MEDINFO 2004
M. Fieschi et al. (Eds)
Amsterdam: IOS Press

Using Natural Language Processing to Link from Medical text to On-Line Information Resources

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Summary

We have used a natural language processing system to extract from electronic health records (EHR), concepts of potential interest to clinicians using the record. We have then provided links, which we call "infobuttons" from those concepts to on-line information resources, such as medical dictionaries and textbooks. In this way, we are able to anticipate, and resolve, the information needs that arise when clinicians use an EHR.

Introduction

Providing information to clinicians at the right time, the right place and about the right person is essential for the appropriate clinica decision making.[1,2] The increased use of information systems by clinicians at the point of care provides a new medium in which to help with unmet medical information needs. Where the information need arises due to some concept appearing in a clinical report, that concept can help guide information retrieval, if it can be extracted from the record. We are using natural language processing (NLP) to carry out this extraction and are experimenting with this approach to resolving clinicians' information needs.

Methods

We use the NLP-system MedLEE [3] to parse plain text reports from our Web-based clinical information system (WebCIS) and use the results to identify clinical findings in the text. We are then able to reconstruct the text as hypertext (HTML), for which each finding is a link to program called the Infobutton Manager (IM), which provides automated links to on-line information resources.[1]

Results

Our program successfully parses clinical reports and produces HTML versions of the text, in which each finding term is a link to our IM. Figure 1 shows an example of MedLEE output and the same output coverted to HTML with IM links. If a user clicks on a link, the IM will return to the user a list of links to other resources that will appear as questions, such as "what is the definition of left pneumothorax?"

Conclusion

It is our hypothesis that clinical care will be improved by the ability to link from CISs to on-line information resources. We have demonstrated the ability to capture clinical terms directly from the reports in order to help anticipate, and resolve, clinicians information needs

Acknowledgments

This work was supported in part by NLM grant 1R01LM07593 and Training Grant LM07079-11.

References

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A: "A left pneumothorax and right basilar atelectasis are seen."

B: <problem v = "pneumothorax" <region v = "left"></region> </problem>
<problem v = "atelectasis" <certainty v = "high certainty" </certainty> <region v = "basilar"><region v = "right"></region></region> </problem>

C: left pneumothorax and <https://flux.cpmc.columbia.edu/webcisdev13/wc_infomanage.cgi?info_institute=CPMC&info_med=right+basilar+atelectasis&info_context=RadReport&info_usertype=MD&info_age=32&info_sex=F"> right basilar atelectasis are seen.

D: A left pneumothorax and right basilar atelectasis are seen.

Figure 1: Text (A) is parsed into XML (B) and then converted to HTML with links to the Infobutton Manager (C). It will apear to the user as a line of text with two terms underlined (D) (see www.dmi.columbia.edu/homepages/ciminoj/howtoUseInfomanage.html).