

A Survey On Context Based Medical Image Processing Using Machine Learning

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Abstract— 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. A Context based image processing is the process of a image which is situation it accruing and it case to show the conditional position in various images like historical images, face detection image, hands on movement image, medical MRI image, Data analytical images, videos signal processing, and binary content and context image etc. this all the case which is shows to the situation related motion of scene image. Machine learning algorithm support for the implementation of segmentation and classification of data knowledge. In this paper we concentrate on a diabetic patient suffer with comorbidities. A diabetes person can cause with Covid-19(lungs MRI-images Scan) and nephrology diagnosis classification.

Index Terms— Context-Based, Content Based, Machine Learning, Segmentation, Classification, MRI images, Covid-19 disease.

I. INTRODUCTION

When unstructured image is teamed up with context, many things are done for the user as opposed to done by the user, making Wuser's life easier. Context is indirect, surrounding or situational information. Such information plays the role of magician - it changes the perspective of the data at right time. So, if this situational information of the data is used, it is very useful in analysis. Image data becomes meaningful, relevant, accurate and sensible to the user.

One of the difficult problems with the visibility of rapid implementation in image classification for example historical place, old temples, park, animals, things in house, MRI images like (brain classification, heart classification, kidney classification, cancer related image classification, diabetes, tuberculosis, asthma, etc..) and non-rigidity, cluster in the background, scale or lighting conditions. It has been broadly explored within the writing to plan great descriptors and classification strategies for image classification. In terms of its impacts of visual look, localization and acknowledgement productivity, the utilize of relevant information picked up more intrigued in brain research and computer vision. Relevant image is the strategy to refers any data that's not specifically delivered by the visual appearance of an protest within the image.

Contextual information is a framework categorization in challenging task. Some of the classifiers were designed to use contextual knowledge to optimize the classification, including certain boosting and logistic regression. Subsequently high-level image highlights successfully diminish the is semantic crevice. The semantic closeness between two image based on their high-level highlights is assessed by image context-based likeness method. These strategies degree the semantic connection between two concepts or catchphrases of two distinctive images. Diverse approaches consider diverse semantic connections to compare the similitude between images for image recovery based on setting. This paper. This paper depicts the distinctive similitude. Approaches subordinate on image setting. In this paper also the comparison these procedures is given arrange to distinguish between method. These methods are utilized in image recovery frameworks to cut back the phonetics hole and gives the shifted successful comes about.

In this paper, we describe various types of image context based similarity techniques. It describes a person who facing more than one diseases like comorbidities. A diabetes mellitus person can cause another disease with primary diseases like cancer, heart stroke, brain tumor, entomology, retinopathy, kidney, Parkinson disease, Alzheimer's, and Covid-19 disease etc...

II. CONTEXT BASED IMAGE APPROACHES

Numerous strategies to degree semantic similarity in this stage or we would say same type of distance between photographic contexts is provided by its associated main phrases or tags, captions, subtitles, etc.... are given.

Now a day's diagnosis priority is increasing day by day improving visual data produced with good format digital imaging in hospitals, Research on medical imagery from CBIR is very active. A client test illustrates that an image recovery framework can essentially make strides demonstrative quality, especially for less experienced radiologists. Common therapeutic image recovery based on catchphrases in PACS (Picture Archiving and Communication Systems) databases is exceptionally unmistakable from extraordinary recovery in a exceedingly centered space.

As a diagnostic aid, the primary objective in the medical field is to be used. The classification of Diabetes Mellitus is a heterogeneous complex metabolic disorder characterized by an assessed blood glucose concentration that is secondary to either insulin resistance, insufficient insulin secretion or both. Hyperglycemia is the diabetic state in major clinical regions.

Complications which are associated with diabetic patient attacked by Covid-19. As per the World Health Organization(WHO) Covid-19 is one of the rapidly growing disease in the world. Covid-19 can attack in any stage of age and as per the record of WHO millions of people suffer with Covid-19. Machine learning ML concepts can use to identify Covid-19 patients by visual analyzing their chest x-ray images. Using decision making algorithm easily classify the images.

