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MEDICAL ASSISTANCE SYSTEM FOR CRITICAL COVID PATIENTS BASED ON HEALTH PARAMETERS PRIORITIZATION.

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Abstract—Global Pandemic emerged on December, 2019 that has impacted several countries, effecting more than 10lakh patients and making it a global public threat. The roots of transmission are direct contact, droplets and possibly aerosol transmissions. It has high spread rate in a short time and prevention of transmission has become a global priority. Since the start of the pandemic, affordable and sustainable access to oxygen has been a growing challenge in low- and middle-income countries. COVID-19 has put huge pressure on health systems, with hospitals in many hospitals running out of oxygen cylinders, availability of beds and other resources, resulting in preventable deaths.

Due to the COVID-19 public health emergency, there may be an increased demand for hospital beds, stretchers, and mattresses to expand health care capacity in local hospitals, and health care systems through temporary expansion sites. To meet this need, manufacturers from a variety of industry sectors not traditionally associated with medical device manufacturing are looking for resources to manufacture and market these devices to the healthcare community. Oxygen is an essential medicine, and despite being vital for the effective treatment of hospitalised COVID-19 patients, access in hospitals is limited due to cost, infrastructure and logistical barriers. Health facilities often

cannot access the oxygen they require, resulting in the unnecessary loss of lives.

I. INTRODUCTION

In 2019, the networks for Disease Control and Prevention (CDC) started really looking at the include: Cough, fever, shortness of breath or inconvenience breathing, body harms, sore throat, loss of taste or smell, free entrails, headache, depletion, squeamishness, blockage or running nose. Clinical and epidemiological data from the Chinese CDC and regarding 72,314 case records (confirmed, suspected, investigated, and asymptomatic cases) were participated in the Journal of the American Medical Association (JAMA), providing the primary significant outline of the epidemiologic bend of the Chinese episode. There were 62% affirmed cases, including 1% of cases that were asymptomatic, yet were research facility positive (viral nucleic basic analysis). Moreover, the general case-casualty rate (on affirmed cases) was 2.3%. Of note, the deadly cases were principally older patients, specifically those matured ≥ 80 years (around 15%), and 70 to 79 years (8.0%). Roughly half (49.0%) of the basic patients and impacted by previous comorbidities like cardiovascular infection, diabetes, constant respiratory sickness, and oncological illnesses, kicked the bucket.

While 1% of patients were matured 9 years or more youthful, no deadly cases happened in this gathering. The creators of the

Chinese CDC report partitioned the clinical signs of the infection by their seriousness: Mild sickness: non-pneumonia and gentle pneumonia; this happened in 81% of cases. Extreme illness: dyspnoea, respiratory recurrence $\geq 30/\text{min}$, blood oxygen immersion (SpO_2) $\leq 93\%$, $\text{PaO}_2/\text{FiO}_2$ proportion or P/F [the proportion between the pulse of the oxygen (incomplete tension of oxygen, PaO_2) and the level of oxygen provided (part of motivated oxygen, FiO_2)] < 300 , as well as lung invades $>$ half inside 24 to 48 hours; this happened in 14% of cases. Basic illness: respiratory disappointment, septic shock, and Critical infection: respiratory disappointment, septic shock, or potentially various organ brokenness (MOD) or disappointment (MOF); this happened in 5% of cases. In a solitary place study, 25% of short term patients with COVID19 had home oxygen immersions 37°C on the underlying show and 78.5% of patients created Body Temperature $> 37^\circ\text{C}$ over the span of the sickness. Critically, patients giving Body Temperature $\leq 36^\circ\text{C}$ had the most noteworthy mortality and this turned out to be significantly higher when the investigation was limited to those with $\text{BT} \leq 35.5^\circ\text{C}$ (44%), demonstrating low 25 2020 third International Conference on Control and Robots. This article is allowed to get to and download, alongside freedoms for full text and information mining, re-use and investigation.

