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FACE RECOGNITION SECURITY SYSTEMS

Abstract: the article describes one of the most promising methods of biometric contactless identification of a person by face.

Keywords: biometrics, Euclidean distance, signs of haar.

The first face recognition systems were used as programs installed on a computer. Now this technology is more often used in video surveillance systems, access control. Face recognition system - the process of comparing the faces of people who looked at the camera with a database of stored images of faces of standards [1,2].

The face recognition system consists of a camera and program code, which analyzes and compares images. The program code for face recognition is based on the analysis and processing of images and calculations of complex mathematical algorithms. Face recognition technology is divided into 2 types: 2D and 3D face recognition.

The best use of face recognition systems at the moment is its use in access control and management systems.

Modern face recognition systems are used not only to solve serious problems, such as the detection of wanted people in places of mass presence of people, but also for purely civilian purposes [3].

Nowadays, in every 3rd office there is an access control and management system. Most often it turns out to be turnstiles. As we know, the throughput of a conventional turnstile is not very large, and the safety and convenience are poor, due to reasons such as [5]:

- People can search for a card for a very long time;

- Many cardholders may lose them or leave them at home;

- Having found someone else's card, you can go into the room without being an employee of this organization;

- Ordinary cards can be faked using special tools;

- There are universal cards for turnstiles.

And to solve all these problems, a turnstile system with face recognition was developed. Application of this technology in turnstiles: increases the throughput, reduces the number of unwanted visitors and eliminates cases of forgotten or lost cards.

Most often, the theory of pattern recognition is used in face recognition technology, the task of which is to automatically search for a face in an image or video stream, and identify a person by face. The interest in the procedures that underlie the process of searching and recognizing faces is quite significant due to the diversity of their practical application in such areas as security systems, verification, forensic examination, newsgroups, computer games, etc. [14]

The Haar sign is a rectangular region divided into two adjacent regions. Signs are superimposed on the image at various positions and at different scales. The attribute value is defined as the difference of the sums of pixels from the regions.
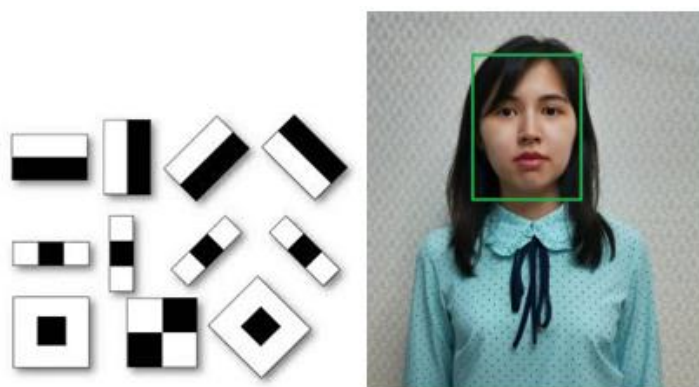

Figure 1. Examples of Haar signs

Each feature may indicate the presence (or absence) of a particular image characteristic, such as borders or texture changes. For example, a feature from two adjacent rectangular areas can show where the border is between the dark

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and light regions. Inclined signs successfully expand the space of signs, for example, they can determine the presence of an edge at an angle of 45 degrees. Although from the mathematical point of view the idea of oblique features is true, in practice there are problems with rounding in low-resolution images, which are usually used to ensure real-time [2-4].

The task of the face recognition system is to process an input image or video received from a surveillance camera or other source of photo and video data, find faces on it and identify the person who owns the person. In general, the process of identifying a person by face includes six main stages:

1) database record - at this stage, images of persons who will be allowed access to the passage are recorded. Further, this database is recorded as an image database;

2) face detection - at this stage, the entire image I searches for rectangular areas, inside each of which is a face, the result of the step is a lot of face images;

3) face saving - the detected face is stored in the catalog with faces and is subsequently compared with faces from the database;

5) the selection of signs - for proper comparison, it is necessary that the eyes, lips, eyebrows and nose are always in one place. For this, an algorithm for estimating anthropometric points is used. On the face, 68 marks are available on each face;

6) selection of the descriptor from the face - using a specially trained model of the neural network, the descriptor is calculated from the face. Typically, a descriptor contains 128 facial characteristics consisting of real numbers. The descriptor is also allocated from persons from the database.

7) comparison by standards - the Euclidean distance is used to compare two descriptors. This function calculates the distance between two descriptor points [2,3]. If the Euclidean distance is less than 0.6, then the recognized face matches the database, and passage will be allowed. And if the person does not

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match the database, the person will be considered unidentified (id = 'unknown') and access will be denied.

In development, you can additionally use additional features such as OpenCL, Red – black trees, like all binary search trees [6,7].

Based on the above information, we can say that face recognition today, this topic is very interesting and has many features.

Bibliography

1. Жарлыкасов Б. Ж., Мауленов К. С. Методы экстракции признаков изображения с целью поиска и распознавания лиц //Новые информационные технологии в образовании и науке. – 2018. – №. 1. – С. 114-117.

2. Мауленов К. С., Жарлыкасов Б. Ж. Распознавание образов для задач поиска и идентификации //Наука. Информатизация. Технологии. Образование. – 2018. – С. 538-543.

3. Аимбетова Д. Т., Жарлыкасов Б. Ж., Муслимова А. З. Распознавание изображений лиц для идентификации личности //Актуальные научные исследования в современном мире. – 2017. – №. 12-1. – С. 164-168.

4. Жарлыкасов Б. Ж., Чубаркова Е. В. Использование метода яркостных гистограмм для решения задачи детектирования движения объектов на нерегулируемых пешеходных переходах //Современная наука: актуальные проблемы теории и практики. Серия: Естественные и Технические Науки. – 2019. – №. 2. – С. 31-34.

5. Умарова Т. А., Жарлыкасов Б. Ж. Сравнение методов организации комплексных систем безопасности //Наука. Информатизация. Технологии. Образование. – 2018. – С. 605-617.

6. Zharlykasov B. J., Abatov N. T. SOFTWARE MODEL OPEN COMPUTING LANGUAGE //Экономика и социум. – 2016. – №. 6-3. – С. 356-359.

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7. Zharlykasov B. J., Abatov N. T. BINARY AND RED-BLACK TREES. TIME SEARCH //Теория и практика современной науки. – 2016. – №. 6-1. – С. 6-9.