THE USE OF ARTIFICIAL INTELLIGENCE TO ENSURE THE SAFETY OF LIFE IN THE INDUSTRY

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Abstract. The work covers problems of life safety for enterprises. Describes ways to improve life safety using artificial intelligence (AI). Shows several examples of the application of AI for life safety. Underlines problems of usage of AI.

Keywords: AI, life safety, computer vision, object detection.

Анотація. У роботі розглянуто проблеми безпеки життєдіяльності на підприємствах. Наведено способи покращення безпеки на роботі за допомогою штучного інтелекту. Розглянуто приклади застосування штучного інтелекту у сфері безпеки життєдіяльності. Підкреслено проблеми застосування штучного інтелекту.

Ключові слова: штучний інтелект, безпека життєдіяльності, комп'ютерний зір, розпізнавання об'єктів.

Introduction. As our world becomes more and more digitized so does our ability to connect with it. Every day we see new ways of how technology is integrated into our life. Now employers use it not only to boost productivity but also to ensure the safety of their employees. Existing technology can be used to provide real-time management of workers and processes to ensure safety.

Problem statement. Around 340 million occupational accidents and 160 million victims of work-related illnesses happen worldwide annually, states International Labour Organization [1]. Each one of these cases costs companies money and reputation. So it is not surprising that organizations all over the world are developing new ways on how to prevent or at least to minimize the risk of work-related accidents. Starting from enterprises like Microsoft, Amazon, and ending with Ukrainian startups lots of IT companies around the globe are trying to use the latest AI advances to ensure the safety of workers.

Objectives. There are four ways of how AI-powered algorithms can improve workplace safety and productivity.

- Decrease human error. The human factor plays a huge role in workplace safety, with fatigue and stress readily contributing to accidents.
- Undertake dangerous tasks. As technology advances, drones, robots, and other automated systems powered by AI will be able to complete potentially dangerous and difficult tasks.
- Track worker and object location. Wearable technologies and surveillance systems together with AI can follow workers, oversee one's vital signs (such as heart rate and blood pressure), alert about environmental risks, issue information to remote workers, reduce the chance of injuries, and improve staff training.

● Monitor workplace harassment. It is a fact that happiness correlates with the productivity of a worker. So AI can track worker's behaviour, look for conflicts within the teams, and reorganize them to prevent consequences.

Methods and results. During Microsoft's annual Build conference, several solutions used to improve safety conditions on worksites were presented [2]. A series of demonstrations modelling common situations on worksites were presented there. In the first case, a danger spill occurs at a chemical plant. There are cameras that recognize the incident. Information about the spill is instantly shared with the people who need it the most, enabling them to protect other employees from endangering themselves, by sending a special liquidation team that eliminates the threat. The second case demonstrated how their technology can also be useful in environments like a construction site, where people who need specialized tools are spread out, sometimes across multiple floors. Using cameras this technology can identify a specific tool as well as the closest authorized person who can use it, saving everyone's time and keeping the workflow. The third case showed that this technology also can help keep people safer in hospitals. For instance, patients recovering from heart surgery are limited to how much they should exert themselves. When someone exceeds the prescribed level of activity a nurse is notified. Then the location of the closest wheelchair is identified so that the nurse can quickly get the patient seated and safe. This works because both people and object recognition models are deployed simultaneously.

But not only technological giants are interested in this field. Limpid Armor, Ukrainian IT company specialized in the development of AI solutions, recently shared its experience on the development of a safety violation detection system. They are creating a system capable of detecting people who did not wear hardhat on a production line. Using Computer Vision and object detection their algorithm can recognize violations of predefined safety policy, like wearing a hardhat at special areas of a construction site, and send notification about the violation to a manager or the worker himself.

However, all things considered, we shall not forget that every technology has its flaws. AI and assistive technologies have a true potential to reform the workplace, but at the same time, they introduce additional risk factors that we should not ignore. First, they cause job losses. The more and more technologies we introduce in our work the less there is a place for humans there. Though we are still quite far away from a time when AI will completely deprive us of work, we can already feel its influence. Secondly, AI solutions are not cheap. Last but not least, there still seems to exist a lack of awareness about AI. We need to understand, that AI is not completely error-free, so we should not rely solely on it.

Conclusion. Nowadays we see how digital and physical worlds are coming together to help make everyone more safe, secure and productive. There is a huge room for AI-based solution which improve safety conditions on worksites, and many companies around the world are working to bring them to life. And while there are still problems that need to be worked out when it comes to AI, these are few and far between. Importantly, their contributions to worker's safety and productivity are

certain, and we shall look forward to a day when humans and robots will be colleagues who look after, help and improve each other.

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