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Research On Covid-19 Data To Investigate The Future Prediction In Odisha

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Abstract

Research on covid-19 is a point of academic and medical interest now a days. The term covid or corona virus creates a havoc in the world since 2019 December, which was first occurred in China. So day by day, the number of the patients corresponding to the covid-19 disease increase in an exponential manner. Many machine learning models or many statistical models have been applied to create to find out the exact investigation with respect to the covid-19. The covid-19 is not a new type of disease. It has been realized since a few decades ago. However, the characteristics of covid-19 is completely different with respect to the current scenario for example the behaviour of the virus is called as the SARS-2 of covid-19 is a having a different behaviour with respect to the older one which an around the year 1980-1985. Nevertheless many researchers have been developed for different type of the mathematical models with respect to confirmed cases ,death cases and cured cases or with respect to the several parameters .We in this research have considered the data for a particular state Odisha with respect to January 2021 to March 2022.Taking the data from the validated website we use a machine learning model that is called as the polynomial regression model order is 7^{th} .We have considered it and then verified. Finally, developed mathematical model corresponding same as well as fetching the error analysis

1. Introduction

Corona virus widely known as COVID-19 are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)[1].

Figure1: SamplePicture of Corona Virus Image source: https://www.webmd.com/lung/news/20200124

The virus out-braked on Nov-2019 from Wuhan city of China. The virus affected south China for about a month and then it spread throughout the world making the path through Europe. The champion's league game between Atlanta and Valencia became the poison for spreading the virus in Europe as more than 80,000 spectators were in stadium. Till date, the virus had spread in about 235 territories affecting more than 55 million of population. Nepal also reported its first COVID-19 case on 23 January 2020 which today tallied to 208,299 cases [2-5]. The timely imposing of the lockdown controlled the chances of rapid incrementation of infected population till June. But with the foreign manpower being brought to home country and loosening of lockdown after July, the number of infected populations increased in the exponential way. The large number of people are being infected and killed on daily basis all over the world. And the data of death, infected and recovered cases are being provided on 2 different websites, Google, webpages etc. But these data are only limited to national and international level. Therefore, with the necessity to bring the data of local level with effective analysis, and to make a project work possible through virtual classes we the students of Geomatics engineering were assigned with project "Emergency Handling of COVID-19 in Home Districts[7-10]". We all were divided into different groups with 5 members from 5 different districts in each. Hence, with the guidelines of supervisors and strong group work, we have finally completed our engineering project. In India, the first case of 2019-nCoV was reported in Kerala in the last week of January 2020. Since then, about 1353 cases have been reported from 27 States and Union Territories. The State of Tamil Nadu has reported more than 300 cases and 110 samples were under investigation at the time of writing. In Kerala, about 290 people are infected while 120,000 others are under observation. The 2019 n-Cove poses a potential threat to children, families and communities at large. There are direct health implications of the virus infection itself, as well as the risk of secondary morbidity and mortality, inevitable disruption of basic services such as health, education and social protection programmers, and severe impact on the economy and livelihoods of the marginalized people. The total lockdown for 21 days announced by the Government of India had created fear, panic, anxiety and stress among children and parents[11-12]. In order to reduce the spread of infection, it is essential to provide correct information and dispel myths, misconceptions and misleading facts while encouraging social distancing, promoting personal and hand hygiene and prompting the seeking of treatment for flu-like symptoms. The media and other concerned agencies carry the important

