



An Investigation on Coronavirus (COVID-19) Pandemic for India using Power BI

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Abstract: An unexpected outburst of disease in the whole world affecting the man-kind resulting to hospitalizations, deaths, a rapid increase in the numbers of all of these has raised a havoc amongst the human race. This is the time when the whole world tried to deal with the same when there is no medicine, no vaccine or treatment for this illness. This paper is an effort to understand the spread of this dangerous malady based on Data Science Concepts. We conduct this study for various states, cities and states in India. We understand the kind of raise of the disease concurrently studying the cases of deaths and number of patient being cured. This can give us an idea of how long will the lockdowns continue, the most crucially affected places etc.

Index Terms– Moving Average, Regression Chart, Decompose Chart , COVID-19 (Corona Virus).

I. INTRODUCTION

Well, there is a rumor as - 'The killer coronavirus most likely originated from a laboratory in Wuhan' that is claimed by a research paper published by Chinese scientists. With the outbreak of the deadly disease named Corona COVID-19 that started its presence in the world from a Wuhan Wet Market, where koalas, wolf pups and snakes were sold allegedly. Since then the world has been flooded with digital data and information about its spreads in different countries and locations. It has also been a matter of study for medical, biological fields as well as for computer science to explore it with different technologies and techniques with the core reason being to analysis, find or discover any new causal parameter, deeper understanding of the emergence of the dangerous disease. Chinese authorities had identified at least 266 people who contracted the virus last year and who came under medical surveillance on 17 November that was weeks before authorities announced the emergence of the new virus. The first person to contract Covid-19 was from Hubei who was 55yrs old. For about one month after that date there were one to five new cases reported each day and by 20 December there were 60 confirmed cases. Then after it became a pandemic.

Meanwhile after the vulnerable outbreak of this deadly disease for which the world is reeling since Nov-19, it has been understood that there are hundreds of coronaviruses that cause diseases in animals such as pigs, camels, bats and cats, till date seven different types of coronaviruses[Fig: 1] have been identified that infect humans.

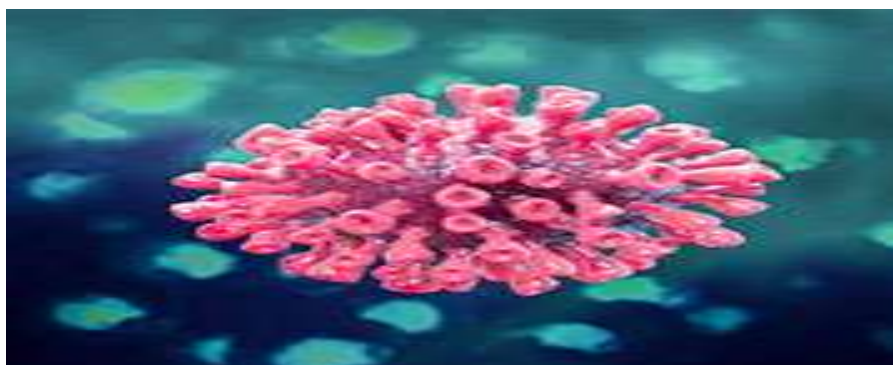


Fig [1] : Corona Virus

Coronavirus disease (COVID-19) is an infectious disease caused by a new virus. The disease causes respiratory illness (like the flu) with symptoms such as a cough, fever, and in more severe cases, difficulty breathing. You can protect yourself by washing your hands frequently, avoiding touching your face, and avoiding close contact (1 meter or 3 feet) with people who are unwell. (Google, 2020).

Coronavirus disease 2019 (COVID-19) is an infectious spreading disease, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2). This disease was first found in 2019 in Wuhan district of China, and is spreading tremendously across the globe, resulting in pandemic declaration by World Health Organization. Basically Based on genome sequencing, all known human coronaviruses have emerged

from animal reservoirs [2]. The COVID - 19, SARS - CoV and MERS - CoV belong to the family of betacoronaviruses, and mostly share a common reservoir in bats [3].

As it is infectious, airborne and speedily spreads with only a few droplets lets of cough or sneeze, one of the ways of prevention is to maintain social distancing. Few symptom known are viz: Fever, Cough, loss of appetite, fatigue, shortness of breath, coughing up sputum, loss of smell, muscle aches and pains.

