



Analysis of Psychological and Physical Impact on Individuals During Covid-19 Through Machine Learning Technique

Nisha Bhoi

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ANALYSIS OF PSYCOLOGICAL AND PHYSICAL IMPACT OF COVID19 PANDEMIC THROUGH MACHINE LEARNING TECHNIQUE

Nisha bhoi¹, Govt. Gundadhur P.G. College, Kondagaon, C.G., India, (nishabhoy@gmail.com)

ABSTRACT

Adoption of machine learning and data mining in health care is to minimize errors in predicting disease, prescription of medicines, perception of individuals, and detection of diseases in its early stage. The proposed research aims to develop an intelligent decision making model that shall aid in revising medical pedagogies and remedial instructions and precaution and guidelines for human beings identified with low immunity and weak body strength, well before they face major clinical problem. This model shall also recognize the behaviour of patient and on the basis of their behavioural symptom we can predict who is most vulnerable to disease or at low risk. We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle.

This paper is an extensive coverage of integration of algorithms and logic with various data mining and machine learning techniques to handle healthcare and uncertainty at various levels to incorporate human type reasoning in modelling. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behaviours. It involves a combination of techniques from numerous domains such as machine learning, organizing databases and information retrieval.

KEYWORDS: Machine Learning, Data Mining, Naïve Bayes, Clustering, Co-relation Analysis.

1. INTRODUCTION

Data Mining is the process involved in identifying interesting, interpretable, useful and novel information and extracting them from the data. The information shall be processed further to arrived decisions on a particular task. It has been used for many years in the fields of business, health care, engineering and research organizations to examine through bulk data like patient records, sales history of a commodity, seismic data of a particular location etc. Adoption of machine learning and data mining in health care is to minimize errors in predicting disease, prescription of medicines, perception of individuals, use of traditional medicines, detection of diseases in its early stage and avoiding fake medical

insurance claims. Diseases such as cardiac disease, cancer, bone fracture etc. can be diagnosed by adopting data mining techniques. It involves a combination of techniques from numerous domains such as machine learning, organizing databases and information retrieval.

There are several major data mining techniques that have been developed and used in data mining projects. These techniques include association, classification, clustering, prediction and sequential patterns. Fuzzy logic is capable of supporting, to a reasonable extent, human type reasoning in natural form by allowing partial membership for data items in fuzzy subsets. Integration of fuzzy logic with data mining techniques has become one of the key constituents of machine learning in handling the challenges posed by the massive collection of natural data. This thesis is an extensive coverage of integration of fuzzy logic with various data mining and machine learning techniques to handle healthcare and uncertainty at various levels to incorporate human type reasoning in modeling. Since data mining is a computer-based technology, it is quite natural to build the principles of data mining using Re-production Neural Networks. But this study aims to use data mining techniques for modeling the behavior patterns of human interaction with various systems. The human behavior is always fuzzy in nature and it is very difficult to model human behavior patterns with crisp neural networks data mining systems. The modeling of imprecise and qualitative knowledge, as well as handling of uncertainty at various stages is possible through the use of fuzzy sets.

In data mining, Clustering is used for segmenting objects into similar groups. Using crisp clustering technique an object can become the member of only one cluster and the membership is either fully inclusive (inlier) or exclusive (outlier). A review of crisp clustering techniques and illustration of k-means algorithm and reproducing neural networks are performed in this work to have clear idea about clustering principles. But in humanistic approach the object segmentation is different as because the object can become the member of more than one cluster at a time with varying degrees of association. Using fuzzy clustering techniques, data mining segmentation can be implemented exactly the way humans organize objects. The central idea in fuzzy clustering is the non-unique partitioning of the data in a collection of clusters with membership values between zero and one. The non-zero membership values with a maximum of one show the degree to which the data point belongs to a cluster. Fuzzy k-means (FKM) algorithm incorporates the fuzzy concepts in clustering and this is used in wide range of application domains. In this thesis, the FKM algorithm is introduced and illustrated to bring out the advantages and limitations of the algorithm.

