Nearest Neighbor Method Using Non-nested Generalized Exemplars in Breast Cancer Diagnosis

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2017 IEEE 14TH INTERNATIONAL SCIENTIFIC CONFERENCE ON INFORMATICS
Edited by: Novitzka, V; Korecko, S; Szakal, A
Pages: 40-44
Published: 2017
Document Type: Proceedings Paper

Conference

Conference: 14th IEEE International Scientific Conference on Informatics
Location: Poprad, SLOVAKIA
Date: NOV 14-16, 2017
Sponsor(s): IEEE; Tech Univ Kosice, Fac Elect Engn & Informat; Assoc Slovak Sci & Technol Soc; IEEE SMCS Tech Comm Computat Cybernet; Tech Univ Kosice, Fac Elect Engn & Informat, Dept Comp & Informat, Slovak Soc Appl Cybernet & Informat; IEEE Hungary Sect; IEEE SMC Chapter; IEEE Joint IES RAS Chapter; IEEE SMC Soc

Abstract

Every year there are several million people in the world who die from cancer while breast cancer is belonging to the most prevalent cancers diagnosed in women. In this paper, a nearest neighbor method which uses non-nested generalized exemplars is analyzed for diagnosis of breast cancer. The aim is to improve its accuracy so that the severity of a mammographic mass lesion is predicted more accurately from BI-RADS attributes and the age of the patient. The improvement consists in a change of distance computation between attributes with missing values and the use of several exemplars in diagnosis for a patient. Experiments on mammographic mass data make use of 10-fold cross-validation where sensitivity, specificity and overall accuracy are computed. Achieved results show increases in the sum of sensitivity and specificity as a combined measure for minimization of life-threatening situations and costs. Overall, the amount of unnecessary biopsies is decreased in the analyzed method.

Keywords

Author Keywords: nearest neighbor; classification; breast cancer
KeyWords Plus: MORTALITY PATTERNS; EUROPE

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Funding

Funding Agency	Grant Number

"University Science Park of the University of Zilina - Phase II" of the Operational Programme Research and Innovation - European Regional Development Fund	ITMS: 313011D13
Faculty of Management Science and Informatics, University of Zilina, Slovakia	FVG/2/2017

Close funding text

This paper was supported by the following project: "University Science Park of the University of Zilina - Phase II" (ITMS: 313011D13) of the The Operational Programme Research and Innovation funded by the European Regional Development Fund.
It was also supported by the following faculty research grant: "User-centred Approach for Decision Support Systems" (no. FVG/2/2017) of the Faculty of Management Science and Informatics, University of Zilina, Slovakia.

Publisher

IEEE, 345 E 47TH ST, NEW YORK, NY 10017 USA

Categories / Classification

Research Areas: Computer Science; Engineering

Web of Science Categories: Computer Science, Information Systems; Computer Science, Theory & Methods; Engineering, Electrical & Electronic

Document Information

Language: English

Accession Number: WOS:000452194700009

ISBN: 978-1-5386-0889-0

Other Information

IDS Number: BL5MT

Cited References in Web of Science Core Collection: 14

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1. **Breast Cancer** — **Times Cited:** 4
   Group Author(s): American Cancer Society
   BREAST CANC Published: 2016
   Publisher: American Cancer Society

2. Title: [not available] — **Times Cited:** 5
   Edited by: Bernard, S.; Christopher, W.
   World Cancer Report 2014 Published: 2014
   Publisher: World Health Organization

3. Title: [not available] — **Times Cited:** 9
   By: Brent, M.
   Instance-based Learning: Nearest Neighbour with Generalization Published: 1995
   Publisher: University of Waikato, Hamilton, New Zealand

4. **Advances in breast cancer screening and diagnosis** — **Times Cited:** 1
   By: Dodge, D. G.; Kegel, J. L.
   The Journal of Lancaster General Hospital Volume: 1 Issue: 2 Pages: 47-51 Published: 2006

5. **The prediction of breast cancer biopsy outcomes using two CAD approaches that both emphasize an intelligible decision process** — **Times Cited:** 74
   By: Elter, M.; Schulz-Wendtland, R.; Wittenberg, T.
   MEDICAL PHYSICS Volume: 34 Issue: 11 Pages: 4164-4172 Published: NOV 2007

6. **Cancer incidence and mortality patterns in Europe: Estimates for 40 countries in 2012** — Times Cited: 2,459
By: Ferlay, J.; Steliarova-Foucher, E.; Lortet-Tieulent, J.; et al.
EUROPEAN JOURNAL OF CANCER Volume: 49 Issue: 6 Pages: 1374-1403 Published: APR 2013

7. **Understanding the perceptions and unmet needs of advanced breast cancer patients** — Times Cited: 1
By: Lenz, C.; Schmitt, D.
Journal fur Pharmakologie und Therapie Volume: 23 Issue: 4 Pages: 111-115 Published: 2014

8. **Economic burden of cancer across the European Union: a population-based cost analysis** — Times Cited: 278
By: Luengo-Fernandez, Ramon; Leal, Jose; Gray, Alastair; et al.
LANCET ONCOLOGY Volume: 14 Issue: 12 Pages: 1165-1174 Published: NOV 2013

9. Title: [not available] — Times Cited: 247
By: McLachlan, G; Do, K.-A; Ambroise, C.
Analyzing Microarray Gene Expression Data Published: 2004
Publisher: Willey, San Diego, USA

10. **Extending survival with chemotherapy in metastatic breast cancer** — Times Cited: 286
By: O'Shaughnessy, J
ONCOLOGIST Volume: 10 Supplement: 3 Pages: 20-29 Published: 2005

11. **A pictorial review of changes in the BI-RADS fifth edition** — Times Cited: 1
By: Rao, A. A.; Feneis, J.; Lalonde, C.; et al.
Breast Imaging Volume: 36 Issue: 3 Published: 2016
[Show additional data]

12. **Screening for Breast Cancer: US Preventive Services Task Force Recommendation Statement** — Times Cited: 269
By: Siu, Albert L.; Bibbins-Domingo, Kirsten; Grossman, David C.; et al.
Group Author(s): US Preventive Serv Task Force
ANNALS OF INTERNAL MEDICINE Volume: 164 Issue: 4 Pages: 279-+ Published: FEB 16 2016

13. Title: [not available] — Times Cited: 16
By: Witten, I. H.; Frank, E.; Hall, M. A.
Practical machine learning tools and techniques Published: 2011
Publisher: Morgan Kaufman Publishers, Burlington, MA, USA

14. **Cancer incidence and mortality patterns in South Eastern Europe in the last decade: Gaps persist compared with the rest of Europe** — Times Cited: 43
By: Znaor, Ariana; van den Hurk, Corina; Primic-Zakelj, Maja; et al.
EUROPEAN JOURNAL OF CANCER Volume: 49 Issue: 7 Pages: 1683-1691 Published: MAY 2013

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