A. Review Stage

Agreeing to a modern ponder, a few patients with Covid-19 are at higher hazard of neurological issues counting dying within the brain and stroke. These possible life-threatening comes about were more predominant in patients with hypertension and diabetes, the analysts said. This knowledge was obtained from everyday science by the North American Radiological Society (RSNA).

B. Attacking process

When a patient cause with Covid-19, virus can attack to begin with on cells within the respiratory framework, regularly driving to an irritation of the lungs that puts individuals at chance of contracting pneumonia. But the nearness of both the infection was generally felt in other structures interior the body. The impacts of Covid-19 reach well past the chest, ponder lead creator Colbey W. Freeman, M.D. Chief inhabitant of Penn Medicine's Division of Radiology in Philadelphia said. Whereas neurological wounds are uncommon, they are a progressively reported and effectively destroying result of disease with COVID-19.

III. LITERATURE REVIEW

Diabetes comorbidities is one of the serious infection linked to the severity of all few well know human pathogenic corona virus infections. 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 contextual of an object. 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.

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 comorbidities suggest Atherosclerosis, partial.

blindness, myocardial infarction (**MI**), hypertension etc.

Diabetes Mellitus is disorder that happens when the level of blood glucose becomes high, leading inevitably to other health issues such as heart disease, kidney disease, retinopathy, etc. Diabetic is caused by primarily by highly processed food intake, poor consumption patterns, etc.

Patients with nephropathy, retinopathy, cardiovascular and other endocrine disorders, and patients with complications such as already on antioxidant supplementation or on anti-restorative therapy were excluded from the study.

APPLICATION:

1. A diabetic can as well lead to swollen, flawed blood vessels inside the eye, called diabetic retinopathy.
2. The changing hormones in the midst of pregnancy can cause gestational diabetes and it run increase your chance to tall blood weight such sort of blood weight is called preeclampsia or eclampsia.
3. Kidney disease related to diabetes is called diabetic nephropathy. Diabetes can besides hurt your kidneys.
4. Heart attack can effect to the high blood level and hurt blood vessels put included strain on heart, growing the chance of cardiovascular malady.

OBJECTIVES

- Type 1 diabetic recognition using proactive and reactive classification.
- Types of diabetes and its effects on comorbidities.
- Using type-2 diabetic can be recognizing the early stage of disease detection if the patient has the diseases like heart disease, kidney diseases, Covid-19 disease, etc.
- DT2M patients have more complex when compare to DT1M patients and SARS-Cov-2 level also vary entire changing.

- Using machine learning concept, we to find COVID-19 with the best results using pneumonia and GGO.
- A Covid-19 effect on primary disease of Diabetes Mellitus.
- Finding the characterization of DM and COVID-19 by individually along with risk factors.

