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Signature Verification: Increasing Performance by a Multi-Stage System

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Abstract:

A serial three stage multi-expert system for facing the problem of signature verification is proposed. The whole decision process is organised into successive stages, each using a very reduced set of features for recognising forgeries and providing information about the reliability of the recognition process. The first expert, adopting only a single global feature, is devoted to the elimination of random and simple forgeries. The second stage receives only those signatures not classified as false by the first stage (i.e. those signatures really genuine or forgeries reproduced in a skilled way), and adopts a single specific feature suitable for isolating skilled forgeries. Both of these two stages employ suitable criteria for estimating the reliability of the performed classification, so that, in case of uncertainty, the signature is forwarded to a final stage which takes the final decision, taking

into account the decisions of the previous stages together with the corresponding reliability estimations. The proposed multi-stage automatic signature verification system has been tested on a database of signatures produced by 49 different writers. The experimental analysis highlights the effectiveness of the approach: the proposed system employing only two features, used in distinct moments of the decision process, performs better than other systems, employing larger feature set (including the features used in the proposed system) and performing classification in a single stage.

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