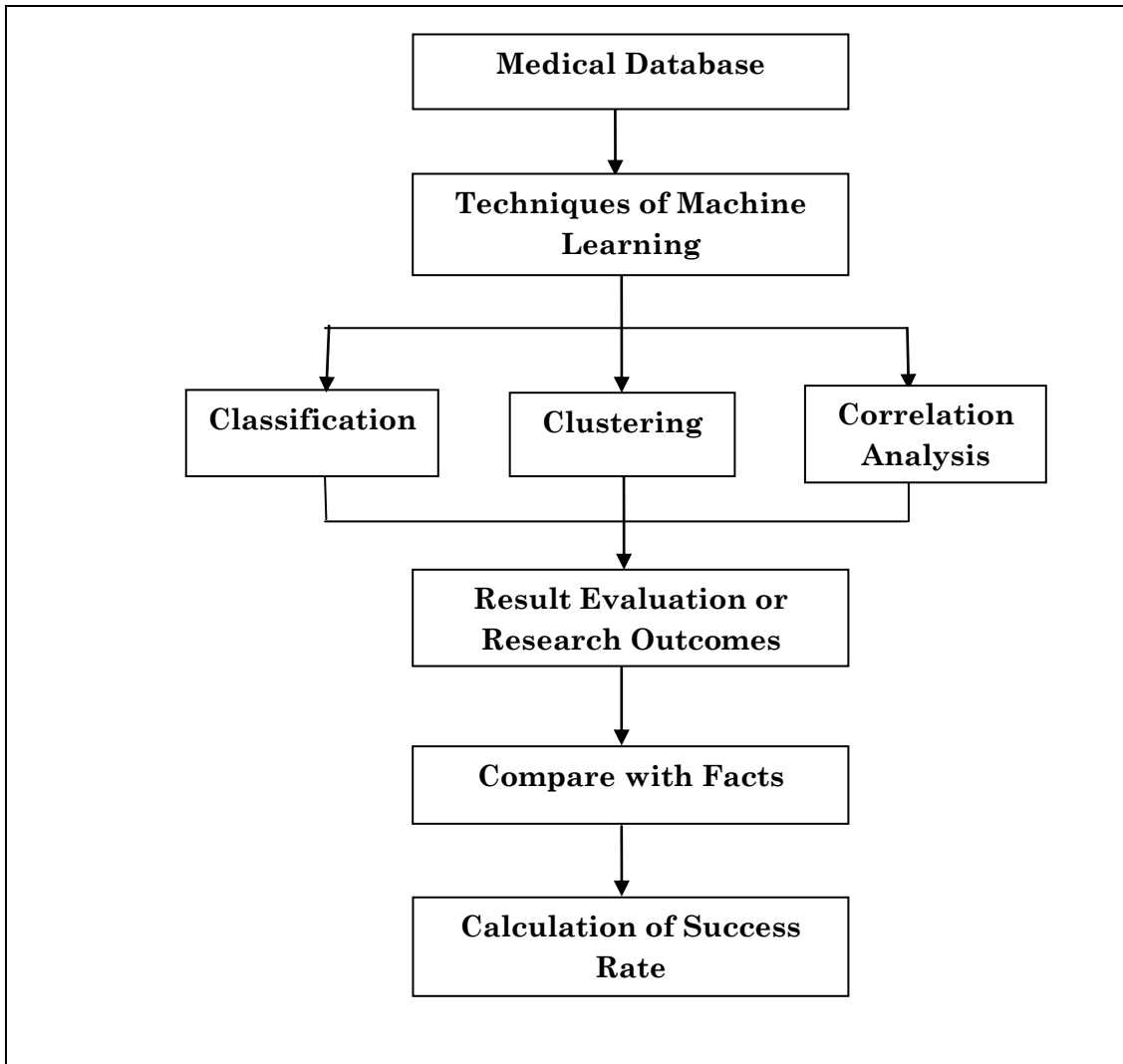
The outbreak of Corona virus (Covid19) started with first cases on December 2019, in Wuhan (China). The first reported case in South America was in Brazil on 26 February 2020, in Sao Paulo city. The strategy to stop the infections in the country was a partial lockdown to avoid the propagation of the virus. On 28 January 2020, Ministry of Health of Brazil reported a suspected case of Covid19 in Belo Horizonte, Minas Geris state, recently one student returned from China. The same day were reported two suspected cases in Porto Alegre and Curitiba. The first confirmed COVID-19 case was reported in Brazil, a man of 61-year-old who returned from Italy. The patient was tested in Israelita Einstein Hospital in Sao Paulo state. On 14 May, more than 200 000 cases were confirmed, this number double during the first days of May. A regular monitoring and remote detection system for individuals will assist in the fast-tracking of suspected COVID-19 cases. Moreover, using such systems will generate a huge amount of data, which will provide many opportunities for applying big data analytics tools that are likely to improve the level of healthcare services. There is a large number of open-source software such as the big data components for the Apache project, which are designed to operate in a cloud computing and distributed environment to assist in the development of big data-based solutions. Furthermore, there are several key characteristics of big data called the Six V's, namely, Value, Volume, Velocity, Variety, Veracity, and Variability. However, the original definition of the big data key characteristics considers only three Vs, namely Volume, Velocity, and Variety. The big data characteristics apply to data acquired from the healthcare sector, which increases the tendency to use big data analysis tools to improve sector services and performance.

