A Non-Invasive Diagnosis Method for Eye Cancers Using Machine Learning Algorithms

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Eye cancer has affected over 500,000 people worldwide in the past decade. Approximately 10% of people with eye cancer will die because it is not diagnosed early enough, causing it to metastasize throughout the body. Fortunately, eye cancer can be treated successfully when it is detected early, and it has a 5-year survival rate of 75%. The aim of this project was to use image processing and machine learning algorithms to develop a system that can correctly categorize an eye tumor as intraocular melanoma, intraocular lymphoma, or retinoblastoma, which are the three most common forms of eye cancer. Image processing algorithms in MatLab were used to analyze the features of a tumor such as asymmetry, border, pigmentation, size, and entropy. 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 type of machine learning algorithm called an artificial neural network that can diagnose eye cancer. These comprehensive steps resulted in an algorithm that can diagnose eye cancer with 98% accuracy and can function as preliminary cancer diagnosis. Overall, this program can be used to diagnose 3 different forms of eye cancer non-invasively, and it can potentially save the lives of thousands of people who die from this cancer each year.

Awards Won:

Fourth Award of $500