

EVEREST ENGINEERING COLLEGE



A Presentation on

“Analyzing Univariate Time Series Machine Learning Algorithms/Models With Different Time Gap And Forecasting Average Surface Temperature of Kathmandu Valley”

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Introduction

- Univariate time series forecasting
- Studying of algorithms
- Comparing algorithms

AIM & OBJECTIVE

- To study and analyze the machine learning algorithms to predict the average surface temperature of Kathmandu valley

RELATED WORKS

- Use of the Autoregressive Integrated Moving Average (ARIMA) Model to research about climate change and rise in temperature in Dubigarh, a place in India.[\[1\]](#).
- Time Series Forecasting With ARIMA Model in Python for Temperature Prediction[\[2\]](#).
- Time Series Forecasting with ARIMA , SARIMA and SARIMAX[\[3\]](#).
- Time-series Forecasting in LSTM [\[4\]](#).

METHODOLOGY

- Working of ARIMA

$$\hat{y}_t = \underbrace{\mu}_{\text{Constant}} + \underbrace{\phi_1 y_{t-1} + \dots + \phi_p y_{t-p}}_{\text{AR terms (lagged values of } y)} - \underbrace{\theta_1 e_{t-1} \dots - \theta_q e_{t-q}}_{\text{MA terms (lagged errors)}}$$

θ = moving average parameters of order q ,

Φ = autoregressive parameters of order p ,

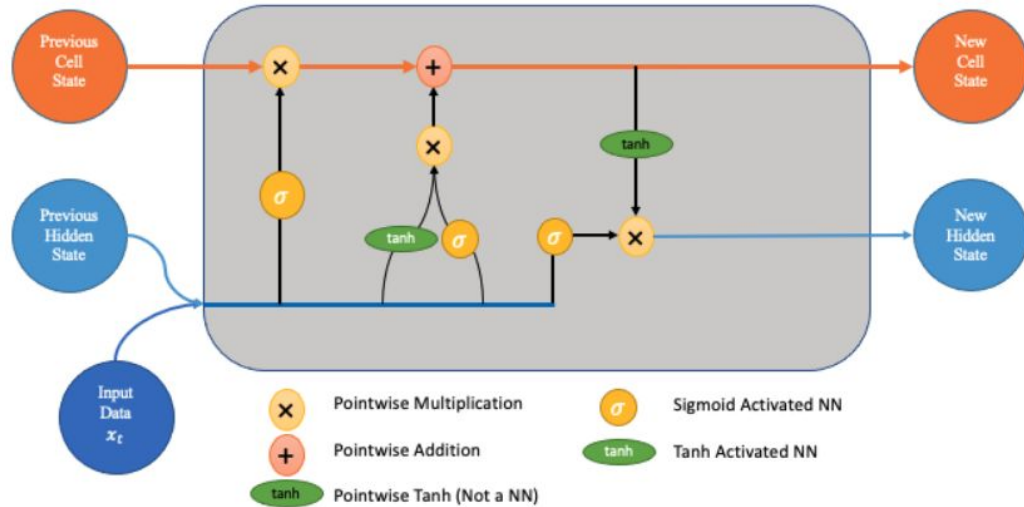
\hat{y}_t = prediction estimates at time t ,

y_{t-p} = lagged values of y , and

e = error term.

