Multi Biometric Authentication And Recognition System Based on Deep Learning

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Abstract

Biometrics is one of the most important technologies for a lot of fields like finance, healthcare, airports, travel, also for important and service companies. They are based on two concepts; one is the identification of the person, using their physical features, such as finger vein, fingerprint, hand geometry, and palm print. The other concept is the behavioral features, such as voice, dynamic signature, etc. Biometrics technologies achieved an important role in facilitating the identification process of persons and accessing the secure areas in its success levels rather than the traditional methods, such cards, passwords, etc.

In this research, we designed a multi biometrics recognition and authentication system using a modified deep learning algorithm, called convolutional neural network, that depends on finger vein and palm print. The finger vein method depends on the veins under the skin, which makes it more secure and robust method, resistant to theft or tampering. On the other hand, palm print, despite

having more details than finger veins, but it can be altered .So, we used the fusion of finger vein and palm print to enhance the security and reliability of the system. The system passes through several stages: Preprocessing, feature extraction and for the classification, a convolutional neural network, as a technique of deep learning, was applied over the reduced features.

Finally, we used the technologies of cloud computing, that provide on-demand resources of IT through the Internet with cost-per-use prices. Rather than owning, buying, and maintaining the physical centers of data, we opted to use technological services, like the computing abilities, databases and storage.

The using of deep learning CNN compared with three machine-learning algorithms, KNN, RF and J48, based on three measurements: Precision, Recall and F1-measure. In the present study, our proposed CNN has been capable of obtaining a 99.6 % precision rate compared with machine learning techniques used.