S.N O	AUTHOR NAMES	TITILE	ASSUMSION DATA SETS	METHODS	TECHNIQUES	ADVANTAGE	REMARKS
1	Carolina Galleguillosa,*, Serge Belongie a (Elsevier - 2017)	Context based object categorization: A critical survey	Mask or bundle box	Context information from objects Toimprove recognition accuracy. Exploited Biederman's semantic relations	machine learning	Easy to recognize image using object. Through the help of Object classification to recognize the image scene.	1. Classification of image can be done by 2D image generation. 2.The appearance of the object is not enough to tell us about the object's identity
2	Diego Olival & Salvador Hinojosa2 & Mohamed Abd Elaziz3,4 &Noé Ortega-Sánchez1 (Springer-2018)	Context based image segmentation using antlion optimization and sine cosine algorithm.	Kapurs, OstusMethodos	Histogram, Multilevel thresholding (MTH), Antlion Optimizer (ALO) and the Sine Cosine Algorithm (SCA)	CBIR	Quality and assurance	1.Two similar type of image histogram is not same accuracy. 2.Selection in ML and power system we can do same work with help
3	S. Sharanya1 · Revathi Venkataraman1 (Springer-2020)	An intelligent Context Based Multi-layered Bayesian Inferential predictive analytic framework for classifying machine states.	Machine learning algorithm and AI concept as well as neural network. Data sets taken from Western Reserve University.	Hierarchical Deep Learning (HDN)	CBMBI predictive analytic framework, which is motivated by MisMatch Negativity (MMN) and Predictive Coding.	First It avoids all the issues in manual condition monitoring.	1.Using CBMBI we can predict the reactive diagnosis. 2.Missing the accuracy of context object to predict the diagnosis.
4	SheungWai Chan, Valentina Franzoni (IEEE-2018)	Context-based Image Semantic Similarity for Prosthetic Knowledge conference	Flickr web based images	WordNet Distance, Wikipedia Distance, Flickr Distance,	CBIR, Web based knowledge used.	Using prosthetic knowledge underlining the augmented	1.Different similarity connotations between human and computer. 2.Results have been compared to human similarity evaluation.
5	Andrei Sharf,markalex (SCI-2019)	Context-based Surface Completion	Gaussian noise to the Bunny's surface	CAD model	2D technology	Easily can find the related patch to the image. Identifying the object	1.Accuracy implementation using that objet reorganization.

IV. LITERATURE REVIEW ON DIABETES AND COVID-19

In this paper proposed to a semantic audit of the writing to shed light on the impacts of these pre-existing conditions on Covid-19 illness seriousness. All action of ponders appears that among the Covid-19 patients, there was moreover discernible to effect of patients enduring from diabetes mellitus (DM).

SUMMARY TABLE : ANALYSIS OF DIFFERENT METHODS TO APPROACH CONTEXT BASED IMAGE PROCERING IN MEDICAL DIAGNOSIS							
S.NO	AUTHOR NAMES	TITILE	ASSUMSI ON DATA SETS	METHODS	TECHNIQUE S	ADVANTAG E	REMARKS
1	Adel Al-Zebari, AbdulkadirSengur (IEEE-2019)	Performance Comparison of Machine Learning Techniques on DDD	Pima diabetes	ML SVM, Logistic Regression	SVM technique. LR,DA, Discrete techniques	machine learning algorithms to detect Diabetic Retinopathy (DR)	1.The accuracy report is up to 95.86% is implementation .
2	LejlaAlic*, Hasan T. Abbas Marelyn Rios, Muhammad AbdulGhani, and Khalid Qaraqe (IEEE-2019)	Predicting Diabetes in Healthy Population through Machine Learning	OGTT data	ML, segmentation	SVM	Type 2 disease is more impact	Type 2 diabetes accuracy is only 70% they given.
3	UshaNandhini, Dr. K. Dharmarajan (IEEE-2020)	Diabetic Analysis on Big data and Machine Learning - A Literature Review	ML, SVM, Naïve Bayes, Random Forest, ANN, DT	Naïve Bayes, Random Forest, ANN,SVM, Simple CART algorithms	--	Easy monitoring the Electronic health record. Hospital visit can be reduced.	1.Predicts a disease accurately, 2. proactive diagnosis to build the country in economy mode with less risk
5	Shawni Dutta1 and Bandyopadhyay Kumar Samir2* (IJMHSC-2020)	Diabetes Prediction Using Ensemble Classifier	UTD	Decision Tree and K-Nearest Neighbour	Naïve Bayes Classifiers	detecting diabetic tendency of comorbidities	1. Stacking ensemble classifier even performs better than voting ensemble classifier with best accuracy level.
6	Nazar Zaki a, *, Hany Alashwal a, Sahar Ibrahim b (elsevier-2020)	Association of hypertension , diabetes, kidney disease, and high-cholesterol with COVID-19 disease severity and fatality: A systematic review	Open access	Google Scholar and PubMed.	-	Recognize the all associate data from various data	Comorbidities can work out all the cases.
7	Biplab and et all.,	Geographical appraisal of	Westbengal COVID	ML	RM	How far COVID is	Using other few algorithms

		COVID-19 in Westbengal	datasets			surrounded in westbengal	we can give the more results.
8	Luca saba et all.,	Six different model for COVID-19	Kaggle	ML	CNN, iCNN	--	Using 3D and 2D spectrum find the best graph.

