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COMPARISON ALGORITHM BASED ON IMAGE STRUCTURE IN PERSONAL RECOGNITION

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A B S T R A C T	K E Y W O R D S
This article presents an approach to identifying the identification features of a person's image and comparing images based on this. By changing the values of the parameters of this algorithm aimed at identifying the identification features in the image, several training samples are formed. Based on the obtained training samples and the shape of the image, a comparison is made and the algorithm is evaluated.	Image, class, object, identification feature detection algorithm, contour line separation, training sample, training, classification, quality functional.

Introduction

It is known that each person receives a large part of the information he receives (approximately more than 80%) through his eyes. Considering this, it becomes clear how urgent the task of solving problems related to images is [1]. Therefore, the problem of separating and recognizing objects by comparing images is a pressing problem today. The problem of identifying a person based on various biometric indicators (for example, various parameters of the face and earlobe image) also belongs to the group of problems related to image analysis.

Problem statement.

Many optional objects are given $\{\Im\}$ number of last classes $K_1, K_2, ..., K_l$, ($K_i \cap K_j = \varnothing$, $i \neq j$, $i, j \in \{1,...,l\}$). Splitting into multiple objects $\{\Im\}$ not fully defined. Only initial information J_0 and those in the classroom [4].

$J_0 = \{\Im_1,...,\Im_i,...,\Im_m;\ \tilde{\alpha}(\Im_1),...,\tilde{\alpha}(\Im_i),...,\tilde{\alpha}(\Im_m)\}$, here $\tilde{\alpha}(\Im_i) = (\alpha_{i1},...,\alpha_{ij},...,\alpha_{im})$, α_{ij} - predicate value $P_j(\Im_i) = "\Im_i \in K_j"$ $(\forall \Im_i \in \{\Im\}, i = \overline{1,m})$.

Vector $\tilde{\alpha}(\Im_i)$ is called a data vector $\Im_i$, va $|\alpha_{ij}|_{mxl}$ - this matrix is called the information matrix.

Given an arbitrary object set $\tilde{\Im}^q = \{\Im_1^{'},...,\Im_q^{'}\}$, $(\tilde{\Im}^q \in \{\Im\})$ the control multiplier is calculated.

Also, let us ask to construct an algorithm A. Predicate $P_j(\Im_i)$ initial information, calculated as the value J_0 equal to:

$$A(J_0, \tilde{\Im}^q) = \|\beta_{ij}\|_{qxl}, \quad \beta_{ij} \in \{0,1,\Delta\}.$$

Solution method:
The solution to this problem is based on a heuristic approach [1]. Based on this approach, a model of a comparison algorithm has been developed, which can identify many complex connected geometric features that are essentially unrelated and many complex connected features that are representative.
The goal of the algorithm is to compare the model to the next key step (this problem was solved for the earlobe image).

1. Separating contour lines in an image.
At this stage, the color image is converted to binary form and the contour lines of the image are taken as objects. Also, contour lines p This value represents the difference between the given difference between the contour lines and the rest of the image.
For this, a simple method is used to change the brightness very precisely.

2. Identify the characteristics of the image
k_i - Let's look at a concentric circle, with its center at the center of the image
δ let a pixel equal a step: Let everything be considered a circle.
1) Number of points and contour lines intersecting the circle;
2) Distances between all points;
3) Intersections of contour lines;
4) Number of bisections of contour lines;
5) Coordinate points and contour lines intersecting the circle;
6) Coordinate points intersecting contour lines;
7) Bisection points of contour lines.

3. Distinguishing interconnected signs that have character.

At this stage, the system is given, and unrelated symbols are n This results in unrelated high-linked characters $W_A = \{\Xi_1, \Xi_2, ..., \Xi_{n'}\}$.

4. Distinguishing representative characters. All interconnected characters Ξ_q At this stage, representative signs are identified. It χ_q is determined by. As a result, representative symbols $\chi_1, \chi_2, ..., \chi_{n'}$ consists of. In the next step, only representative symbols are seen[4].

5. $d(S,S_v)$ difference function and object range S and S_v is found.

At this stage, the function difference is given, the object difference is S and S_v characters $\tilde{\chi}$ The larger the value of the function, the $d(S,S_v)$, the difference is so big.

6. Proximity function $\phi(S,S_v)$ object S and S_v between.

At this stage, the proximity function is determined S and S_v potential function

$\phi(S,S_v)$ [2-3]:

$$\phi(S,S_v) = \exp(-\tau d(S,S_v)),$$

here τ – algorithm value.

7. For the relevance class K_j evaluate the.

To evaluate at this stage K_j is counted. K_1 objects for assessment class $S_1, S_2, ..., S_{m_1}$. The estimation is close to the calculated $\phi(S_1,S), \phi(S_2,S), ..., \phi(S_{m_1},S)$. The object's valuation is appropriate S and class K_j ($j = 1,2$) evaluated in the same way as when finding a function[3]:

$$\mu_j(S) = \sum_{u=m_1+1}^{m} \gamma_u U(S_u, S) - \sum_{u=1}^{m_1} \gamma_u U(S_u, S),$$

here γ_u - algorithm value.

The decisive rule.

The last step of the algorithm depends on the rule to be solved.

$$\beta_{ij} = C(\mu_j(S)) = \begin{cases} 0, \text{ агар } \mu_j(S) < c_1; \\ \Delta, \text{ агар } c_1 \le \mu_j(S) \le c_2; \\ 1, \text{ агар } \mu_j(S) > c_2, \end{cases}$$

here c_1, c_2 - algorithm values ($0 \le c_1, c_2$).

So the modification model algorithm $\{A\}$ found based on the appearance of a person's ear image.

Any algorithm A ($A \in \{A\}$) in this model, it is found by summing the values $\pi = (k, p, n', \{\lambda_i\}, \tau, \{\gamma_u\}, c_1, c_2)$. Compare the model based on the model you saw $A(\pi, S)$ we denote it as. The closest algorithm within the considered model is π is seen within the parameters[6-9].

Research results

It turned out from the experiments that in order to verify the performance of the developed algorithm, a functional scheme was developed within the framework of the model under consideration and a comparison program was created.

The program's functionality was checked based on the appearance of the person's image when comparing the person's identity.

For all classes considered, 150 images were obtained. The number of classes is 5. The experiments showed that the high accuracy of the algorithm model when verifying the identity of a person is assessed based on his image.

As a result of the experiment, it was found that the associated geometric signs and, as a result, a useful algorithm was developed, which was found to be much less error-prone in identifying people based on the structure of the image.

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