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Diabetic Retinopathy Prediction using Modified Inception V3 Model Structure

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Abstract: The analysis of clinical findings revealed that more than 10% of diabetic individuals have an elevated risk of eye issues. Diabetic Retinopathy (DR) is a type of eye illness that impacts 80-85% of persons suffering for more than 10 years from diabetes. In hospitals, retinal fundus images are commonly employed for the identification and study of diabetic retinopathy. The unprocessed retinal fundus images are difficult for machine learning approaches to analyze. Original retinal fundus images are pre-processed utilizing green channel separation, histogram equalization, contrast enhancement, and scaling procedures. For statistical analysis, 14 attributes are additionally collected from preprocessed images. Technique for the detection of retinal lesions can aid in the earlier identification and treatment of a frequently found condition, diabetic retinopathy. We introduce a new criterion for the identification of the optic disc in which we initially identify the significant blood vessels and then utilize their intersection to estimate the position of the optic disc. Future localized utilizing color characteristics. We also demonstrate that a set of attributes, including blood vessels, mucus, micro aneurysms, and hemorrhages, may be recognized with high precision utilizing different morphological techniques applied suitably.

Keywords: *Diabetic Retinopathy (DR), Retinal Fundus Images, Histogram Equalization, Contrast Enhancement, Optic disc, Morphological Techniques.*

1.Introduction

Diabetic Retinopathy is a consequence of diabetes impacts person's eyesight may decline progressively owing to injury to the retinal blood vessels. Initially, diabetic retinopathy may produce no signs or just mild vision issues. However, it can cause blindness. Patients having forms of type 1 or type 2 diabetes can get the disease. In past few years, increase in patients having diabetic dealing from diabetic retinopathy has risen exponentially (DR). DR is among the commonly found serious conditions and the biggest reason for loss of vision in average-aged persons in affluent countries. DR manifests as minute alterations in the retinal capillaries. The earliest noticeable abnormalities are micro aneurysms, which are small capillary disturbances. Micro aneurysms that are distorting produce intraregional hemorrhage. Therefore rises in the early phase of DR, often termed as moderate non-proliferative diabetic retinopathy. Owing to the susceptibility of the eye fundus to certain muscles disorders, fundus imaging is ideally suited for non-invasive visibility. The effectiveness of the testing procedure is straight proportional to the effective and precision of the images of fundus collection methodology and the image processing technologies used to identify anomalies.

Intermediate non-proliferative diabetic retinopathy is characterized by the appearance of exudates, which are essentially greasy deposits oozing from the bad end of blood vessels. If these secretions begin to grow in the central vision region, the condition is known as diabetic maculopathy. Later with specific period of duration, when retinopathy progresses, the micro infarcts in the retina block the blood arteries. These little infarcts are referred to as delicate exudates. When all three of the above irregularities are present, this type of diabetic retinopathy is referred to as serious non-proliferative diabetic retinopathy. The Classification of the advancement of DR within the patient is done into one of the categories: 0 - No DR , 1 – Mild, 2 – Moderate, 3 – Severe, 4 - Proliferative DR. Typically, DR is detected manually by a qualified physician by interpreting Fundus Images, which frequently leads to confusions and ultimately, prolonged therapy. Thus, we aim to provide an automated and sophisticated approach to detect DR as early as possible so that the situation can be controlled before it exacerbates. The aim is to provide an easy to use and maintainable UI to the Prediction Model in the form of a Web Application, so that users can obtain their results with minimal efforts and confusions. Hence, a complete system which enables users to upload their Fundus Images and receive results with minimal errors will be established.

