



Strike off removal in Indic scripts with transfer learning

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Abstract

Strike-off text poses major challenges in handwritten text recognition as it changes the semantic and structural information of the image. Although significant results have been achieved in identifying and removing such strike-off data using deep learning methodologies, most have been done for Roman scripts only. Deep learning approaches require a large amount of data with a high cost of training for every script individually to derive effective performance. Due to its complex nature and non-availability of sufficient data, research in strike-off removal in Indic scripts is limited. To address this problem, we propose reducing the requirement of a huge amount of data and minimizing the training cost through transfer learning. With the objective of strike-off removal in multiple Indic scripts, we leverage the experiences of a pre-trained model (trained on the Roman script) for strike-off removal in different domains (Indic scripts). We consider handwritten text documents of **10** different Indic scripts and introduce **7** different strike-offs in these documents. We implement Few-Shot Learning (FSL) and Zero-Shot Learning (ZSL) to train various state-of-the-art deep generative models on a few samples of the mentioned Indic texts. An extensive analysis of the results for ZSL and FSL has been presented with the perspective of source hypothesis generalization capability and the strength of relatedness of source and target domains. The results show that the degree of adaptability of the source hypothesis is significant for the right amount of transfer to take place. The scripts with angular structure have performed better than the round structured scripts as there is a higher degree of relatedness of angular scripts with the Roman script (source script). FSL and ZSL approaches promise to reduce data requirements and training costs for strike-off removal.

Keywords Strike-off text · Indic scripts · Deep learning · Transfer learning · Source hypothesis · Few-shot learning (FSL) · Zero-shot learning (ZSL) · Deep generative models

1 Introduction

Strike-off handwritten words pose challenges to hand writing recognition systems. Among the most frequent writing error is the Strike-off error. A strike-off is the markdown indication to ignore the concerning content of the text. It is a characteristic of an individual which is profoundly indiscriminate. Strike-off can be on a single character, multiple characters of a word, a single word, multiple words or multiple lines. It becomes more complex due to various writing styles, background complexities and added noise of image acquisition methods. Most state-of-the-art recognition systems only consider some of the diversities and complexities of handwritten text. They assume that the document texts are flawlessly written and captured. The recognition systems disregard the chances of errors in the unconstrained handwritten text, which are quite high. Also, most works in this regard have been done

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