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Statistical analysis of deaths from COVID-19 in Hubei, China

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ABSTRACT

The aim was to find the trends in deaths caused by Coronavirus Disease 2019(COVID-19) in Hubei, China. Statistical analysis tools of data analysis were used to find the 5-day moving average, trendline, and regression analysis. Data was extrapolated and predicted for the next 3 days after 18th February 2020.

Keywords— Corona Virus (Covid-19)

1. INTRODUCTION

Corona virus disease 2019(COVID-19) was a corona virus chain originating in Wuhan, Hubei, China. Corona virus is a threat for all countries and threatens the lives of many people along with the economies of the world should it spread further having already infected more than 90000 people across the globe. In this research paper we found 5 day moving averages for the casualties caused by the virus along with the trend line for the expected casualties of the virus.

Table 1: Data

Day	Date	y(deaths)	5 Month Moving Average	x =day - 13.5	Trend Line
1	01/22/2020	0		-12.5	-275.275
2	01/23/2020	17		-11.5	-205.018
3	01/24/2020	24	33.8	-10.5	-134.76
4	01/25/2020	52	53.8	-9.5	-64.5022
5	01/26/2020	76	75.4	-8.5	5.755393
6	01/27/2020	100	103	-7.5	76.01302
7	01/28/2020	125	133.4	-6.5	146.2707
8	01/29/2020	162	168	-5.5	216.5283
9	01/30/2020	204	206.8	-4.5	286.7859
10	01/31/2020	249	251.8	-3.5	357.0435
11	02-01-2020	294	302.2	-2.5	427.3012
12	02-02-2020	350	357.2	-1.5	497.5588
13	02-04-2020	414	403.2	-0.5	567.8164
14	02-04-2020	479	468	0.5	638.0741
15	02-05-2020	479	521.6	1.5	708.3317
16	02-06-2020	618	594.8	2.5	778.5893
17	02-07-2020	618	673.2	3.5	848.847
18	02-09-2020	780	772.2	4.5	919.1046
19	10-02-2020	871	862.2	5.5	989.3622
20	11-02-2020	974	1000.6	6.5	1059.62
21	12-02-2020	1068	1129.8	7.5	1129.877
22	13-02-2020	1310	1247	8.5	1200.135
23	14-02-2020	1426	1371.4	9.5	1270.393
24	15-02-2020	1457	1497	10.5	1340.65
25	16-02-2020	1596	1592.8	11.5	1410.908
26	17-02-2020	1696		12.5	1481.166
27	18-02-2020	1789		13.5	1551.423
28	forecast			14.5	1621.681
29				15.5	1691.939
30				16.5	1762.196

Source: <https://www.kaggle.com/sudalairajkumar/novel-corona-virus-2019-dataset/kernels>