II. LITERATURE REVIEW

The outbreak of the new disease COVID-19 that has spread in almost the whole world stretching through USA, Canada, Australia, India, Iran, Italy and other European countries that have experienced a sharp growth in detecting the cases and diagnosing it.

They point crucially that the global effort is needed to deal with this pandemic and to break the spread of it. Hence the authors in [4] explicitly focus on can robots help in this phase of crisis? As the disease is spread by the droplets that can be created in the human body only but rather is the robots deal with the same like conducting surveys, checking patients. As epidemics escalate, the potential roles of robotics are getting clearer. In the year 2015 Ebola outbreak, workshops organized by the White House Office of Science and Technology Policy and the National Science Foundation identified three main areas where robotics can make a difference: clinical care (e.g., telemedicine and decontamination), logistics (e.g., delivery and handling of contaminated waste), and reconnaissance (e.g., monitoring compliance with voluntary quarantines)[4].

Mobile robots have been used for temperature measurement in public areas and ports of entry represent practical technologies. To screen multiple people automated cameras are being used. Robots can increase the efficiency and coverage of screening by using for those stated tasks with accuracy. These mobile robots could also be used to repeatedly monitor temperatures of in-/outpatients in various areas of the hospitals with data linked to hospital information systems. By the systems with capability of networking and facial recognition systems, it's possible to trace the contacts of infected individuals and to create an alert. They also highlight how IT has been used by many countries on the education ground for teaching and learning also in this time. Hence robots can be effectively used in medical field.

COVID-19 is a new disease to making, where we do not have any vaccination to therapy for the same. It affects and brings an end to the life in an exponentially fast manner or else if treated in a controlled way many are recovered too.

Here the experts of [5] make a study of the spatio-temporal propagation of the COVID-19 virus in China and compare it to other global locations. Their results suggest that the disease propagation is highly related topopulation migration from Hubei resembling a wave in which human mobility is seen as main characteristic that can be controlled by quarantines. Since quarantine is usually applied on a city level, more insight can be obtained in analyzing the epidemic in cities. Hence they perform their study and suggests results that in a city in China is characterized by two-stages process. At early times, at order of few days, the infection rate in the city is close to constant probably due to the lack of means to detect infected individuals before infection signs are observed and at later times it decays approximately exponentially due to quarantines. These two stages can explain the significant differences between the propagation in China and in other world-wide locations. While most cities in China control the disease which resulted in the decaying stage, in other world-wide countries the situation is still becoming worse probably due to less social interactions control and overloaded health systems in which the death and recovery rates. More over experts in [6] explore this pandemic as it takes on life or death importance. In [6] authors state that the Wallinga's models predict that the number of infected people needing hospitalization, his most important metric, will taper off next week. But if the models are wrong, the demand for intensive care beds could outstrip supply, as it has, tragically, in Italy and Spain.

five years. The time series monthly data is collected on stock prices for sample firms and relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE -100 Index is taken from yahoo finance.

III. INVESTIGATIONS PERFORMED

We now focus on our country India only. The histogram picture for all the states for the spread of COVID-19 in India is shown in Fig 2. This shows the state wise confirmed cases, confirmed foreign nationals, number of cured and number of deaths by state/Union Territory. We consider the data in the time span between 1st January 2020 and 2nd April 2020.

