil drilling, ore mining, space exploration, underwater exploration, clean-up toxic material, search and rescue, medical, military fields. An industrial robot can include only one link between feeling and action, and this link is not controlled by human hand. Robot's movements may be motor or drive (also called effectors) to move an arm, open or close a clip of the action. Such direct and detailed control with the feedback may be external or embedded by the electronic computer or program running on the microcontroller to provide.

According to this definition, all of the automatic device is considered a robot. Industrial Robot can be directly accept human commands can also perform pre-programmed procedures can also be formulated according to the principles of artificial intelligence technology program actions.

2.2 Sweeping cleaning robots

Some robots have been developed purely for the purpose of model simulation of people as these can be either mimic the appearance and movement behavior, and they can be on the thoughts and feelings. In theory, to make the appearance, behavior, thoughts are very close to the real robot, there are insurmountable in the current technical difficulty, but in the future is not impossible. And how to use and control of that class of simulated robots, how will they relate to human relationships, has become a long-term topic of science fiction circles.

2.3 Simulated robot

Ideal simulation of the robot is a senior integration of high-control theory, mechanical and electronics, computers and artificial intelligence, product materials, and bionics, the current scientific research and development in this direction is such as the Atlas of education, entertainment, security, cleaning and other functions in a variety of home cleaning robot Robot visual grounds following different levels of a combination of sub-systems:

- A. processing (Process) sub-systems: including the robot must perform the work, which of their environment and interact with the environment by the need to interface.
- B. Mechanical (Mechanical) sub-system: in order to achieve the robot must perform the required work gear and actuators and so on.
- C. ELECTRONIC (Electrical) sub-system: contains a various of actuators driven and sensors required for electronic components, power supply and so on.
- D. Control (Control) sub-systems: procedures required to perform various work through the relevant software and hardware issued to the variety of actuators, sensors, command and feedback signals in order to maintain the robot system command execution and stability.
- E. Sensor (Sensor) sub-system: provide feedback signals to the control sub-system to inform the location of the robot or other physical components to perform the normal work of the robot and hazard prevention.
- F. Planning (Planning) sub-system: through the integration of various types of sensors to perform a variety of intelligent planning, including the capture action planning, the end effector of the trajectory planning, to avoid collision and so on.



Figure 1. 360 degrees surround sound receiver

In Figure 1, robot head 360 degrees surround sound receiver, to receive instruction to improve the traditional shortcomings of point-type, to ensure the message does not miss a Korea Institute of Science and Technology Research Institute (Korea Institute of Science and Technology, KIST) KIST was established in 1966, which by Mun Sang Kim intelligent robots led by Professor Center (Center for Intelligent Robotics, CIR), the main development humanoid robots and service robots, to develop technology-based intelligent robot, the current implementation of the Ministry of Industry (Ministry of Commerce, Industry, and Energy, MOCIE) ten-year plan, annual funding for a million dollars.

Direction of the laboratory robot development system development and integration of the main, to have the support functions of the human priority, in addition to technology and systems and a complete platform to demonstrate its capabilities and technologies, such as intellectual activity and hearing, people were sensing technology, autonomous control system, autonomous navigation technology, emotional interaction projects the main research laboratories are accredited to the Iraqi military disaster relief robot, robot arm, lifted smoothly and accurately pour the tea kettle robots, hope that the future well-being of the elderly to provide care and other functions.

See figure 2, iRobiQ provides information, entertainment, education and other interactive features. As shown in figure 3, it can help teaching and navigation TIRO. Seen in figure 4, the Robots care for the elderly, is the implementation of inverted tea, very accurate.



Figure 2. iRobiQ



Figure 3. Tiro Robot



Figure 4. *nurse robot*

3. DESCRIPTION

SegaToys and the Hasbro will be held in November 2008 when the market can play music and make movement and luminous robot "Ampbot". Listing areas of Japan and the United States. In the United States under the trade name "A.M.P" (Automated Music Personality). The product has two tires for the humanoid robot that can play music in the user behind the same time with the rotation, with dance music. In addition to the built-in music player, but also be able to add portable music player. You can use the remote control. 17 sensors built body, 4 motors, with obstacles and take appropriate action detection function.

