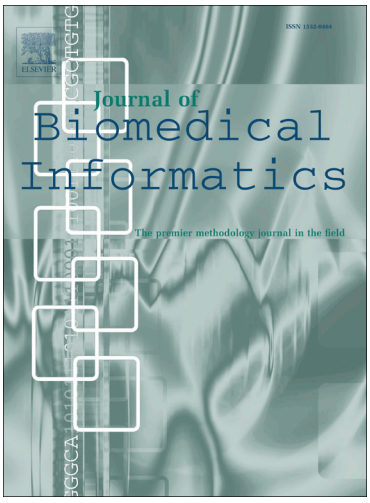
Accepted Manuscript



Predicting Mental Conditions Based on "History of Present Illness" in Psychiatric Notes with Deep Neural Networks

Tung Tran, Ramakanth Kavuluru

PII: S1532-0464(17)30133-8
DOI: http://dx.doi.org/10.1016/j.jbi.2017.06.010
Reference: YJBIN 2806

To appear in: *Journal of Biomedical Informatics*

Received Date: 1 February 2017
Revised Date: 5 June 2017
Accepted Date: 6 June 2017

Please cite this article as: Tran, T., Kavuluru, R., Predicting Mental Conditions Based on "History of Present Illness" in Psychiatric Notes with Deep Neural Networks, *Journal of Biomedical Informatics* (2017), doi: http://dx.doi.org/10.1016/j.jbi.2017.06.010

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Predicting Mental Conditions Based on "History of Present Illness" in Psychiatric Notes with Deep Neural Networks

Tung Tran[a], Ramakanth Kavuluru[a,b,*]

[a]*Department of Computer Science, University of Kentucky, 329 Rose Street, Lexington, KY 40506, USA*
[b]*Division of Biomedical Informatics, Department of Internal Medicine, University Kentucky, 725 Rose Street, Lexington, KY 40536, USA*

Abstract

Background: Applications of natural language processing to mental health notes are not common given the sensitive nature of the associated narratives. The CEGS N-GRID 2016 Shared Task in Clinical Natural Language Processing (NLP) changed this scenario by providing the first set of neuropsychiatric notes to participants. This study summarizes our efforts and results in proposing a novel data use case for this dataset as part of the third track in this shared task.

Objective: We explore the feasibility and effectiveness of predicting a set of common mental conditions a patient has based on the short textual description of patient's history of present illness typically occurring in the beginning of a psychiatric initial evaluation note.

Materials and Methods: We clean and process the 1000 records made available through the N-GRID clinical NLP task into a key-value dictionary and build a dataset of 986 examples for which there is a narrative for history of present illness as well as Yes/No responses with regards to presence of specific mental conditions. We propose two independent deep neural network models: one based on convolutional neural networks (CNN) and another based on recurrent neural networks with hierarchical attention (ReHAN), the latter of which allows for interpretation of model decisions. We conduct experiments to compare these methods to each other and to baselines based on linear models and named entity recognition (NER).

*Corresponding author
Email addresses: tung.tran@uky.edu (Tung Tran), ramakanth.kavuluru@uky.edu (Ramakanth Kavuluru)

Download English Version:

https://daneshyari.com/en/article/6927637

Download Persian Version:

https://daneshyari.com/article/6927637

Daneshyari.com