I. Larionov, Student
V. Spivachuk, PhD in Engr., As. Prof., research advisor
Khmelnytsky National University

AUTOMATION AND COMPUTER-INTEGRATED TECHNOLOGIES

We want to take direct part in the development of information and telecommunication networks, to introduce computer technologies and automated control systems in all spheres of production and human life, and the specialization "Automation and computer-integrated technologies" is exactly for us. Students of this specialty thoroughly study special sections of mathematics, methods of theory of management, decision making and artificial intelligence, modern information technologies, computer systems and networks, methods of processing and protection of information, advanced programming technologies and microprocessor technology. Graduates of the specialty "Automation and Computer-Integrated Technologies" successfully work in design and development organizations, research institutions, computer centers, industrial enterprises in various fields of production, telecommunication enterprises, transport, in the departments of the Ministry for Emergencies, where they apply automation systems, in the emergency system "112", in the services of telecommunication systems and information technologies maintenance, in the field of software development and management.

The specialty is in all Ukrainian universities. Especially it is widespread in universities in the East, because the branches in which it is used are very common in the Eastern region of Ukraine.

Graduates of the specialty "Automation and Automation on Transport" receive basic scientific and practical training, which allows them to engage in the design and maintenance of automation systems for various technological processes, including automated train control systems. The training of specialists is aimed at studying the principles of building information management and telecommunication systems, studying and improving existing ones, as well as developing new systems of railway automation, studying the technology of operation and repair of such systems.

During study, students acquire knowledge of microelectronics, microprocessor technology, mastering modern computing, information technology, communication systems, microprocessor and relay control systems in railway transport.

All disciplines include a sufficiently serious theoretical part and practical training. Many special disciplines are preceded by the study of natural sciences, mainly physical and mathematical and electrical engineering disciplines.

Theoretical training is supported by laboratory and practical classes. In addition, during their studies, students undergo training, technological production and pre-diploma practice at specialized enterprises and receive appropriate practical skills.

Graduates of the department work in the distances of signaling and communication on railway transport, in design and development organizations, research institutions, computer centers, communication enterprises, various industrial enterprises, where automation systems are used.

Automation – the main technical direction and indicator of the technical level of modern production, because it reflects the content of scientific and technological

development of mankind: the replacement of man with technical means directly in the production environment.

The directions of automation of technological processes are quite diverse. The most characteristic features of modernization automation are the rapid development of robotics, rotor and rotor conveyor lines, flexible automated productions that provide high performance.

Robotics – is the creation of technical systems, similar to some of the most important systems of the human body.

In robotics a lot of things are developing, here are just some of them:

• Sensory technology - creation and use of artificial sensory organs for robots;

• section of artificial intelligence and informatics - training of robots for elements of mental activity of a person;

• mechanics – development of mechanical manipulators;

• industrial robotics, or robotics, - designing manipulators ...

Robotics as the highest level of automation of production processes is a prerequisite for the creation of desertuous industries.

The US company Stratasys in 2016 developed a new BD-printer, capable of creating products of various shapes and sizes. Thanks to the three-dimensional Infinite-Build printer, you can not only create the necessary parts in single instances, but also start batch production.

The first Ukrainian auto-mobile unmanned ground on the basis of KrAZ-Spartan successfully passed the test and is ready to replenish the military equipment of the Armed Forces of Ukraine.

The combat machine is operated with the help of the Ukrainian autopilot Pilotdrive. It is equipped with a thermal imaging with automatic zoom function, a video camera with 360 ° coverage, a human presence sensor in the radius of 18 m, rangefinder. These sensors allow you to determine the width of the road and obstacles. The reaction to them is triggered instantly.

You can control a drone using a tablet, "smart gloves" or a camcorder station. Car connection is via WiFi / Wimax, range from 10 to 50 km. In addition, the SmartDrive software and hardware package has the ability to memorize a given route. Its coordinates are transmitted via GPS through the satellite

The new Komatsu dump truck can be called a new generation unmanned car. The driver's cab completely disappeared from the design, which makes the dumper completely unmanned vehicle. In addition, the engineers of the company have developed a new design of the car, which provides more efficient load distribution and road clutter.

