

[Look Up Full Text](#)
[Full Text from Publisher](#)
[Find PDF](#)
[Export...](#)
[Add to Marked List](#)

## Cancer Relapse Prediction from Microrna Expression Data Using Machine Learning

By: Razak, E (Razak, Eliza)<sup>[1]</sup>; Yusof, F (Yusof, Faridah)<sup>[1]</sup>; Raus, RA (Raus, Raha Ahmad)<sup>[1]</sup>

JOURNAL OF MECHANICS OF CONTINUA AND MATHEMATICAL SCIENCES

Pages: 365-373 Special Issue: 1  
 DOI: 10.26782/jmcms.2019.03.00035  
 Published: MAR 2019  
 Document Type: Article

### Abstract

Cancer is a major deadliest disease globally that involve uncontrolled cell growth and invasion-metastasis events. It accounts for around 13% of all deaths worldwide. Statistical reports have pointed out that the cancer occurrence rate is increasing at an alarming rate in the world. Furthermore, cancer relapse rate is also rising mostly due to late cancer diagnosis. Some cancers can recur at the site of origin or the distant site after years of anticancer treatment. Therefore, cancer relapse prediction process is of paramount important so that early specific treatments can be sought. Nevertheless, conventional methods for diagnosing cancer relapse rely on invasive and labor intensive biopsy examinations. Circulating miRNAs have gained great interest in medical field because of their higher sensitivity, specificity and potential for minimally invasive sampling procedures. Furthermore, miRNA expression profiling from body fluid samples using high-throughput approaches is a promising technology that could predict cancer relapse. This paper describes a machine learning based approach called one-dependent estimator to predict cancer relapse from miRNA expression data. The proposed framework will predict whether a particular cancer will relapse within cancer recurrence time frame, which is usually 5 years. To select relevant cancer recurrence associated miRNAs, we employ an entropy-based miRNA marker selection approach. This proposed system has achieved an average accuracy of 92.82% in predicting cancer relapse over three datasets, namely glioblastoma, ovarian cancer, and hepatocellular carcinoma (HCC). The experimental results exhibit the efficacy of the proposed framework.

### Keywords

Author Keywords: Mirna; Cancer Relapse Prediction; Marker Selection

### Author Information

Reprint Address: Razak, E (reprint author)

+ Int Islamic Univ Malaysia, Kuala Lumpur, Malaysia.

### Addresses:

+ [ 1 ] Int Islamic Univ Malaysia, Kuala Lumpur, Malaysia

E-mail Addresses: drelizarazak@gmail.com; yfaridah@iium.edu.my; rahaar@iium.edu.my

### Funding

Funding Agency	Grant Number
Ministry of Higher Education under the Fundamental Research Grant Scheme (FRGS)	FRGS15-202-0443

[View funding text](#)

### Publisher

INST MECHANICS CONTINUA & MATHEMATICAL SCIENCES, P-9-1, L I C TOWNSHIP, MADHYAMGRAM KOLKATA, WEST BENGAL, 700129, INDIA

### Categories / Classification

Research Areas: Mechanics

Web of Science Categories: Mechanics

[See more data fields](#)

### Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

18

Cited References

[View Related Records](#)

### Use in Web of Science

Web of Science Usage Count

1

Last 180 Days

1

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection  
 - Emerging Sources Citation Index

### Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

## Cited References: 18

Showing 18 of 18 [View All in Cited References page](#)

(from Web of Science Core Collection)

- Discretization of Continuous Attributes in Supervised Learning algorithms** Times Cited: 1

By: Al-Ibrahim, A.  
 The Research Bulletin of Jordan ACM-ISWSA Volume: 7952 Published: 2011
- Improving the Prediction of Survival in Cancer Patients by Using Machine Learning Techniques: Experience of Gene Expression Data: A Narrative Review** Times Cited: 11

By: Bashiri, Azadeh; Ghazisaeeadi, Marjan; Safdari, Reza; et al.

