

## Accepted Manuscript

Transferability of Artificial Neural Networks for Clinical Document Classification Across Hospitals: A Case Study on Abnormality Detection from Radiology Reports

Hamed Hassanzadeh, Anthony Nguyen, Sarvnaz Karimi, Kevin Chu

PII: S1532-0464(18)30143-6

DOI: <https://doi.org/10.1016/j.jbi.2018.07.017>

Reference: YJBIN 3022

To appear in: *Journal of Biomedical Informatics*

Received Date: 16 April 2018

Revised Date: 25 June 2018

Accepted Date: 14 July 2018

Please cite this article as: Hassanzadeh, H., Nguyen, A., Karimi, S., Chu, K., Transferability of Artificial Neural Networks for Clinical Document Classification Across Hospitals: A Case Study on Abnormality Detection from Radiology Reports, *Journal of Biomedical Informatics* (2018), doi: <https://doi.org/10.1016/j.jbi.2018.07.017>

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.



# Transferability of Artificial Neural Networks for Clinical Document Classification Across Hospitals: A Case Study on Abnormality Detection from Radiology Reports

Hamed Hassanzadeh<sup>a,\*</sup>, Anthony Nguyen<sup>a</sup>, Sarvnaz Karimi<sup>b</sup>, Kevin Chu<sup>c</sup>

<sup>a</sup>The Australian e-Health Research Centre, CSIRO, Brisbane, Australia

<sup>b</sup>Data61, CSIRO, Sydney, Australia

<sup>c</sup>Royal Brisbane and Women's Hospital, Queensland Health, Brisbane, Australia

---

## Abstract

*Objective.* Application of machine learning techniques for automatic and reliable classification of clinical documents have shown promising results. However, machine learning models require abundant training data specific to each target hospital and may not be able to benefit from available labeled data from each of the hospitals due to data variations. Such training data limitations have presented one of the major obstacles for maximising potential application of machine learning approaches in the health-care domain. We investigated transferability of artificial neural network models across hospitals from different domains representing various age demographic groups (i.e., children, adults, and mixed) in order to cope with such limitations.

*Materials and methods.* We explored the transferability of artificial neural networks for clinical document classification. Our case study was to detect abnormalities from limb X-ray reports obtained from the emergency department (ED) of three hospitals within different domains. Different transfer learning scenarios were investigated in order to employ a source hospital's trained model for addressing a target hospital's abnormality detection problem.

---

\*Corresponding author. UQ Health Sciences Building, Royal Brisbane Hospital, Herston, Queensland 4029, Australia. Tel: +61 7 3253 3654.

*Email addresses:* hamed.hassanzadeh@csiro.au (Hamed Hassanzadeh), Anthony.Nguyen@csiro.au (Anthony Nguyen), Sarvnaz.Karimi@data61.csiro.au (Sarvnaz Karimi), Kevin.Chu@health.qld.gov.au (Kevin Chu)

Download English Version:

<https://daneshyari.com/en/article/6927389>

Download Persian Version:

<https://daneshyari.com/article/6927389>

[Daneshyari.com](https://daneshyari.com)