



Breast cancer segmentation using hybrid HHO-CS SVM optimization techniques

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Abstract

Breast cancer remains a prevalent and serious health issue, leading to high mortality rates among women worldwide. Early detection of breast cancer is pivotal in improving patient outcomes. This study introduces an innovative approach for breast cancer segmentation by integrating Support Vector Machine (SVM) with Harris Hawks Optimization (HHO) and Cuckoo Search (CS) algorithms. HHO, a metaheuristic optimization algorithm inspired by the cooperative behavior of Harris Hawks, is employed for effective exploration and exploitation within the search space, thereby enhancing the accuracy of image segmentation. The CS algorithm, incorporating Cuckoo Search principles, ensures a balanced exploration of local and global search spaces, contributing to a comprehensive optimization strategy. The hybrid HHO-CS SVM algorithm is instrumental in fine-tuning hyperparameters, resulting in superior performance and improved segmentation outcomes for breast cancer detection. This innovative amalgamation of techniques significantly elevates the accuracy and efficiency of breast cancer detection through image segmentation.

Keywords Cancer · Mammography · Distort countour · Segmentation · World health organization · Breast cancer

1 Introduction

The term "breast cancer" refers to a group of subtypes of breast tumours, each of which has a different molecular and cellular cause and a different way of acting in the body. Most of these tumours started in the ducts or lobules and are made of cells from the epithelium.

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