ORIGINAL ARTICLE

Iranian Quarterly Journal of Breast Disease 2018; 11(3):71.

Improvement of Genetic Bee Algorithm to Select the Effective Features in Predicting Breast Cancer from Among Dietary Habits, Cultural Factors, Clinical Signs, and Laboratory Results

Nooshyar M: Department of Computer, University of Mohaghegh Ardabili, Ardebil, Iran
Momeni M: Ph.D. Student, Computer Department, Yazd University, Yazd, Iran
Gharravi S: Electrical and Computer Department, Esfarayne Higher Education Complex, Northern Khorasan, Esfarayne, Iran

Corresponding Author: Mehdi Nooshyar, nooshyar@uma.ac.ir

[Downloaded from ijbd.ir on 2026-11-14]

[DOR: 20.1001.1.17359406.1397.11.3.2.2]

[DOI: 10.30699/acadpub.ijbd..11.3.71]

Abstract

Introduction: The identification of factors influencing the incidence of breast cancer bears great importance. The wide range of symptoms of the disease makes the diagnosis difficult for doctors. Preventing breast cancer could be achieved via a knowledge of the factors affecting the incidence of the disease. The purpose of this paper was to identify variables related to dietary habits, cultural factors, and laboratory results that could contribute to the effective prediction of breast cancer. For this purpose, an optimal model based on genetic bee colony (GBC) algorithm was developed to increase machine learning accuracy.

Methods: In this study, patient information was collected from the database of Mortaaz subspecialty hospital in Yazd. Medical records of 711 breast cancer patients were screened for 63 variables. Patients had been followed up for at least two years. Variables most affecting the incidence of breast cancer were identified using the GBC algorithm and backup vector machine.

Results: Among diet- and culture-related factors, smoking and hookah use, physical inactivity, nighttime employment, and being single and cultural factors related to breast cancer were selected. Also, based on the proposed model, factors such as comparing the results of previous and current mammograms, the duration of taking contraceptive pills, hysterectomy, hormone replacement therapy, nipple retraction and pain, type of discharge, and detecting a mass in mammograms were effective in detecting the disease. No significant relationship was found between breast cancer and factors such as using the microwave in the kitchen, or the type of rice or oil consumed.

Conclusion: Using dietary habits and cultural factors in the prediction of breast cancer, the proposed model has the least error rate and the most accuracy compared with other models such as fuzzy and neural networks.

Keywords: Genetic Bee Colony Algorithm, Feature Selection, Breast Cancer, Dietary Habits, Cultural Factors, Laboratory Results