responsibility of appropriate risk communication[13]. The media can play a significant role in raising awareness, dispelling myths and exposing misleading information, as well as in promoting kindness, preventing stigmatization and infusing confidence among the people by disseminating fair and accurate reports. It can also contribute to creating a positive atmosphere by putting out stories of effective coping and recovery. This handbook for journalists, brought out jointly by the UNICEF Office for Tamil Nadu & Kerala and the Press Institute of India, Chennai, is an attempt to empower journalists (editors and reporters) to help India beat COVID-19 through well-thought-out, researched, and responsible. India is among the most severely affected countries during the COVID-19 pandemic in the world and the worst affected in Asia considering the sheer number of cases. It is remarkable that India, being a developing country, despite its limited resources, has so far however, managed to have one of the lowest death rates at 2.8% as compared to 7% in the globe.3,4 It is imperative at this point to have a look at how the world's largest democracy approached the pandemic. Nations across the world have incorporated widespread containment activities, lockdown/ shut down and curfews in addition to massive awareness activities to curb the spread of COVID-19. The first country in the world to impose nationwide lockdown was Italy on 9th March 2020, when the confirmed cases crossed 4000 mark and deaths crossed 400. In contrast, India imposed a nationwide lockdown affecting the entire population of 1.3 billion people on 25th March 2020 when the total number of confirmed cases crossed 500 and deaths were at only twelve. India was appreciated in the international arena. for the response being described as 'timely, comprehensive and robust, far-sighted and courageous[14-15]. As a central government strategy, the entire nation wasdivided into three zones - green, orange and red - with differential prohibitions and relaxations: with the red zone having the strictest containment measures. This has seen to slow the growth rate of the pandemic from that of doubling every three days before the lockdown to doubling every six days by 6th April and doubling every twelve days by 25 April 2020.

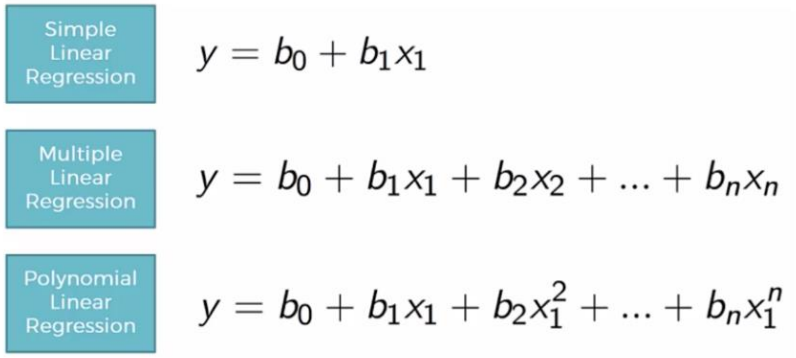
2. **Corona virus in Odisha:**

The first case of the COVID-19 pandemic was confirmed in the Indian state of Odisha on 16 March 2020. The state has confirmed 10,00,084 cases, including 9,497 active cases, 9,83,245 recoveries, and 7,289 deaths as of 21 August 2021[16]. To lay more emphasis on testing, Director of National Health Mission (NHM) in Odisha has proposed a strategy to let social welfare workers go door-to-door to test people for COVID-19 symptoms. The strategy is to be implemented in rural areas and slums of urban areas as well [17]. Due to COVID-19, economic activities in rural areas have been hit hard with rabi crops being completely ruined[18]. To revive the agricultural economy, a meeting was held in May 2020, chaired by Chief Minister. The State Government assured to increase the supply of fertilizers, seeds and other necessary agricultural machinery, and activities such as fish farming, poultry farming, horticulture, and dairy farming are reviving gradually[19]. Additionally, activities to introduce more labor-intensive programs in different sector have been initiated by Departments of Water Resources, Rural Development, Works and Forest and Environment. Other industries like IT and MSME sectors are also affected. With US and Europe suffering as well, very little projects are being renewed in IT industry and employees are being laid off.Since 92% of the state's total workforce is in unorganized sector (approx. 1.62 crore people), livelihood and employment have become extremely challenging[20]. One of the major revenue for Odisha comes from excise duty and with liquor shops being closed, a loss of around 1500 crore is to be expected.

Odisha prepared an online database of returning migrants since the first case was discovered in the state[21]. Due to this, the state government knew that approx 78,233 persons had returned from other states to Odisha on the day of the national lockdown, with district and panchayat specifically tallyed. The panchayat members encouraged the returning migrants to self-isolate themselves. In order to ensure their period of quarantine, the state announced a cash incentive of Rs. 15,000 to all those who completed self-isolation keeping the guidelines in mind and following the correct procedures issued by the government.

3. Simple math to understand Polynomial Regression

Here we are dealing with mathematics, rather than going deep, just understand the basic structure, we all know the equation of a linear equation will be a straight line, from that if we have many features then we opt for multiple regression just increasing features part alone, then how about polynomial, it's not about increasing but changing the structure to a quadratic equation, you can visually understand from the diagram,



Non-linear data in Polynomial Regression

We need to enhance the model's complexity to overcome under-fitting. In this sense, we need to make linear analyzes in a non-linear way, statistically by using Polynomial,

$$y = \theta_0 + \theta_1 x \longrightarrow \theta_0 + \theta_1 x + \theta_2 x^2$$

Because the weights associated with the features are still linear, this is still called a linear model. x2 (x square) is only a function. However, the curve we're trying to fit is quadratic in nature.

