ENHANCING IRIS AUTHENTICATION MODEL: A GRADUAL FEATURE SELECTION APPROACH AUGMENTED WITH SOFT VOTE ENSEMBLING

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ABSTRACT

ometrics is the science that entails both identification and verification of an individual lying on the basis of the measurable traits. A system with the functionality of ometrics could uniquely identify users by their measurable traits prior to granting them cess. The non-consideration of underfitting-overfitting tradeoff in data mining models urns a distorted and unreliable performance metrics which prevents machine learning odels from establishing a good decision boundary. this study was implemented and aluates the performance of a graduated feature selection methodology for user thentication attributes. The study employed the best feature set for developing a vote semble-based user authentication application. The training set used in the study is de up of iris and facial images of both authentic and unauthentic users, which is then ed by a vote ensemble learner algorithm for the purpose of building the artificial elligent authentication system. Feature vectors were extracted from the input data ough knowledge transfer technology of image embedding functionality and were nsequently concatenated for ensuing phase of feature engineering. The output of the ture engineering was made up of the ideal training set for the consecutive machine rning phase. The dataset was obtained from the public repository kaggle. Each of the ividuals captured in the database about 103 had 12 images each, showing different ts of their facial images. There was about 1236 image instances in the acquired aset. The input iris image signals were subjected to image embedding towards racting genetic numeric vectors from each of the input images through the rumentality of the SqueezeNet neural network. The network extracts a total of 1000 neric vectors from each of the iris image signals per each of the input signal. The 0-no of extracted numeric attributes by SqueezeNet (Ai) was graduated in the owing subsets of 800 attributes ($a1$), 600 attributes ($a2$), 400 attributes ($a3$), 100

ttributes ($a4$) and 10 attributes ($a5$). The model was evaluated using performance ıetrics: precision, accuracy, f-measure (f1score) and area under the curve (auc). The erformance of the vote ensemble on the distributed subsets showed accuracy, f-ıeasure, precision and (auc) of value 100%, 99.06%, 100% and 0.57 respectively. The ıodel was compared with convolutional neural network with performance of accuracy, measure, precision and area under curve of 98.45%, 97.94%, 94.99% and 0.54 :spectively. The results signified the ensemble's capacity to retain its strong predictive erformance and enhanced the iris authentication model's relevance in real-world iometric systems. The study showed the versatility and adaptability of the ensemble ıodel as it demonstrated exceptional iris authentication capabilities across different :ature spaces.