iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.42368

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

Covid19 Prediction Model with Hybrid Approach: A Review

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Abstract: ***Several medical specialty models are getting used round the world to project the number of infected people and therefore the mortality rates of the COVID-19 irruption. Advancing correct prediction models is of utmost importance to take correct actions. Because of the dearth of essential data and uncertainty, the medical specialty models are challenged relating to the delivery of higher accuracy for long prediction. As an alternate to the susceptible-infected-resistant (SIR)-based models, this study proposes a hybrid machine learning approach to predict the COVID-19.This Paper presents hybrid approach for Covid-19 prediction.***

Keywords: machine learning; prediction model; COVID-19; CNN; Hybrid Approach;

I. INTRODUCTION

The World Health Organization (WHO) and therefore the global nations confirmed the corona virus un-wellness to be extraordinarily contagious [2,3]. The COVID-19 pandemic has been well known as a public health emergency of international concern [4]. To estimate the occurrence, determine the height before time, and additionally predict the deathrate, medicine models have been wide employed by officers and media. outbreak prediction models have shown to be basic to produce insights into the damages caused by COVID-19. moreover, the prediction models are used as a relevance build new policies and to judge the conditions of curfew [5]. The COVID-19 pandemic has been reportable to be extraordinarily aggressive to spread [6]. Due to the uncertainty and complexity of the COVID-19 this paper presents hybrid approach for covid-19 prediction in which feature extraction is done with GLCM Algorithm. And then hybrid approach is used in which CNN and SVM are used for COVID-19 Prediction. After that accuracy score get calculated.

II. LITERATURE REVIEW

Time series models will play a vital role in unwellness prediction. Incidence knowledge is the longer term predict data prevalence of unwellness events. Developments in modeling approaches give a chance to match totally different statistic models for prognostic power. Michael J Kane et.al [1] applied ARIMA and Random Forest time series models to incidence data of outbreaks of highly pathogenic avian influenza (H5N1) in Egypt, available through the online EMPRES-I system. they found that the Random Forest model outperformed the ARIMA model in predictive ability. Furthermore, they found that the Random Forest model is effective for predicting outbreaks of H5N1 in Egypt

Deepak Gupta et.al [2] presents associate optimized cuttlefish algorithm for feature choice supported the standard cuttlefish algorithm, which may be used for diagnosing of Parkinson's unwellness at its early stage. Parkinson could be a central system disorder, caused because of the loss of brain cells. Parkinson's unwellness is incurable and will eventually result in death however medications will facilitate to regulate symptoms and elongate the patient's life to some extent. The proposed model uses the standard cuttlefish algorithm as a quest strategy to establish the best set of options. the choice tree and k-nearest neighbor classifier as a judgment on the chosen options. The Parkinson speech with multiple kinds of sound recordings and Parkinson Handwriting sample's datasets are accustomed evaluate the proposed model. The proposed algorithm may be utilized in predicting the Parkinson's unwellness with associate accuracy of roughly ninety four and facilitate individual to own correct treatment at early stage. The experimental result reveals that the proposed bio-inspired algorithm finds associate optimal subset of options, increasing the accuracy, minimizing variety of options chosen and is additional stable.

In [3], Isra Al-Turaiki et.al built several models to predict the stability and recovery of MERS-CoV infections. Their models were built using Naive Bayes and J48 decision tree classification algorithms. The decision tree recovery model indicated that patients who are healthcare personnel are more likely to survive. The age attribute was found to be vital in predicting the soundness of the patient. Previous patients with ages between sixty six and eighty seven are a lot of probably to suffer from crucial complications.

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The performance of all the models was evaluated and compared. In general, the accuracy of the models is between 53.6% and 71.58%. they believe that the performance of the prediction models can be enhanced with the use of more patient data. As future work, they plan to directly contact hospitals in Riyadh in order to collect more information related to patients with MERS-CoV infections.

Approaches performed based on computer supported systems within the medical field gain more popularity day by day. In such systems, Artificial Intelligence techniques are often used for several disease diagnostics. Diabetes is one of these diseases. In [4], a diabetes diagnosis system based on Support Vector Machines has been proposed. Along training of SVM, Vortex Optimization Algorithm was used for determining the sigma parameter of the Gauss (RBF) kernel function, and a classification process has been done over the diabetes data set related to Pima Indians.

