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Visualization & Prediction of COVID-19 Future Outbreak by Using Machine Learning

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Abstract*:* Day by day, the accumulative incidence of COVID-19 is rapidly increasing. After the spread of the Corona epidemic and the death of more than a million people around the world countries, scientists and researchers have tended to conduct research and take advantage of modern technologies to learn machine to help the world to get rid of the Coronavirus (COVID-19) epidemic. To track and predict the disease Machine Learning (ML) can be deployed very effectively. ML techniques have been anticipated in areas that need to identify dangerous negative factors and define their priorities. The significance of a proposed system is to find the predict the number of people infected with COVID-19 using ML. Four standard models anticipate COVID-19 prediction, which are Neural Network (NN), Support Vector Machines (SVM), Bayesian Network (BN) and Polynomial Regression (PR). The data utilized to test these models' content of number of deaths, newly infected cases, and recoveries in the next 20 days. Five measures parameters were used to evaluate the performance of each model, namely root mean squared error (RMSE), mean squared error (MAE), mean absolute error (MSE), Explained Variance score and r2 score (R^2). The significance and value of proposed system auspicious mechanism to anticipate these models for the current scenario of the COVID-19 epidemic. The results showed NN outperformed the other models, while in the available dataset the SVM performs poorly in all the prediction. Reference to our results showed that injuries will increase slightly in the coming days. Also, we find that the results give rise to hope due to the low death rate. For future perspective, case explanation and data amalgamation must be kept up persistently.

Index Terms: COVID-19, Deep Neural Network, Support Vector Machines, Bayesian Network, Polynomial Regression Pandemic.

1. Introduction

There are many epidemics that have invaded humanity throughout history. In December 2019, a disease appeared in Wuhan, China, this disease spread very quickly around the world and countries could not control it, prompting the World Health Organization in March 2020 to declare the COVID-19 epidemic is a global pandemic [1]. The new COVID-19 fulminate in more than 186 countries infecting cases 34.2 million individuals and causing 1.02 million deaths by OCT 02, 2020. COVID 19 causes many effects on the human body, such as influenza symptoms, failure in many organs, and acute respiratory syndrome, which may eventually lead to the death of people, especially the elderly and Patient with chronic diseases [2].

ML has imposed itself as a science capable of solving very complex real-world problems of past years. Machine learning and artificial intelligence have been used in most areas of life such as medicine [3], autonomous cars, robotics, weather forecasting [4], image processing, natural language, [5], UAV,.. etc. [6]. ML algorithms surpass traditional algorithms in that they use the method of learning from experiences and correcting errors based on these experiences as a human being. Prediction is one of the most important areas of ML. ML has been used to predict diseases.

The major objectives of this research to contribute to getting rid of the virus and help save humanity. We will develop a predictive model that predicts the spread of the Coronavirus using ML. Our methodology consider three cases predicted within the next 20 days, the number of confirmed, deaths, and recovery cases. The ML algorithms used are NN, SVM, Bayesian Network, PR [7, 8]. The ML models used in this study are trained using a set of statistical data for daily cases of COVID-19 patients provided by a which are continuously updated. This data is processed and divided into a training data set (85%) and a test data set (15%).

In the absence of any medical advices, the only solution to stop the spread by training social distancing and cleanliness. This up normal of behavior of COVID-19 requires evolving method for tracking its prevalence and automation of the tracking tools for dynamic decision making.

We know that the ML can be utilized to handle large data and intelligently predict the next step of any model such as spreading any dangers disease. The Motivation and our contributions of this paper has findings the prediction model using ML algorithms can be profitable for decision-makers to restrain COVID-19 pandemics. This manuscript, provide a prediction model deployed using for precise prediction of the number of COVID-19 cases: confirmed, deaths and recoveries in near future. Furthermore, provide a detailed of model comparison based on MSE, RMSE, MAE and R^2 parameters. Finally, we summarize this work and present various research directions.

2. Related Work

There are many studies conducted to predict future diseases using regression and artificial intelligence networks. ML techniques have been used to predict chronic diseases [9], diabetes [10], heart disease [11], Breast Cancer [12] and other diseases to help the doctor make the right decision.

COVID 19 spreads very quickly between people, through air or physical contact, or by touching surfaces contaminated with the virus, so it poses a great danger to humanity [13, 14]. Doctors, scientists, and researchers in various parts of the world are making efforts to provide the appropriate treatment and vaccine to get rid of COVID-19. Unfortunately, now there is no suitable vaccine for this disease. Limiting the spread of the virus in the coming days is very important, and therefore the governments of the world have taken strict measures such as closing airports and imposing a complete or partial ban. Technology helps limit the spread of the virus by predicting new cases [15]. ML algorithms are evaluated with the following measures parameters MSE, RMSE, MAE and R^2 [16].

3. Materials and Methods

ML and Data Science community are hardly work to improve the estimates of epidemiological models and analyze the generation information. This article proposes a ML model that can be run continuously on **Python** platform to obtain the most accurate result of the development of the spread of the epidemic and to develop a strategy to avoid the spreading by the government and the citizen. Prediction of COVID-19 using ML in Python language is a technique implemented with the help of processing tool following:

- **Jupyter** Notebook environment: It is used to generate a single web document by merging executable code, text, formulas into. This is useful for many purposes such as debug, and so forth.
- library ***NumPy***: Foundation library used for scientific computing in Python since. It offers data structures and high-performing purposes. It defines a precise data structure that is an N-dimensional array defined as ndarray. This library utilized in this article for element-*wise computation and Reading-writing datasets.*
- ***Pandas***: this package is core of data analysis in Python and provides complex data structures to make the work easy, fast, and effective. Its work with NumPy library to manipulation of data in spreadsheets or in relational databases (SQL databases).
- ***Matplotlib***: it used to generate the plots and other data visualizations in 2D.