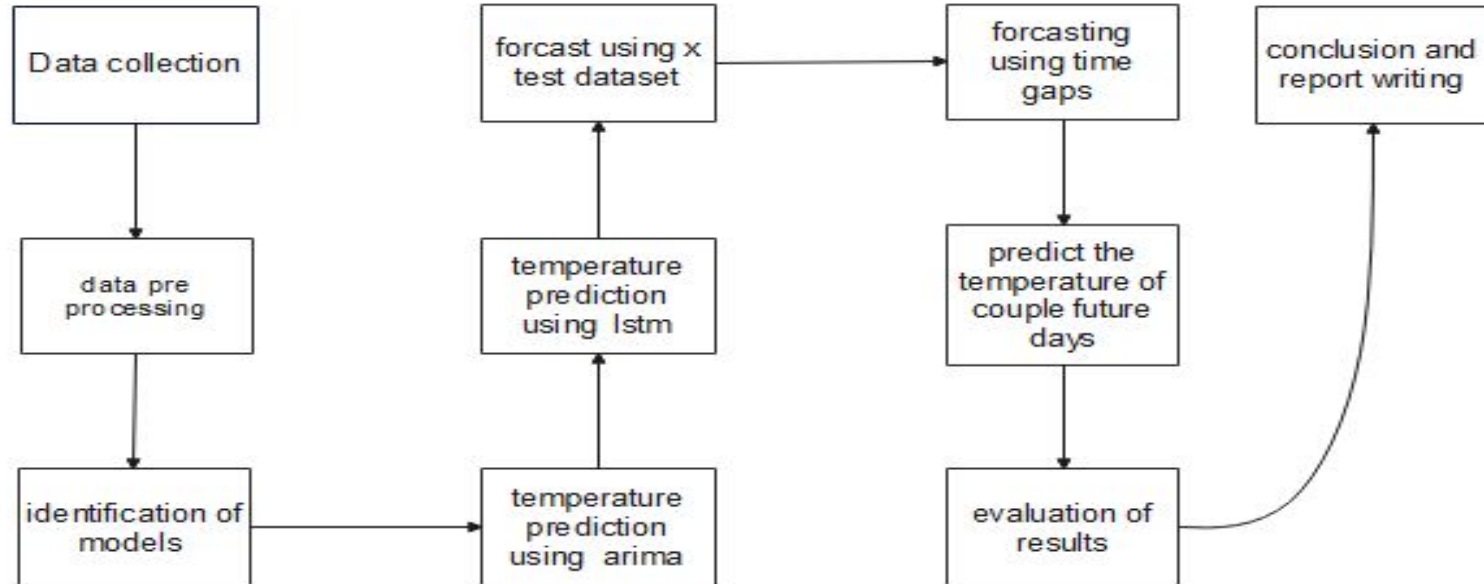
METHODOLOGY

Working of LSTM



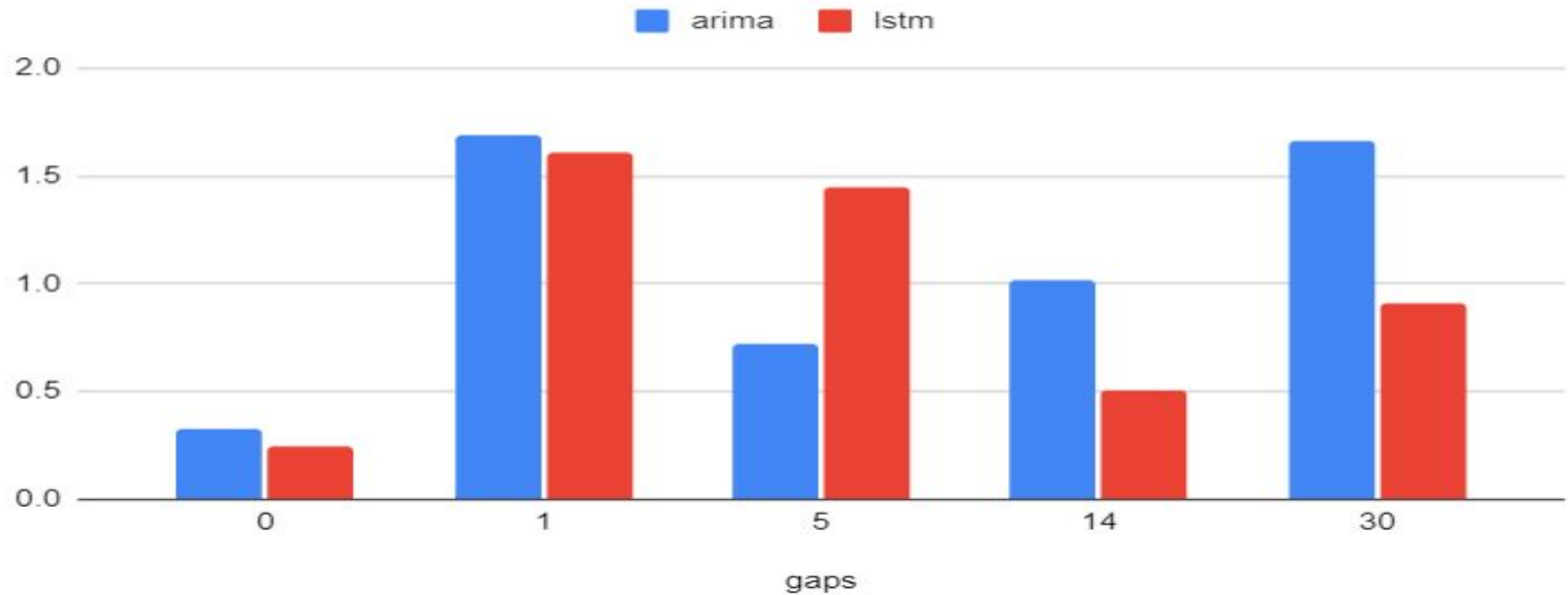
LSTM Diagram

BLOCK DIAGRAM

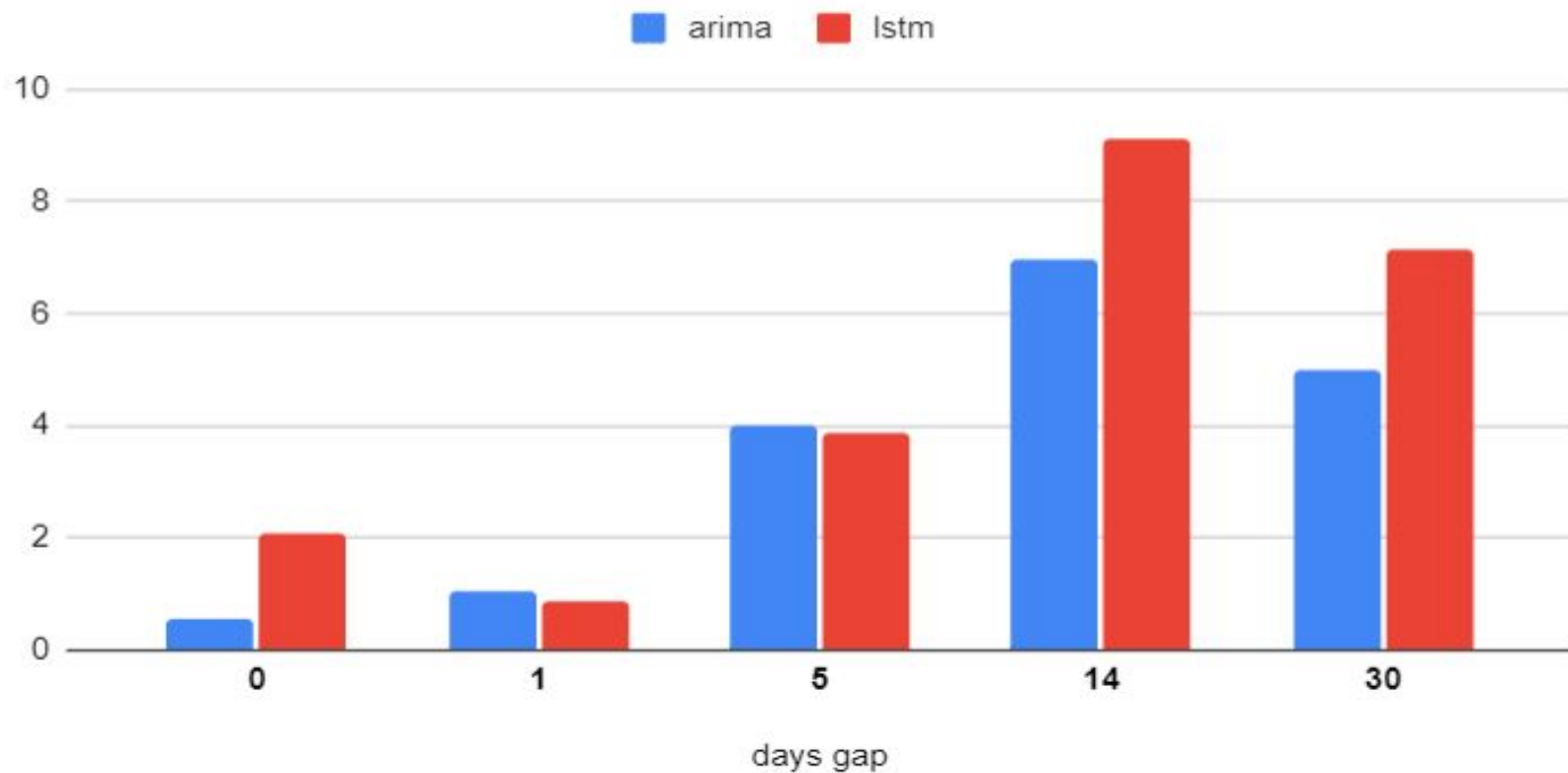


OUTPUT

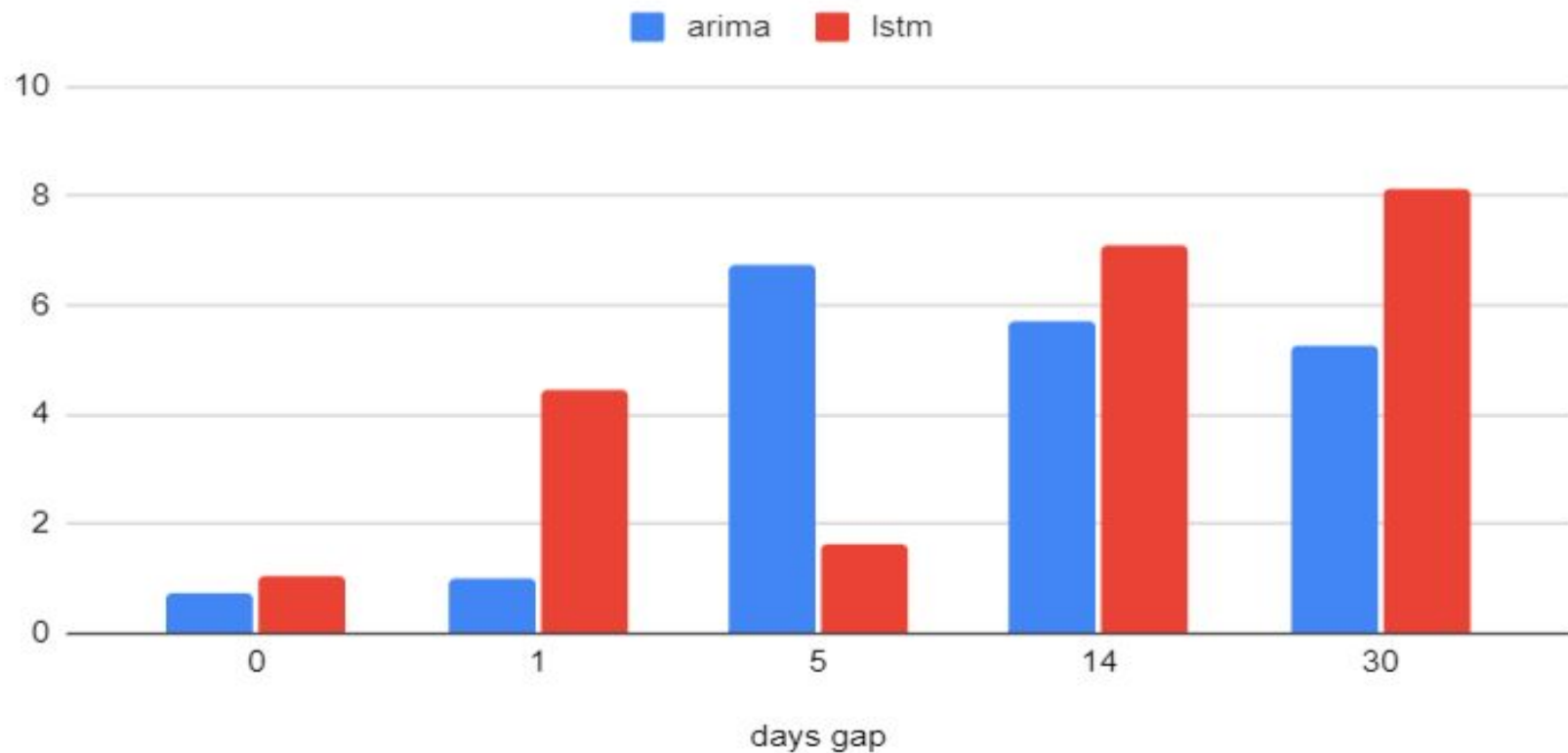
1 day prediction for arima vs lstm



16 days prediction with time gap (arima vs lstm)



30 days prediction with time gap (arima vs lstm)



CONCLUSION

- Lstm better in day prediction
- Arima better in weekly and monthly prediction

FURTHER ENHANCEMENT

- Comparison with more algorithms
- Implementation of multivariate

REFERENCES

1. <https://doi.org/10.1175/WAF-D-19-0158.1>
2. <https://medium.com/swlh/temperature-forecasting-with-arima-model-in-python-427b2d3bcb53>
3. <https://medium.com/towards-data-science/time-series-forecasting-with-arima-sarima-and-sarimax-ee61099e78f6>
4. <https://www.analyticsvidhya.com/blog/2021/07/time-series-forecasting-complete-tutorial-part-1/>

A top-down view of a desk with various items. In the center, a magnifying glass with a black handle and frame is positioned over a financial candlestick chart. To the right of the magnifying glass, a pair of round-rimmed glasses with blue frames and clear lenses lies on the desk. Below the glasses, a small blue rectangular sticker with the number '700.11' is visible. In the upper right, a portion of a laptop is seen. To the left, a black pen and a black folder are partially visible. The background is filled with various financial documents, including line charts, bar charts, and tables of data. One table in the upper left shows 'Step Loss' and 'Take Profit' values. Another table in the lower right shows a price of '700.11'. The overall scene suggests a professional or academic setting related to finance or data analysis.

THANK YOU

Any Queries ?