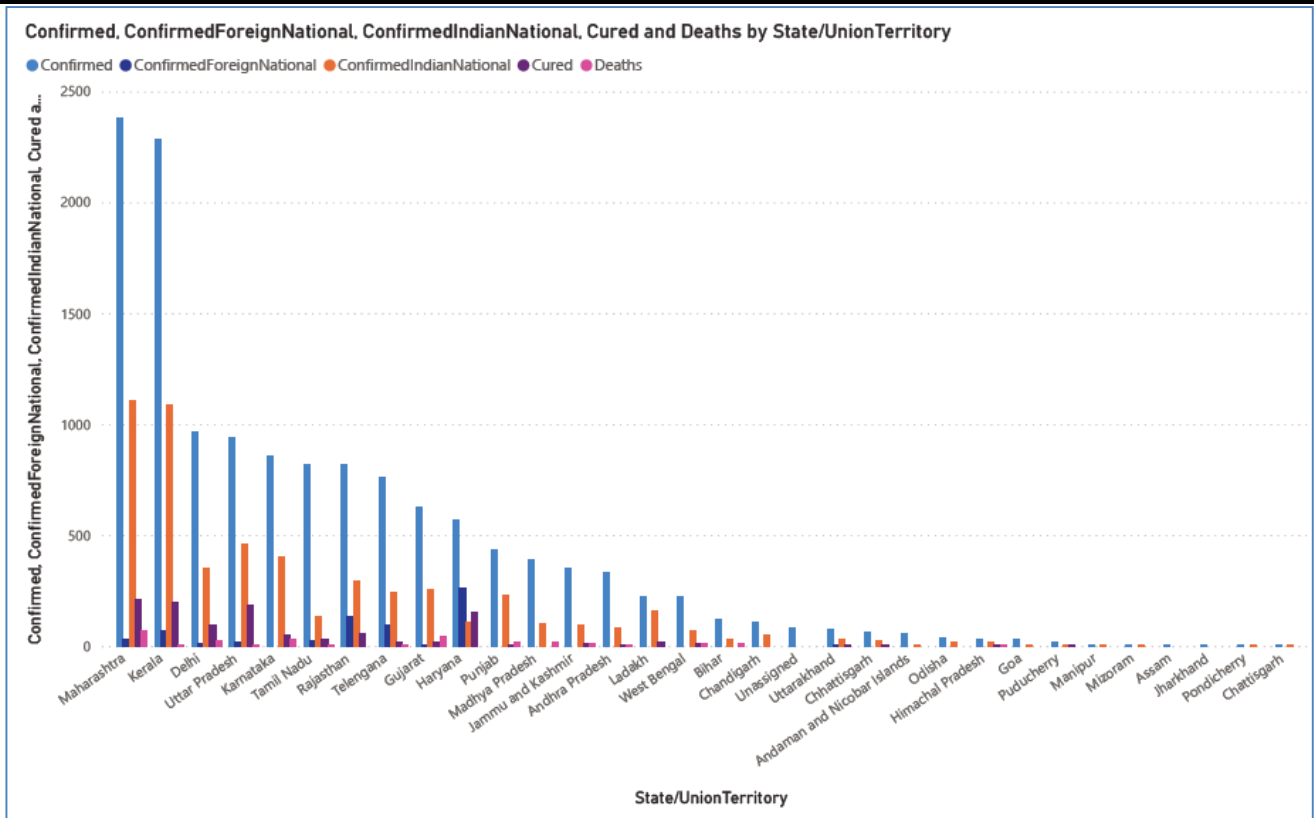


Fig [2]: Number of cured and number of deaths by state/Union Territory

The next diagram shows the same data along with the data set.

