A Scalable, Non-Invasive, and Digital Tool to Quickly Diagnose the Zika Virus by Applying Correlation Analysis, Edge Detection Methods, and K-Means Clustering to Fundus Images

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The world remains unprepared to contain the Zika virus and other similar mosquito borne viral diseases which can spontaneously become an epidemic in days. In a survey published by the Wall Street Journal as well as multiple other respected information sources, it was concluded that even the U.S. is not prepared to handle the demand for Zika testing in case of an actual epidemic. This project idea originated from the concern for a possible epidemic mentioned above. It's become requisite for an efficient and scalable solution that can be used to diagnose Zika infected patients. The tool should also be capable of supporting large number of detections for possible use to scan the airline or cruise ship passengers for Zika infection when they arrive to US after visiting a Zika infected region. In the study, fundus images of a healthy individual are being compared to the fundus image of a Zika infected eye through the means of a program. The program designed in this study which was written in R uses statistical, machine learning, and edge detection techniques to compare fundus images of a healthy eye and a Zika infected eye to establish if the person has symptoms of Zika infection or not.

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