Data Set: In this paper, COVID-19 dispersal predicts in the future using ML algorithms to taking into consideration the number of confirmed cases, recoveries and deaths. The ML models were constructed using the datasets from the GitHub repository provided by the Center for Systems Science and Engineering, Johns Hopkins University [17]. Datasets are included in the folder on the GitHub under the name (csse_covid_19_time_series). These Dataset files consist of daily time series tables, inclusive the number of recoveries cases, deaths cases, and confirmed cases. All data are from the daily case report and the update frequency of data is one day. Table 1, Table 2 and Table 3 are displayed the country, latitude, longitude and interval range (1/22/2020 to 04/10/2020) for recovery, death and new confirmed, respectively. The selection of MATERIALS AND METHODS facilitates to achieve research objectives was the assistance of experts in the field of ML and scientific papers.

Table 1. Sample data of new recovery cases worldwide

	COUNTRY/ REGION	LAT	LONG	1/22/2 020	1/23/ 2020	...	9/30/ 2020	10/1/ 2020	10/2/ 2020	10/3/ 2020	10/4/ 2020
0	Afghanistan	33.93911	67.709953	0	0	...	32789	32842	32842	32842	32852
1	Albania	41.1533	20.1683	0	0	...	7847	8077	8342	8536	8675
2	Algeria	28.0339	1.6596	0	0	...	36174	36282	36385	36482	36578
3	Andorra	42.5063	1.5218	0	0	...	1432	1432	1540	1540	1540
4	Angola	-11.2027	17.8739	0	0	...	1941	2082	2215	2436	2577

Table 2. Sample data of New death cases in worldwide

	COUNTRY /REGION	LAT	LONG	1/22/2 020	1/23/2 020	...	9/30/ 2020	10/1/ 2020	10/2/ 2020	10/3/ 2020	10/4/ 2020
0	Afghanistan	33.93911	67.70995	0	0	...	1458	1458	1458	1462	1462
1	Albania	41.1533	20.1683	0	0	...	387	388	389	392	396
2	Algeria	28.0339	1.6596	0	0	...	1736	1741	1749	1756	1760
3	Andorra	42.5063	1.5218	0	0	...	53	53	53	53	53
4	Angola	-11.2027	17.8739	0	0	...	183	185	189	193	195

Table 3. Sample data of New Confirmed Cases in Worldwide

	COUNTRY /REGION	LAT	LONG	1/22/ 2020	...	9/30 /2020	10/1 /2020	10/2 /2020	10/3 /2020	10/4 /2020
0	Afghanistan	33.93911	67.709953	0	...	39268	39285	39290	39297	39341
1	Albania	41.1533	20.1683	0	...	13649	13806	13965	14117	14266
2	Algeria	28.0339	1.6596	0	...	51530	51690	51847	51995	52136
3	Andorra	42.5063	1.5218	0	...	2050	2050	2110	2110	2110
4	Angola	-11.2027	17.8739	0	...	4972	5114	5211	5370	5402

ML PREDICTION MODEL:

Four regression models have been used to predict the COVID-19: NN, SVM, BR and PR. In this paper, to denote the NN we used the ML Perceptron regressor (MLP) [18]. MLP model using LBFGS or stochastic gradient descent to optimizes the squared-loss. MLP regressor trains iteratively since at each time step the partial derivatives of the loss function with respect to the model parameters are computed to update the parameters. To update the parameters of MLP always use concept of iterative to obtain the partial derivatives of the loss function with respect to parameters of the model to compute the new value of parameters [19-22]. In our model, we used parameters as follow:

a) *in case of recoveries*

alpha=0.0001, hidden layer sizes= (30, 30), random state=35, learning rate='constant, solver='lbfgs', activation='relu'.

b) *in case of confirmed*

alpha=0.001, hidden layer sizes= (100, 60), random state=25, learning rate='constant, solver='lbfgs', activation='relu'.

c) *in case of deaths*

alpha=0.001, hidden layer sizes= (500, 120), random state=25, learning rate='constant, solver= 'adaptive', activation='relu'.

Secondly, SVM [23] use a mechanism called kernels. This mechanism converts the input data into the required output. SVM solves the regression problems using a linear function but in our case we map the input (x) to a feature space (z) (i.e, n-dimensional space) because our it has non-linearity behavior. In this paper, we used parameter as follow:

a) *in case of recoveries*

shrinking=True,kernel='poly',gamma=0.01,epsilon=1,degree=4, C=1

b) *in case of confirmed*

(shrinking=False,kernel='poly',gamma=0.01,epsilon=0.01,degree=3, C=0.1)

c) *in case of deaths*

(shrinking=True,kernel='poly',gamma=0.1,epsilon=0.01,degree=2, C=0.01)

Thirdly, the utilization of ***Bayesian*** inference [24] was used to construct the models where the update of the parameters using Sparse Bayesian Learning and the Relevance Vector Machine [25]. When talking about hierarchical data structure the Bayesian modeling framework has been praised for its capability to deal with it [26].

Furthermore, ***Polynomial Regression*** is a form of regression analysis in which the relationship between the independent variable (x) and the dependent variable (y) are modeled as (n^{th}) degree polynomial in (x).

4. Methodology

The study is aimed to finding a new way to limit the spread of the Coronavirus due to the threat to human life. It causes the death rate is increasing day by day throughout the globe. To add to this pandemic situation control, this study effort to achieve number of confirmed cases, recoveries and deaths in the upcoming 20 days. In the study, the dataset used holds regular time series, containing the number of confirmed cases, deaths, and recoveries in the past number of days from which the pandemic started until 4 October 2020.

We will predict the number of confirmed cases, recoveries and deaths. The first step is to process the data. In next step, the dataset (259) split into two subsets: a training set (220 days) and testing set (39 days). The ML models used in this paper are NN, SVM, BR and PR. These models trained on the days confirmed cases, recovery, and death patterns. The evaluating matrix consist of number of parameters such as MSE, RMSE, and MAE and R^2. The proposed approach used in this article has been illustrated in Fig. 1 block diagram.