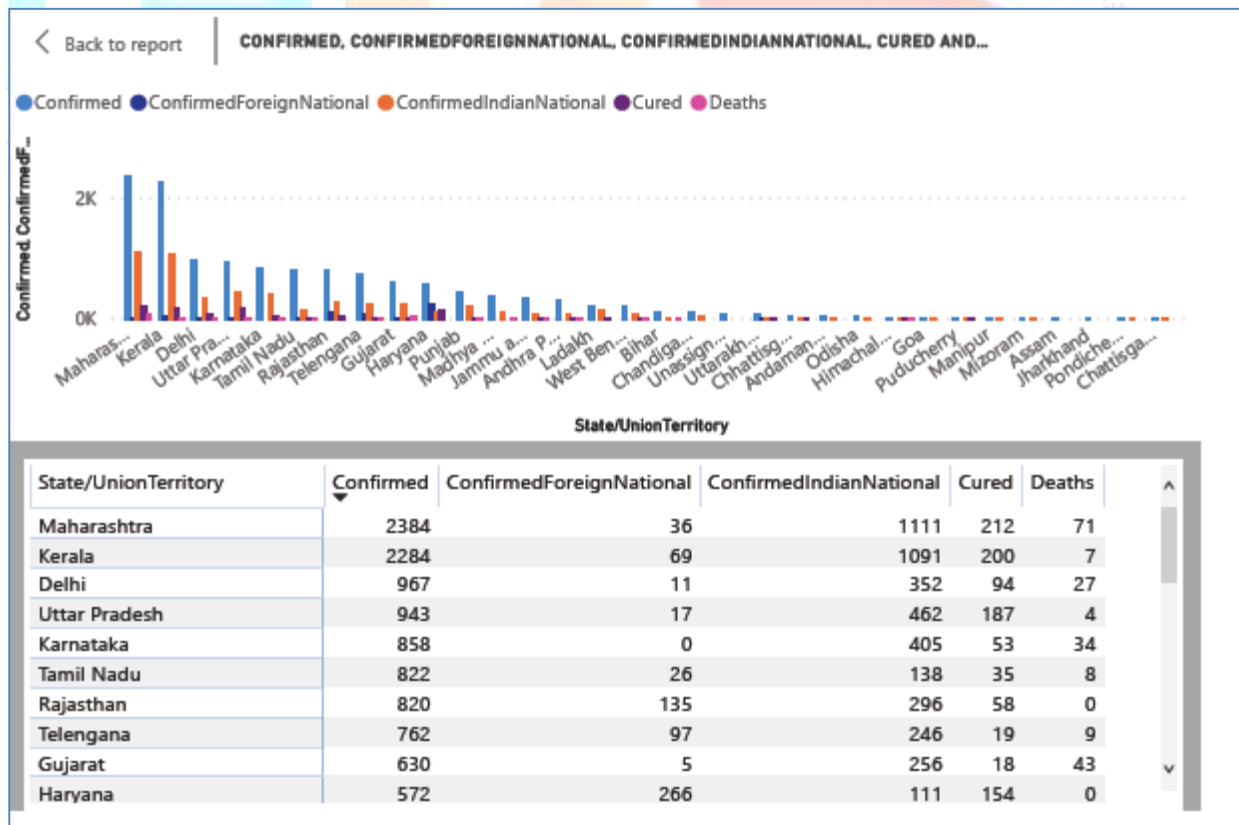


Fig [3]: State wise count along with data set.

The above two diagrams [Fig 2, Fig: 3] clearly show that the count of COVID-19 affected people are more in numbers in the State – Maharashtra. Hence the next diagram[4] shows the visible reasoning with the data being it Foreign Nationals in 44.23x.



Fig [4] : Influencers

Next diagram shows a look at the way the disease has been growing since the time it has been recorded.

We further form the decompose tree to decompose the state affected by COVID-19. In Maharashtra 423 patients were effected as shown in Fig [5]. 88 are yet hospitalized not recovered yet. Out of it 3 had attended Delhi for religious work, Details are yet awaited for 3 and 1 is confirmed for 2nd time.

