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DETECTION OF COVID-19 FROM CT SCAN IMAGE USING MACHINE LEARNING ALGORITHUM

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ABSTRACT:

Diabetes is one of the leading causes of morbidity and mortality throughout the world. We aimed to briefly review the general characteristics of the novel coronavirus (SARS-CoV-2) and provide a better understanding of the coronavirus disease (COVID-19) in people with diabetes, and its management. In this project we are using COVID-19 dataset to train machine learning algorithms and then predict whether person has type diabetes and if type 2diabetes detected in person test record then he will be more vulnerable to COVID-19 disease, heart or kidney disease. To implement this project we build two machine learning model where first model detect person has diabetes or not and if diabetes detected then application will use his CT SCAN LUNG images to detect COVID or other diseases. The proposed learning method has enabled users to improve their search results based on the performance of CBIR system.

KEYWORDS: diabetes, COVID-19, SARS-CoV

1] INTRODUCTION:

A content -based image retrieval (CBIR) system has been developed as an efficient image retrieval tool, whereby the user can provide their query to the system to allow it to retrieve the user's desired image from the image database.The condition is associated with several macrovascular and microvascular complications, that ultimately impact the overall patient's survival. A relationship between diabetes and infection has long been clinically recognized. Infections, particularly influenza and pneumonia, are often common and more serious in older people with type 2 diabetes mellitus (T2DM). Nevertheless, the evidence remains controversial regarding whether diabetes itself indeed increases susceptibility and impacts outcomes from infections, or the cardiovascular and renal

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comorbidities that are frequently associated with diabetes are the main factors involved.

Diabetes and uncontrolled glycaemia were reported as significant predictors of severity and deaths in patients infected with different viruses, including the 2009 pandemic influenza A (H1N1), SARS-CoV and MERS-CoV. In the current SARS-CoV-2 pandemic, some studies did not find a clear association between diabetes and severe disease. However, other reports from China and Italy showed that older patients with chronic diseases, including diabetes, were at higher risk for severe COVID-19 and mortality.

Scarce data exist regarding glucose metabolism and development of acute complications of diabetes (e.g., ketoacidosis) in patients with COVID-19. Infection of SARS-CoV-2 in those with diabetes possibly triggers higher stress conditions, with greater release of hyperglycemic hormones, e.g., glucocorticoids and catecholamines, leading to increased blood glucose levels and abnormal glucose variability. On the other hand, a retrospective study from Wuhan reported that around 10% of the patients with T2DM and COVID-19 suffered at least one episode of hypoglycemia (<3.9 mmol/L). Hypoglycemia has been shown to mobilize pro-inflammatory monocytes and increase platelet reactivity, contributing to a higher cardiovascular mortality in patients with diabetes. Yet it remains largely unknown how exactly the inflammatory and immune response occurs in these patients, as well as whether hyper- or hypoglycemia may alter the SARS-CoV-2 virulence, or the virus itself interferes with insulin secretion or glycemic control. Furthermore, the impact of usual diabetes drug treatment on COVID-19 outcomes, as well as therapeutic approaches for COVID-19 on glucose regulation remains unspecified.

2] LITERATURE SURVEY:

Aspects of SARS-CoV-2 pathogenesis and potential implications for clinical management of patients with COVID-19 and diabetes

Patients with COVID-19 commonly show on admission lymphocytopenia, and to a lesser extent thrombocytopenia and leukopenia, which are more prominent among those with severe disease. Further, elevated levels of pro-inflammatory cytokines, including interleukin-6 (IL-6) and C-reactive protein, as well as increased coagulation activity, marked by higher d-dimer concentrations, were also associated

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with severity. In T2DM, besides the marked inflammatory process previously discussed, an imbalance between coagulation and fibrinolysis takes place, with increased levels of clotting factors and relative inhibition of the fibrinolytic system. Both insulin resistance and T2DM are associated with endothelial dysfunction, and enhanced platelet aggregation and activation. These abnormalities favor the development of a hypercoagulable pro-thrombotic state. Additionally, atherosclerosis, vascular inflammation and endothelial dysfunction are also part of the pathogenesis of other chronic conditions, e.g., hypertension and CVDs. Animal studies involving SARS-CoV reported that older age was related to defects in T-cell and B-cell function and excess inflammation markers. Thus, T2DM alone or in association with older age, hypertension and/or CVDs might contribute to a deficient control of SARS-CoV-2 replication and more prolonged proinflammatory response, potentially leading to poor outcomes.

3] PROBLEM DEFINTION:

Capturing context for supporting a particular scenario depends on various constructs like data history, imperfections, timeliness, dependencies and relationships among contextual facts. Context refers to any piece of information that can characterize any situation of an entity. The entity refers to any person, place or object. This property of characterizing any entity plays a significant role in context- aware applications, such as image retrieval based on contextual inputs, video surveillance, biomedical applications such as repairing lost cognition, creation of ensemble classifier.