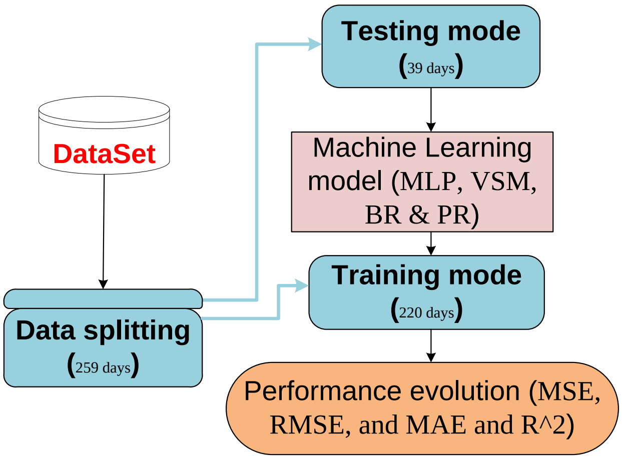

Fig.1. proposed approach

A. Covid 19 Data Visualization

All data until 4 October 2020 has been used to generate the prediction results as in Fig. 2,3,4 and 5 where the log figures are shown from Fig. 6 to Fig. 9. The world daily cases presented from Fig. 10 to Fig. 12.

The figures displayed the data on moving average for 10 days which can be calculate at time period (t) as in equation:

$$\frac{\left(x_t + x_{t-1} + x_{t-2} + .. + x_{M-(t-1)}\right)}{M} \tag{1}$$

where (M) represents the sliding window, it depends on the amount of smoothing desired since increasing the value of (M) improves the smoothing at the expense of accuracy.

