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Today's achievements of modern intelligent robots

Soatov Xalik Sadikovich
Department of Electronics and radio engineering, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Kholmonov Shodiyor Qarshiboyevich
Department of Electronics and radio engineering, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Alimjonov Botirjon Abdulmaqsud O'g'li
Department of Electronics and radio engineering, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Nurmukhamedova Tursunoy Usmonovna
Department of Electronics and radio engineering, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

***Abstract*---**This article is an article written about the various types of intelligent robots that are developing today and their achievements. The essence of the main content of the article also provides a reference on the principles of operation of robot technologies.

***Keywords*---**sensors, effectors, technology, key technology, technology of intelligent development.

Introduction

Intelligent robot has a well-developed "artificial brain," which can arrange actions according to the purpose and also has sensors and effectors. The research of the intelligent robot can be divided into four levels: basic frontier technology, common technology, key technology and equipment, and demonstration application. Among them, the basic frontier technology mainly involves the design of new robot mechanism, the theory and technology of intelligent development, and the research of new-generation robot verification platform such as mutual cooperation and human behavior enhancement. Common technologies mainly include core components, robot-specific sensors, robot software, test/safety and reliability, and other key common technologies. Key technologies and equipment mainly include industrial robots, service robots, special environment service

robots, and medical/rehabilitation robots. Demonstration applications are oriented to industrial robots, medical/rehabilitation robots, and other fields. At the end of the 20th century, the computer culture has been deeply rooted in the hearts of the people. In the 21st century, robot culture will have an immeasurable impact on the development of social productivity, the way of human life, work, thinking, and social development.

A robot is a programmable machine that is capable of carrying out a complex series of activities automatically. An intelligent robot is an intelligent machine with the ability to take actions and make choices. Choices to be made by an intelligent robot are connected to the intelligence built into it through machine learning or deep learning as well as inputs received by the robot from its input sensors while in operation. A new species of robots is emerging called the apricot. Apricots have been used in certain areas of precision agriculture such as fruit harvesting and farm weeding through the development and implementation of visual recognition algorithms on weeds in the farm landscape with deep learning. But the most important angles to look at the quality and risks of robotics are the business impact and social impact. The business impact can be judged by looking at the business process and evaluating whether the robot fits well within the process and actually makes the process more valuable to the user and/or owner. In my opinion the social impact of robotics is the hardest angle to test. Because how can we determine if the social impact is desirable?

Let me give you some examples (both positive and negative) of social impact of robotics. My brother-in-law owns a farm where he has about 200 dairy cows. Since a couple of years he has a milking-robot. This robot uses a regular industrial robot-arm with some laser-sensors to milk the cows fully automatically and 24 hours a day (you will be amazed how often cows want to be milked in the middle of the night!). Not only does this robot save a lot of manual labor and it gathers useful information about the health-condition of the cows. At least as important was the social impact. In “the old days” the farmer had to be at home from 5:30 through 8:00 in the morning and from 17:00 through 19:30 in the evening to milk the cows. Seven days a week! Since the robot took over the farmer has a choice to sleep longer or to go shopping or do whatever other thing. Also it’s much easier to go away for a couple of days, you only need someone (a neighbor for example) who is able to go to the farm when the robot sounds an alarm. But the most continuous impact of the robot being installed at the farm was that the farmer and his family are now able to have dinner together every day at 18:00 hours, as regular families in the Netherlands do.

Unfortunately not all types of social impact of robots will be positive. Think of self-driving cars. Yes, they are robots too. Imagine all cars would be self-driving (and they will be although it’s still difficult to say when the tipping point will be reached). Would there still be taxi-drivers? No! Would you need truck-drivers? Well, maybe you still would need someone to load and unload the truck, but the driving will be automatic. And also think of car-salesmen. Who would still want to buy a car? You can simply order a car when you need one. And if you like some company you order a shared-car (multiple people going in the same direction in one self-driving car). But if you want some quietness you order your own car (and

pay a little extra). So you won't buy and own a car anymore. The self-driving cars will change our society at least as much as the smart-phone has recently done.

Will new jobs be created?
Yes, I think they will. For example think of "robot-trainers". People that assist robots in learning a specific skill. In the future we won't program our robots but simply demonstrate how a task has to be done and give them feedback whether they do it correctly. Another new job is "robot-psychologist". We will need to teach robots what behavior is seen as correct and what isn't. For example the Spencer-robot that helps transfer -passengers at Schiphol Airport to find their way from one gate to the other. Spencer has learned not to walk between people that are standing opposite of each other and one of them is holding a camera. And more important psychological dilemmas will also arise and be dealt with. The group of people that will experience the biggest social impact of robots are children. Robots will enter schools and assist children in learning. But robots can also take over tasks. Children will quickly find out that robots are very good at making homework. Would that be a good or a bad development? It wouldn't be difficult to find many more examples of impact of robotics on our social lives. What really intrigues me is how can we "test" whether a specific impact is good or not?

Conclusion

To be able to determine if something is good or bad we need some sort of specification of what is good. But "good" depends on many things. For example on your social values. Also "good" will differ over time. Currently we may not like it when robots take over jobs of taxi-drivers. But if robots do the work so much more efficient that we only have to work one day a week to earn our salary we may actually like robots very much and spend a lot of time on doing things we really enjoy.

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