II. SOFTWARE REQUIRMENTS

Jupyter scratch pad is an opensource web application utilized in this venture, that permits to make and share records that contain live codes, condition, representation and other mixed media assets, alongside informative message in a solitary report. Jupyter Notebooks can be utilized for a wide range of information science assignments including information cleaning and change, mathematical reproduction, exploratory information investigation, information perception, measurable displaying, AI, profound learning, and substantially more. A Jupyter Notebook gives you a simple to-utilize, intuitive information science climate that doesn't just function as an incorporated improvement climate (IDE), yet in addition as a show or instructive device. Jupyter is an approach to working with Python inside a virtual "note pad" and is developing in notoriety with information researchers in enormous part because of its adaptability. It gives you a method for consolidating code, pictures, plots, remarks, and so on, in arrangement with the progression of the "information science process." Further, it is a type of intelligent figuring, a climate wherein clients execute code, see what occurs, change, and rehash in a sort of iterative discussion between the information researcher and information.

A Jupyter scratch pad has two parts. To begin with, information researchers enter programming code or message in rectangular "cells" in a front-end page. The program then, at that point, passes the code to a back-end "part" which runs the code and returns the outcomes. Numerous Jupyter parts have been made,

supporting many programming dialects. The parts need not dwell on the information researcher's PC. Note pads can likewise run in the cloud, for example, Google's Collaboratory project. Jupyter journal can be run without network access right on your own PC and play out your work locally. The magnificence of Jupyter is that it makes a computational account, an archive that permits analysts to enhance the code and information with investigation, theory, and guess.

III. CONTENT DATASET OF THE PROJECT

	Breathing	Fever	Dry Cough	Sore Throat	Hypox	Ten	Abroad tra	Contact w	Attended	Visited	Pub	Family w	SpO2	heart_bea	body_tem	Covid Condition
0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	77	52	100.71	SEVERE
1	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	89	111	100.17	MODERATE
2	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	88	101	100.24	MODERATE
3	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	84	88	100.71	MODERATE
4	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	78	103	102.18	SEVERE
5	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	76	103	101.08	SEVERE
6	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	89	107	101.46	SEVERE
7	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	79	68	102.65	MODERATE
8	Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No	80	48	100.44	SEVERE
9	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	84	53	101.78	SEVERE
10	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	80	77	100.04	MODERATE
11	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	88	57	101.13	SEVERE
12	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	78	108	100.15	MODERATE
13	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	81	81	101.28	MODERATE
14	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	75	59	102.81	SEVERE
15	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	89	81	102.84	MODERATE
16	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	75	81	100.84	MODERATE
17	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	88	90	101.06	MODERATE
18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	82	49	101.28	SEVERE
19	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	83	67	102.6	MODERATE
20	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	85	52	102.6	SEVERE
21	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	83	86	102.07	MODERATE
22	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	89	52	102.05	SEVERE
23	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	78	69	102.81	MODERATE
24	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	83	93	101.2	MODERATE
25	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	80	116	100.68	SEVERE
26	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	No	85	40	100.09	MODERATE
27	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	84	118	100.93	SEVERE

By taking this dataset figure:1 as a reference and considering all the parameters if:

$\text{SpO}_2 < 60$ and > 30 ,

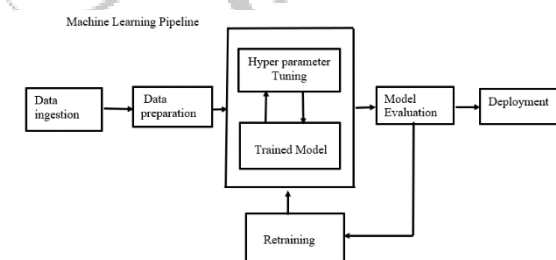
Heartbeat < 90 ,

Temperature > 100.4 we consider it as "SEVERE".

$\text{SpO}_2 < 60$ and > 30 ,

Heartbeat < 90 ,

Temperature < 100.4 we consider it as "MODERATE" or else "MILD".