3. Result and Implementation

Implementation of this Particular reserach deals with the deployment of the machine learning model such as the polynomial machine learning modelto the Covid-19 data for confirm cases for Odisha 1st January 2021 to 29May 2022.Before going to the discuss the outcome of the results we have collected the data genuine website such that the number of confirm patients with respect to Covid positive with respect to date 1st January 2021 to 29 May 2022. All the data's we have indicated in the suitable manner in the table-1

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Date	Conf.	Date	Conf.	Date	Conf.	Date	Conf.
01-01-2021	1	31-01-2021	60	02-03-2021	611	01-04-2021	3723
02-01-2021	1	01-02-2021	60	03-03-2021	672	02-04-2021	3909
03-01-2021	1	02-02-2021	60	04-03-2021	737	03-04-2021	4055
04-01-2021	1	03-02-2021	60	05-03-2021	828	04-04-2021	4163
05-01-2021	2	04-02-2021	61	06-03-2021	876	05-04-2021	4338
06-01-2021	2	05-02-2021	68	07-03-2021	978	06-04-2021	4512
07-01-2021	2	06-02-2021	74	08-03-2021	1052	07-04-2021	4677
08-01-2021	2	07-02-2021	82	09-03-2021	1103	08-04-2021	4856
09-01-2021	2	08-02-2021	83	10-03-2021	1189	09-04-2021	5160
10-01-2021	2	09-02-2021	90	11-03-2021	1269	10-04-2021	5303
11-01-2021	2	10-02-2021	94	12-03-2021	1336	11-04-2021	5470
12-01-2021	2	11-02-2021	103	13-03-2021	1438	12-04-2021	5752
13-01-2021	3	12-02-2021	108	14-03-2021	1517	13-04-2021	5962
14-01-2021	3	13-02-2021	118	15-03-2021	1593	14-04-2021	6180
15-01-2021	3	14-02-2021	119	16-03-2021	1660	15-04-2021	6350
16-01-2021	3	15-02-2021	128	17-03-2021	1723	16-04-2021	6614

17-01-2021	4	16-02-2021	143	18-03-2021	1819	17-04-2021	6859
18-01-2021	4	17-02-2021	149	19-03-2021	1948	18-04-2021	7065
19-01-2021	5	18-02-2021	160	20-03-2021	2104	19-04-2021	7316
20-01-2021	5	19-02-2021	163	21-03-2021	2245	20-04-2021	7545
21-01-2021	20	20-02-2021	170	22-03-2021	2388	21-04-2021	8106
22-01-2021	21	21-02-2021	175	23-03-2021	2478	22-04-2021	8601
23-01-2021	42	22-02-2021	185	24-03-2021	2608	23-04-2021	9070
24-01-2021	42	23-02-2021	219	25-03-2021	2781	24-04-2021	9526
25-01-2021	42	24-02-2021	271	26-03-2021	2856	25-04-2021	10097
26-01-2021	44	25-02-2021	294	27-03-2021	2994	26-04-2021	10624
27-01-2021	48	26-02-2021	377	28-03-2021	3140	27-04-2021	11201
28-01-2021	54	27-02-2021	414	29-03-2021	3250	28-04-2021	11956
29-01-2021	54	28-02-2021	437	30-03-2021	3386	29-04-2021	12526

In the column-1, we have taken the date and in the column-2, we have taken the confirmed cases. Table-1 gives the information about the number of persons affected in corona virus with respect to date in Odisha state. The variation of number of people with respect to date in arbitrary.

To find out the prediction we use the polynomial mathematical regression and found that the curve using polynomial mathematical regression is almost same with black color and the green color shows the polynomial confirmation. Apart from this when we are going to develop a mathematical model, we use 7^{th} order polynomial in MATLAB. Our mathematics model is giving accuracy than others. So further also we have developed the mathematical model to determine the error. Which is shown on the variation through representation using the green color besides this we also found the error for this.

