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## **ОПТИКО-ЭЛЕКТРОННЫЕ ПРИБОРЫ И УСТРОЙСТВА В СИСТЕМАХ РАСПОЗНАВАНИЯ ОБРАЗОВ И ОБРАБОТКИ ИЗОБРАЖЕНИЙ**

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<sup>1</sup>*Institute of Information Technology, Baku, Azerbaijan***GENERAL ARCHITECTURE OF DIGITAL TWINS IN MEDICAL FIELD**

The article examines the technology of digital twins and their possibilities. It shows the application and effects of DT in the field of health care. The article proposes a generalized architecture of health digital twins formed by physical and virtual objects with uninterrupted data sharing between them.

Providing citizens with high-quality and safe healthcare services, whether it is the adoption of health decisions or management decisions, has necessitated the introduction of tools to ensure the complex digitization of healthcare. To achieve these goals, a wide range of modern technologies have emerged, and one of them is digital twin (DT) technology. A digital twin is a digital copy of an animate or inanimate physical object. DT allows to test and predict the effects of the application of certain options, solutions, as well as to visualize the obtained results in a convenient form. A connection between a digital twin and its real-life counterpart is required, ensuring a seamless and reliable data flow.

The following basic requirements must be provided for the formation of the DT ecosystem:

- Availability of a Digital Twin Prototype (DTP). This type of digital twin describes the prototype of a typical physical artifact. It contains the information sets needed to describe and create a physical version that duplicates a virtual version.
- Availability of a Digital Twin Instance (DTI). This type of digital twin describes a specific physical product with which an individual digital twin remains associated throughout the lifetime of that physical product [1].
- Many of these DTIs form a DTA and are focused on establishing group behavior rather than an individual product.

Healthcare is one of the promising fields where digital twins can have a revolutionary impact. Digital twins act as a digital copy of the physical object or process they represent, enabling real-time monitoring and evaluation of the process regardless of location. The digital twin is designed to provide more effective medical interventions, assisting doctors and medical technologies comprehend the patient's health status [2]. One of the main conditions for the application of digital twins in medical field is the presence of its physical object in the real world.

By collecting certain data from many physical objects in the healthcare system, it is possible to create their virtual digital twin [3]:

- Patient: genetic data, laboratory tests, medical images, biomedical signals, personal data, social determinants;
- Hospital: medical resources (equipment, medicines, etc.), personnel resources, operational information within the hospital, building layout;
- Data sensing medical devices – sensor data, quality indicators, environmental data.

The architecture of digital twins consists of a physical object, a virtual object and the technologies providing the connection between them. As the amount of sensor data continuously collected from the corresponding physical objects of health digital twins (patient, hospital, doctor, medical devices, organs, etc.) through 4G/5G, Internet of Things (IoT), artificial intelligence (AI) technologies, digital twins are also evolving and provides smarter decision-making.

Figure 1 illustrates a general architecture of health digital twins.

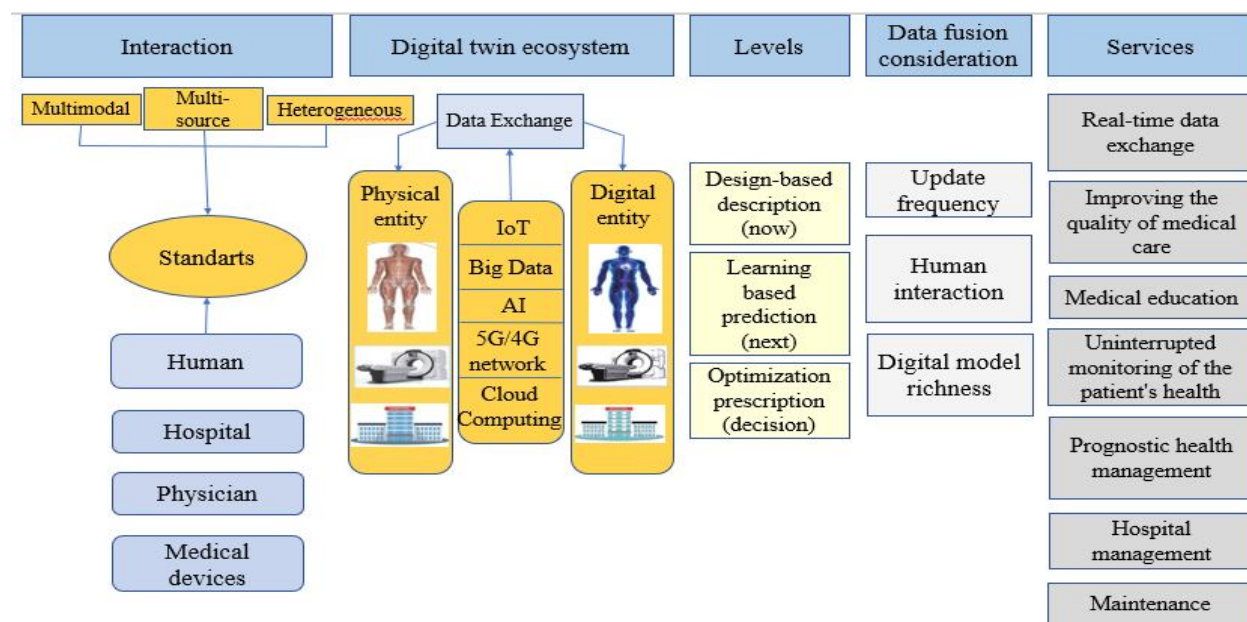


Fig. 1. General architecture of health digital twins

By using the full potential of data sensed from various sources through digital twin technology, a favorable ground is created to fully automate the continuous monitoring and evaluation of the state of health services, decision-making and their implementation.

## REFERENCES

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