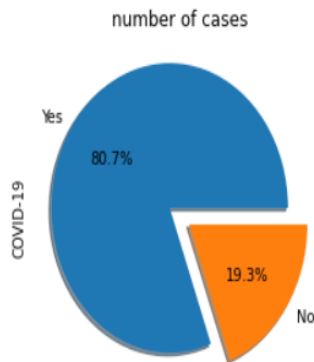
The AI pipeline is only the work process of the Machine Learning process beginning from Defining our business issue to Deployment of the model. In the Machine Learning pipeline, the information arrangement part is the most troublesome and tedious one as the information is available in an unstructured organization and it needs some cleaning. In this blog, we will plunge further into the Data Analysis part utilizing insights!

Information can be gotten from different information sources, for example,

- APIs
- Document size
- Data set
- Recordings/pictures/sounds

Data Visualization

```
In [17]: 1 covid["COVID-19"].value_counts().plot.pie(explode=
2         plt.title('number of cases');
```



After the investigation of dataset, we will go for the information representation between the Coronavirus and number of cases. Then, at that point, we will yes for 80.7% and no for 19.3%. Information perception is the introduction of information in a pictorial or graphical configuration. It empowers chiefs to see investigation introduced outwardly, so they can get a handle on troublesome ideas or recognize new examples. With intuitive representation, you can make the idea a stride further by utilizing innovation to dive into outlines and diagrams for more detail, intelligently changing what information you see and how it's handled.

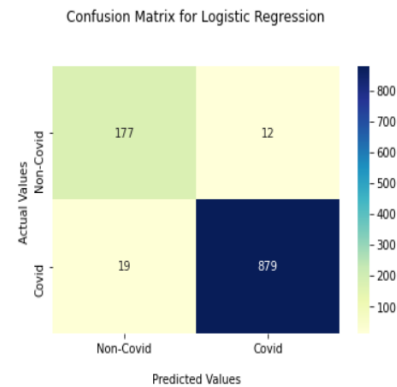
In view of the manner in which the human mind processes data, utilizing diagrams or charts to imagine a lot of perplexing information is more straightforward than poring over bookkeeping pages or reports. Information representation is a speedy, simple method for conveying ideas in an all inclusive way and you can try different things with various situations by making slight changes.

Information perception can likewise:

- Distinguish regions that need consideration or improvement.
- Explain which elements impact client conduct.
- Assist you with understanding which items to put were.
- Foresee deals volumes.

Information perception will change the manner in which our investigators work with information. They will be relied upon to react to issues all the more quickly. Also they'll should have the

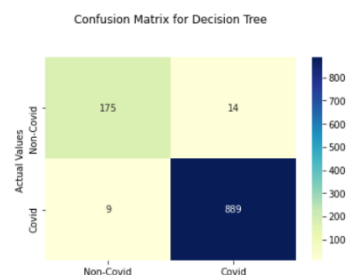
option to burrow for additional experiences - check out information in an unexpected way, more innovatively. Information representation will advance that innovative information investigation.



Relapse investigation is a measurable technique to display the connection between a reliant (target) and free (indicator) factors with at least one autonomous factors. All the more explicitly, Regression investigation assists us with seeing how the worth of the reliant variable is changing comparing to a free factor when other autonomous factors are held fixed. It predicts ceaseless/genuine qualities like temperature, age, compensation, cost, and so forth