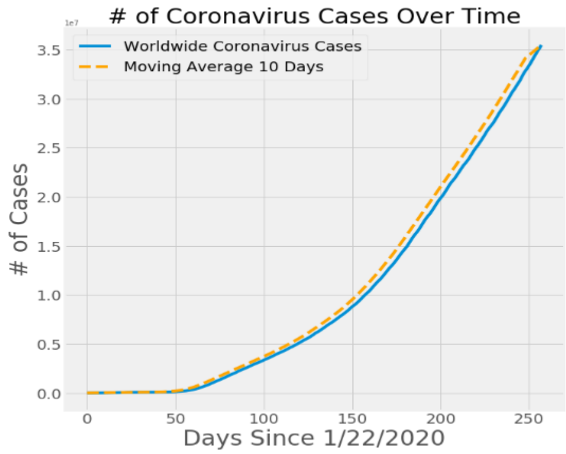

Fig.2. number of confirmed cases in worldwide

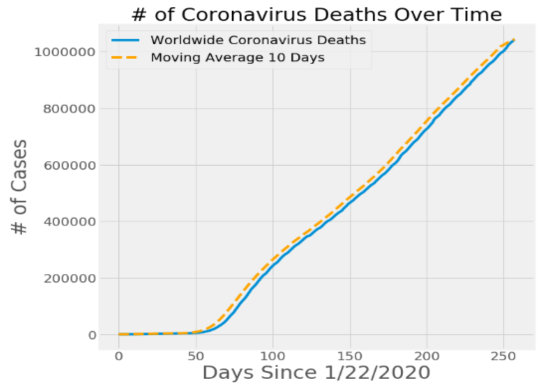

Fig.3. number of deaths cases in worldwide

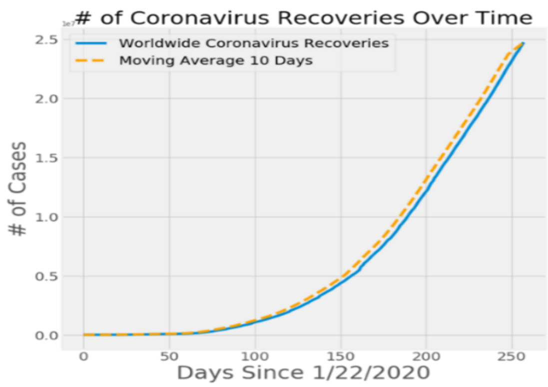

Fig.4. number of recoveries cases in worldwide

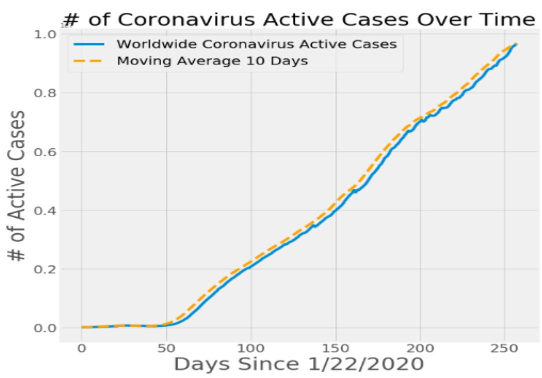

Fig.5. number of active cases in worldwide

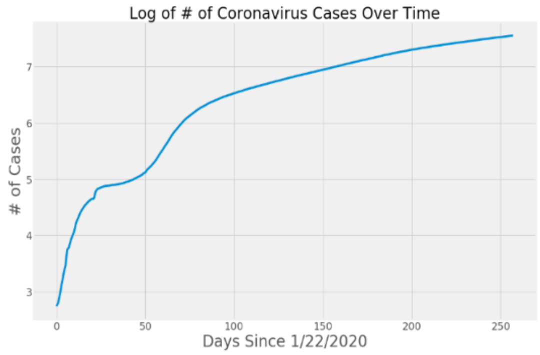

Fig.6. log of COVID 19 cases in worldwide

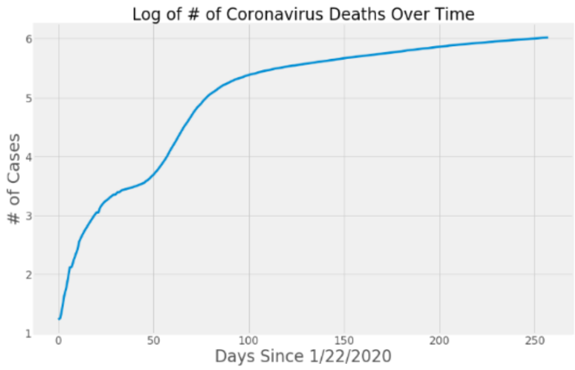

Fig.7. log of deaths cases in worldwide

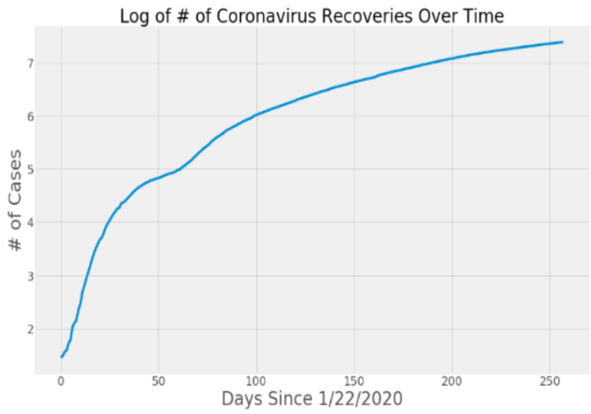

Fig.8. log of recoveries cases in worldwide

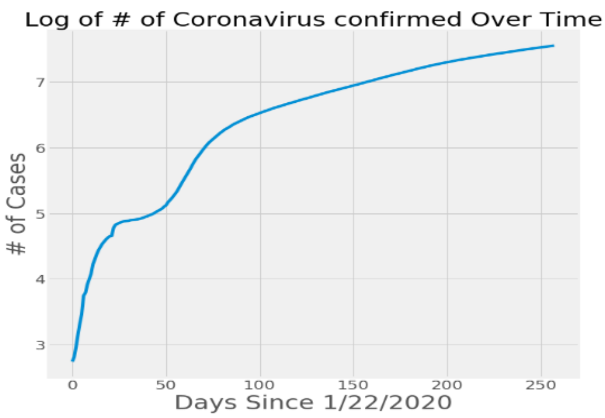

Fig.9. log of confirmed cases in worldwide

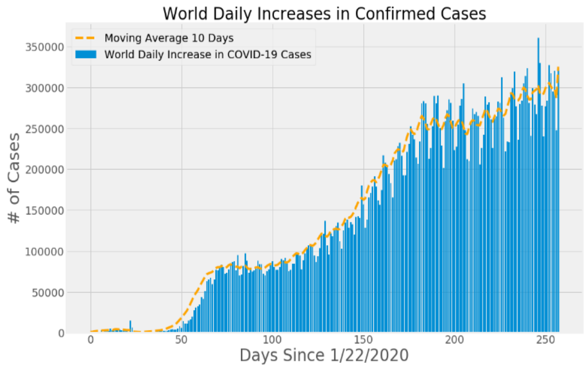

Fig.10. word daily increases in confirmed cases

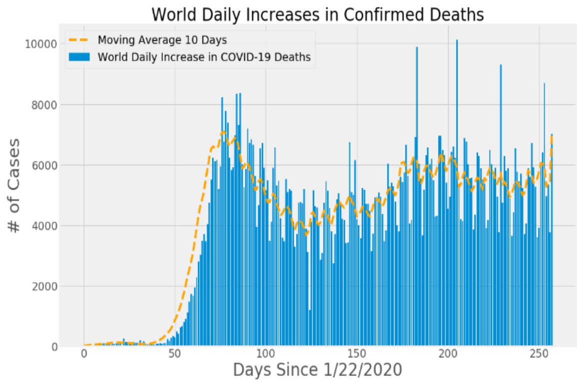

Fig.11. word daily increases in confirmed deaths cases

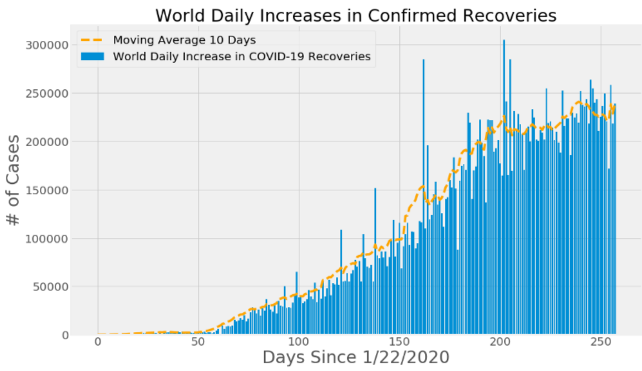

Fig.12. word daily increases in confirmed recoveries cases

5. Results and Discussion:

The number of people infected with COVID-19 is unknown in the world. In this paper, we are trying to know the numbers of infected cases and death cases, in addition to the cases of recovery affected by COVID 19 in the next 20 days. Four machine learning models MLP, PR, SVM, and BR have been used to forecast the number of confirmed cases, the deaths, and recoveries. Four measures have been used to evaluate the four algorithms and choose the best algorithm that predicts the number of COVID 19 cases.

5.1. Prediction of New Confirmed Cases

In the following, figures are presented the performance graphs of SVM, PR, MLP, BR and linear regression models respectively. All Graphs in all figures predict that the new confirmed case will increase in upcoming days which is a not good sign expect, the results of MLP give us the *hopefulness*. We can observe clearly from Fig. 18, the MLP curve (B), outperform other algorithms as in curve (A).

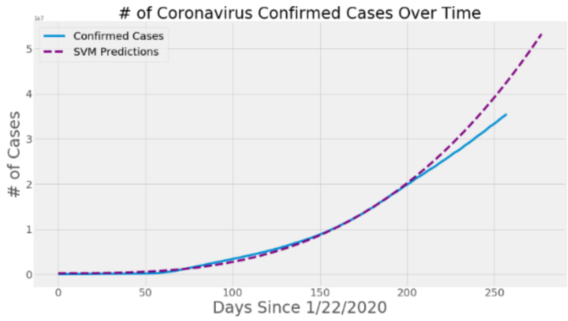

Fig.13. SVM prediction for the upcoming 20 days (New confirm cases).

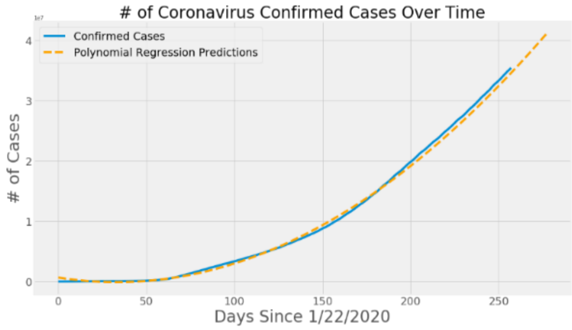

Fig.14. PR prediction by for the upcoming 20 days (New confirm cases).

