The systems for persons' identification and verification on the basis of face correlation recognition

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ABSTRACT

In the article it is presented a PC based system for persons' identification and verification on the basis of face correlation recognition. There are described the structure and the functions, the software, the interfaces, the options of image processing. There are presented the investigation results of the influence of the noise, rotation and scale of the input images on the identification process. There are calculated the data concerning the recognition time for the images of different resolution. In order to increase the system's productivity it is proposed to use an optical-electronic system.

Keywords: correlation, recognition, face, information system, identification, verification

1. INTRODUCTION

In terrorism and organized crime combating one of the important problems becomes the identification and verification of persons[1]. In artcicles[2,3] we used the correlation method for persons identification and verification on the basis of the fingerprints. We showed the high robustness of the correlation method in the conditions of the change of the scale and angular orientation of the input images, of the surface reducing etc.

In the present article we use the correlation algorithm for persons' recognition on the basis of faces. In chapter 2 it is described a PC based information system for persons' identification and verification. There are presented the structure and the functions of the system, the software, the interfaces, the options of image processing. The elaborated system permits to introduce images of variable resolution using different kinds of the sensors such as TV camera, Web camera, digital camera or scanner. The system permits to create and modify the personal records in data base, to realize the searching operations.

In chapter 3 there are presented the investigation results of influences of the noise, rotation and scale of the images on the identification results. The data show that the noise with the probability P=0.01, the change of the rotation with the angle on 0.1 degree and the scale with 1.5% of the input images lead to the correlation function maximum's decrease with 60%. To increase the reliability of persons recognition it was analyzed the correlation algorithm based on the image transformation to the polar logarithmic system of coordinates. The experiments showed the stability in faces recognition at rotation and scale changes of the input images in this case.

In chapter 4 there are presented the data concerning the recognition time for the images of different resolution. In order to increase the system's productivity it is proposed to utilize an optical-electronic system.

2. INFORMATION SYSTEM FOR PERSONS' IDENTIFICATION ON THE BASIS OF THE FACES

2.1. The structure of the system

The structure of the information system for persons' identification on the basis of the faces (ISPIF) is presented in the fig 1. The system is realized on the basis of the standard PC.
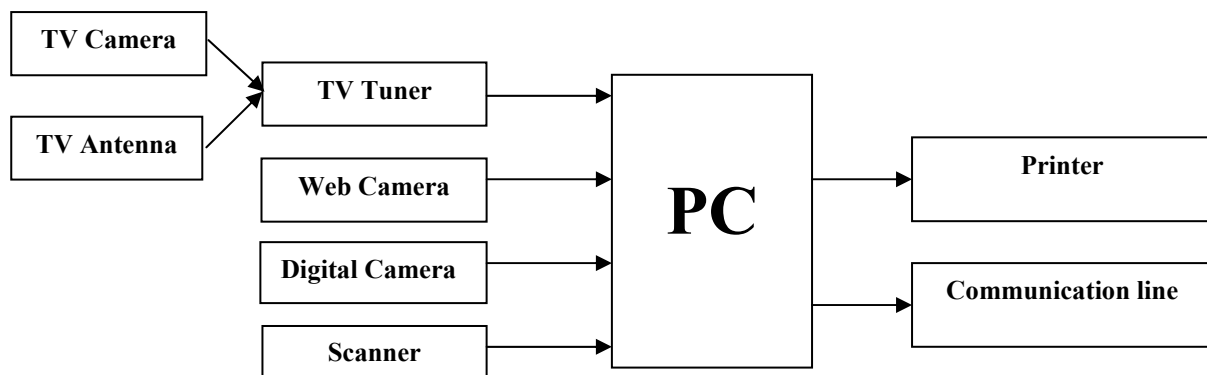

Figure 1. The structure of the ISPIF

The specialized software was realized on the basis of C++ Builder package of the Borland International Inc. and data base PostgreSQL. The software is encoded in the C++ language using object oriented programming principles.

The functions of ISPIF system are:
1. The images' capture from different devices such as TV Camera, TV antenna, TV Tuner, Scanner, Web Camera, Digital Camera and other devices that support the WDM or TWAIN interfaces.
2. The images' introducing at different resolution;