2. LITERATURE REVIEW

The proposed research aims to develop an intelligent decision making model that shall aid in revising medical pedagogies and remedial instructions and precaution and guidelines for human beings identified with low immunity and weak body strength, well before they face major clinical problem.

This model shall also recognize the behavior of patient and on the basis of their behavioral symptom we can predict who is most vulnerable to disease or at low risk.

Figure-1: exploring the flow of our work in brief



Research Design

The Research design adopted for the present study is mixed design - Descriptive design to understand the quality of life, psychological distress, social functioning and family burden of leprosy patients and One Group pre and post-test design using “before” and “after” measurements to evaluate the subjects' knowledge on COVID 19.

The proposed research aim to develop an intelligent decision making model for prediction of people who is more vulnerable to COVID-19 disease or any other infectious disease. Prediction based on their clinical

and non-clinical behavior. We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle. The proposed research aims to enlist the precise decision making dimensions that collectively frame the recommended system of medical field for people who are at risk.

In our work we want to mainly classify vulnerable patients who are very nearer to accept infection from outside. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behavior.

Fig1: Clustering Algorithm

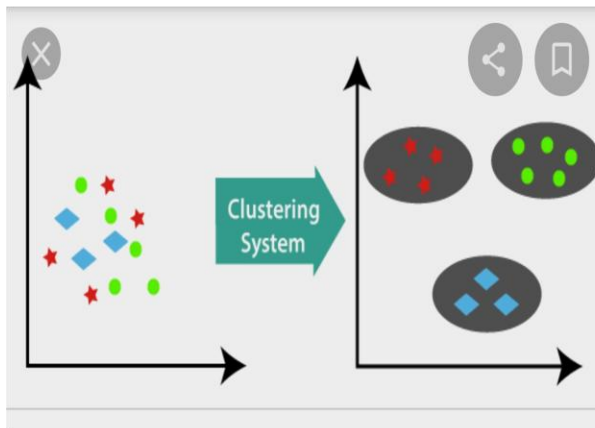


Fig2: Classification Algorithm

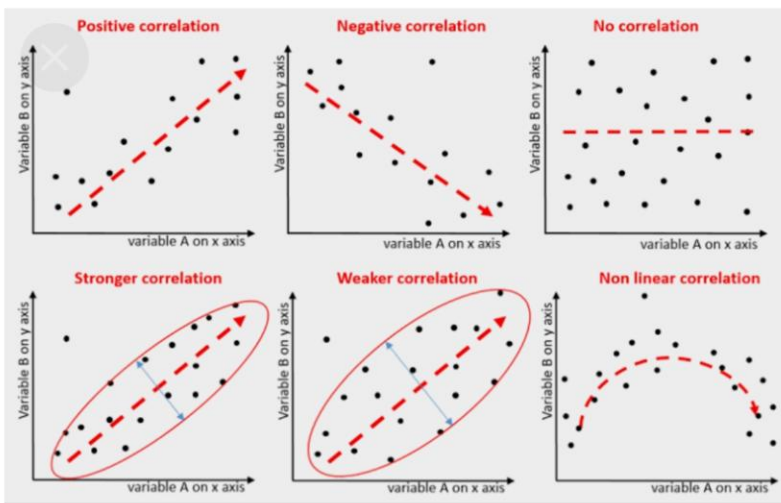
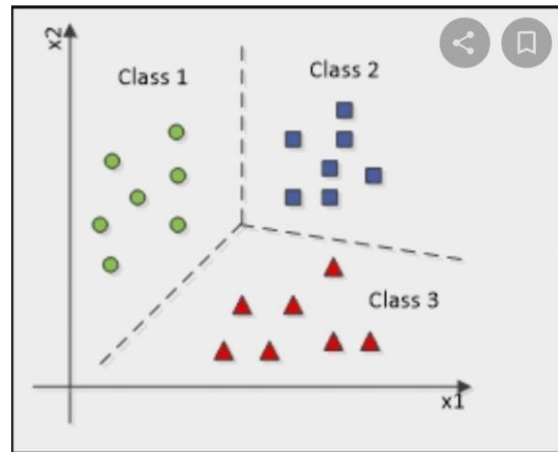


Fig3: Correlation Analysis to identify Positive, Negative, linear, stronger, weaker variables.

These dimension moves about the following steps:

- Provide extra remedial data.
- Prediction aim recommends system to suggest some remedial action.

An earnest effort has been made to develop disease diagnosis system that facilitates identification and prediction of the disease from the patient data. The reliance of data mining and machine learning techniques in classification of disease has been acknowledged and the algorithms are implemented for assisting health care professionals. In this work, a disease diagnosis system using the data mining techniques is developed which can be used by patients, doctors and society as well. Data pre-processing and organization plays a vital role in the final output of the system. Genuine input data ensures the accurate