4] PROPOSED APPROACH:

This proposal statement focuses on an application that can be patient under observation, who is suffering from heart stroke, kidney, or any disease attacks, diabetics etc.

According to **WHO** out of 10 members 6 members are suffering with Diabetes. Diabetes causes comorbidites suggest Atherosclerosis, partial blindness, myocardial infarction (**MI**), hypertension etc..

Diabetes is a disease that occurs when the blood glucose level becomes high, which ultimately leads to other health problems such as heart diseases, kidney disease, retinopathy, etc. Diabetes is caused mainly due to the consumption of highly processed food, bad consumption habits, etc.

Patients with complications like nephropathy, retinopathy, cardiovascular

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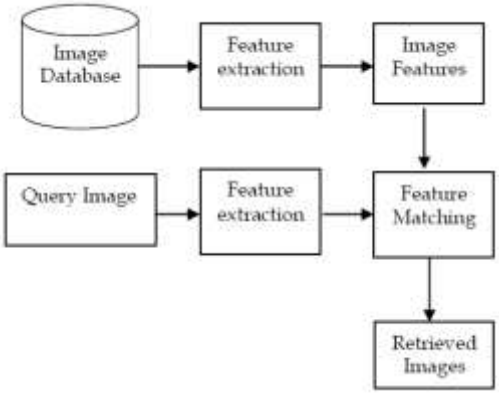
and other endocrinal disorders and patients already on antioxidant supplementation or on antiresorptive therapy were excluded from the study.

5] ARCHITECTURE:



7] PROPOSED METHODOLOGY:

Dataset

The dataset contains the information about patients. This dataset is given by doctors. By using this dataset we predict the diabetes and covid diseases.

Upload Covid & Diabetes Dataset:

In this module User can upload the dataset. The dataset contains the information about covid patients. This dataset is given by doctor, we can used this dataset to train and predict diabetes and covid diseases.

Build context based image diabetes model:

After uploading the dataset the dataset is loaded, after loading successful we generate build context based image diabetes model to build machine learning model, after that it shows the accuracy results.

Upload Test data and predict disease:

Upload the Dataset file and then click on 'Open' button to load that dataset data and this dataset data contains patients records and we will get the prediction for all patients.

DEEP LEARNING ALGORITHMS:

Convolution Neural Networks (CNN) and Support vector machine (SVM)

CNN: A Convolutional Neural Network (ConvNet/**CNN**) is a **Deep Learning algorithm** which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

SVM: SVM is a supervised machine learning algorithm which can be used for classification or regression problems. It uses a technique called the kernel trick to transform your data and then based on these transformations it finds an optimal boundary between the possible outputs.

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Step 1: There are number of images present in image database and first step is to extract the features from images present in database.

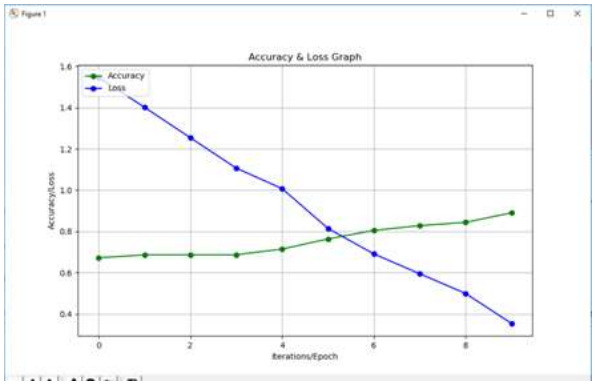
Step 2: The performance of Context Based Image Processing Using Machine Learning Approaches is depend on shape, texture and color or other features of image. For this feature extraction CNN algorithm is used.

Step 3: The shape, texture and color information low level features of images are extracted. And in feature database these features are stored as feature vector.

Step 4: A query image is enters into the system. After extraction of query image features a feature vector is generated which is further compared with all vector stored in database.

Step 5: In high dimensional feature space firstly the image data is represented in terms of features and then images similarity is stored in the database which is further compared with query image. For the comparison of image features and query features SVM algorithm is used.

8] RESULTS:



In above graph x-axis represents epoch/iterations and y-axis represents accuracy and loss values. In above graph green line represents accuracy and blue line represents loss and in above graph we can see with each further iteration accuracy get increase and loss get decrease

9] CONCLUSION:

COVID-19 has rapidly spread since its initial identification in Wuhan and has shown a broad spectrum of severity. Early isolation, early diagnosis, and early management might collectively contribute to a better control of the disease and outcome. Diabetes and other comorbidities are significant predictors of morbidity and mortality in patients with COVID-19. Future research is urgently needed to provide a better understanding regarding potential differences in genetic predispositions across populations, underlying pathophysiological

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mechanisms of the association between COVID-19 and diabetes, and its clinical management

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