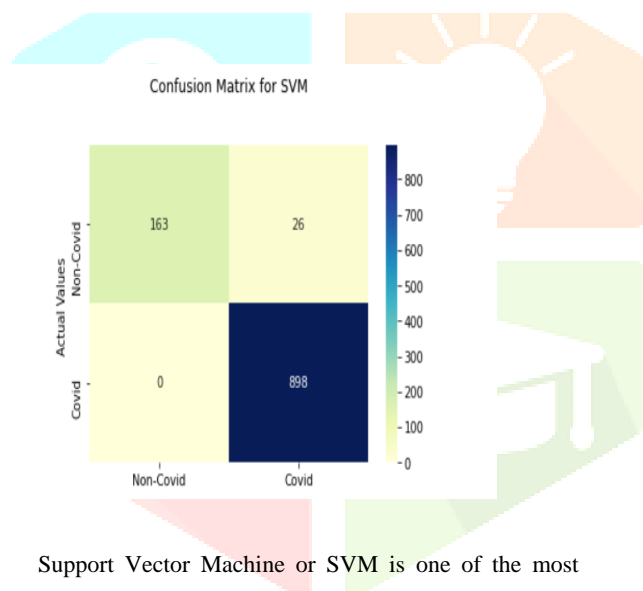
What is Logistic Regression

It's an augmentation of straight relapse where the reliant variable is downright and not nonstop. It predicts the likelihood of the result variable Logistic relapse can be binomial or multinomial. In the binomial or twofold strategic relapse, the result can have just two potential kinds of values (e. g. "Indeed" or "No", "Achievement" or "Disappointment"). Multinomial alludes to situations where the result can have at least three potential kinds of values (e.g., "great" versus "excellent" versus "best"). By and large, the result is coded as "0" and "1" in twofold calculated relapse.



Choice Tree is a Supervised learning method that can be utilized for both characterization and Regression issues, yet for the most part it is liked for taking care of Classification issues. It is a tree-organized classifier, where inward hubs address the highlights of a dataset, branches address the choice principles and each leaf hub addresses the result. In a Decision tree, there are two hubs, which are the Decision Node and Leaf Node. Choice hubs are utilized to settle on any choice and have various branches, while Leaf hubs are the result of those choices and don't contain any further branches.

The choices or the test are performed based on elements of the given dataset. It is a graphical portrayal for getting every one of the potential answers for an issue/choice in view of given conditions. It is known as a choice tree on the grounds that, like a tree, it begins with the root hub, which develops further branches and builds a tree-like construction. To construct a tree, we utilize the CART calculation, which represents Classification and Regression Tree calculation. A choice tree basically poses an inquiry, and in view of the response (Yes/No), it further split the tree into subtrees. Underneath graph clarifies the overall design of a choice tree: How does the Decision Tree calculation Work. In a choice tree, for anticipating the class of the given dataset, the calculation begins from the root hub of the tree. This calculation contrasts the upsides of root trait and the record (genuine dataset) characteristic and, in view of the correlation, follows the branch and leaps to the following hub. For the following hub, the calculation again contrasts the characteristic worth and the other sub-hubs and move further. It proceeds with the interaction until it arrives at the leaf hub of the tree. The total cycle can be better perceived utilizing the underneath calculation.



Support Vector Machine or SVM is one of the most famous Supervised Learning calculations, which is utilized for Classification as well as Regression issues. In any case, fundamentally, it is utilized for Classification issues in Machine Learning. The objective of the SVM calculation is to make the best line or choice limit that can isolate n-layered space into classes so we can undoubtedly put the new informative item in the right classification later on. This best choice limit is known as a hyperplane. SVM picks the outrageous focuses/vectors that assistance in making the hyperplane. These outrageous cases are called as help vectors, and subsequently calculation is named as Support Vector Machine. Consider the beneath graph in which there are two distinct classifications that are grouped utilizing a choice limit or hyperplane:

Kinds of SVM

SVM can be of two kinds: (Support vector machine)

- **Direct SVM:** Linear SVM is utilized for straightly distinguishable information, and that implies if a dataset can be ordered into two classes by utilizing a solitary straight line, then, at that point, such information is named as directly detachable information, and classifier is utilized called as Linear SVM classifier.
- **Non-direct SVM:** Non-Linear SVM is utilized for non-straightly isolated information, and that implies on the off chance that a dataset can't be grouped by utilizing a straight line, such information is named as non-direct information and classifier utilized is called as Non-straight SVM classifier

IV. OUTPUT SCREENS AND RESULT

Medical Emergency

Covid Test Result

Dear DeviSree
Urgent reminder from government of Andhra Pradesh
It is informing that You have tested positive for Covid-19. You have Covid-19 in SEVERE level.

Name:

DeviSree.

Patient Id:

210103.

====Take Precautions and Medication====

Z

Thanks and Regards

Dr. Rajasekaran

HOD of medical dept.

