Novel Machine Learning Algorithms for Early Diagnosis of Melanoma

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Melanoma, the most lethal and common form of skin cancer, is a type of cancer that develops from the pigment-containing cells known as melanocytes. It has an estimated mortality rate of 63% worldwide, and 9,480 people died in the United States in 2013 due to melanoma. This is because melanoma is not diagnosed early enough, and most people ignore skin moles or lesions, thinking that they will go away. Fortunately, melanoma can be treated successfully when it is detected early and has a 10 year survival rate of 90%. The aim of this project was to use image processing and machine learning algorithms to develop a system that can detect the probability that a given mole or lesion is cancerous. Image processing algorithms in MatLab were used to analyze the ABCD (asymmetry, border irregularity, color, and diameter) features of a skin lesion. Index values were analyzed statistically using a normal distribution curve to better understand the impact of each independent factor. Then, these features were used to program a machine learning algorithm called an artificial neural network that can diagnose melanoma. These comprehensive steps resulted in an algorithm that can diagnose melanoma with 95% accuracy and can function as preliminary cancer diagnosis. Overall, this program can be used to diagnose melanoma early, and it can potentially save the lives of thousands of people who die from this cancer each year.

Awards Won:

Third Award of $1,000