A. References

As for the previous reference most of them says that with the comorbidity there is more chance to get risk factor when compare to normal patients. Now a days Covid-19 is wondering to all over world and still there is no proper injection for that and still now dearth rate also not to decrease with this disease and in that most of the patients are diabetes patients are more. how of PubMed is employed for implementation of novel corona virus (COVID-19) and Google scholars gathered information databases till 01 November 2020, with subsequent keywords: “SARS-CoV-2”, “COVID-19”, “infection”, “pathogenesis”, “incubation period”, transmission”, “clinical features”, “diagnosis”, “treatment”, “diabetes”, with interposition of the Boolean operator “AND”.

B. Role of imaging

Diagnosis is requiring to artificial even shows the negative transcription poly-measure chain reaction test on Covid-19. As per the medical practices recommendation determination cannot be made by computed tomography but in any case may be it is valuable for COVID-19 pneumonia, which more often than not is respective and with basal or multi-lobar dissemination. Chest imaging has limited affectability for COVID-19, since up to 25% of the patients appear standard Chest-X ray bar or CT when their signs are delicate, be that as it may this decreased to 5% in extraordinary cases.

V. PROPOSED WORK

Diabetes mellitus disease is the one of the rapid disease it can cause any age of a time. As per the WHO information diabetes patient causes another disease or comorbidities case then a diagnosis center can recognize following easy way to recognize.

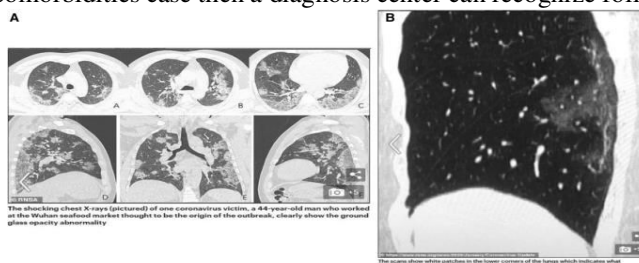


Fig a: X-ray and CT scan image of a SARS-COV-2 victim showing white dots in the lower corners of the lungs (Source: RNSA)

LINEAR REGESSION: LR is the straight forward way to show the relation between dependent variable and at more independent variable. It is extremely developed principal method and common methodologies

$$Y=bX+a \tag{1}$$

RANDOMFOREST: This algorithm is ensemble of learning algorithms based on methods. RF is one of series of classifier for decision tree. Each node and edge will have composed as tree. This one will work out as bootstrap aggregation along with random splits.

