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МАТЕРІАЛИ XI ВСЕУКРАЇНСЬКОЇ НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ СТУДЕНТІВ АСПІРАНТІВ ТА ВИКЛАДАЧІВ ЛІНГВІСТИЧНОГО НАВЧАЛЬНО-МЕТОДИЧНОГО ЦЕНТРУ КАФЕДРИ ІНОЗЕМНИХ МОВ

“TO MAKE THE WORLD SMARTER AND SAFER”

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POPULAR TECHNIQUES IN OBJECT RECOGNITION

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Creating artificial intelligence is the most challenging task in computer science nowadays. If we review the ideas of science fiction writers, the task of computer vision will be described as a valuable one. Basically, computer vision is a process of object localization and recognition.

The object in computer science is a name of data structure that can be identified. Localization of the object is searching for the subwindow that covers the object of interest. Step by step the frame moves on the image in programmed direction. The classifier gets information about negative scored background that must be known in advance. When the classifier finds positive scored unknown element that must be marked as object of interest, the step decreases for each iteration, until the classifier finds the background again. Subwindows in specified forms can not cover the object of interest tightly. As a result, the desired subwindow around the object may not be optimal. This task has inspired a great number of scientists to create different algorithms for optimization subwindow size or to avoid sliding-window techniques using the so-called swarm optimization. The swarm in computer science is a set of points chaotically spreaded on the image. All of them get the information about positive or negative featured parts of picture. All points get closer to the object on every step of spreading.

But as for recognition task, human imagination creates really fantastic technologies to answer the challenge. There are two popular solutions: intelligent expert system and neural network. Expert system is a system based on the images vector representation, where every pixel gets its number in RGB color system. Texture classes must be set at the beginning of the experiment. They are called training matrix and they are used to find out the background of the image, which also needs to be represented as a matrix. All matrices should be transformed to binary interpretation with the help of specified tolerance system. Then the etalon vector is counted for

every training matrix. It helps classifier to guess the radius of the container in multidimensional space and to make decision to what specified classes the image fragments belong.

The neural networks is considered to be a very popular technology nowadays. It`s common knowledge that scientists are inspired to make inventions which are linked to nature creatures. It Submarines, sonar and planes are the best example. In the computer sciences and object recognition the best instrument for image processing and recognition is human brain. Neurons that are organized as networks in our heads are used to direct impulse from the starting neuron to the correct finishing one. It means that our brains are being trained throughout the life to connect the input and output neurons and to rapidly make decisions about the object as soon as we see it. This logic was implemented in computer realization as a system of a neuron layers formation, which is used to find out suitable weight coefficients on the entry layer for every input signal to direct it to the correct output layer.

To find out the pros and cons of that technique, let`s review main types of neural networks. The main difference in networks is if it is supervised or not. For the supervised one the supervisor, who controls the training process, needs to mark correct and incorrect recognitions for network to be able to make corrections by itself. It`s unnecessary for unsupervised networks, but it may result mistakes in final recognitions.

Trained network can recognize objects extremely fast. There is one problem – most of the networks can find classes, which are already known. If there is unknown input signal, feedforward network will try to direct it to the most similar exit neuron. Such task can be done with the help of counter propagation networks. Recognition process in such networks works with both input and output neurons, sacrificing the recognition speed. Links between neurons form a line from the input layer to the output layer for known classes and vice versa for the detection of unknown classes.

Computer vision is one of the most interesting and difficult tasks for scientist nowadays. But it only means that the numbers of

scientists will increase in future and the problem will be solved. It would be a great step for creating the artificial intelligence.

THE USE OF NANO-ROBOTS IN MEDICINE

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Today, more and more people question the treatment without surgery. Thanks to modern research and the efforts of scientists a new possible way to use nano-robots was invented. The first thing to know about nanorobots in medicine is that they're not like the robots you're probably imagining. Scientists who build nanorobots are building tiny packages that can complete tasks in an automated way.

The design and use of such devices will bring a number of advantages. Moreover, they will provide medication or, at least, control or reduction of the impact of diseases. Also they will provide valuable empirical evidence for improvement and further development of such machines. Practical information received from these transactions at the microscopic level will eliminate a number of false paths and point the way to more effective methods in solving the problems inherent in working at this level.

Firstly, we must decide which way to introduce these robots into the body. The most likely way is to put them in the blood because the human body is penetrated by blood vessels and capillaries, and sizes of robots almost comparable with them. Another goal is to decide on a way to deliver nanobots to problem zones. There are two options: the first - the robot will get it to the right place automatically, moving through bloodstream, and the second is to manage it using special devices. The very first Feynman prize in Nanotechnology was awarded to William McLellan for building an electric motor that fits within a cube 1/64th of an inch on a side. This is probably smaller than we would need for our preliminary microrobot. One or several of these motors could be used to power propellers that would push (or pull) the microrobot through the bloodstream. We must create design propellers which would not cause damage to tissues. One idea is to create a robot with remote