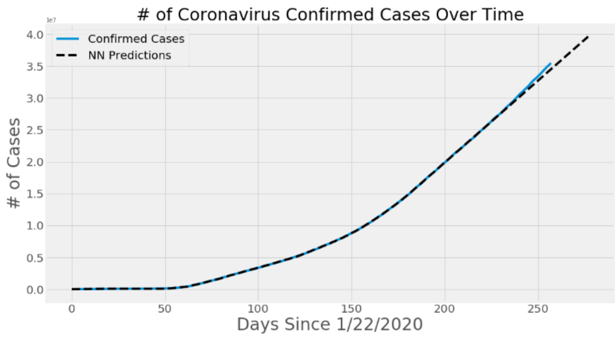

Fig.15. NN (i.e. MLP) prediction for the upcoming 20 days (New confirm cases).

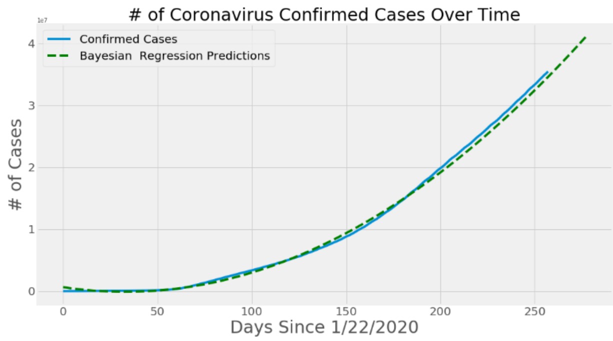

Fig.16. B. R. prediction for the upcoming 20 days (New confirm cases).

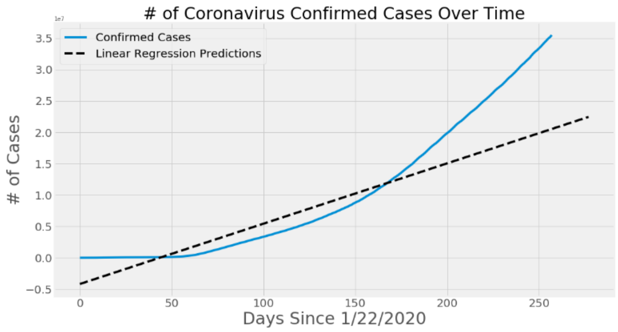

Fig.17. L.R prediction for the upcoming 20 days (New confirm cases)

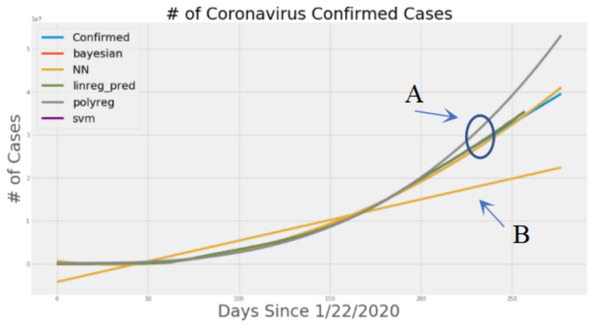

Fig.18. Prediction algorithm for the upcoming 20 days (New confirm cases).

The algorithm NN (i.e. MLP) achieved the best prediction performance for new cases as in curve (B) in Fig. 18. While the algorithm SVM was performing poorly. The performance of the algorithms PR and BR was good and comparable in performance. As for the linear algorithms, they were not able to predict the states and the values were very far from reality. The study performs predictions on confirmed case and according to results MLP performs better among all the models, while PR and BR perform equally well and achieve almost the same R^2 as shown in Table 4. The predicted number of confirmed cases over the worldwide are list in Table 5.

Table 4. Evaluate Metrics to Confirmed Cases Prediction

	SVM	PR	BR	NN (i.e. MLP)
MAE	3350432.468	888352.8451	906398.9479	268264.6905
MSE	14851309552451.30	7.90834E+11	8.23477E+11	1.62164E+11
R^2	0.593436004	0.953576088	0.951513218	0.989086182
Explained Variance	0.900738369	0.999902393	0.999887051	0.993298691
RMSE	1830.418659	942.5247186	952.0498663	517.9427483

Predicted # of Confirmed Cases Worldwide

Table 5. Predicted of Confirmed Cases Worldwide

	Date	Polynomial Predicted # of Confirmed Cases Worldwide	SVM Predicted # of Confirmed Cases Worldwide	Bayesian Predicted # of Confirmed Cases Worldwide	NN (i.e. MLP) # of Confirmed Cases Worldwide
0	10/6/2020	34925200	43049834	34895230	34755613
1	10/7/2020	35237460	43549854	35206971	35012449
2	10/8/2020	35551106	44053750	35520094	35269286
3	10/9/2020	35866137	44561537	35834599	35526123
4	10/10/2020	36182555	45073230	36150485	35782960
5	10/11/2020	36500357	45588844	36467754	36039796
6	10/12/2020	36819546	46108393	36786404	36296633
7	10/13/2020	37140120	46631894	37106436	36553470
8	10/14/2020	37462080	47159361	37427850	36810307
9	10/15/2020	37785426	47690809	37750646	37067143
10	10/16/2020	38110157	48226252	38074824	37323980
11	10/17/2020	38436274	48765706	38400383	37580817
12	10/18/2020	38763776	49309186	38727325	37837269
13	10/19/2020	39092665	49856707	39055648	38091178
14	10/20/2020	39422938	50408283	39385353	38345087
15	10/21/2020	39754598	50963930	39716440	38598996
16	10/22/2020	40087643	51523663	40048908	38852905
17	10/23/2020	40422074	52087496	40382759	39106814
18	10/24/2020	40757891	52655445	40717991	39360724
19	10/25/2020	41095093	53227524	41054605	39614633

5.2. *Prediction of New Recoveries Cases*

The recovery cases of COVID-19 increase day by day, Graphs in figures 19, 20, 21, 22 and 23 are illustrates the predictions of learning models. Table 6 shows the estimating results to recovery cases of the models used in this study. Table 7 provides the predicted of recovered cases over the worldwide. We found that, the results also proved the superiority of MLP over the rest of the models, and both BR and PR were equal.

