uni-edit
English Editing & Translation

Sample of Level 2 English Editing

Field of research: Imaging and Informatics

Using UMLS to Construct a Generalized Hierarchical Concept-based

Dictionary of Brain Function for Information Extraction from fMRI Literature

1. Introduction

Functional magnetic resonance imaging (fMRI), which measures the blood metabolism of neural activities [1], is a non-invasive approach for studying human brain function. Over the past 15 years, fMRI has become extremely popular among neuroscientists. As a result, a profusion e number of fMRI studies are published every year, in numerous journals. Hence, it is becoming difficult for researchers to keep up with the literature by reading papers, as this activity is extremely time-consuming and labor-intensive. Therefore, automated ic analysis and understanding of unstructured texts using a text mining technique such as that, as proposed here, , may be of great help to scientists.

The main challenge in text mining, especially in the field of neuroscience, is the problem of data entry problem. Currently, the automatic retrievaling and extraction of ng large amounts of data for analysis is still difficult, and most databases rely on inputting information manuallinput manually. For instance, the first annotated database for published neuroimaging studies was BrainMap [2, 3], the . Its interface of which allowed researchers to search by querying

Comment [SM1]: CHECK: Reference to "understanding" was unclear; in fact this is a human function rather than a computerized function, so sits oddly with the automated analysis; thus have left this out. Reference to helping scientists gets the point across anyway.

experimental parameters, bibliographical details, or specialized locations in Talairach space [4]. However, the scale of BrainMap was limited; currently, only 61 behavior related terms or function names, and 72 experimental paradigms, ~~exist is~~are ~~available in the database. Such a limited scale may be inevitable, because BrainMap relies on researchers to input data manually. The lack of automatic processing severely limits the scope of the database and reduces its usefulness.

The goal of the work presented in this paper was to build an automatic information extraction (IE) tool that can extract terms related to brain anatomy, function, and experimental tasks from the fMRI literature. Such an approach should allow for the processing of a large amount of text data in a relatively short period and could overcome the shortcomings of the manual entry approach, as discussed above. To demonstrate the possible applications of this system, we constructed ~~the~~ a brain-function co-occurrence association model to assist with identifying terms associated with ~~study~~ human brain function.

IE is a method that allows automatic recognition of meaningful words or phrases from free text. A variety of IE methods have been applied to bioinformatics, either ~~by~~ in ~~the~~ dictionary based [5] or ~~the~~ rule based approaches [6, 7], in applications including detection of disease, protein and gene names [8-11]. IE methods have also been used for identifying relationships between different terms—, for

example, protein-protein interactions [12-15]. While much progress has been made in applying IE to bioinformatics, unfortunately, it is difficult to ~~directly~~ apply these achievements directly to a different domain, such as neuroscience, as the textual features subject to IE are highly domain-specific.

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