Author’s response to reviews

Title: The medical diagnosis as a linguistic game

Authors:

Peter Fritz (peter.fritz23@arcor.de)
Andreas Kleinhans (andreas.kleinhans@fuchspartner.de)
Florian Kuisle (florian.kuisle@gmx.de)
Christine Fritz-Kuisle (christine-fritz@web.de)
Mark Dominik Alscher (dominik.alscher@rbk.de)

Version: 1 Date: 22 Oct 2016

Author’s response to reviews:

Reply to editor’s comment and change done
https://1drv.ms/w/s!Ak5LVQIOg78ZiE7hRun5hpfSpl_4

MIDM D_16-00235

criticism of reviewer

1. Clinical decision support system and review of literature

Clinical decision support systems are discussed in the introduction and discussion

2. Medical concept recognition

a text concerning concept recognition is inserted in the discussion

There are already many systems and tools presented for biomedical text mining and biomedical concept recognition like Neij and others (...). The systems mainly focus on natural language processing and concept identification through dictionary matching and various machine learning mechanisms. In contrast to these approaches Memem7 is not focused on identifying concepts in
natural languages but rather on using such concepts for identification of other complex objects like health disorders. In future the system might also be able to handle the pre-process of concept identification of written data e.g. medical patient reports. Technically Memem7 is dealing with the problem of matching ambiguous fact concepts (like symptoms, medical events, lab data) with complex concept trees (like anatomy, medical body functions, diseases). Because of the plurivalent nature of the concepts and the heuristic of the algorithms the matching processing is more similar to a game than a deterministic process.

3. MetaMap

MetaMap was cited as example of of CDSS in introduction and discussion

4. cTakes

cTakes was cited as example of of CDSS in introduction and discussion

5. The function of R should be better explained:

We added a part about R in material and method explaining the application of R for memem7 material and method: R was used for statistical analysis and for text analysis (so far ICD-10, German version) (tm-package). The question to be answered was of how many atomized terms the ICD-10 consisted and to integrate those lacking in memem7.

Result: With the tm text analysis system of R we obtained a list of 53947 atomized terms. 16798 (31.1%) were originally not part of memem7 and were integrated in the system.

6. accuracy material and methods accuracy: Testing for accuracy of memem7 was done with 190 artificial reports (not representing a patient or consisting of real medical data), originally developed for testing CLEOS. Each artificial case consists of a short medical report and/or symptoms with a moncausal medical explanation. An example of such a case (case 1) is a
woman aged twenty with a breast node of 2 cm, recognized by herself. This history was transformed in either a 2 tuple with attributes or in up to 5 tuple. In the example given the search function was: mamma: node and female. A result was considered as correct if the proposed explanation of the artificial report was in the set of pathosoms (diagnoses) proposed by memem7.

accuracy results: In 90/190 (47.4%) artificial cases the proposed diagnosis was identified by memem7 (47.6%). The number of proposed pathosoms (diagnoses) ranged between 0 and 173 with a median of 3.

Further changements

1. Abstracts: Results:

We have isolated more than 4600 disease entities (from us so-called pathosoms) with more than 100,000 attributes sets (termed pathophemes)

We have isolated more than 4600 disease entities (termed pathosoms using a made-up word) with more than 100,000 attribute sets (termed pathophemes using a made-up word)

Introduction

2. For the approach mentioned in (2) and (3) medical decision support systems (MDSS) and inference engine technology are available

Discussion

3. Therefore, the development of computer systems for medical decision support is partly on the shoulder of industry or fanatic individualists. Only was replaced by partly.
4. and the results of the analysis should be considered to be a linguistic game assisting classification of a patient vector to different pathosoms and the results of the analysis should be considered to be a linguistic game assisting classification of a patient vector to different pathosoms without the use of defined mathematical methods or a distance measure.

5. For a coming assistance system of decision making in medicine three different tools are mandatory: (1) an electronic history taking which can be transformed in a patient data vector [3,4] (2) a set of disease vectors (in our system called pathosoms) each reflecting a prototypic disease vector or an algorithms for a disease entity. (3) an algorithm comparing the patient vector with all pathosom vectors giving a ranking of possible pathosoms fitting to a given patient vector.

For a coming assistance system of decision making in medicine three different tools are mandatory: (1) an electronic history taking which can be transformed in a patient data vector [3,4] or extracts of electronic health care systems (2) a set of disease vectors (in our system called pathosoms) each reflecting a prototypic disease vector or an algorithms for a disease entity. (3) an algorithm comparing the patient vector with all pathosom vectors giving a ranking of possible pathosoms fitting to a given patient vector (interference engine).

6. A sentence concerning possible improvements of memem7 is included.

Combining memem7 with tools recognizing medical texts like MetaMap [21] or cTake [22] are currently in work.

7. A sentence was included concerning the difference of memem7 to other clinical decision systems in our opinion.

What are the differences of memem7 to other existing medical decisions systems like e.g. HELP [18]. We use only linguistic elements (syntactic or semantic) omitting so far tools like probabilistic or Bayesian tools. Therefore, the results of a search function in our system is not the result of a logic, but of a linguistic approach.
8. References

References were completed for clinical decision systems