3. **Serum-Based miRNAs in the Prediction and Detection of Recurrence in Melanoma Patients** Times Cited: 61  
By: Fleming, Nathaniel H.; Zhong, Judy; da Silva, Ines Pires; et al.  
CANCER Volume: 121 Issue: 1 Pages: 51-59 Published: JAN 1 2015
4. Title: [not available] Times Cited: 2  
By: Garcia-Gimenez, J. L.  
Epigenetic biomarkers and diagnostics Published: 2015  
Publisher: Academic Press
5. **MicroRNA sequence polymorphisms and the risk of different types of cancer** Times Cited: 50  
By: Hu, Ye; Yu, Chen-Yang; Wang, Ji-Lin; et al.  
SCIENTIFIC REPORTS Volume: 4 Article Number: 3648 Published: JAN 13 2014
6. **The Correlation between miRNA and Lymph Node Metastasis in Gastric Cancer** Times Cited: 16  
By: Huang, Kuo-Hung; Lan, Yuan-Tzu; Fang, Wen-Liang; et al.  
Biomed Research International Article Number: 543163 Published: 2015
7. Title: [not available] Times Cited: 35  
By: Kumar, V; Abbas, AK; Aster, JC.  
Robbin's basic pathology e-book Published: 2017  
Publisher: Elsevier Health Sciences, Amsterdam
8. **Cancer biomarker discovery: Current status and future perspectives** Times Cited: 56  
By: Maebert, Katrin; Cojoc, Monica; Peitzsch, Claudia; et al.  
INTERNATIONAL JOURNAL OF RADIATION BIOLOGY Volume: 90 Issue: 8 Special Issue: SI Pages: 659-677 Published: AUG 2014
9. **DNA and Histone Methylation in Gastric Cancer** Times Cited: 2  
By: Matsusaka, Keisuke; Kaneda, Atsushi  
DNA AND HISTONE METHYLATION AS CANCER TARGETS Book Series: Cancer Drug Discovery and Development Pages: 377-390 Published: 2017
10. **Cell-free Circulating miRNA Biomarkers in Cancer** Times Cited: 95  
By: Mo, Meng-Hsuan; Chen, Liang; Fu, Yebo; et al.  
JOURNAL OF CANCER Volume: 3 Pages: 432-448 Published: 2012
11. **Redefining global health priorities: Improving cancer care in developing settings** Times Cited: 17  
By: Moten, Asad; Schafer, Daniel; Farmer, Paul; et al.  
JOURNAL OF GLOBAL HEALTH Volume: 4 Issue: 1 Article Number: 010304 Published: JUN 2014
12. Title: [not available] Times Cited: 6  
By: Natrella, M. G.  
Experimental statistics Published: 2013  
Publisher: Courier Dover Publications
13. **MicroRNA profiling: approaches and considerations** Times Cited: 841  
By: Pritchard, Colin C.; Cheng, Heather H.; Tewari, Muneesh  
NATURE REVIEWS GENETICS Volume: 13 Issue: 5 Pages: 358-369 Published: MAY 2012
14. **Data discretization: taxonomy and big data challenge** Times Cited: 39  
By: Ramirez-Gallego, Sergio; Garcia, Salvador; Mourino-Talin, Hector; et al.  
WILEY INTERDISCIPLINARY REVIEWS-DATA MINING AND KNOWLEDGE DISCOVERY Volume: 6 Issue: 1 Pages: 5-21 Published: JAN-FEB 2016
15. **Accurate prediction of neuroblastoma outcome based on miRNA expression profiles** Times Cited: 70  
By: Schulte, Johannes H.; Schowe, Benjamin; Mestdagh, Pieter; et al.  
INTERNATIONAL JOURNAL OF CANCER Volume: 127 Issue: 10 Pages: 2374-2385 Published: NOV 15 2010
16. **On the Origin of Cancer Metastasis** Times Cited: 189  
By: Seyfried, Thomas N.; Huysentruyt, Leanne C.  
Critical Reviews in Oncogenesis Volume: 18 Issue: 1-2, Sp. Iss. SI Pages: 43-73 Published: 2013
17. Title: [not available] Times Cited: 463  
By: Shalev-Shwartz, S.; Ben-David, S.  
Understanding machine learning: From theory to algorithms Published: 2014  
Publisher: Cambridge University Press
18. **Roles of miR-182 in sensory organ development and cancer** Times Cited: 46  
By: Wei, Qing; Lei, Rong; Hu, Guohong  
THORACIC CANCER Volume: 6 Issue: 1 Pages: 2-9 Published: JAN 2015