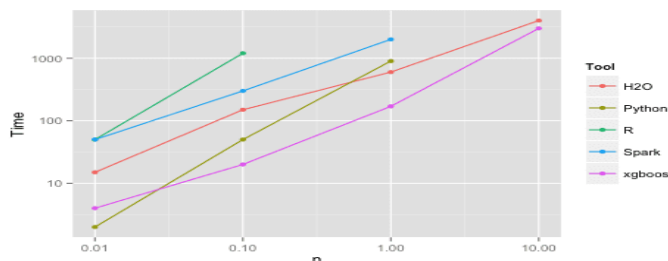


Fig b. Random forest classification of standardized benchmark dataset

Random Forest Classifier

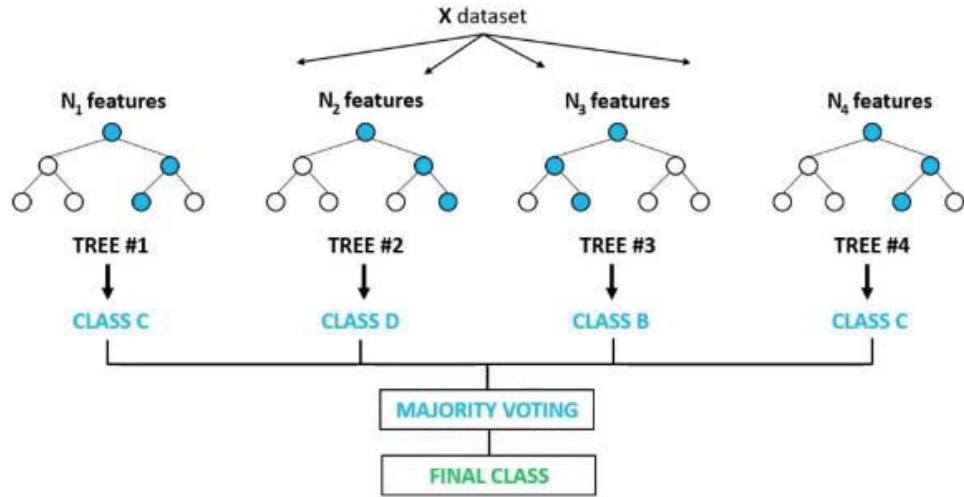


Fig c: Random Forest Classifier

XGBOOST and OTHER SUPPORTED ALGORITHMS: XGBoost and Gradient Boosting framework will work as end-to-end guide to understand the math of ML for Classifying of decision tree.