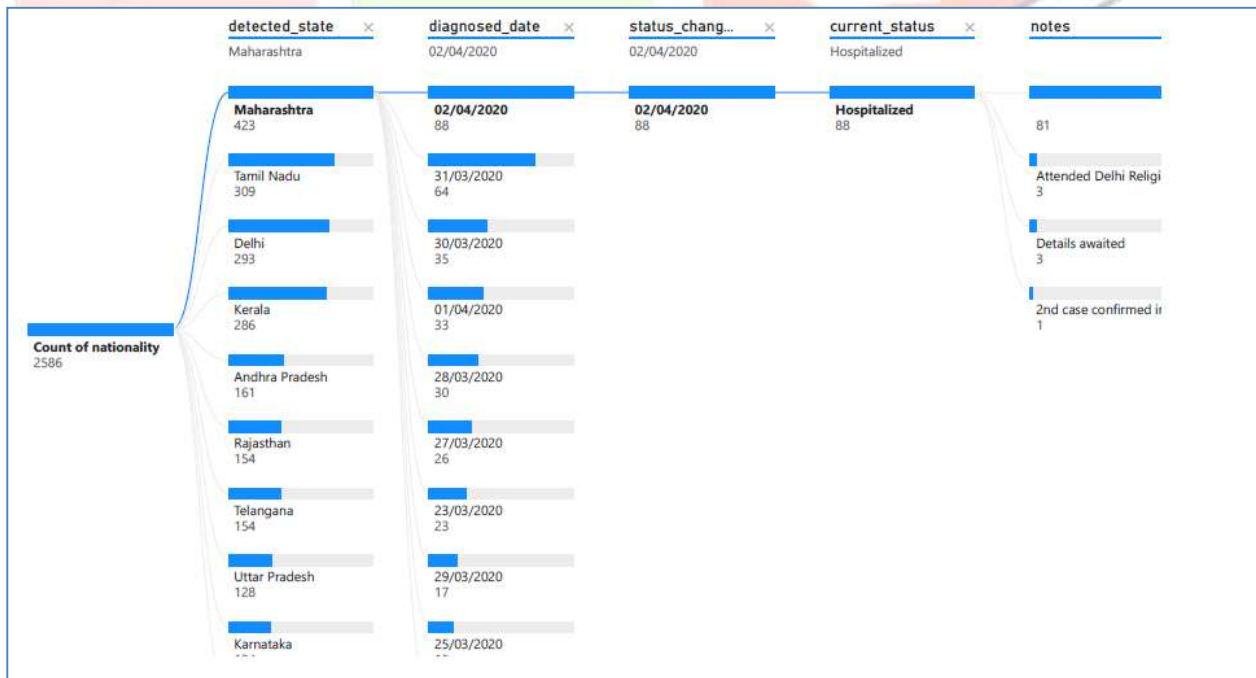


Fig 5: Decompose chart of Maharashtra

We further look at the Curve to fit the plotting of Maharashtra corona data as shown in Fig 6. We see that the data follows a best fit with moving average curve with considering 2 per move that almost resemble the exponential curve fit also with a curve fit formula of $y=5.436e^{0.17x}$ with r^2 error value of 0.937.

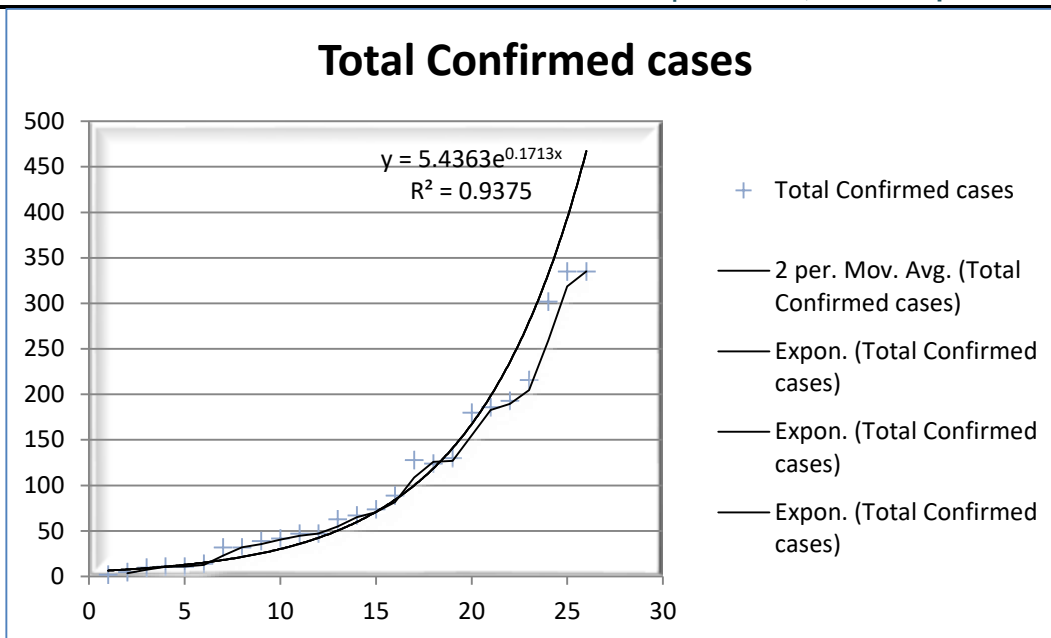


Fig 6: Graph fitting using Moving average (the best fit) and Exponential Curve fit

We focus to look at 5 major states of India viz Delhi, Gujarat, Karnataka, Kerala and Maharashtra in Fig 7 below