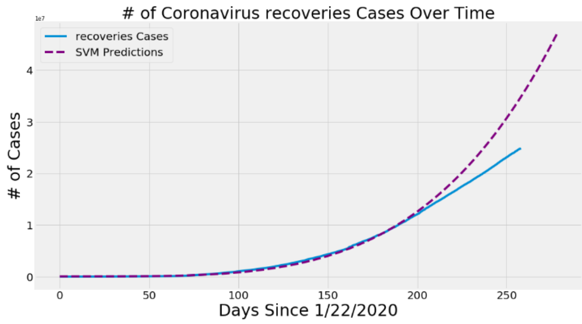

Fig.19. SVM prediction for the upcoming 20 days (New recoveries cases).

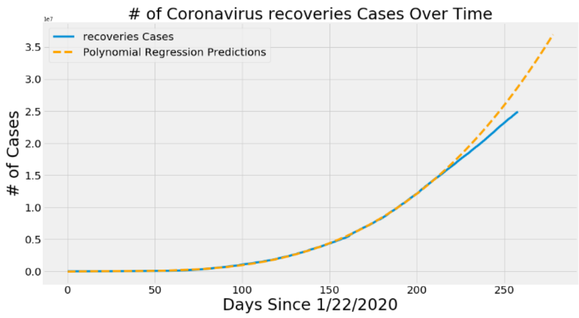

Fig.20. PR prediction for the upcoming 20 days (New recoveries cases)

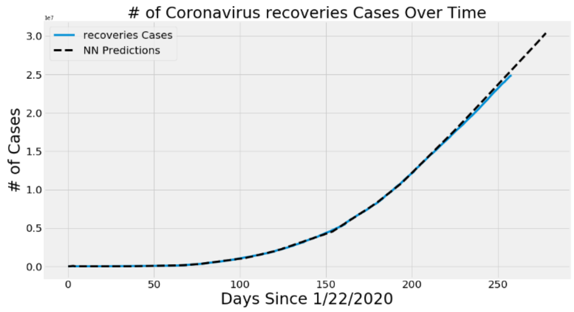

Fig.21. MLP prediction for the upcoming 20 days (New recoveries cases).

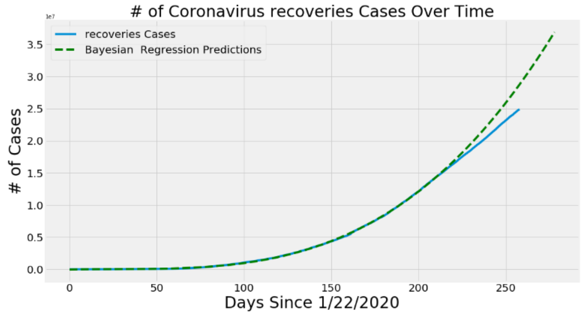

Fig.22. B.R. prediction for the upcoming 20 days (New recoveries cases).

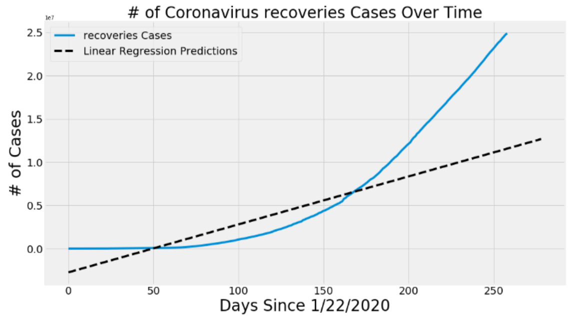

Fig.23. LR prediction by for the upcoming 20 days (New recoveries cases).

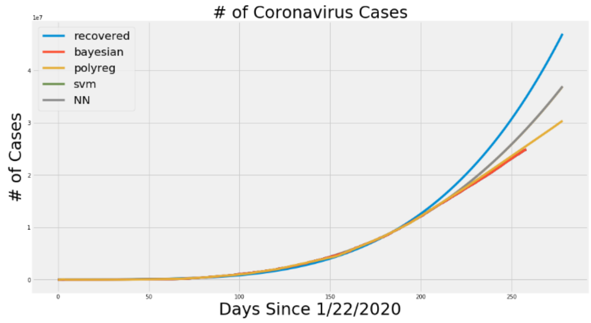

Fig.24 ML algorithm prediction by for the upcoming 20 days (New recoveries cases).

Table 6. Evaluate Metrics to recoveries Cases Prediction

	SVM	PR	BR	NN (i.e. MLP)
MAE	4271162.927	1318443.424	1261822.89	246086.8444
MSE	25161649191032.50	2.94424E+12	2.72036E+12	1.04288E+11
R^2	0.286567242	0.849124653	0.85858648	0.989356735
Explained Variance	0.803824055	0.937260783	0.939929732	0.995537118
RMSE	2066.679203	1148.234917	1123.308902	496.0714106

Predicted of recovered Cases Worldwide:

Table 7. Predicted of recovered Cases Worldwide

	Date	Polynomial Predicted # of recovered Cases Worldwide	SVM Predicted # of recovered Cases Worldwide	Bayesian Predicted # of recovered Cases Worldwide	Predicted # NN (i.e. MLP) of recovered Cases Worldwide
0	10/7/2020	29170602	35417364	29144438	25783933
1	10/8/2020	29549772	35966719	29522921	26022671
2	10/9/2020	29932228	36522449	29904679	26261409
3	10/10/2020	30317984	37084604	30289727	26500146
4	10/11/2020	30707055	37653233	30678078	26738884
5	10/12/2020	31099455	38228385	31069748	26977622
6	10/13/2020	31495198	38810110	31464749	27216360
7	10/14/2020	31894298	39398459	31863097	27455097
8	10/15/2020	32296769	39993480	32264805	27693835
9	10/16/2020	32702626	40595225	32669887	27932573
10	10/17/2020	33111883	41203743	33078359	28171310
11	10/18/2020	33524555	41819086	33490233	28410048
12	10/19/2020	33940654	42441304	33905523	28648786
13	10/20/2020	34360197	43070448	34324245	28889115
14	10/21/2020	34783196	43706570	34746413	29135897
15	10/22/2020	35209666	44349721	35172039	29382680
16	10/23/2020	35639621	44999952	35601140	29629462
17	10/24/2020	36073076	45657316	36033727	29876245
18	10/25/2020	36510044	46321863	36469817	30123027
19	10/26/2020	36950541	46993648	36909423	30369810

5.3. Prediction of New Deaths Cases

The performance of the NN (i.e. MLP), PR, SVM, and BR models are illustrated in Fig. 25, 26, 27, 28 and 29 respectively. All figures are predicting that the death rate will be growing in upcoming days, which are a very worrying marking. Through this sign, new precautionary precautions must be taken or an algorithm for life must be created in a different way in order to come with this virus. From Table 8 we can observe that the MLP outperform other approach in R^2 parameter. The Predicted of Deaths Cases Worldwide provide in Table 9.