Equipped with engines with a total capacity of 2700 hp, an unmanned dump truck is capable of developing a speed of 64 km / h and with a payload of 230 tonnes. It is important that the obstacle detection system can take into account (process) the surrounding environment on all sides of the machine, which gives the ability to dump truck in any direction without the help of the driver or operator.

Now multivarts, washing machines and dishwashers, refrigerators, which can be controlled from a smartphone, a robot vacuum cleaner and even a "smart house", which itself installs and regulates the temperature, light and other modes of life of their masters, is a common reality.

For the first time the term "robot" was used by the Czech writer Karel Chapek in his play "R. U. R "at the beginning of the 20th century, calling so mechanical people.

The first project of human-like work was developed around 1495 by Leo-Nardo da Vinci, whose records contained detailed drawings of a mechanical knight capable of sitting, moving his head and hands, and opened the door.

The first robot-android playing the flute was created in 1738 by a French mechanic and inventor Jacques de Woaksonson. And in 2017, Dubai's first job policemen began to work as field policemen in certain situations.

Robot-humanoid (humanoid robot) is a car, the chassis (chassis) which is executed in the form of a human-like body. Humanoid design is predetermined for a certain purpose: functionality - for use of human instruments or human life environments; with experimental purpose - to study the straightforwardness; with a medical purpose - studying the influence on the body of certain loads, etc. In general, humanoid work has a torso, head, two hands and two legs; although some types of humanlike robots can only model part of the body, for example, from the head to the waistline. Some human-like work can have a head designed to replicate human facial features (such as eyes and mouth, etc.).

In September 2005, the first human-made works of "Vakamaru" produced by Mitsubishi Company were first released for free sale. A $ 15,000 robot is capable of recognizing individuals, understanding some phrases, giving references, performing some secretary functions, and monitoring premises.

Industrial (industrial) work in recent decades has almost completely replaced human labor in a variety of industries, especially in technological processes, which require precision accuracy, speed and uniformity, the repetition of operations - in engineering and processing of materials, in the production of microprocessors, and even in such technologies as production or drawing up of paper-cardboard containers.

Household robot – a robot designed to help a person in everyday life. At present, the distribution of domestic robots is small, but futurologists predict their widespread use in the near future

The following commercial models of household robots are known:

• work-toys;

• social work that can interact and communicate with people in an autonomous or semi-autonomous mode;

• work assistants, for example:

• work-cleaners (robot-vacuum cleaner, robot for floor washing [6], etc.)

• Robotic lawn mowers

• works for pool cleaning, sewer pipes, etc.

• A combat robot (or Military robot) is an automatic device that can replace a person in battle situations to save lives or to work in conditions of increased difficulty for people for military purposes: reconnaissance, combat operations, demining, etc.

• Combat works are not only machines that partially or completely replace a person and are able to perform anthropomorphic actions, but also those operating in air and water environments (airless unmanned aerial vehicles, submarines and surface ships). The device may be electromechanical, pneumatic, hydraulic or combined.

REFERENCES

1. First robot policemen on Dubai streets [Електронний ресурс] // Vido.com.ua. – 2017. – Режим доступу до ресурсу: https://vido.com.ua/article/14958/piershii-u-sviti-robot-politsieiskii-na-vulitsiakh-dubaya/.

2. Karel Chapek [Електронний ресурс] // The Gale Group. – 2010. – Режим доступу до ресурсу: https://encyclopedia2.thefreedictionary.com/Capek%2c+Karel.

3. Military robot [Електронний ресурс] // Wikipedia.org. – 2018. – Режим доступу до ресурсу: https: // uk.wikipedia.org / wiki/ %D0%91%D0%BE%D0%B9%D0%BE%D0%B2%D0%B8%D0%B9_%D1%80%D0%BE%D0%B1%D0%BE%D1%82.

4. Robot-humanoid [Електронний ресурс] // Wikipedia.org. – 2016. – Режим доступу до ресурсу: https: // uk.wikipedia.org / wiki / %D0%A0%D0%BE%D0%B1%D0%BE%D1%82-%D0%B3%D1%83%D0%BC%D0%B0%D0%BD%D0%BE%D1%97%D0%B4.