An Eye-Opener to Early Detection and Prevention of Alzheimer's and Glioblastoma Brain Tumors: Using a Multi-Output Regression Convolutional Neural Network Model and Smart Contact Lenses to Detect Alzheimer's and Brain Tumors

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This project was created to aid patients who have a potential risk of developing Alzheimer's disease and/or glioblastoma brain tumors due to genetic, environmental, and lifestyle factors. In this experiment, a Multi-Output Regression Convolutional Neural Network was created to discern the amount and placement of blood vessels in the retina. Through the research process, it was noted that there is an absence of blood vessels in the middle of the retina for Alzheimer's patients, and groups of enlarged blood vessels in the retina for glioblastoma patients. Further developing on this research, in my experiment, nanotechnology-designed nano-material components will be incorporated into smart contact lenses to protect the eyes and perform non-invasive retina scanning. Physicians can easily get the reading and the data from the patients to identify the potential risk and early warning signs for Alzheimer’s and/or glioblastoma. The AI algorithm created uses images of the blood vessels and identifies the variance. The created model achieved accuracy as high as 99.9% on previously unseen data, suggesting that a machine-learning approach is appropriate for Alzheimer’s and/or optic nerve brain tumor detection and classification through retinal scanning using smart contact lenses.

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