Якщо $d_{ij} > 0{,}368$, то ми вважаємо цей фрагмент відповідного фрейма стороннім включенням. Константа 0,368 була обрана, тому що $0{,}368 = \frac{1}{e}$, де $e \approx 2{,}718$.

Для практичної реалізації та демонстрації роботи нашого алгоритму ми використали мову C#, у якій є клас FileStream [2], який має усі необхідні нам методи. Але для реального впровадження подібного алгоритму слід використати мову C або C++, оскільки така програма на цих мовах у загальному випадку матиме більшу швидкодію.

Універсальність нашого алгоритму є одночасно перевагою і недоліком. Недолік полягає у тому, що він не враховує специфічні особливості формату вхідних даних, тому його точність може бути менша, ніж у алгоритмів, пристосованих до конкретного формату даних.

Отже, ми дослідили один із способів знаходження сторонніх включень у деякий послідовний потік даних. Отримані результати досліджень можуть бути корисні у розробці систем безпеки та аналізу даних різних типів.

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USE OF ARTIFICIAL INTELLIGENCE IN THE STOCK MARKET

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Artificial intelligence has not yet captured the world, but already subjugates the world of digital marketing. And this should not be alarming, because artificial intelligence is beginning to perform simple tasks for people and opens up many new opportunities. What are its benefits for digital marketing? It can analyze consumer behavior and search patterns, data from social networks and blogs, help companies determine how customers find products or services, and more.

In the near future, artificial intelligence will be a driving force for many areas of marketing and will give recommendations on products, communicate with consumers, create content. Businesses that have implemented artificial intelligence will be able to reduce staff costs and accelerate growth by bypassing their competitors. And those who are late with the use of this tool are likely to be

uncompetitive. Stock markets are no exception. But in the Ukrainian stock market [1] the use of electronic technologies is not one of the characteristic features that provide high dynamics of operations, significantly speed up settlements, expand the range of participants and reduce risks on the stock exchange.

The stock exchange is an organized, regularly functioning securities market. Stock exchanges are designed to: mobilize temporarily free funds of enterprises and individuals through the sale of securities, to facilitate the movement of money capital between different economic entities [2].

Artificial intelligence is a branch of computer science that includes the development of methods for modeling and reproducing with the help of computers certain functions of human creativity, solving the problem of presenting knowledge in computers and building knowledge bases, creating expert systems, developing so-called intelligent robots.

The history of using artificial intelligence in working with investment projects began in the 1970s in America. Nowadays, with the development of computer capacity, the scope of their use is developing: now machines often make certain investment decisions on their own in many companies that manage the stock exchange. The neural network, on the technology of which the work of the employee of the company managing the stock exchange is based, is developed on the basis of previously obtained real data on the work of the stock market and already implemented investment projects. Each portfolio investment situation is mathematically a common set of variables, and this is how a robot perceives certain events and numbers. Going through similar events in his memory, he finds the model of behavior that best fits the relevance and implements it. Thus, investment decisions made by the machine consist of an analysis of real data and the experience of predecessors. The robot is able to process absolutely all market indicators, information about which has entered the system, and it can find the relationship between events that a person, even with a very rich imagination can not connect. The disadvantages of artificial intelligence on the stock exchange are almost non-existent: it forms the optimal portfolio at the moment, which brings maximum benefits. The human factor in investment management is excluded, incomes increase. The only disadvantage of the car – it can not guess, intuitively making a illogical but successful decision. This is the prerogative of man. At the same time a person takes risks, and the machine seeks to minimize risks. Many experts are absolutely convinced that soon the trade of traders will come to naught, because even now the speed of transactions is no longer available to the human mind, let alone manual transactions. This may well be the case, as evidenced by the actions of some exchanges, which not only certify robots and impose fees for exceeding the transaction limit, but also create special tools, such as increasing the commission for active robots.

But among professional participants in the securities market is mostly skeptical about automatic trading. As a rule, traders are confused by three things:

1. A person is not able to constantly monitor the accuracy of data issued by a mechanical trading system or an exchange robot.

2. In the event of a system failure, the program can generate incorrect signals for the conclusion of transactions for a long time, which will lead to losses.

3. Many players believe that online trading should combine a systematic approach and personal intuition, ie subjective assessment [3; 4].

The global trend allows us to conclude that trading robots on stock exchanges will become more and more. It is possible that long-term trading will give way to short-term, in which positions will open not even for seconds, but for milliseconds. Traders are already using pre-market trading to avoid competition with artificial intelligence. In terminology, a premarket is a pre-market period from the English pre-market, ie "to the market". But, do not be afraid that stock exchanges will turn into large halls with computers without people – the work is effective only in trading in highly liquid securities.

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ПОРІВНЯННЯ АЛГОРИТМІВ PPO ТА SAC ДЛЯ ЗАДАЧІ ПОШУКУ АГЕНТОМ ЗАДАНОГО ОБ'ЄКТУ

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Задача пошуку агентом заданого об'єкту вирішується у численних програмних системах з кількома користувачів-агентів, які взаємодіють між собою та з системою у певному графічному середовищі. У даній роботі представлені результати у середовищі Unity, в якому реалізована бібліотека ML-Agents, що дозволяє перетворити будь-яку сцену Unity на навчальне