results. The proposed algorithm detects more outliers even with lower record size. The proposed algorithm produces accuracy for disease prediction. The records from the repository can be taken as reports for any further prediction. To exhibit the contributions focused with a societal facet the proposed methodologies have been implemented in health care for disease prediction. This will go a long way to exploit the advancements in this ever-growing technological era and offer innovative remedies to the emerging problems in the medical world.

OBJECTIVES

- To develop a healthcare disease diagnosis system that uses data mining techniques that can be used by all stakeholders.
- To develop and implement a hybrid approach constituting density-based K-means clustering algorithm.
- To generate association rules to identify the classes of categories and to include fuzzy influence rule to further improve the system response to sensitive data. The mass of each class is estimated to predict the possibility and severity of disease.
- To understand the effects of covid-19 including clinical and non-clinical behaviours of human being in society.
- To generate reports for medical analysts on a day-to-day basis, thereby helping them in the decision-making process.

Shikah J. Alsunaidi (2021) The COVID-19 epidemic has caused a large number of human losses and havoc in the economic, social, societal, and health systems around the world. Controlling such epidemic requires understanding its characteristics and behaviour, which can be identified by collecting and analyzing the related big data. Big data analytics tools play a vital role in building knowledge required in making decisions and precautionary measures. However, due to the vast amount of data available on COVID-19 from various sources, there is a need to review the roles of big data analysis in controlling the spread of COVID-19, presenting the main challenges and directions of COVID-19 data analysis, as well as providing a framework on the related existing applications and studies to facilitate future research on COVID-19 analysis. Therefore, in this paper, they conduct a literature review to highlight the contributions of several studies in the domain of COVID-19-based big data analysis. The study presents as a taxonomy several applications used to manage and control the pandemic. Moreover, this study discusses several challenges encountered when analyzing COVID-19 data. The findings of this paper suggest valuable future directions to be considered for further research and applications.