V. CONCLUSION

Pandemic brought about by the Covid accompanied extraordinary awkwardness in every aspect of worldwide movement. It has a high spread rate in a brief time frame, and avoidance of transmission turned into a worldwide need and nations should cooperate which will bring about a lot quicker recuperation than if every nation acts alone. Because of more variations in Coronavirus the manifestations are not unsurprising effectively for that an essential strategy utilized in this battle is to distinguish out breaks and high dangers this can be overwhelmed

by isolating the dataset of patients and they can be focused on in that prioritization the basic patients have greater need by this they get opportunity to defeat from death.

The issue is individuals are don't know about the accessibility of the ventilators and beds. Subsequently, to defeat this issue there is approach which is clarified for rapidly fostering a choice for focusing on a basic patient. By this we have isolated the patients in the emergency clinic into Coronavirus and noncovid patients in view of the wellbeing boundary and indications like patient wellbeing boundaries (Breathing Problem, fever, dry hack, sore throat, cerebral pain, coronary illness, diabetes, hyper strain, weariness, gastrointestinal) present in .csv dataset is given as message contribution to prepare the model and test the model utilizing AI calculation utilizing jupyter scratch pad as the open source web application and further isolate the Coronavirus patients in three classes as gentle side effects Coronavirus patients, passivable manifestations Coronavirus patients, and basic indications Coronavirus patients.

The Covid-19 expanded the issues to heart patient that related with the numerous different elements. Then again, every one of the contaminated individuals might be relieved by adequate offices. In these offices, oxygen is an innovation subordinate medication and requires successful collaboration between medical care laborers, experts, and chiefs through which the assets like oxygen chambers and accessibility of beds in the emergency clinics to be used all the more proficiently to save more lives and their families.

VI. REFERENCES

[1] "Severity Monitoring Device for COVID-19 Positive Patients" In this paper, a variable device is developed which uses ESP-32: node MCU, MAX30102: pulse oximeter and heart rate sensor, LM 35: temperature sensor, vibration sensor is constantly monitors the covid-19 infected person's body conditions like oxygen saturation level, heart pulse rate, body temperature and hand movements due to restlessness and process the information simultaneously.

[2] Detection of covid-19 in Chest X-ray image using CLAHE and convolutional neural network.

The purpose of this paper is to develop a convolutional neural network (CNN) algorithm which is an Artificial intelligence with deep learning and explore the convolutional neural network's basic performance with some primary deployment scenarios and transfer learning trails.

[3] An interpretable mortality prediction model for covid-19 patients.

The purpose of this paper is to develop a machine learning based model that can predict the mortality rates of patients, and compare the accuracy with the accuracy that we have obtained.

[4] Assessment of physiological signs associated with covid-19 measured using wearable devices.

The purpose of this paper is to predict the hospitalisation which is based on the symptoms that describes results of supervised learning technique know as logistic regression classifier.

[5] A Review of Scientific Research on Artificial Intelligence.

The purpose of this paper is to provide analysis regarding artificial intelligence and Machine Learning this paper provides publication activity of Russian and international scientists in the field of artificial intelligence (AI) and Machine learning (ML).

[6] FORECASTING MODEL FOR CORONA VIRUS DISEASE(COVID-19)

The purpose of this paper is to study on the analysis of covid-19 and it's forecasting models for covid-19 and control measures. This paper describes forecasting techniques which is important in yielding accurate predictions.

[7] Logistic regression relating patient characteristics to outcome

The purpose or this paper is for estimating the probability of a patient dying of sepsis using information on the patients symptom like respiratory rate, blood pressure, temperature, cough and etc., The method used these health parameters called as independent variables it to estimate the condition of a patients having an outcome of interest called the dependent variable.

[8] Cross validated variable selection in tree-based methods improves predictive performance.

The purpose of this paper is to analyse recursive partitioning methods producing tree like models which are long standing staple of predictive modelling. This paper demonstrates the cross validation scheme underling ALOOF can alleviate a major problems of tree based methods that are not able to utilize categorical features with large number of categories in predictive models.