Machine learning technique is widely used in various fields of science and technology. They have been giving out purposeful and classified data this tool additionally explores in constructing and study of algorithms which may learn from data. Data mining in care is associate rising field of high importance for providing prognosis and a deeper understanding of medical data. Its applications in care embody analysis and interference of hospital errors, early detection, prevention of diseases, and for cost savings. The main problem arises to predict and diagnosis the disease in early stage, with the use of machine learning techniques.[5] gives a comparative study of different machine learning technique such Fuzzy logic, Fuzzy Neural Network and decision tree in classifying liver data set.

Due to big data progress in medicine and care communities, correct study of medical knowledge advantages early disease recognition, patient care and community services. When the quality of medical data is incomplete the exactness of study is reduced. Moreover, different regions exhibit unique appearances of certain regional diseases, which may results in weakening the prediction of disease outbreaks. In the proposed system of Vinitha S et.al[6], it provides machine learning algorithms for effective prediction of various disease occurrences in disease-frequent societies. It experiment the altered estimate models over real-life hospital data collected. To overcome the difficulty of incomplete data, it use a latent factor model to rebuild the missing data. It experiment on a regional chronic illness of cerebral infarction. Using structured and unstructured data from hospital it use Machine Learning Decision Tree algorithm and Map Reduce algorithm. To the best of their knowledge in the area of medical big data analytics none of the existing work focused on both data types. Compared to several typical estimate algorithms, the calculation exactness of their proposed algorithm reaches 94.8% with a convergence speed which is faster than that of the CNN based unimodal disease risk prediction (CNN-UDRP) algorithm.

The idea of Upendra Kumar Tiwari [7] was too analyzed whether the case of covid-19 in India is going to be same as in Italy or South Korea. The answer is yes. India might be going to face its worst days in future if ewe look the pattern of these countries and India too. Since the Italy comes at the 2nd rank in medical facilities while the India is ranks 145.as the number of cases will be getting increased due to shortage of medical facilities and resources the worst days are nevertheless to come back in India because of Covid-19.

The happening of COVID-19 Corona virus, specifically SARS-CoV-2, has created a unfortunate scenario throughout the globe. The cumulative incidence of COVID-19 is rapidly increasing day by day. Machine Learning (ML) and Cloud Computing may be deployed terribly effectively to trace the illness, predict growth of the epidemic and design methods and policy to manage its unfold. [8] applies an improved mathematical model to analyse and predict the growth of the epidemic. An ML-based improved model has been applied to predict the potential threat of COVID-19 in countries worldwide. They show that using iterative weighting for fitting Generalized Inverse Weibull distribution, a better fit can be obtained to develop a prediction framework. This has been deployed on a cloud computing platform for more accurate and real-time prediction of the growth behavior of the epidemic. A data driven approach with higher accuracy as here may be terribly helpful for a proactive response from the government and citizens. Finally, Shreshth Tuli[19] propose a set of research opportunities and setup grounds for further practical applications.

In the present era of knowledge, information has disclosed itself to be a lot of valuable to organizations than ever before. By applying machine learning and deep learning approaches to historical or transactional data, In [9], Godson Kalipe et.al have not only sought to establish a relationship between climatic factors and a possible malarial outbreak but they also tried to find out which algorithm is best suited for modeling the discovered relationship For that purpose, historical meteoric data and records of malarial cases collected over six years are combined and mass so as to be analyzed with numerous classification techniques like KNN, Naive mathematician, and Extreme Gradient Boost among others They were able to find out few algorithms which perform best in this particular use case after evaluating for each case, the accuracy, the recall score, the precision score, the Matthews correlation coefficient and the error rate. The results clearly inexplicit that weather forecasts might be licitly leveraged within the future to predict malarial outbreaks and probably take the mandatory preventing measures to avoid the loss of lives due to malaria.

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Millions of people are diagnosed every year with a chest disease in the world. Chronic obstructive pulmonary and pneumonia diseases are two of the most important chest diseases. And these are very common illnesses in Turkey. In [10], a comparative study on chronic obstructive pulmonary and pneumonia diseases diagnosis was realized by using neural networks and artificial immune systems. Three completely different neural networks structures and one artificial system were used. Used neural network structures in their study multilayer, probabilistic, and learning vector quantization neural networks. The results of the study were compared with the results of the pervious similar studies reported focusing on chronic obstructive pulmonary and pneumonia diseases diagnosis. The chronic clogging respiratory organ and respiratory illness diseases dataset were ready from a chest diseases hospital's info exploitation patient's epicrisis reports.

