consolidate our thinking we also performed experimentation with the GMM classifier by feeding it with the global features (the same global features that are used by our NN Classifier). The results were worse in this case. The accuracy went below 50% and the EER was above 70%. Actually the nature of global features is to have a fixed amount of features while local features are not fixed. As such our GMM based system also outperforms all the participants of ICFHR 4NsigComp 2010 in this scenario as well. An important point to mention here is that our GMM based system was not even optimized to work with disguised signatures explicitly. In contrast, it was initially developed as a general-purpose offline writer identification system. We strongly believe that this better performance of our system is attributed to the fact that it relies on the local features.

## V. Conclusion and Future Work

In this paper we have reported on the experiments conducted to evaluate the impact of local and global features on automated signature verification for off-line signatures collected by the FHEs. Two state of the art offline signature verification systems were applied on the datasets of the last two signature verification competitions.

Our experimental results show that the global features could produce acceptable results when the traditional paradigm of forged vs. genuine authorship is under consideration. The actual power of local features is revealed when considering the more realistic scenario which involves the presence of disguised signatures among the questioned signatures. This has been shown by using the equal error rates achieved by a GMM based offline signature verification system that heavily relies on the local features of offline signature samples. We strongly believe that the main reason for the good performance of this system is due to the difference that this system is relying on local features.

In future we plan to investigate more local features approaches for signature verification. Using novel image analysis methods like scale-invariant Speeded Up Robust Features (SURF) [12] might be an interesting idea as well. We also plan to combine various offline signature verification systems based on different global and local features through voting strategies to produce even better results.

Furthermore, we plan to perform analyses on data which contains signatures from more reference writers and skilled forgers. Regarding genuine signatures, large and diverse test sets where signatures are produced by different authors under various different psychological and physical conditions may also yield interesting results.

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