









TABLE IV  
COMPARISON BETWEEN OFFICIAL RECORD (OR) AND PREDICTED VALUE (PV) FOR BANGLADESH.

Date	Total Confirmed Case			Total Deaths		
	OR	PV	Error	OR	PV	Error
9/25/2020	356767	359431	-0.74	5093	5105	-0.23
9/26/2020	357873	360829	-0.82	5129	5126	-0.05
9/27/2020	359148	361948	-0.77	5161	5162	-0.02
9/28/2020	360555	363237	-0.74	5193	5194	-0.02
9/29/2020	362043	364660	-0.72	5219	5226	-0.47
9/30/2020	363479	366164	-1.13	5251	5252	-0.02
10/1/2020	364987	367616	-0.72	5272	5284	-0.22
10/2/2020	366383	368512	-0.58	5305	5375	-1.32
10/3/2020	367565	368432	-0.24	5325	5388	-1.18
10/4/2020	368690	368543	0.04	5348	5369	-0.39

TABLE V  
COMPARISON BETWEEN OFFICIAL RECORD (OR) AND PREDICTED VALUE (PV) FOR INDIA

Date	Total Confirmed Case			Total Deaths		
	OR	PV	Error	OR	PV	Error
9/25	5901571	5945817	-0.74	93410	93817	-0.43
9/26	5990581	6033189	-0.71	94534	94927	-0.41
9/27	6073348	6124183	-0.83	95574	96067	-0.51
9/28	6143019	6208794	-1.07	96351	97123	-0.80
9/29	6223519	6280018	-0.91	97529	97911	-0.39
9/30	6310267	6362311	-0.82	98708	99107	-0.40
10/1	6391960	6450993	-0.92	99804	100304	-0.50
10/2	6471934	6534506	-0.96	100875	101416	-0.53
10/3	6547413	6616262	-1.05	101812	102503	-0.67
10/4	6622180	6693423	-1.07	102714	103454	-0.72

40 days which is compared with the official record shown in the figure. The figures show that our predictions are very close to the officially recorded data. In more observations, the Confirmed case prediction and dead prediction both are very good.

Figure 6(a) shows the number of patients infected with Covid-19 in India. Here we predict the data for the last 40 days which is compared with the official record which is shown in the figure. Figure 6 (b) shows the number of deaths of patients infected with Covid-19 in India. Here also we predict the data for the last 40 days which is compared with the official record shown in the figure. The figures show that our predictions are very close to the officially recorded data. In more observations, the Confirmed case prediction and dead prediction both are very good.

Table IV shows the prediction data and the official Record data in Bangladesh for September 25 to October 4 and the percentage errors are also shown. Here we see that the total Confirmed Case Prediction Error is around -0.65% and the total death prediction error is around -0.22%.

TABLE VI  
ALL PROPOSED MODELS' PERFORMANCE TO FORECAST THE TOTAL NUMBER OF CONFIRMED CASES

Model	RMSE	MAE	MAPE
ARIMA	115.5	102.5	4.88
AR	145.34	88.45	6.49
MA	88.95	79.34	7.45
LSTM	65.12	56.1	4.37

Table V shows the prediction data and the official Record data in India for September 25 to October 4 and the percentage errors are also shown. Here we see that the total Confirmed Case Prediction Error is around -0.80% and the total death prediction error is around -0.45%.

TableVI shows that LSTM achieve the lowest error rate among other models such as Autoregressive Moving Average(ARIMA), Autoregressive Model(AR), and Moving Average(MA). LSTM is very suitable for very short data. Recently LSTM and ensemble methods are used in short-term and long-term prediction respectively. LSTM can run on very low data and provide satisfactory accuracy. It is very efficient that's the main reason we believe. For evaluation, we use RMSE(Root Mean Square Error), MAE(Mean Absolute Error), and MAPE ( Mean Absolute Percentage Error). For calculating those values we use equations 10, 11, 12.

#### IV. CONCLUSION AND FUTURE WORK

According to a research report, [15], the effects of the Covid-19 epidemic are threatening to bring Bangladesh's poverty rate back to 15 years ago. In India, an estimated 140 million people lost their jobs during the lockdown [16], and many more lost their salaries. A prediction gives an estimation of the future. Predictions can be effective in helping to plan for future uncertain and potential developments. Our proposed LSTM method predicts covid-19 infection on a daily basis and total infection all over in two countries. The necessary steps for the coming days can be taken through these predicted values. Despite having a small dataset, the LSTM method is making accurate estimations. Proposed LSTM is also a handful for country-specific datasets and predictions.

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