Semi-supervised Learning for Cyberbullying Detection in Social Networks

Abstract: Current approaches on cyberbullying detection are mostly static: they are unable to handle noisy, imbalanced or streaming data efficiently. Existing studies on cyberbullying detection are mainly supervised learning approaches, assuming data is sufficiently pre-labelled. However this is impractical in the real-world situation where only a small number of labels are available in streaming data. In this paper, we propose a semi-supervised leaning approach that will augment training data samples and apply a fuzzy SVM algorithm. The augmented training technique automatically extracts and enlarges training set from the unlabeled streaming text, while learning is conducted by utilizing a very small training set provided as an initial input. The experimental results indicate that the proposed augmented approach outperformed all other methods, and is suitable in the real-world situations, where sufficiently labelled instances are not available for training. For the proposed fuzzy SVM approach we handle complex and multidimensional data generated by streaming text, where the importance of features is discriminated for the decision function. The evaluation conducted on different experimental scenarios indicates the superiority of the proposed fuzzy SVM against all other methods.