Fig d: XGboost and Gradient Boost algorithm

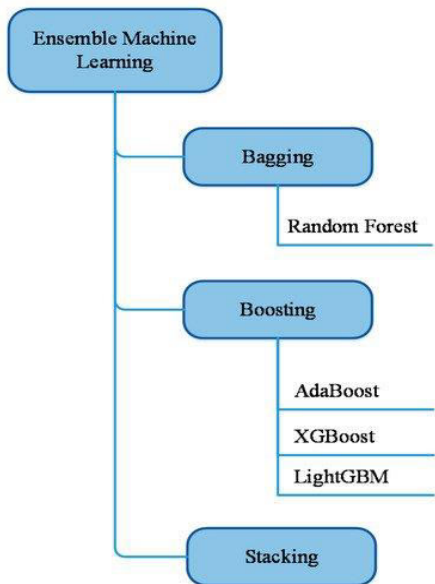


Fig e: Ensemble of ML for various algorithms

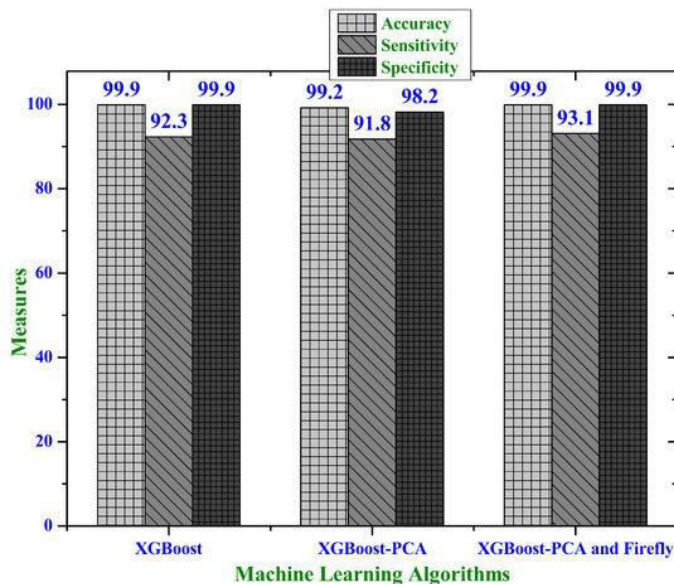


Fig f: XGBoost fasted best result on comorbidity of Diabetes

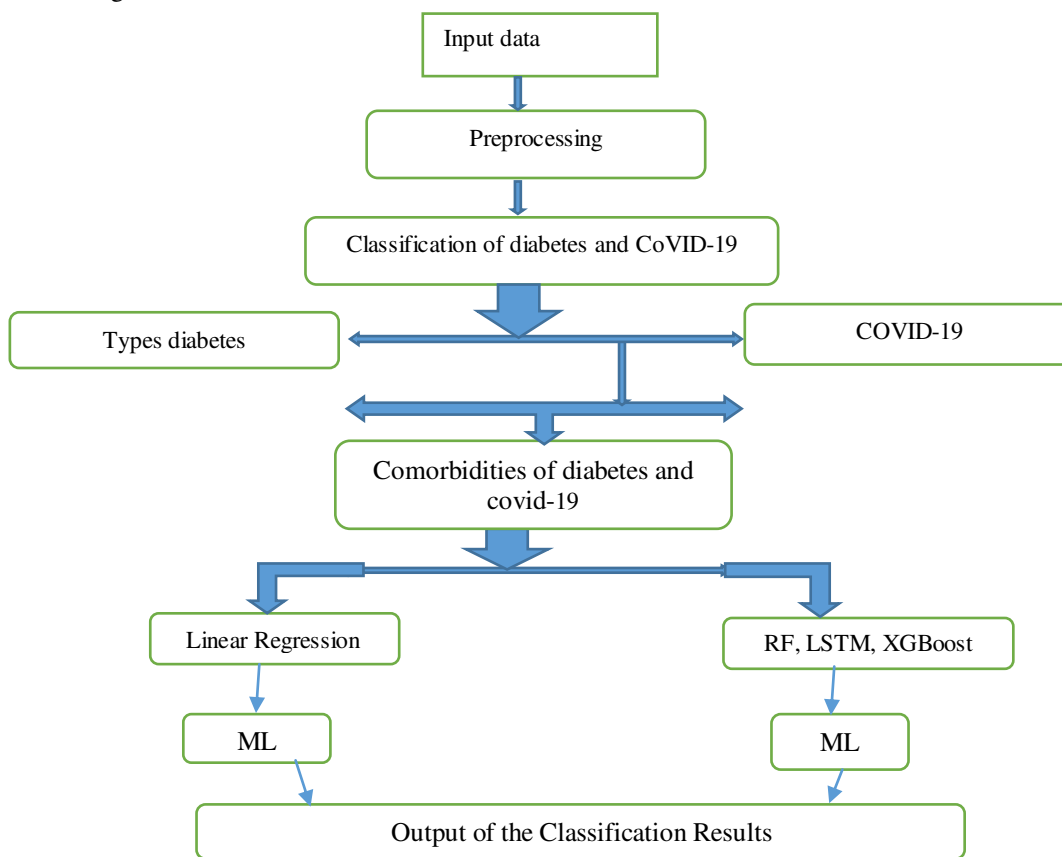


Fig g: Flow of implementation

VI. CONCLUSION

This paper mainly concentrates on the COVID-19 and Diabetes classification and implementation of diagnosis analyses of radiology easy to understand how much fast grow the diseases who are effect with diabetic. The meaning of setting in thing affirmation and grouping has been analyzed for quite a while. Scientists from different instructs, for instance, scholarly sciences and cerebrum science have thought about setting information as an approach to gainful appreciation of the normal visual world. In future using this examination another image setting closeness based methodology can be proposed which will crush the

hindrances of existing techniques and profitably measure the significant closeness of x-ray images. In like manner semantic opening can also be lessened by considering both high and low level features of pictures to measure comparability. Thus, by using any of these techniques with CBIR, we can interface the semantic opening issue of CBIR and recuperate the x-ray images capably.[1, 2]

The feature goal of this paper is to find the comorbidities with diabetes to other diseases how will effect more on patient.

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