J. P. M. van der Valk (2021) Corona virus disease 2019 is a serious respiratory virus pandemic. Patient characteristics, knowledge of the COVID-19 disease, risk behavior and mental state will differ between individuals. The primary aim of this study was to investigate these variables in patients visiting an emergency department in the Netherlands during the COVID-19 pandemic and to compare the “COVID-19 suspected” (positive and negative tested group) with the “COVID-19 not suspected” (control group) and to compare in the “COVID-19 suspected” group, the positive and negative tested patients. The patients were either “COVID-19 suspected” (positive and negative tested group) or “COVID-19 not suspected” (control group). This is one of the first (large) study that investigates and compares patient characteristics, knowledge, behavior, illness perception, and mental state with respect to COVID-19 of patients visiting the emergency room, subdivided as being suspected of having COVID-19 (positive or negative tested) and a control group not suspected of having COVID-19. All patients in this study were generally aware of transmission risks and virulence and adhered to the non-pharmaceutical interventions. COVID-19 suspected patients and patients with (pulmonary) co morbidities were significantly more anxious. However, there is no mass hysteria regarding COVID-19. The higher the degree of fear, the more carefully hygiene measures were observed. Knowledge about the coping of the population during the COVID-19 pandemic is very important, certainly also in the perspective of a possible second outbreak of COVID-19.

3. EXPERIENTIAL WORK

Data set: We have observed overall activities about the covid-19 test report, positive cases, etc. activities around kondagaon, Chhattisgarh district.

Data Table-1: District Positive Linelist District- Kondagaon

District Positive linelist Dist- Kondagaon												
Sn.	SAMPLE COLLECTIO N DATE	POSITIVE REPORT DATE	NAME	Age	Sex	Father name	Block	Mo. No.	Place of Admission Hospital/Home isolation	TYPE OF SAMPLE	Contact Tracing Done / Not Done	Testing Status
1	05.06.2020	11-Jun-2020	Vijaypal singh	54	M		Kondagaon	8630904134	Medical College Jagdalpur	RTPCR		
2	12.06.2020	15-Jun-2020	Kamal singh	32	M		Kondagaon	8273960677	Medical College Jagdalpur	RTPCR		
3	12.06.2020	15-Jun-2020	Satyaveer singh	53	M		Kondagaon	6395552583	Medical College Jagdalpur	RTPCR		
4	08.07.2020	10-Jul-2020	Ajit Netam	27	M		Baderajpur	9821636091	Medical College Jagdalpur	RTPCR		
5	08.07.2020	10-Jul-2020	Umang singh	16	M		Kondagaon	9131018427	Medical College Jagdalpur	RTPCR		
6	14.07.2020	14-Jul-2020	Dr. T. Kavya Raddy	32	F		Kondagaon	9482159280	DH Kondagaon	RTPCR & Rapid Antigen		
7	14.07.2020	14-Jul-2020	Dr. Aaditya Raddy	34	M		Kondagaon	9959934321	DH Kondagaon	RTPCR & Rapid Antigen		
8	14.07.2020	14-Jul-2020	T. Venkat Raddy	65	M		Kondagaon	8790052800	DH Kondagaon	Rapid Antigen		
9	11.07.20	15-Jul-2020	Ramesh	24	M		Kondagaon	7828835784	DH Kondagaon	RTPCR		
10	11.07.20	15-Jul-2020	Dileshwar	19	M		Kondagaon	6382462968	DH Kondagaon	RTPCR		
11	11.07.20	15-Jul-2020	Bhakchand	16	M		Kondagaon	8103558608	DH Kondagaon	RTPCR		
12	11.07.20	15-Jul-2020	Vamdev	18	M		Kondagaon	6261046368	DH Kondagaon	RTPCR		
13	11.07.20	15-Jul-2020	Ashok	18	M		Kondagaon	8459656883	DH Kondagaon	RTPCR		
14	11.07.20	15-Jul-2020	bitram	33	M		Kondagaon	9525955023	DH Kondagaon	RTPCR		
15	14.07.2020	17-Jul-2020	Sujata Raddy	60	F		Kondagaon	8790052800	DH Kondagaon	RTPCR		
16	16.07.2020	19-Jul-2020	Dhlp singh	39	M		Kondagaon	7000287091	DH Kondagaon	RTPCR		
17	16.07.2020	19-Jul-2020	Vmla singh	55	F		Kondagaon	7000287091	DH Kondagaon	RTPCR		
18	16.07.2020	19-Jul-2020	Raisingh kashyap	16	M		Kondagaon	7722598469	DH Kondagaon	RTPCR		
19	19.07.2020	19-Jul-2020	Sukdu Korram	18	M		Kondagaon	8817028061	DH Kondagaon	Rapid Antigen		
20	17.07.2020	21-Jul-2020	S.Ramasamy	35	M		Kondagaon	8939779978	DH Kondagaon	RTPCR		
21	17.07.2020	21-Jul-2020	Ganesh prasad	47	M		Kondagaon	8840730653	DH Kondagaon	RTPCR		

