Visualizing and Predicting Heart Diseases with an Interactive Dash Board

1. **DOMAIN NAME** : DATA ANALYTICS

2. **TEAM ID :** PNT2022TMID29533

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PAPER-1: Research on Two Dimensional Visualization of Heart Sound Signal Based on Variant Model Theory

Author: xiang liu

Abstract:

Cardiac auscultation plays an important role in the diagnosis of heart disease. Domestic and foreign researchers have done a lot of research on the analysis of heart sound signals from the point of view of signals, hoping to find an effective signal analysis method to assist doctors in the diagnosis of congenital heart disease. This paper introduces a new method to perform a series of logical transformations on the envelope of the heart sound signal, making it a two-dimensional scatter plot, and reflecting its characteristics in the case that the characteristics of the original signal are not substantially lost. In the dispersal point distribution map, different features of different pathological heart sound signals can be directly observed in the corresponding two-dimensional scatter plot.

PAPER-2: Evaluation of Artery Visualizations for Heart Disease Diagnosis

Authors:Michelle Borkin

publised year : 2011

Abstract:

Heart disease is the number one killer in the United States, and finding indicators of the disease at an early stage is critical for treatment and prevention. In this paper we evaluate visualization techniques that enable the diagnosis of coronary artery disease. A key physical quantity of medical interest is endothelial shear stress (ESS). Low ESS has been associated with sites of lesion formation and rapid progression of disease in the coronary arteries. Having effective visualizations of a patient's ESS data is vital for the quick and thorough non-invasive evaluation by a cardiologist. We present a task taxonomy for hemodynamics based on a formative user study with domain experts. Based on the results of this study we developed HemoVis, an interactive visualization application for heart disease diagnosis that uses a novel 2D tree diagram representation of coronary artery trees.

PAPER-3: Visualization and Prediction of Heart Diseases Using Data Science Framework

Authors:Vaibhav Gupta

published year : 2021

Abstract:

Heart is one the most vital organ in the human body. When we talk about heart diseases, we can have multiple conditions where heart is not working the way it should be like blockage in blood vessels. According to many researches that have been conducted through a period of time have found out that heart failure and heart disease has been the cruel cause of death in human beings. What aggravates this situation is that most of these diseases are being diagnosed at later stages at which it is very difficult to control. But if somehow, we can diagnose these diseases at its early stage, then we can surely cure the disease.

PAPER-4: Visual Analysis of Cardiac 4D MRI Blood Flow Using Line Predicates

Authors:Silvia Born

published year : 2012

Abstract:

Four-dimensional MRI is an in vivo flow imaging modality that is expected to significantly enhance the understanding of cardiovascular diseases. Among other fields, 4D MRI provides valuable data for the research of cardiac blood flow and with that the development, diagnosis, and treatment of various cardiac pathologies. However, to gain insights from larger research studies or to apply 4D MRI in the clinical routine later on, analysis techniques become necessary that allow to robustly identify important flow characteristics without demanding too much time and expert knowledge.

PAPER-5: Real-time machine learning for early detection of heart disease using big data approach

Authors:Abderrahmane Ed-Daoudy

published year:2019

Abstract:

Over the last few decades, heart disease is the most common cause of global death. So early detection of heart disease and continuous monitoring can reduce the mortality rate. The exponential growth of data from different sources such as wearable sensor devices used in Internet of Things health monitoring, streaming system and others have been generating an enormous amount of data on a continuous basis.

PAPER-6: Glyph-Based SPECT Visualization for the Diagnosis of Coronary Artery Disease.

Authors : Jennis Meyer-Spradow

published year : 2008

Abstract:

Myocardial perfusion imaging with single photon emission computed tomography (SPECT) is an established method for the detection and evaluation of coronary artery disease (CAD). State-of-the-art SPECT scanners yield a large number of regional parameters of the left-ventricular myocardium (e.g., blood supply at rest and during stress, wall thickness, and wall thickening during heart contraction) that all need to be assessed by the physician.

PAPER-7: Component-composition based heart isolation for 3D volume visualization of coronary arteries

Authors : Mingqing Chen

published year : 2015

Abstract:

Heart isolation (separating the heart from the neighboring tissues, e.g, lung, liver, and rib cage) is a prerequisite to generate a 3D volume visualization as an intuitive view for coronary disease diagnosis and treatment planning. Previously, we proposed a component-carving based heart isolation approach by removing unwanted background tissues (e.g, non-cardiac structures, left atrial appendage, and pulmonary veins/arteries) sequentially

PAPER-8: Visualization of a Digital Twin of the Heart

Authors : Oleg N. Bodinpublished

published year : 2021

This paper considers methods applying of computer graphics for visualization of electrical activity of the heart based on algorithms for topological transformation and a voxel representation of a 3-D heart model. A distinctive feature of a proposed approach is use of a spring voxel as a unit volume, which

mathematical model is a rough approximation of the heart muscle cell - a cardiomyocyte. The article describes criteria for choosing a technological platform for visualization 3D objects.

PAPER-9: 3D Visualization of Echocardiogram and Blood Flow

Authors : Jun Wangpublished

published year : 2006

Abstract:

Congenital heart defect is a leading cause of children mortality. Two-dimensional echocardiography is a safe and noninvasive diagnostic tool and two-dimensional images can be reconstructed to a three-dimensional model. However, for some complex congenital heart diseases, the visualization of three-dimensional cardiac tissue structure alone is not enough. Visualization of blood flow patterns in a human heart is important to evaluate cardiac disease of patients.

PAPER-10:Machine Learning-Based Heart Patient Scanning, Visualization, and Monitoring

Authors : Ahmed Al Ahdal

published year : 2021

Abstract:

Heart diseases leading most causes of death globally according to World Health Organization cardiovascular or all heart related disease are responsible for 17.9 million death every year. An early detection and diagnosis of the disease is very important and maybe it's the key of cure. The major challenge is to predict the disease in early stages therefor most of scientists and researches focus on Machine learning techniques which have the capability of detection with accurate result for large and complex data and apply those techniques to help in health care.