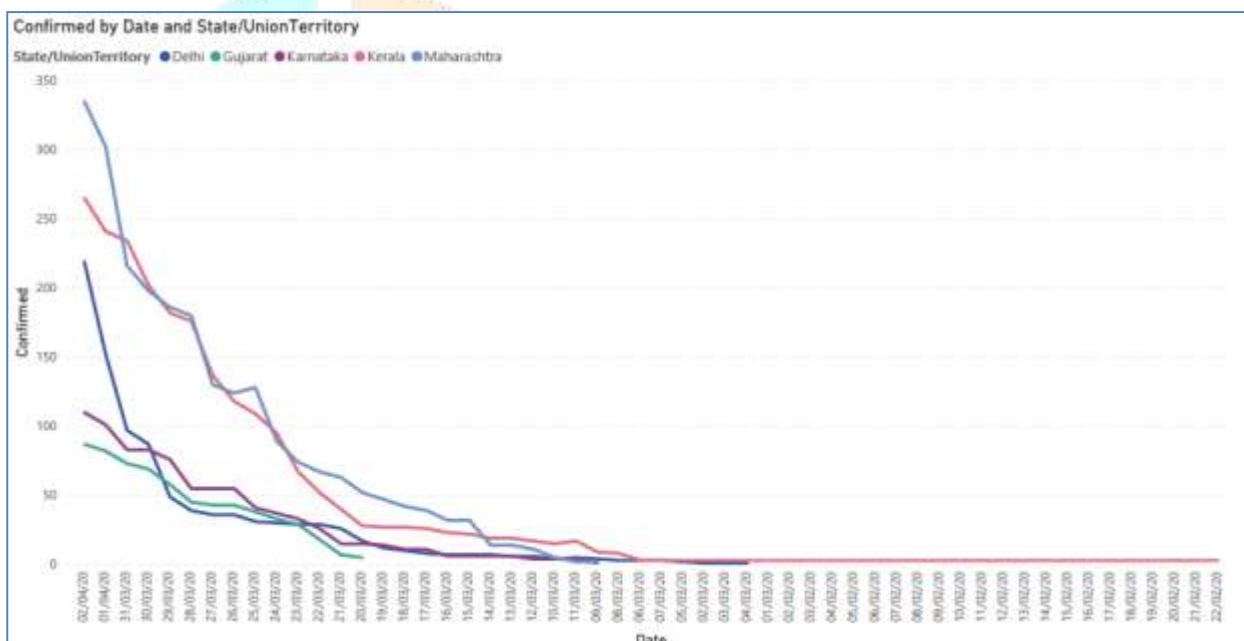
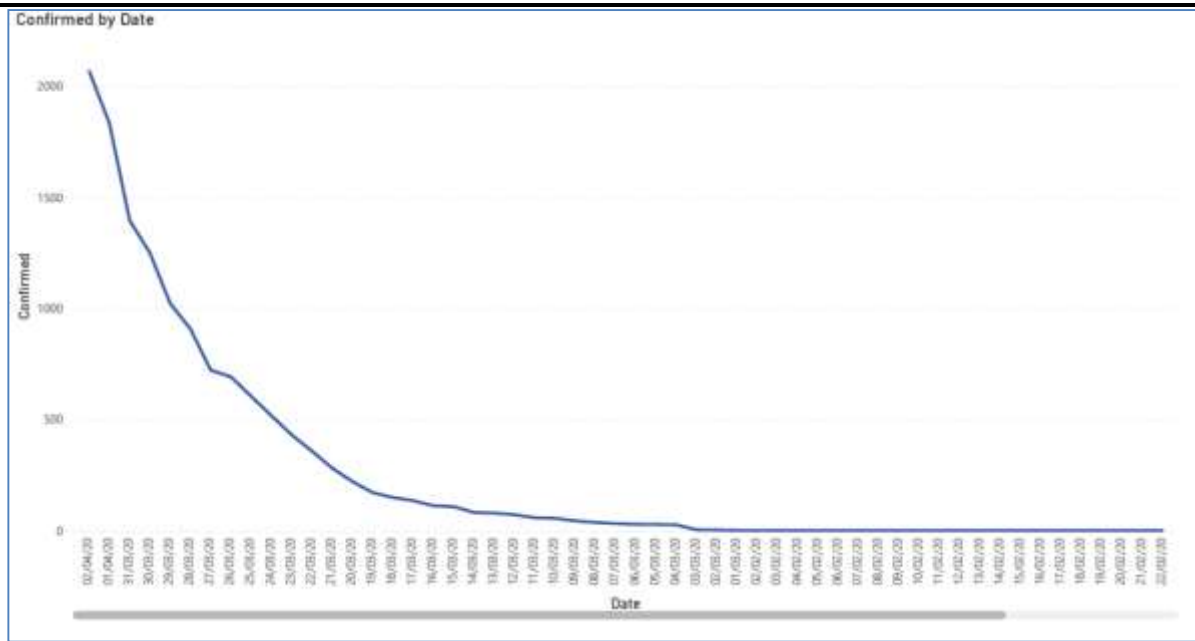


Fig 7: Covid-19 confirmed cases in 5 major states of India

The growth in India is plotted as shown in Fig 8 below that shows an exponential growth since 4/3/2020 with increase of 2-3 per day.