The prediction of future events based on accessible statistic measurements could be a relevant analysis space specifically for healthcare, like prognostics and assessments of intervention applications A measure of brain dynamics, electroencephalogram time series, are routinely analyzed to obtain information about current, as well as future, mental states, and to detect and diagnose diseases or environmental factors. Because of their chaotic nature, encephalogram statistic need specialized techniques for effective prediction. The objective of the study [11] was to introduce a hybrid system developed by artificial intelligence techniques to deal with electroencephalogram time series. Both artificial neural networks and also the ant-lion optimizer, that could be a recent intelligent optimization technique, were utilized to comprehend the connected system and perform some prediction applications over encephalogram time series. Consistent with the obtained findings, the system can with success predict the longer term states of target statistic and it even outperforms another hybrid artificial neural network-based systems and alternative time series prediction approaches from the literature.

III. SYSTEM DESIGN

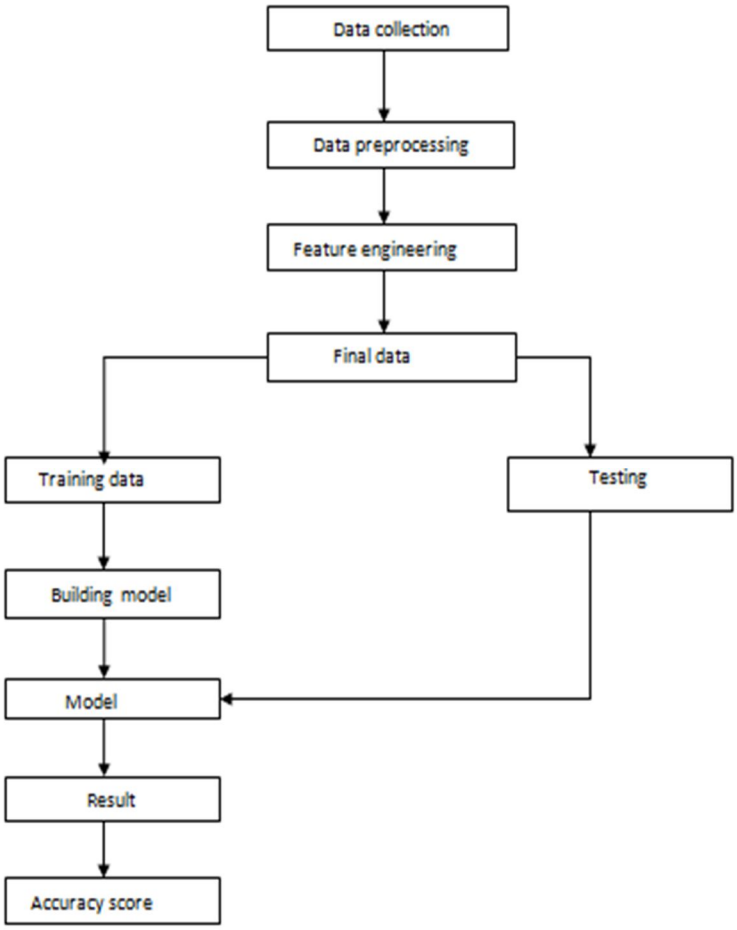


Fig 1: Data Flow Diagram of System

Fig.1 shows the data flow diagram of the system. The description of data flow diagram is given below:

