Automatic Processing of Pathological Reports for Classification of Brain Tumors

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Abstract

There are over 120 different types of brain tumors, making effective treatment very complicated. Classification of brain tumors accurately can not only help the doctors to treat the patients correctly but also help doctors to do research and teaching in this field efficiently. The objective of our study was to classify pathological reports into different classes of brain tumors automatically according to World Health Organization 2000 classification of brain tumors. We developed pattern-matching rules called Brain-Tumor Classifier processing pathological reports and classifying brain tumors automatically. We compared Brain-Tumor Classifier against a gold standard that was established by three experts judging 276 records. In this testing set, Brain-Tumor Classifier had a specificity of 99.74% (versus 99.79 ~ 99.9 % for the physicians), a positive predictive value of 91.67% (versus 82.35 ~ 94.92 % for the physicians) while maintaining a reasonable sensitivity of 90.83% (versus 85.91 ~ 97.93 % for the physicians). In addition, it had accuracy of 91.1%. We conclude that automatic processing of pathological reports for classification of brain tumors is feasible and useful.

Keywords: pattern-matching rule, text classification, Natural Language Processing, brain tumor