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Spam Email Image Classification Based on Text and Image Features

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Document Sections

- I. Introduction
- II. Related Works
- III. The Proposed Method
- IV. Experimental Results
- V. Conclusions

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References

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Abstract: Filtering of spam image-based email remains a major challenge for researchers. This paper presents a proposed work which is based on several facts such that spam images containing a large percentage of text which has characteristics or features different from other types of images. In addition to that, there is much similarity between the features of these images. These facts can be used to distinguish text regions spam images from others. A hybrid method based on combined features vector from text regions and features of the image is proposed. Two types of features are extracted. The first features extraction method is the local binary pattern (LBP) with extricating the image texture features directly, while the second is utilised to extricate features of image text regions only. The extracted features are used in individual and combination style in order to learn classifiers at the training stage. A one-class KNN classifier and two-class KNN classifier are applied separately. Each classifier was used in three fashion, with the text-regions features, with texture features in the image, and with merging both those

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features respectively. Experimental results showed that the appropriation of both image and text features together improves the effectiveness of the classification concerning the case in which only image or text features are used.

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Contents

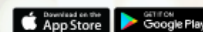
I. Introduction

When the Internet is available in most regions of the world, the use of e-mail has become one of the most important and popular methods of communication between people[1]. Email services are very cheap, do not take any time, the user can receive and send in the real period, delete space problems, better for functional communication, remove period region restrictions, etc.[2], [3]. E-mail recruitment is a global activity in the field of Internet messaging. Therefore, some people and companies for different reasons in the commercial, political and religious fields began to send an e-mail with various substances for clients of this service. It is named an unwanted message, junk or spam, which is sent as meddlesome for people. his phenomenon faced a serious challenge by e-mail, so checking spam was a salient topic of the study. For published records, further, than one-half of the e-mail messages are sent daily as spam, which in turn leads to the loss of large amounts of Internet lines in addition to imposing high costs to manage users' spam, causing memory loss and network resources such as network congestion [4]. In recent studies of e-mail servers, they have reported that 60% of the entire e-mail trade over the Internet is spam. Unsolicited electronic mail trade is spam traffic. Spamming causes two serious problems; the first is overloading Internet bandwidth and the second is, and it overloads the storing on the server. This result is the consumption of storage memory and unnecessary time and also furthermore increment the yearly expense of the company. Also, spam is a genuine treatment for the safety of end clients, as spammers endeavour to take significant individual information such as account number and passwords[5]. However, email filters have been created as one of the main ways to handle spam based on computer vision and pattern recognition techniques. Spammers of this type of message, and to stay away from the discovery of these filters, developed a new way to include images in spam messages, and this type of email, is the spam image. This type of technology began in 2005 and has grown at an amazing speed. For example, text can be placed in an image. So, it is difficult to break down message content using simple filters. Therefore, new ways a person need that can correctly detect spam images and achieve high and accurate performance in identifying spam images from non-spam images [4].

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