USE OF COMPUTER VISION IN SCIENCE AND TECHNOLOGY
Kovalenko A.S., Severyn V.P.

National Technical University «Kharkiv Polytechnic Institute», Kharkiv

Computer vision enables computers to see, identify, distinguish, and process raster images in the same way that humans see them [1]. It's like transferring human intelligence and instincts to a computer. In reality, however, it is a difficult task to make computers able to recognize images of different objects.

Supervised learning helps organizations solve a variety of real-world problems at scale, such as classifying spam into a separate folder from the inbox. Some techniques used in supervised learning include neural networks, naive Bayesian regression, linear regression, logistic regression, random forest, and support vector machine.

Unsupervised learning, uses machine learning algorithms to analyze unlabeled data sets. These algorithms detect hidden patterns or groups of data without human intervention. This method's ability to identify similarities and differences in information makes it ideal for exploratory data analysis, cross-selling strategies, customer segmentation, and image and pattern recognition. It is also used to reduce the number of features in a model through the dimensionality reduction process. Principal component analysis and singular decomposition are two common approaches for this. Other algorithms used in unsupervised learning include neural networks, k-means clustering, and probabilistic clustering methods [2].

Semi-supervised learning includes characteristics of supervised and unsupervised learning. During training, it uses a smaller labeled dataset to guide classification and extract features from a larger unlabeled dataset. Semi-supervised learning can solve the problem of not having enough labeled data for a supervised learning algorithm. This will also help if tagging enough data is too expensive [3].

However, each medal has a downside – in addition to the obvious advantages and benefits of computer vision for science and technology, this technology can be used for dishonest purposes.

Today, tools for creating deepfakes are actively developing. Methods for creating photo and video fakes have existed for a long time, but with the development of deep learning, the process of creating them has become much simpler, and the fakes themselves have become much more believable.

References:

1.	Шапиро Л. Компьютерное зрение. Москва: БИНОМ. Лаборатория знаний, 2006. 752 с.

2.	Кащеєв Л. Б., Коваленко С. В. Графічний редактор InkScape. Побудова фракталів та фільтрів : Навчальний посібник з курсу «Математичні основи комп'ютерної графіки». Харків: НТУ «ХПІ», ТОВ «Планета-Прінт», 2019. 173 с.

3.	Yury Megel, Alexander Kutsenko, Ivaylo Blagov, Svitlana Kovalenko, Sergii Kovalenko, Maksym Malko and Antonina Rybalka "Information System for Automating Processes of Biological Objects Detection, Recognition, and Measurement," 2021 XXXI International Scientific Symposium Metrology and Metrology Assurance (MMA), 2021, Sozopol, Bulgaria, 2021, pp. 1-6.