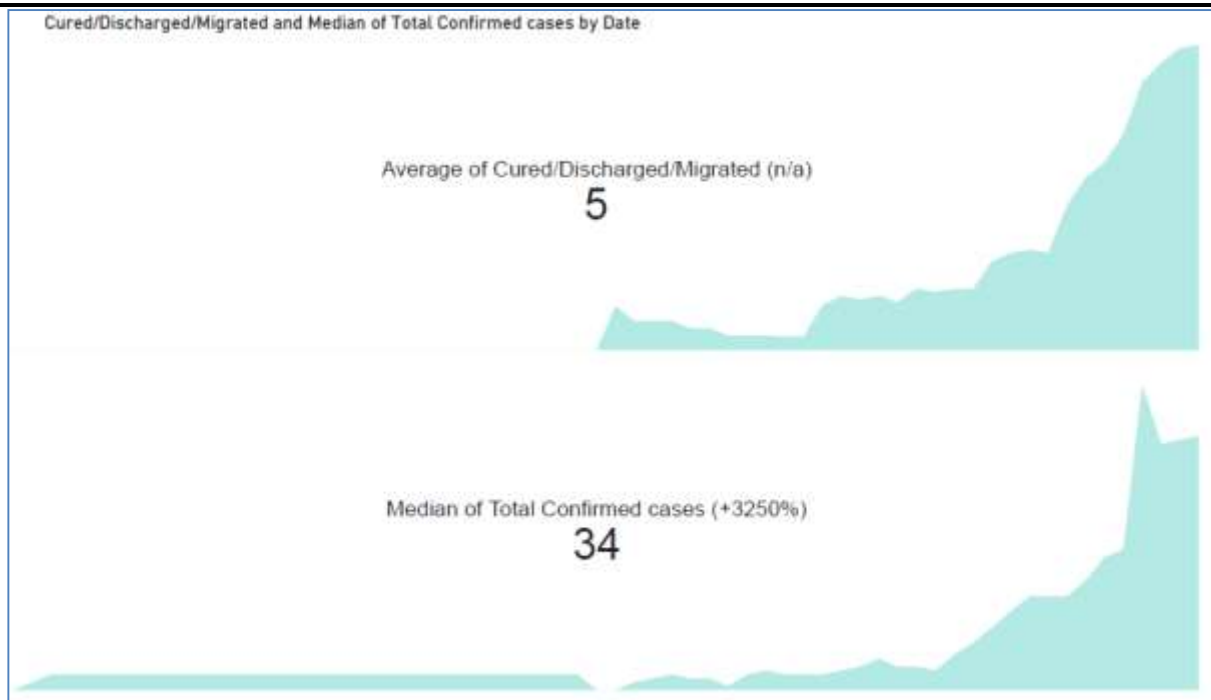


Fig 10: Avg of Cured and Med of confirmed

As in mathematics, understanding of exponential growth is that the rate of growth increases as time increases. You can see this in the graph at Fig[8] that shows the affected and Fig[9] showing the same for cured and deaths occurring.

As this has been plotted for the pandemic occurring today, we see and expect that no disease can ever be in the same form forever in the world, hence we expect that the graph will take the form of exponential decay further with the function value (the y-values) getting smaller and smaller as x gets larger (but the curve never cuts through the x-axis.). Hence as the time grows exponential decay will occur.

This follows the formula that can be expressed by the following differential equation, where N is the quantity and λ (lambda) is a positive rate called the exponential decay constant:

$$\frac{dN}{dt} = -\lambda N.$$

We can see this clearly in Fig [10] that the Avg of Cured is exponentially increasing and at the same time the current number of cases that are new that are confirmed have decreased and become stagnant in growth. The main factors for this stage would be Social Distancing as experienced by China too.

This will bring us closer to Flattening of Curve.

IV. CONCLUSION

We in this paper have attempted to explore the research dataset of Corona -19 pandemic data. That particularly focuses on the Country India. India being the Seventh largest Country of the world has a various number of states, wherein all these states have been affected in different numeric counts from the least as low as 2 in Chhattisgarh to the largest as high as 2300 in Maharashtra. We represent various insights from different angle and also we represent comparative study of various reading like total cases, total recovered, total deaths etc. Various graphs and charts have been plotted for better understanding of this huge complex data. This report can be helpful to understand the current situation and the expected results further, that can help in various major decision like to how long this pandemic is expected to stay? How long the lock down is planned or is expected? Which all states or territories can be reopened? And so on.

V. ACKNOWLEDGMENT

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