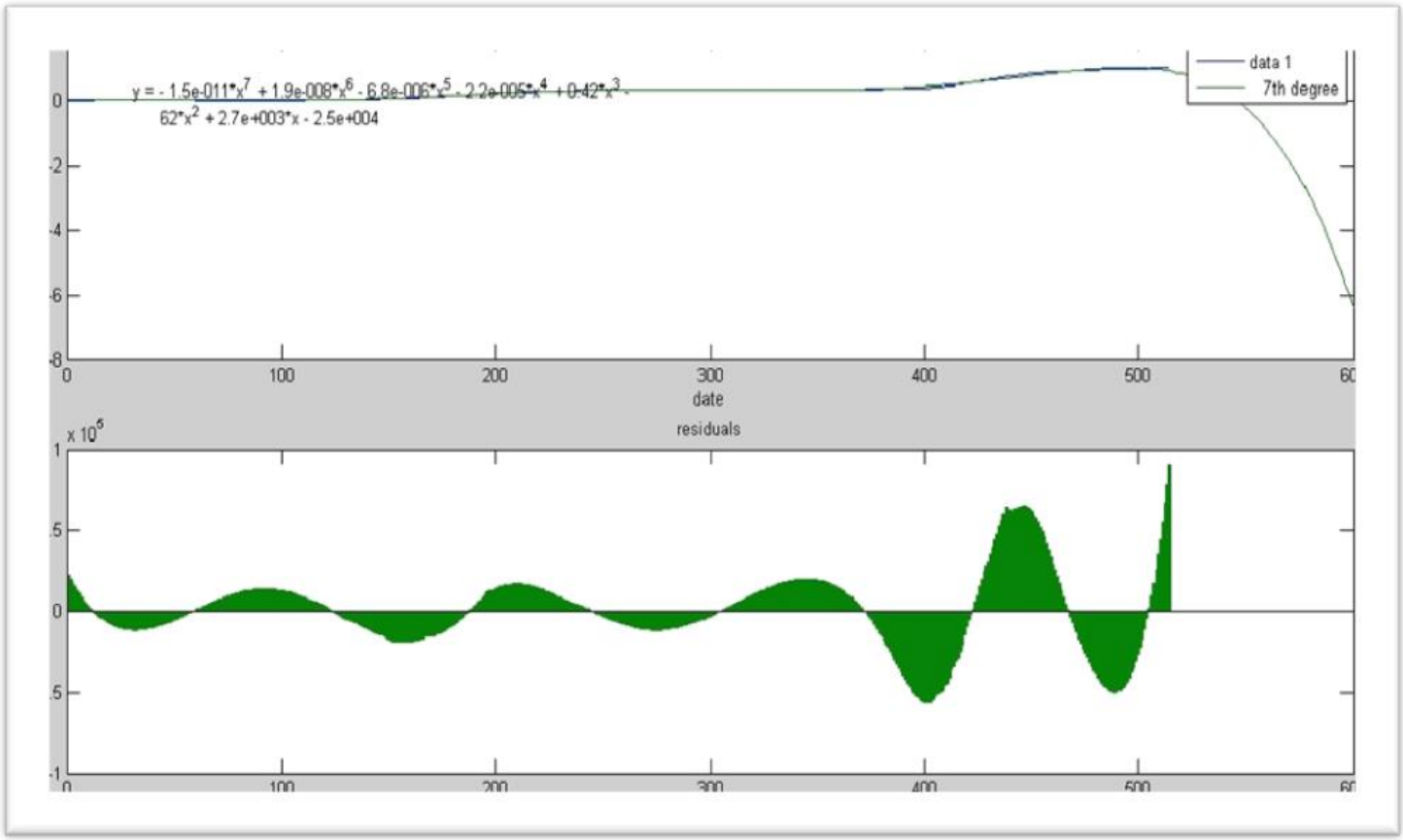

Figure 2; the variation of confirm cases with predication model (upper part) and residual / error part (lower part)

5. **Conclusions:**

In this research , polynomial regression is applied to investigate the predication model with respect to the conform cases . The seventh order mathematical equation predicts more accuracy as compared to an existing one. Moreover the error analysis is made through the graphical representation.

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