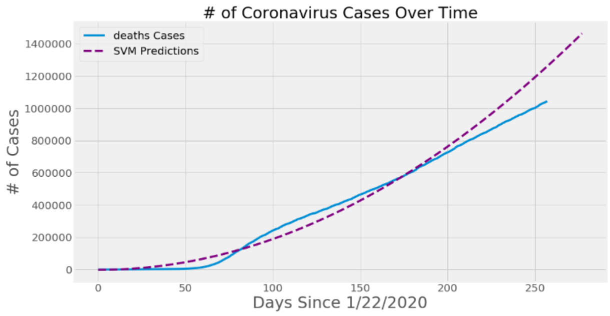

Fig.25. SVM prediction for the upcoming 20 days (New Deaths cases).

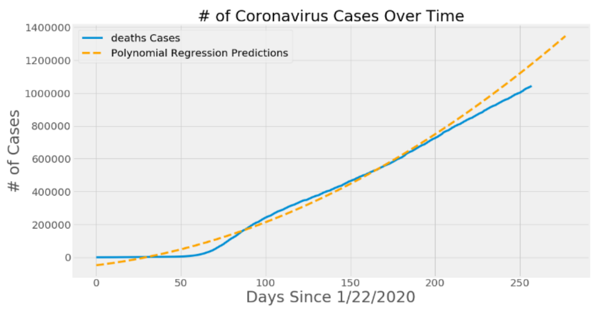

Fig..26. PR prediction for the upcoming 20 days (New Deaths cases).

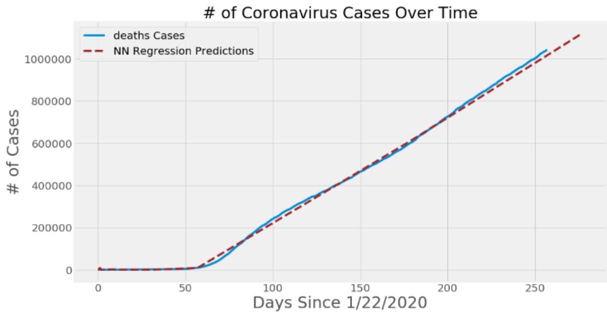

Fig.27. NN (i.e. MLP) prediction for the upcoming 20 days (New Deaths cases).

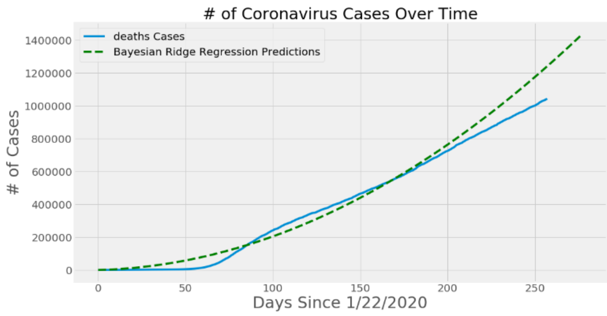

Fig.28. B.R. prediction for the upcoming 20 days (New Deaths cases).

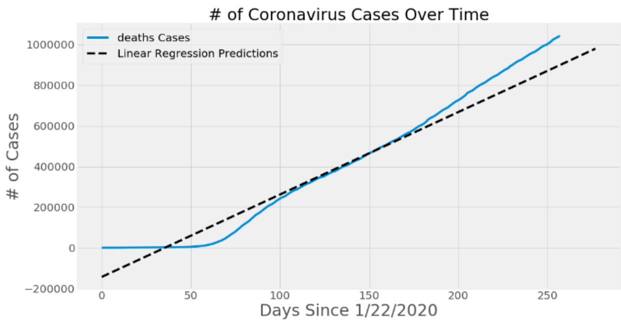

Fig.29. LR prediction for the upcoming 20 days (New Deaths cases).

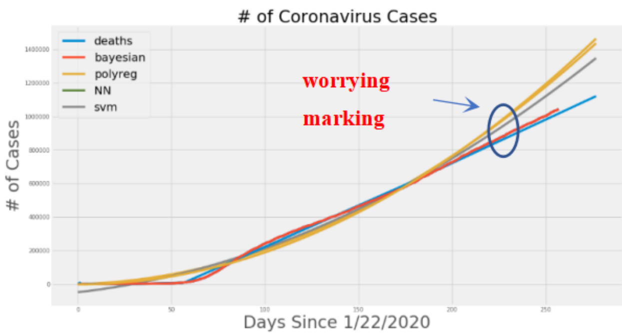

Fig.30. ML algorithm prediction for the upcoming 20 days (New Deaths cases).

Table 8. Evaluate Metrics to Deaths Cases Prediction

	SVM	PR	BR	NN (i.e. MLP)
MAE	55870.28183	56511.30021	112902.4181	19754.56174
MSE	4323906787.89	5930203438	14845929533	406564135.9
R^2	0.67934414	0.6711188	0.083891571	0.932880987
Explained Variance	0.910830061	0.839648927	0.870477134	0.997305522
RMSE	236.3689528	237.7210555	336.0095505	140.5509222