Facial with LED. 12W music power with the power amplifier, a diameter of 165mm midrange speakers and two tweeters. Play a bandwidth of 17Hz ~ 20kHz. In addition, the robot hands are part of the wheel, the left hand section is used to switch modes and adjust the volume, such as right-hand part of the arrangement used to increase the sound operation.

Type of robot

Aging population, declining birthrate and industrial has come an era of labor shortage, countries conduct more resources into intelligent robotics research and development, and in response to the potential impact of industry and society, and expect intelligent robotics industry can drive economic growth. The development of intelligent robots, mainly towards the "service robots" and "industrial robots," the development of service robot in the development of industry can be divided into individual household (Personal / Domestic) and professional use (Professional) service robots. Domestic service robots, including toys, life partner, home security, vacuum cleaners, education, entertainment and other product; professional use, places of national defense, agriculture, medical, logistics, mobile platforms as the main application areas (IFR Statistics, 2009). Industrial robots are mainly used for many years to assist the implementation of human 3K (dangerous, dirty, boring) job, or to improve production efficiency. In recent years, due to lack of work caused by the effects of the future, the development of industrial robots are to enter the fast transition, integration of sensors and intelligent control technology, to help deal with more complex and more challenging production operations.

Use of robot

Intelligent robots can be classified according to function into industrial-type, two types of service. Japan, U.S., and Europe and other countries because the auto industry booming demand-driven industrial robots. Service robots will be used in home care, preservation, clean, interactive learning, medical services, fire rescue and building control, manufacturing handling, police or military investigations and agricultural purposes. About the use of intelligent robots is divided into two cases: one to replace dirty chaotic, dangerous environment, or repeat boring human services, such as manufacturing, testing, fire fighting, rescue, police investigation, removal of dangerous explosives, military defense, environmental cleaning and maintenance, advertising in public places, offices and hospital documents and materials to pass, repeat the cleaning and clean applications such as boring.

The second is to help and assist with inconvenience behavior, improve the living environment is comfortable, such as the care of injured patients, guide, toys, wheelchairs, food service, elderly and disabled assistance.

Ethics of human and robot

Advances in technology, intelligent robots more diverse, a few years robots will be universal, or even every family, which is not good for future development, who do not know, So should begin to establish a standard, people and robots to find a balance.

Robot technology can be developed to what extent ,how humans and robots live together, need to develop robot ethics guidelines to avoid using a robot engaged in improper or dangerous behavior. The purpose of this regulation is to make the peaceful coexistence of humans and machines , rather than limit the development of the robot. The main consideration is the development of regulations to ensure that humanity can maintain control of the robot to prevent the illegal use of the robot, and that can clearly identify the robot.

4. CONCLUSION

Taiwan's high-tech industries strong, have the advantage of development conditions. Intelligent robot (Robot) to replace part of the human work or perform tasks for humans to engage in, a wide range of applications, the implementation of small visceral surgery for surgeons, family preservation, care, big enough to execute combat missions and space exploration and so can using a robot to achieve; At the same time the required technology to many different fields, including precision machinery, tooling, communications, semiconductor, image display, materials, information and electronics, software technology, to create a robot can perform a complete task, not only the technology needs of indispensable integration are equally important. Basically, there are two areas of robotic applications. One is the industrial manufacturing, the other is the relationship with the general life of service more closely with the robot. Taiwan's precision machinery, information and electronics, tooling, optical, medical care and services industries are industries with strong potential for intelligent robot industry is to integrate the many competitive industries the benchmark, so that Taiwan's manufacturing advantages from innovation-driven transformation and then in the next wave of economic development. Currently, the government also set up a "Taiwan Robot Industry Development Association, " the leading main advantage of the new product development projects, industrial technology projects and other measures to help the business community to promote industrial development. Taiwan specialized institution or government should also set up research and development of relevant units of the robot, the robot industry, the high threshold, therefore, still need to integrate the related industries and government departments in drawing up policies to specifically see the future of the industry.

ACKNOWLEDGEMENTS

We gratefully acknowledge the financial support from King Abdulaziz University (KAU) Vice President for Educational Affairs and the KAU funding of Scientific Research, Jeddah, Saudi Arabia.

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