Sample and sample size

Sample of at least 150 patients or more who are suffering from COVID have to be drawn at least 50 or more from each of the at least 3 centers respectively using simple random sampling method through random table and who will meet the inclusion criteria for the study constitutes the sample size. We have observed overall activities about the covid-19 data daily report of vaccination, dose/vaccines availability processes, etc. around kondagaon, Chhattisgarh district.

Data Table – 2: Covid-19 Data Daily Report District, Kondagaon

COVID-19 DATA DAILY REPORT DISTRICT KONDAGAON (CG) DATE - 19.12-2021																			
Sl.	Block	Sample Tested Target			Positive		Positive rate		Discharge		Recover Rate	Active case				Contact Tracing		Death	
		Today Target	Today Achievement	Total Sample Collection	Today	Cumulative	Today	Cumulative	Today	Cumulative	Cumulative	CCC	Home Isolation	Covid Hospital	Cumulative	Today Target	Today Achievement	Today	Cumulative
1	Kotikal	315	0	57055	0	2410	#DIV/0!	4.22	2	2392	99.25	0	0	0	0	0	0	0	16
2	Kondagaon	270	36	67853	0	5072	0.00	7.47	0	5004	98.66	0	0	0	0	0	0	0	60
3	Makdi	190	0	51859	0	1302	#DIV/0!	2.51	0	1294	99.39	0	0	0	0	0	0	0	7
4	Pharagaon	270	14	64971	0	2186	0.00	3.36	0	2174	99.45	0	0	0	0	0	0	0	10
5	visrampur	210	0	48299	0	1135	#DIV/0!	2.35	0	1119	98.59	0	0	0	0	0	0	0	11
6	DH	150	5	35156	0	823	0.00	2.34	0	823	100.00	0	0	0	0	0	0	0	0
Total		1405	55	325193	0	12928	0.00	3.98	2	12806	99.06	0	0	0	0	0	0	0	104
Sl.	District	Home Isolation								COVID HOSPITAL									
		Admission		Referred		Discharge		Active		Admission		Referred		discharge		Active		Death	
		Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative
1	Kotikal	0	2093	0	21	0	2070	0	2										
2	Kondagaon	0	4921	0	111	0	4814	0	0										
3	Makdi	0	1143	0	15	0	1128	0	0	0	1467	0	130	0	1248	0	0	0	37
4	Pharagaon	0	1910	0	22	0	1891	0	0										
5	visrampur	0	1043	0	5	0	1038	0	0										
Total		0	11110	0	174	0	10941	0	2	0	1467	0	130	0	1248	0	0	0	37
COVID CARE CENTRE DIST. KONDAGAON																			
Sl.	Block		Total Bed:	Fill Bed:	Vaccant Bed:	No. of Oxygen cylinder		Admission		Referred		discharge		Active		Death		Containment Zone/Micro	
						Jumbo	Small	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Active	Cumulative
1	Kotikal	Kasturba Hostel	100	0	100	70	51	0	81	0	14	0	67	0	0	0	0	0	82
2	Kondagaon	P.M. Boys Hostel	100	0	100	31	20	0	80	0	17	0	63	0	0	0	0	0	94
3	Makdi	Kasturba Hostel	50	0	50	15	30	0	55	0	9	0	46	0	0	0	0	0	79
4	Pharagaon	Aadarsh Hostel	300	0	300	52	50	0	77	0	9	0	68	0	0	0	0	0	106
5	visrampur	Boys Hostel	50	0	50	19	41	0	26	0	5	0	21	0	0	0	0	0	24
District			600	0	600	187	192	0	319	0	54	0	265	0	0	0	0	0	385