Predicted # of death Cases Worldwide

Table 9. Predicted of Deaths Cases Worldwide

	Date	Polynomial Predicted # of deaths Cases Worldwide	SVM Predicted # of deaths Cases Worldwide	Bayesian Predicted # of deaths Cases Worldwide	NN Predicted # of deaths Cases Worldwide
0	10/6/2020	1184576	1269107	1250318	1021946
1	10/7/2020	1192890	1278980	1259753	1027132
2	10/8/2020	1201231	1288890	1269224	1032318
3	10/9/2020	1209600	1298839	1278730	1037503
4	10/10/2020	1217996	1308825	1288272	1042689
5	10/11/2020	1226419	1318850	1297849	1047875
6	10/12/2020	1234870	1328914	1307462	1053060
7	10/13/2020	1243347	1339015	1317110	1058246
8	10/14/2020	1251853	1349155	1326794	1063432
9	10/15/2020	1260385	1359332	1336513	1068618
10	10/16/2020	1268945	1369548	1346267	1073803
11	10/17/2020	1277532	1379802	1356057	1078989
12	10/18/2020	1286146	1390095	1365882	1084175
13	10/19/2020	1294788	1400425	1375743	1089361
14	10/20/2020	1303457	1410794	1385639	1094546
15	10/21/2020	1312153	1421201	1395571	1099732
16	10/22/2020	1320877	1431646	1405538	1104918
17	10/23/2020	1329627	1442129	1415540	1110103
18	10/24/2020	1338406	1452651	1425578	1115289
19	10/25/2020	1347211	1463210	1435652	1120475

5.4. Impact of Model Performances with 20 Days Prediction Intervals

To ensure the accuracy and reliability of the results, our model predictions are very auspicious that show in Fig. 31, 32 and 33, because the models predict that in upcoming days' death rate will be increased and the scheme of mortality rate shows the same pattern. Furthermore, in recovery scenario models predict that recoveries rate will be also increase and in Fig. 32 the recovery scheme follows the same behavior which proves the model predictions correct.

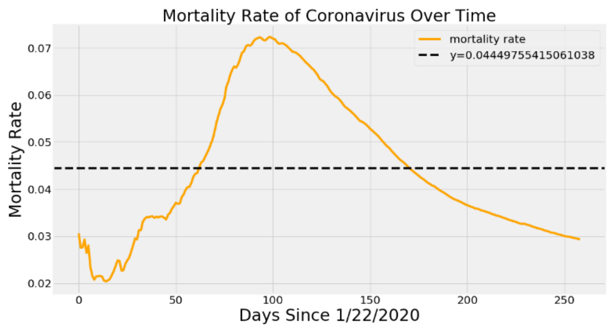

Fig.31. Mortality rate after 20 days of this paper prediction

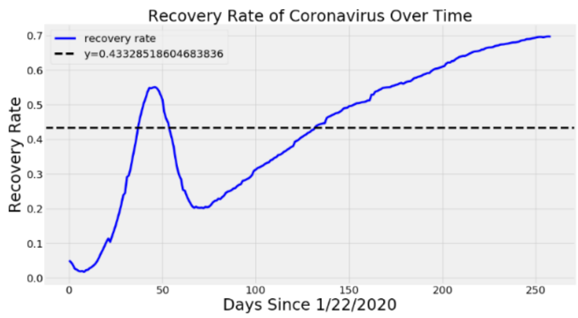

Fig..32. Recovery rate after 20 days of this paper prediction.

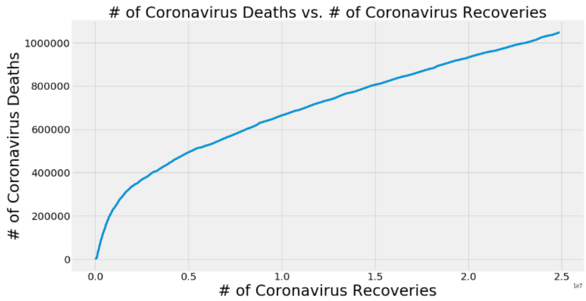

Fig.33. Ratio between recovery rate and death rate after 20 days of this paper prediction

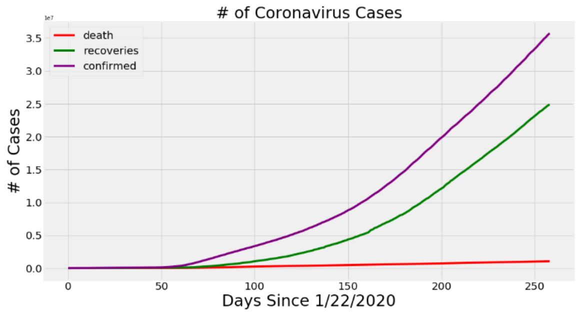

Fig..34. Comparison between death rate, recovery rate and confirm case rate after 5 days of this study prediction

In general, MPL performed best followed by VSM performed followed by PR and then BR and the death has lower values compare to new and recovery case. From Fig. 34, more stringent restrictions must be imposed by governments and the World Health Organization to limit the spread of the Coronavirus.

6. Conclusion

The Coronavirus has caused great economic losses resulting from the imposition of strict measures to confront this virus, including a complete or partial curfew, and the closure of airports and factories, as well as the virus, has caused great loss of life. Scientists and governments fear the second wave of this virus. In this paper, we are building a system to predict the spread of the Coronavirus in the world based on machine learning algorithms. Corona data provided by Johns Hopkins University have been analyzed and predict the spread of the Coronavirus in the coming days to help control this virus. The results showed that smart neural networks outperformed all other algorithms and achieved amazing results with a low error rate. The results showed that injuries will increase slightly in the coming days, and our result deploy the optimism because the deaths will increase. This study will benefit governments in understanding the general situation and taking appropriate measures. The results prove that MLP performs best in the current forecasting domain given the nature and size of the dataset. All algorithms also perform well for forecasting, to some extent, to predict the death rate as in Fig. 30 observe that the situation going to worry marking.

According to the results of all approach, the death rates will increase in upcoming days, and recoveries rate will be slowed down. The poor results clearly have been observed in SVM scenarios because of the ups and downs in the dataset values. This is due to the difficulty of establishing accurate patterns between the given values of the data set. Overall we conclude that model predictions according to the current scenario are correct which may be helpful to understand the upcoming situation.

It is clear that there is a visible effect to the whole world because the Corona virus does not spread to the same extent that it has spread in some countries, due to the exposure of those countries to ultraviolet rays with a value greater than 10 and I think there are other factors. Therefore, the study must be developed to include all natural factors such as relative humidity, solar ultra-violate (UV), erythema dose, UV aerosol index, day light and ozone thick layer.

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