

Напряг № 6**Проблеми формування й удосконалення окремих криміналістичних методик та використання спеціальних знань у кримінальному судочинстві***Darina Mirgorodska**cadet of the faculty of training specialists for criminal police units, Donetsk State University of Internal Affairs, Kropyvnytskyi, Ukraine**Olha Haborets**PhD, Associate Professor of the Department of Operational-search Activities and Information Security Donetsk State University of Internal Affairs, Kropyvnytskyi, Ukraine***CYBER-PHYSICAL SYSTEMS AS CYBER CONTROL TECHNOLOGIES**

The relevance of this article is the concept of "cyber-physical system". Every year, the real and virtual worlds are becoming closer to each other, forming the technical basis of cyber-physical systems. Cyber-physical system combines cybernetic and physical spaces, integrating computational and physical processes with the help of sensors and actuators.

Cyber-physical systems can mean traditional machines controlled by a computer. The essence of cyber-physical systems is that they connect physical production processes or other processes that require the practical implementation of continuous control in real time, with software and electronic systems [2]. We can say that this is a new edition of the definition of embedded systems. At a new stage of development from the consideration of embedded systems as separate components that solve private problems, which moved to their representation as the basis of the whole process.

Cyber-physical systems may well become the underpinning theory of the new wave of computing. These systems should be able to deliver new levels of performance and efficiency, through sophisticated control and computational code design. For this to happen, we must change our understanding of computers and cyberspace. In the past, we fed our information to computers in a pre-digested form, keystrokes and mouse clicks. But now cyber-physical systems are being actively engaged with the real world and in real time. This requires a new understanding about computing as a big change for computers. In many real-world systems, computational and physical resources are tightly coupled: embedded computers and communication networks control physical actuators that operate in the external world and receive data from sensors, creating an intelligent control loop capable of adaptation, autonomy, and efficiency gains. Such systems are commonly and broadly defined as cyber-physical systems.

In general, in other words, a cyber-physical system is an important component of arbitrary production. It allows controlling both the technical (physical) components and the current characteristics of the process, and provides the ability to direct changes in the production process, including possible deviations from the specified conditions. Using cyber-physical systems, it is possible not only to control the immediate course of the production, technological, organizational process, but also to simultaneously predict their development in the conditions of existing situations and risks, to determine the necessary management in this case, to ensure timely elimination and correction of possible violations before they occurred in reality and stopped the process itself or caused significant changes.

Cyber-physical systems involve close interaction between computing resources (such as computer hardware and software) and physical objects (such as a car, human body, etc.). For example, many cars on the market use a computer-based anti-lock braking system. Cyber-physical systems have the potential to revolutionize many areas, from healthcare to manufacturing to transportation. However, the possibilities of realizing these grandiose ideas are limited by today's computing technology, in particular due to the lack of system reliability and time control [1]. This system usually includes a network of devices that take and perform physical actions while being controlled and monitored by computing and communication software [2].

Computing and digital technologies will soon be found, and play an integral role in, many physical structures and devices. Just as the Internet has revolutionized how people interact with each other and allowed us to connect and trade with each other more easily, cyber-physical systems also have the same potential to change how we interact with the physical world around us. The introduction of the Internet is based on the integration of major advances in networking technology, applications and infrastructure. It can also be seen as the integration of embedded systems, sensors and control systems. Cyber-physical system can be seen as the use of logical and discrete properties of computers to control and supervise continuous and dynamic properties of physical systems. Using precise computation to control a seemingly unpredictable physical environment is a great challenge. The uncertainty and lag from real-time physical system to discrete-time digital control is an obstacle to overcome. Failures or security issues must be localized and dealt with, consider replacing this phrase with the adverb “efficiently” to avoid wordiness. . Synchronization within the system and excessive complexity are also obstacles that must be overcome for the system field to grow. Systems that are designed around trial and error methods must be replaced with more robust and easily adjustable blueprints. Analysis and development are necessary to pave the way for more reliable systems to avoid accidents from occurring [3].

A general scheme of using the capabilities of cyber-physical systems, which is an integral and important part of the "smart" enterprise, is proposed. Cyber- physical system allows tracking the production processes carried out at the enterprise to the smallest detail, and not only the process itself, but also the components that accompany it: logistics, resource and supporting. Thus, the very existence of the systems is a backbone

information factor that supports the validity and optimality of the processes performed at the enterprise.

In addition, the cyber-physical system collects information that can be used to intellectualize production processes, thereby moving from a conventional to a "smart" enterprise, and a qualitatively new form of production characteristic of the digital age that has come.

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