Sampling technique:

At each of the centers, the subjects will be recruited using simple random sampling technique. At least 50 or more subjects admitted in each of the at least 3 centers who are diagnosed as suffering from COVID by the medical officers, will be randomly selected using random table, and the total subjects at least 150 or more from 3 centers and considered as single group age.

Data Table - 3: Based on Overall Doses vaccine stock position done of COVAXIN

COVAXIN 10 Dose & 5 Dose vaccine stock position 01st Nov					
Row Labels	CCP	DVS	RVS	SVS	Grand Total
Balod					
Baloda bazar					
Balrampur					
Bastar	6295	6260	0		12555
Bemetara					
Bijapur	215	0			215
Bilaspur					
Dantewada	220	0			220
Dhamtari					
Durg					
Gariaband					
GPM					
Janjgir-Champa					
Jashpur					
Kanker	4165	1920			6085
Kawardha					
Kondagaon	1225	40			1265
Korba					
Koriya					
Mahasamund					
Mungeli					
Narayanpur	1595	160			1755
Raigarh					

METHOD OF DATA ANALYSIS

On completion of the data collection, the data collected will be edited coded and tabulated. The statistical treatment of data is achieved through computer applications, using Basic tools and software. Data analysis comprised appropriate statistical techniques including percentage analysis, multiple regression and correlation. Naive Bayes, K. Nearest neighbor and many more techniques will be employed for comparison of means of psychosocial variables between and males and females. Multiple regression analysis is a method used to study the relationship of a single quantitative dependent variable with several variables. Regression analysis has been found to be very useful in the evaluation of effects of variety of variables, which cannot be subjected to experimental controls but which are nevertheless of primary importance. Hence multiple regression analysis between psychosocial variable and demographic data will be conducted.

4. CONCLUSION

Data on social media contain a wealth of user information. Big data research of social media data may also support standard surveillance approaches and provide decision-makers with usable information. These data can be analyzed using Natural Language Processing (NLP) and Machine Learning (ML) techniques to detect signs of mental disorders that need attention, such as depression and suicide ideation. This article presents the recent trends and tools that are used in this field, the different means for data collection, and the current applications of ML and NLP in the surveillance of public mental health. We highlight the best practices and the challenges. Furthermore, we discuss the current gaps that need to be addressed and resolved.

- The proposed research aim to develop an intelligent decision making model for prediction of people who is more vulnerable to COVID-19 disease or any other infectious disease. Prediction based on their clinical and non-clinical behaviour.
- We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle.
- The proposed research aims to enlist the precise decision making dimensions that collectively frame the recommended system of medical field for people who are at risk.
- In our work we want to mainly classify vulnerable patients who are very nearer to accept infection from outside. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behaviours.
- The reliance of data mining and machine learning techniques in classification of disease has been acknowledged and the algorithms are implemented for assisting health care professionals.
- In this work, a disease diagnosis system using the data mining techniques is developed which can be used by patients, doctors and society as well.
- This will go a long way to exploit the advancements in this ever-growing technological era and offer innovative remedies to the emerging problems in the medical world.
- To develop and implement a hybrid approach constituting density-based K-means clustering algorithm.
- To understand the effects of covid-19 including clinical and non-clinical behaviours of human being in society.
- To generate reports for medical analysts on a day-to-day basis, thereby helping them in the decision-making process.

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