Detection of Alzheimer's and Cardio Vascular Disesase Based on Retinal Disorder

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ABSTRACT

The rapid development of digital imaging and computer vision has extended the potential of diagnosis of human diseases. Medical image analysis is a non- invasive way to identify human diseases which are usually manually marked by medical experts or automatically detected by the Computer-Aided Diagnostic (CAD) system. In this project, we are going to detect Cardiovascular and Alzheimer's Diseases based on retinal disorder using MATLAB software. we feed fundus images to the MATLAB software using image datastore function. The fundus image contains both normal(20%)images and abnormal (80%) images. We have to feed input images to the software it undergoes preprocessing then image segmentation, feature extraction and classification. After the evaluation of images the software will detect the respective diseases.

INTRODUCTION

Eyes are the most important sensory organs of the human body to observe this beautiful world, without which life seems colorless. The health of this organ is indeed very important to live a normal life. Retinal images can provide a snapshot of everything which is happening inside the human body. The retina is the innermost, light-sensitive layer of the human eye. Structural format of the retina (optic disc (OD), macula, fovea, retinal vessels and abnormalities like microaneurysms (MAs), hemorrhages, exudates, cotton wool spots), macular hole, drusens, perivascular sheathing and exudation, retinal detachment, and subretinal fluid is revealed by fundus imaging [1]. Extraction and characterization of retinal vessels such as shape, diameter, tortuosity can be utilized in diagnosis, evaluation, and treatment of different retinal abnormalities. Automatic precise diagnosis of these structural changes and their timely medication can help to avoid severe consequences. An anatomical structure.
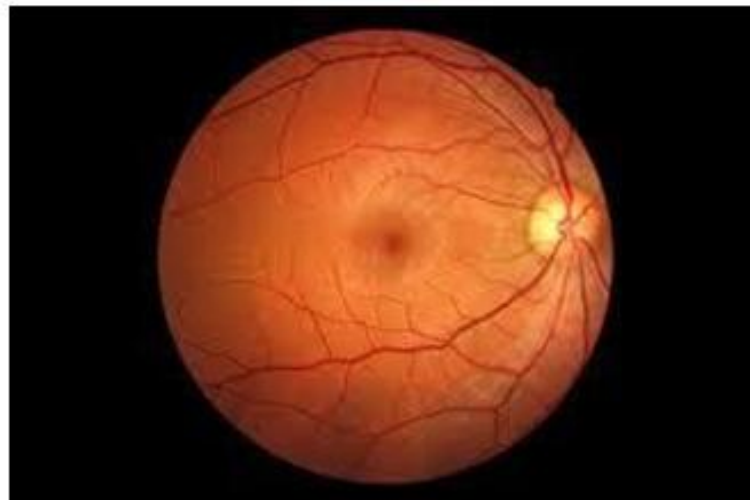
Alzheimers Disease

Alzheimer's disease is a progressive neurologic disorder that causes the brain to shrink (atrophy) and brain cells to die. Alzheimer's disease is the most common cause of dementia — a continuous decline in thinking, behavioral and social skills that affects a person's ability to function independently. Approximately 5.8 million people in the United States age 65 and older live with Alzheimer's disease. Of those, 80% are 75 years old and older. Out of the approximately 50 million people worldwide with dementia, between 60% and 70% are estimated to have Alzheimer's disease. The early signs of the disease include forgetting recent events or conversations. As the disease progresses, a person with Alzheimer's disease will develop severe memory impairment and lose the ability to carry out everyday tasks. Medications may temporarily improve or slow progression of symptoms. These treatments can sometimes help people with Alzheimer's disease maximize function and maintain independence for a time. Different programs and services can help support people with Alzheimer's disease and their caregivers. There is no treatment that cures Alzheimer's disease or alters the disease process in the brain. In advanced stages of the disease, complications from severe loss of brain function — such as dehydration, malnutrition or infection — result in death.
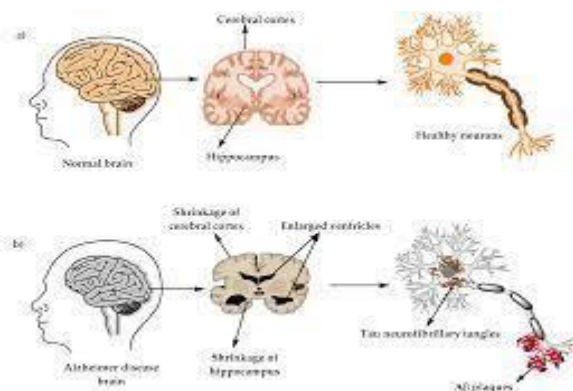

Cardio Vascular Diseases

Cardiovascular disease, including stroke, is the leading cause of illness and death in the United States. There are an estimated 62 million people with cardiovascular disease and 50 million people with hypertension in this country.1 In 2000, approximately 946,000 deaths were attributable to cardiovascular disease, accounting for 39 percent of all deaths in the United States.2 Epidemiologic studies and randomized clinical trials have provided compelling evidence that coronary heart disease is largely preventable.3 However, there is also reason to believe that there is a heritable component to the disease. In this review, I highlight what we know now about genetic factors in cardiovascular disease. As future genomic

discoveries are translated to the care of patients with cardiovascular disease, it is likely that what we can do will change.

