

Investigation on Skin Cancer Classification Using Nature Inspired Algorithms and Machine Learning Models

R.Durga Devi

Department of Computer Applications, SCIMS, B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai, India

Dr. M. Deepika

Department of Computer Applications, SCIMS, B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai, India

Abstract:

Since early detection greatly increases survival rates, skin cancer detection is an important study topic in medical image analysis. In this work, we investigate the use of two potent optimization methods, CAT Swarm Optimization (CSO) and Bat Algorithm (BA), for feature selection and classification in the context of skin cancer diagnosis. Finding the best features in skin lesion photos and improving the precision of skin cancer detection are the objectives of this project. The most pertinent characteristics that aid in differentiating between benign and malignant lesions are chosen using CAT Swarm Optimization, which draws inspiration from cats' hunting habits.

The Bat Algorithm is used to optimize the decision-making process and fine-tune the classification model. It is based on the sound – based navigation of bats. The framework starts by preprocessing and extracting features from the ISIC 2018 Skin Cancer Dataset images. Next, it uses CAT Swarm Optimization to select features. The Bat Algorithm is then used to improve classification accuracy by fine-tuning the parameters of a Machine Learning classifier, like Random Forest or Support Vector Machines (SVM). Results from experiments on publicly accessible skin lesion datasets show that using CSO and BA together performs better than using either technique alone in terms of accuracy, sensitivity, and specificity.

Keywords:

CAT Swarm Optimization (CSO), Bat Algorithm (BA), Support Vector Machine, Machine Learning, Classification.