ORIGINAL ARTICLE

Detecting and Counting Non-Mitotic Cells of Immunohistochemical Stained Breast Tissue

Jazayeriy H: Computer Engineering Department, Babol Noshivani University of Technology, Babol, Iran
Nosrati A: Gastrointestinal Cancer Research Center, Mazandaran University of Medical Sciences, Sari, Iran
FayyazZadeh F: Computer Engineering Department, Islamic Azad University, Sari, Iran

Corresponding Author: Hamid Jazayeriy, jhamid@nit.ac.ir

Abstract

Introduction: The mortality burden of breast cancer among females has drawn the attention of many researches around the world from the early detection to prevention of this leading death cause. In terms of detecting cancerous cells, the identification of mitotic and non-mitotic cells is considered to play a key role. Detecting and counting non-mitotic cells in breast tissue are rather tedious and costly while preparation of the slides is believed to be a crucial step. To surmount such problems, automated analysis of medical images has been considered by applying image processing algorithms.

Methods: In this study, a framework was provided for identifying and counting non-mitotic cells of breast tissue using image processing techniques. All microscopic images of breast tissue collected from Imam Khomeini hospital in Sari, Mazandaran, Iran were stained by ER and PR immunohistochemistry (IHC). A hybrid image processing technique was also conducted in MATLAB software to implement the proposed method.

Results: The figure of merits such as accuracy, sensitivity, and precision of proposed method for counting cells were determined to be 93.15%, 91%, and 94.22%, respectively.

Conclusion: The results from automatic counting compared with that of manual counting indicating that the proposed method has good and reliable performance in identifying and counting of the non-mitotic cells.

Keywords: Breast Cancer, Immunohistochemistry, Non-mitotic cells, Image processing, Cell Counting.