UAA College of Engineering
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CS&E Tenure Track Faculty Candidate

Handwriting Identification of non-Latin Languages using Hybrid Feature Learning and Computer Vision

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ABSTRACT: This research develops a novel computer vision algorithm for the detection and analysis of handwriting comparisons between non-Latin languages. This algorithm could be used in various applications like document analysis, handwriting analysis, and historical review for the archaeology department. In this algorithm, we use a cluster of computer vision algorithms namely Hybrid Deep Learning (HDL) architecture for the task of determining the probability that a questioned handwritten word has been written by a known writer and 'bag of words' for classification of non-Latin languages. In our approach, we use a two-step process. HDL is an amalgamation of Auto-Learned Features (ALF) and Human-Engineered Features (HEF). To extract auto-learned features we use two methods: First, Two Channel Convolutional Neural Network (TC-CNN); Second, Two Channel Autoencoder (TC-AE). Furthermore, human-engineered features are extracted by using two methods: First, Gradient Structural Concavity (GSC); Second, Scale Invariant Feature Transform (SIFT). Our approach is based on using CNN as a feature extractor. We use 5- layer CNN model for high level feature extraction. At the same time, since the AND images are in grayscale with minimal pixel, hence, we remove the max pooling layer so that we do not lose any important datapoint.

BIO: Dr.Prakash Duraisamy received his BE degree in Electronics and Communication Engineering (E.C.E) from the Bharathiar University, Coimbatore, India, in 2002 and his Master's degree in Electrical Engineering (E.E) from the University of South Alabama, Mobile, Alabama, in 2008. He completed his PhD degree in Computer Science and

Engineering (C.S.E) at University of North Texas, Denton, Texas in December 2012. From January 2013-15, he worked as Visiting Scientist at Massachusetts Institute of Technology (M.I.T). He is serving as Assistant Professor. He is serving as conference co-chair for the 13th ICCCNT conference in India during October 2021 which is technically co-sponsored by IEEE Electronic Package society. He is serving as a senior member of IEEE and SPIE. His area of interests are Image Processing, Computer Vision, Pattern Recognition, Bio-Medical, LiDAR, Remote Sensing and Multiple View Geometry.

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