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Improving the Usability of Low Precision Text Analysis Systems Through The Use of Alternative Presentation Techniques

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Abstract

Forgetting to attach an attachment to an outgoing e-mail message is at best embarrassing yet the detection of such mistakes is problematic. Existing systems parse a message's body for keywords but typically have limited effectiveness due to their high precision and low recall. An analysis of a small corpus of emails showed that parsing the text of emails- even when supplemented by rules that parsed the high level attributes of the messages – only enabled a high recall at the expense of low precision. A system is described that utilises such rules calibrated for each user to determine the likelihood – or system confidence - of each rule being correct when fired. The form of user alert is modified according to the system confidence in the rule(s) fired allowing the system recall to remain high without affecting the system's usability.

1 INTRODUCTION

Forgetting to attach an attachment to an outgoing e-mail message typically occurs because the sender reaches closure when the message text is complete but before the attachment has been attached. This paper investigates how to detect the non-existence of an attachment and how best to alert users. A survey of existing systems (e.g. <http://www.attachmentglue.com/>) showed that all used a similar approach: parse outgoing messages for certain keywords (e.g. 'attached' and 'enclosed') and if detected display an alert box. This approach has a high precision but the associated low recall minimises its effectiveness. The high precision of these systems is necessary as the alert boxes used would prove annoying if they were regularly wrong. This paper describes a system that employs alternative presentation techniques to allow the recall to be increased without an associated decrease in usability caused by the decrease in precision.

2 DETECTING MISSING ATTACHMENTS

An initial set of rules was generated by analysing messages with attachments. These rules were then iteratively improved by applying them to users' Inboxes with the aim of maximising the system's recall while the precision of individual rules was used to determine system 'confidence' in the rules. An analysis of three users' "Sent Items" mailboxes showed that the individual rules had low recall with varying precision but combined to give the system a high recall and low precision. This paper proposes that such a system can be made usable through the use of alternative feedback mechanisms.

3 ALERTING USERS

Sellen *et al.* described some of the dimensions upon which feedback can be characterised [1]. The dimensions described included:

- *demanding* versus *avoidable*: demanding feedback is hard to avoid whereas users can choose to ignore the latter. An example of demanding feedback is a popup dialog box and of avoidable feedback is a system tray icon.
- *transient* versus *sustained*: sustained feedback persists whereas transient feedback does not

This paper proposes that structured, non-speech audio (or earcons [2]) should be used to either augment or in some cases replace demanding, visual alerts such as alert boxes. It is hoped that the use of this alternative form of feedback, combined with the high overall recall, will improve the usability of this low precision system.

4 IMPLEMENTATION

A prototype of the system was implemented in Java. The first time the user runs the application they are required to calibrate the rules by running them across their ‘Sent Items’ mailbox (Figure 1). This allows the system to determine the effectiveness of the different rules for that particular user. An evaluation is planned to determine what combinations of feedback enable the low precision rules to be deemed usable.

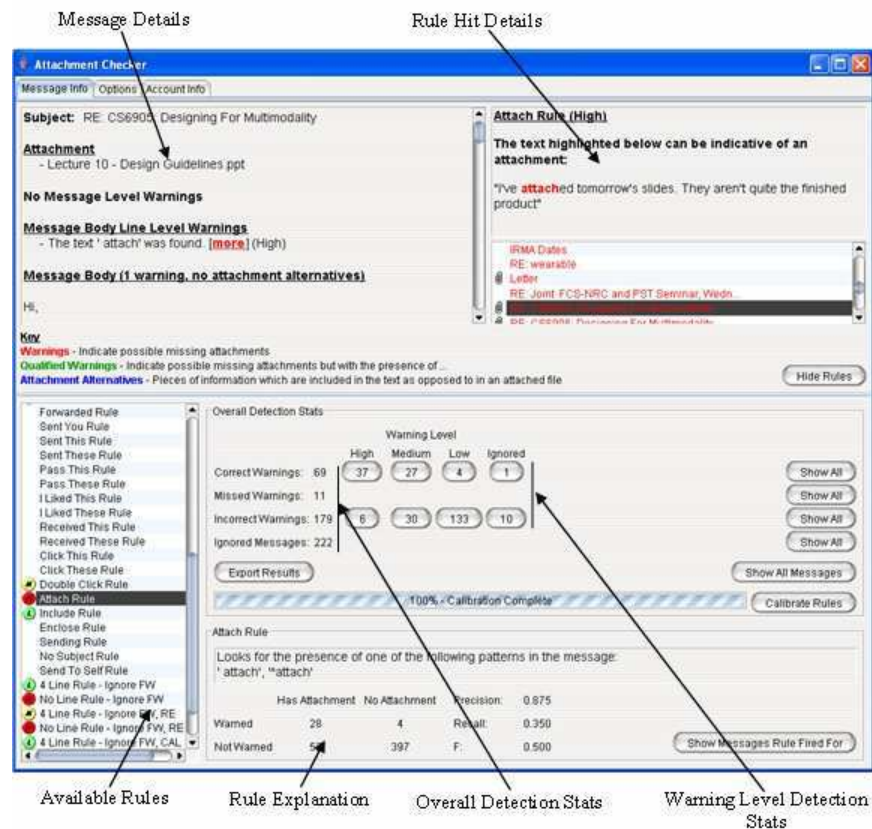


Figure 1: Rule Calibration interface indicating the feedback given to the users regarding the rules. It is hoped that this feedback will make the users trust the system as discussed in [3].

5 CONCLUSIONS

This paper outlines the problems surrounding the detection of emails which should have attachments but do not. An analysis of a small corpus of emails determined that textual parsing alone is insufficient to

detect all missing attachments and even examining higher level details of the message such as message length will not enable 100% recall. A system to detect missing attachments with a high recall but low precision is described. It is hoped that a planned evaluation will show that by employing alternative alerting techniques the low precision of the system does not make it unusable. If successful, this approach could be increase the usability of other low precision text analysis systems.

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