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HANDS-FREE COMPUTING FOR DISABLED PEOPLE USING COMPUTER VISION

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Abstract

Various hands-free mouse replacement systems have been developed for people having a disability in movement and many improvements have been witnessed during the past three decades. For those with disabilities in the movement who have not yet had a fair chance to use the typical input devices of a personal computer, many authors have put forth replacements for the mouse during the past three decades. The overhead of employing head-mounted devices is decreased in camera-based systems by using the web camera as the mouse. The research problems and opportunities are tracking the user's facial expression of various users with various head poses through the camera and accurately converting into mouse cursor movement and click events. The user's inadvertent head movements cause the present systems to lose the tracked feature, and they are only capable of moving the pointer in a slanting direction. The suggested system employs fuzzy logic in its decision-making to streamline and enhance the effectiveness of managing the cursor and its interactions on Graphical User Interfaces, allowing persons with disabilities to move about and utilise computers with ease. By mapping the mouse cursor movement exclusively with the deliberate head movement and disregarding the natural head motions, the system addresses the issue of feature loss. The technology also accomplishes the cursor's horizontal and vertical movement. The usual GUI interactive features like menus and scroll bars that need horizontal or vertical movement are difficult to operate on the existing systems since they can only move the cursor in a slanting manner. Unintentional head movements by users frequently result in the current system losing track of facial feature tracking. The suggested method uses a standard web camera to capture the three-dimensional head rotation. To shift the mouse pointer vertically, the positions of the nasal bridge and nose tip are collected. The inner corners of the left and right eyes, as well as the tip of the nose, are also used to shift the mouse cursor horizontally. Unintentional head motions are disregarded to prevent the loss of face features, and by using fuzzy logic, the movement of the mouse pointer is only mapped with the intended head movements. The fuzzy control uses the head's rate, direction, and distance as inputs to determine how the mouse pointer will travel. By capturing the stable, purposeful, and sudden movements of the head, respectively, the fuzzy system classifies the movement of the head as weak, fair, or powerful. By removing the weak and strong head motions, the algorithm just maps the fair head movements with cursor movement on the screen. The proposed system has achieved the horizontal and vertical movement of the cursor and the results are significant when compared with the existing system. The system also successfully ignores the slight movement of the head captured by the web camera when the

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REAL-TIME NEURAL NETWORK BASED PREDICTION IN HANDS-FREE COMPUTING

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Abstract

For those with movement disabilities, a variety of hands-free mouse replacement systems have been developed, and during the past three decades, numerous advancements have been made. Over the past three decades, numerous authors have proposed alternatives to the mouse for people in the movement with disabilities who have not yet had a fair opportunity to utilise the standard input methods of a personal computer. In camera-based systems, the overhead of using head-mounted devices is reduced by using the web camera as the mouse. Tracking user facial expressions as they are being captured by the camera and accurately translating them into mouse cursor movement and click events are research challenges and opportunities. The current systems can only move the pointer in a slanting manner due to the user's accidental head movements losing the tracked feature. The movement has not yet allowed people with impairments the same chances as others to interact with computers. They have trouble using the input devices on computers due to their mobility problems. Controlling mouse pointer navigation is still difficult, despite the fact that on-screen virtual keyboards may be used to simulate a physical keyboard and speech recognition can be easily utilized to map mouse click events. The development of hands-free mouse replacement technologies has undergone much advancement. There are a number of limitations to mouse replacement systems that use a webcam as a mouse. In order to enable people with movement disabilities to use a standard PC, this research suggests enhancing the ability of camera-based hands-free computing systems to control the mouse cursor by predicting the user's selection of the target item in the GUI-based system using neural network techniques. Using samples where the mouse cursors predicted position values are closer to the user's actual selection region on the computer screen, the system is put to the test, and the anticipated outcome is achieved in every sample.

Keywords: predicting mouse cursor targets; assistive technology; neural networks; hands-free computing; camera mouse; disabled users.

1. Introduction

Around one billion individuals worldwide suffer from some sort of physical disability, with over 20% suffering from severe disabilities such as quadriplegia [1]. More than 25 million individuals in India are disabled, with more than 5 million of them having a movement disability, which includes people who are paralyzed without both legs and/or both arms [2]. People with disabilities in the

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