Dection of Diseases Using Matlab Software:
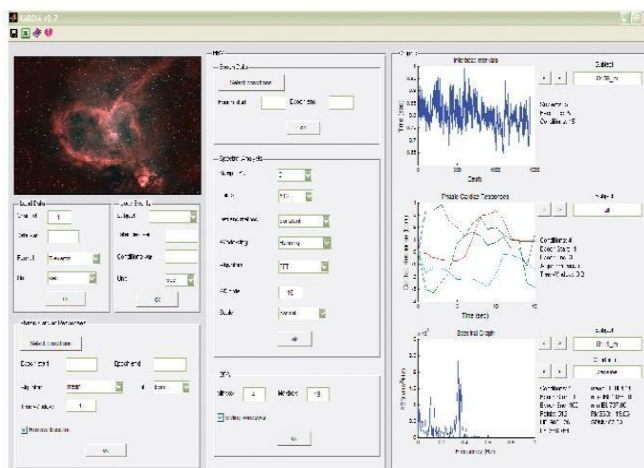
The name MATLAB stands for MATrix LA Boratory. MATLAB was written originally to provide easy access to matrix software developed by the LINPACK (linear system package) and EISPACK (Eigen system package) projects. MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming environment. Furthermore, MATLAB is a modern programming language environment: it has sophisticated data structures, contains built-in editing and debugging tools, and supports object-oriented programming. These factors make MATLAB an excellent tool for teaching and research. MATLAB has many advantages compared to conventional computer languages (e.g., C, FORTRAN) for solving technical problems. MATLAB (matrix laboratory) is a fourth-generation high-level programming language and interactive environment for numerical computation, visualization and programming. MATLAB is developed by Math Works.

It allows matrix manipulations; plotting of functions and data; implementation of algorithms; creation of user interfaces; interfacing with programs written in other languages, including C, C++, Java, and FORTRAN; analyze data; develop algorithms; and create models and applications.

MATLAB's Power of Computational Mathematics:
MATLAB is used in every facet of computational mathematics. Following are some commonly used mathematical calculations where it is used most commonly

• Dealing with Matrices and Arrays
• 2-D and 3-D Plotting and graphics
• Linear Algebra

**Features of MATLAB:**
Following are the basic features of MATLAB

• It is a high-level language for numerical computation, visualization and application development.
• It also provides an interactive environment for iterative exploration, design and problem solving.
• It provides vast library of mathematical functions for linear algebra, statistics, Fourier analysis, filtering, optimization, numerical integration and solving ordinary differential equations.
• It provides built-in graphics for visualizing data and tools for creating custom plots.

Uses of MATLAB:
MATLAB is widely used as a computational tool in science and engineering encompassing the fields of physics, chemistry, math and all engineering streams. It is used in a range of applications including

• Signal Processing and Communications
• Image and Video Processing
• Control Systems

BLOCK DIAGRAM:
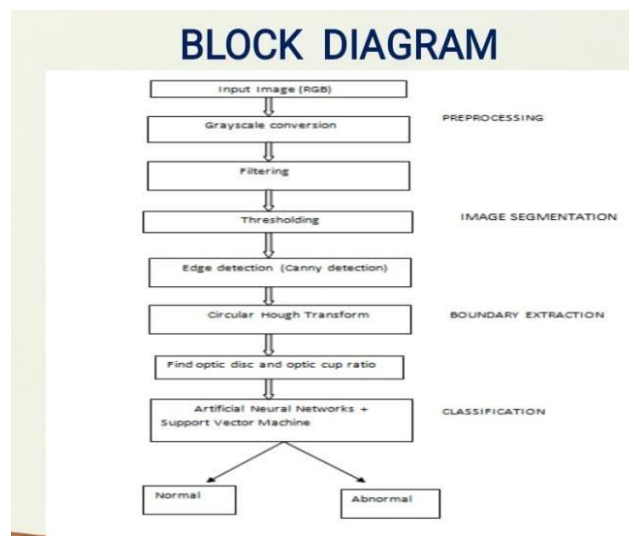
ALGORTHIM:

1. Does the pixel to the left (West) have the same value as the current pixel?
- Yes – We are in the same region. Assign the same label to the current pixel
- No – Check next condition

2. Do both pixels to the North and West of the current pixel have the same value as the current pixel but not the same label?
- Yes – We know that the North and West pixels belong to the same region and must be merged. Assign the current pixel the minimum of the North and West labels, and record their equivalence relationship
- No – Check next condition

3. Does the pixel to the left (West) have a different value and the one to the North the same value as the current pixel?
- Yes – Assign the label of the North pixel to the current pixel
- No – Check next condition

4. Do the pixel's North and West neighbors have different pixel values than current pixel?
- Yes – Create a new label id and assign it to the current pixel

CONCLUSION

In this paper, we briefly discussed various human diseases(eye, cardiac, and brain) that can be diagnosed from fundus images. We further discussed publicly available retina datasets particularly used for the diagnosis of various diseases. Challenges in diagnosis using retinal images include lack of availability of appropriate publicly available databases cover-ing large range of diseases. There is also a lack of consensus that which database is highly recommended for the target disease. Another challenge in diagnosis of diseases through retinal images is acquisition of good quality fundus images. A good quality image is an image that has clarity and content. To address this issue image quality assessment tools are PERSPECTIVES In this paper, we briefly discussed various human diseases (eye, cardiac, and brain) that can be diagnosed from fundus images. We further discussed publicly available retina datasets particularly used for the diagnosis of various diseases. Challenges in diagnosis using retinal images include lack of availability of appropriate publicly available databases cover-ing large range of diseases. There is also a lack of consensus that which database is highly recommended for the target disease. Another challenge in diagnosis of diseases through retinal images is

acquisition of good quality fundus images. A good quality image is an image that has clarity and content. To address this issue image quality assessment tools are required. Image quality assessment is one of the important measures for proper diagnosis of diseases using medical image analysis. required. Image quality assessment is one of the important measures for proper diagnosis of diseases using medical image analysis.

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