2. ANALYSIS

2.1 Moving Averages

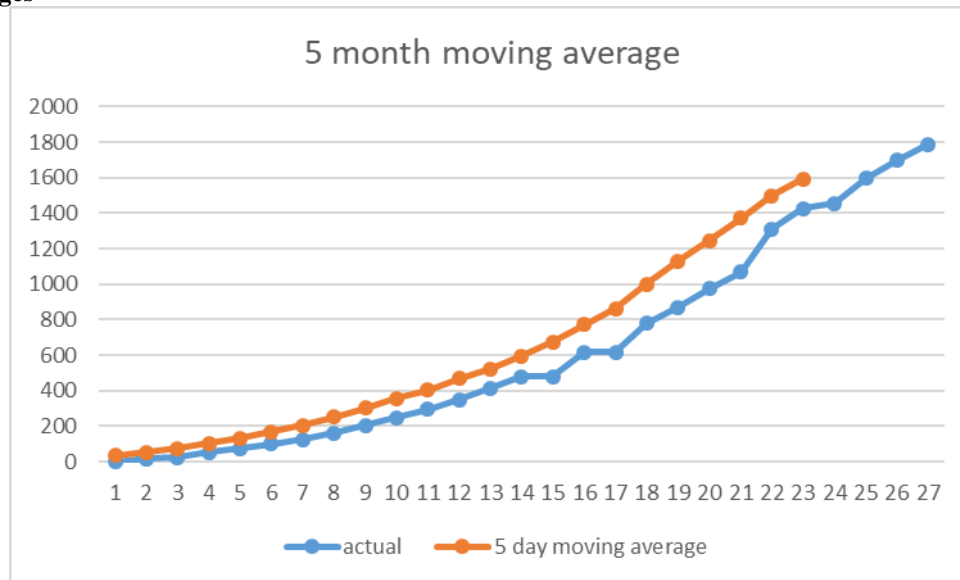


Fig. 1: 5 Month moving average

The graph above indicates the averages of 5 days of deaths caused by COVID-19 in Hubei from 22nd January to 18th February . In this graph we see the trend is rapidly increasing every day and has not declined and thus we do not expect any decline in this trend. The rate of dates increased after the 16th day.

2.2 Trend Lines

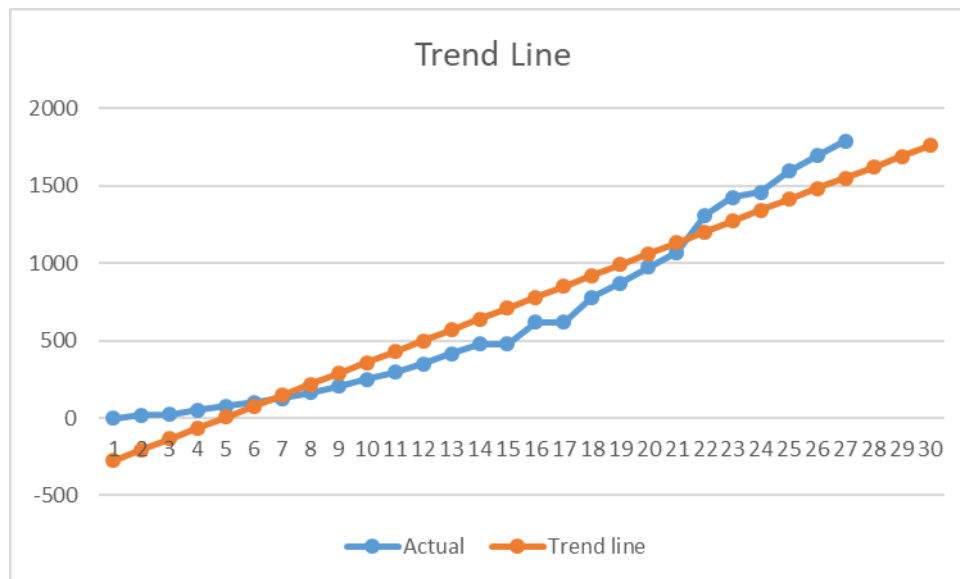


Fig. 2: Trend Line

“A trend line is a line drawn over pivot highs or under pivot lows to show the prevailing direction of price. Trend lines are a visual representation of support and resistance in any time frame. They show direction and speed of price, and also describe patterns during periods of price contraction.”

-investopidea.com

According to this trend line we see that the casualties are expected to reach 1,762 by 30th march in the long term it shows a constant increase although in reality it might be faster due to the manner in which the disease spreads and external factors like how many countries are exposed to it.

Regression Statistics	
Multiple R	0.962479
R Square	0.926366
Adjusted R Square	0.923421
Standard Error	160.335
Observations	27

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	8085389	8085389	314.5169	1.13E-15
Residual	25	642683.1	25707.33		
Total	26	8728072			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	602.9453	30.92001	19.50017	1.23E-16	539.2643	666.6262	539.2643	666.6262
X Variable 1	70.25763	3.961608	17.73462	1.13E-15	62.09855	78.41672	62.09855	78.41672

3. CONCLUSION

To conclude the research found the moving average of deaths in hubei(china) for COVID-19 from 22nd January to 18th February. It shows the rate at which deaths have been increasing and has caused a panic due to the current trend.

4. REFERENCES

[1] <https://www.kaggle.com/sudalairajkumar/novel-corona-virus-2019-dataset/kernels>