Fingerprint Identification Utilizing the ACE-V Method and GYRO System

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This paper describes the identification of the offender on the basis of fingerprints. The fact is that two persons in the human population with identical fingerprints do not exist and the fingerprints do not change during one's lifetime. Slovenian fingerprint experts base their identification opinions on the basis of the fingerprint numeric standard, and take into account the basic patterns of the fingerprint on at least 8 morphological characteristics. Such identifications do not follow the scientific approach, as it would count only morphological characteristics and look for negative characteristics or other ambiguities. In the literature, some modern fingerprint identification methods and procedures are described, and in our case, the ACE-V method and the documentation system GYRO were investigated. The ACE-V method includes the analysis of the papillary lines, comparison, evaluation and verification, and in the GYRO system, the marks are selected on the basis of colours. Selection is made by setting the morphological level of certainty about the existence of and the weight of each morphological characteristic. In the experimental work, four experts were involved.

Donors placed their fingerprints on glass surfaces, and finger marks were recovered by Silver Special powder and transferred with Black Gelatine. The finger marks were then transferred into Automated Fingerprint Identification System (AFIS), and the identification process with ACE-V method and GYRO system was used. The results showed that the ACE-V method with the GYRO system is a modern and scientific approach that provides transparent documentation of process analysis, comparison, evaluation and verification of fingerprints. Police and fingerprint forensics can use these findings in forensic investigation reports and expert opinions.

Keywords: fingerprints, identification, numerical standard, ACE-V method, GYRO system

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