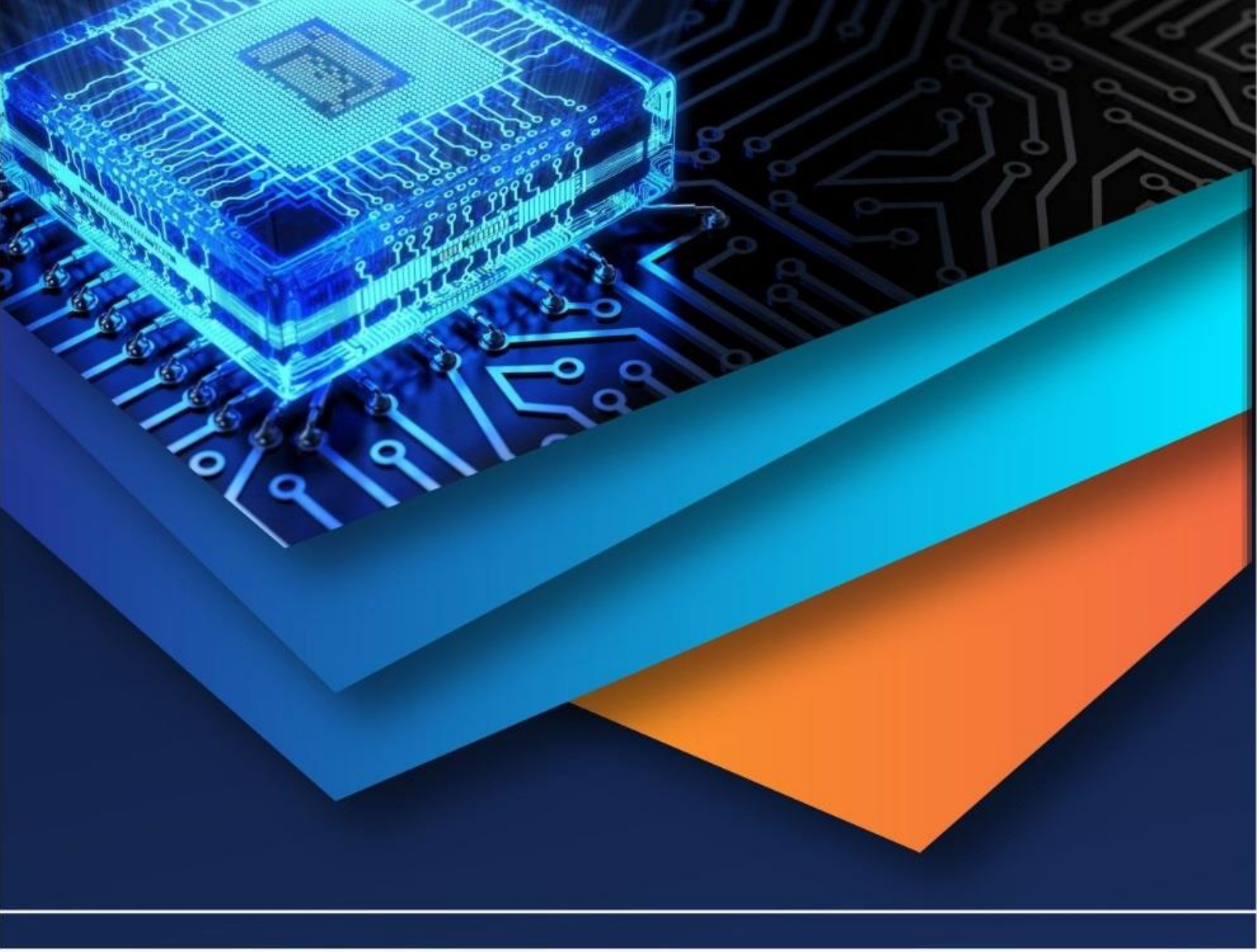
1) *Data Collection:* Data collection is the process of gathering and measuring information from countless different sources. In order to use the data we collect to develop practical artificial intelligence (AI) and machine learning solutions.
2) *Data Preprocessing:* Data preprocessing is a process of preparing the raw data and making it suitable for a machine learning model.
3) *Feature Engineering:* Feature engineering or feature extraction is the process of using domain knowledge to extract features from raw data.
4) *Final Data:* Once feature extraction is done from raw data. Then useful data will be ready for further processing.
5) *Training Data:* Training data is the data you use to train an algorithm or machine learning model to predict the outcome you design your model to predict.
6) *Testing Data:* Test data is used to measure the performance, such as accuracy or efficiency, of the algorithm you are using to train the machine.
7) *Model Building:* The model building method involves fixing ways in which of collection information, understanding and being attentive to what's vital within the information to answer the queries you're asking, finding a statistical, mathematical or a simulation model to achieve understanding and build predictions.
8) *Model:* A model represents what was learned by a machine learning algorithm. The model is the "thing" that is saved after running a machine learning algorithm on training data.
9) *Result:* Machine learning and artificial intelligence have achieved a human-level performance in many application domains, including image classification, speech recognition and machine translation.
10) Accuracy Score: Accuracy is the most intuitive performance measure and it is simply a ratio of correctly predicted observation to the total observations.

IV. CONCLUSION

COVID-19 pandemic now appears to be serious infected spread disease like any other wide-spread diseases. Because of the rapid rise in the number of cases during pandemic, causes struggle in healthcare sector to identify suitable and appropriate treatment. Machine Learning methodologies are commonly used as alternative methods for classification and prediction. Due to the uncertainty and complexity of the COVID-19 this paper presents hybrid approach for covid-19 prediction in which feature extraction is done with GLCM Algorithm. And then hybrid approach is used in which CNN and SVM are used for COVID-19 Prediction. After that accuracy score get calculated. This study helps us to understand and stop the serious wide spread situation by utilizing the most common features that directly affects the spread of disease. This also serves the purpose of humans in predicting the disease that impacts the disease spread abnormalities and high recovery ratio.

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