

CovidZa Mobility

Group 4

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Forecasting Covid-19 cases using machine learning models in South Africa

INTRODUCTION

- The Corona virus (Covid-19) continues to have a significant negative impact on the wellbeing of humanity and the economy of many countries, more especially in emerging market economies
- In South Africa, the virus has led to many job losses in different industries due to cut downs in productivity and the various lockdowns that have been implemented thus far.
- It is expected that Covid-19 will continue to be present in the midst of post vaccinations and as such, developing machine learning models that can be able to early detect the resurgence of the virus is desirable.
- The objective of this work is to develop machine learning models that can be able to predict Covid-19 positively confirmed cases in South Africa.
- This work is important as it could be used as a tool for monitoring the seriousness of the virus in South Africa.

METHODS

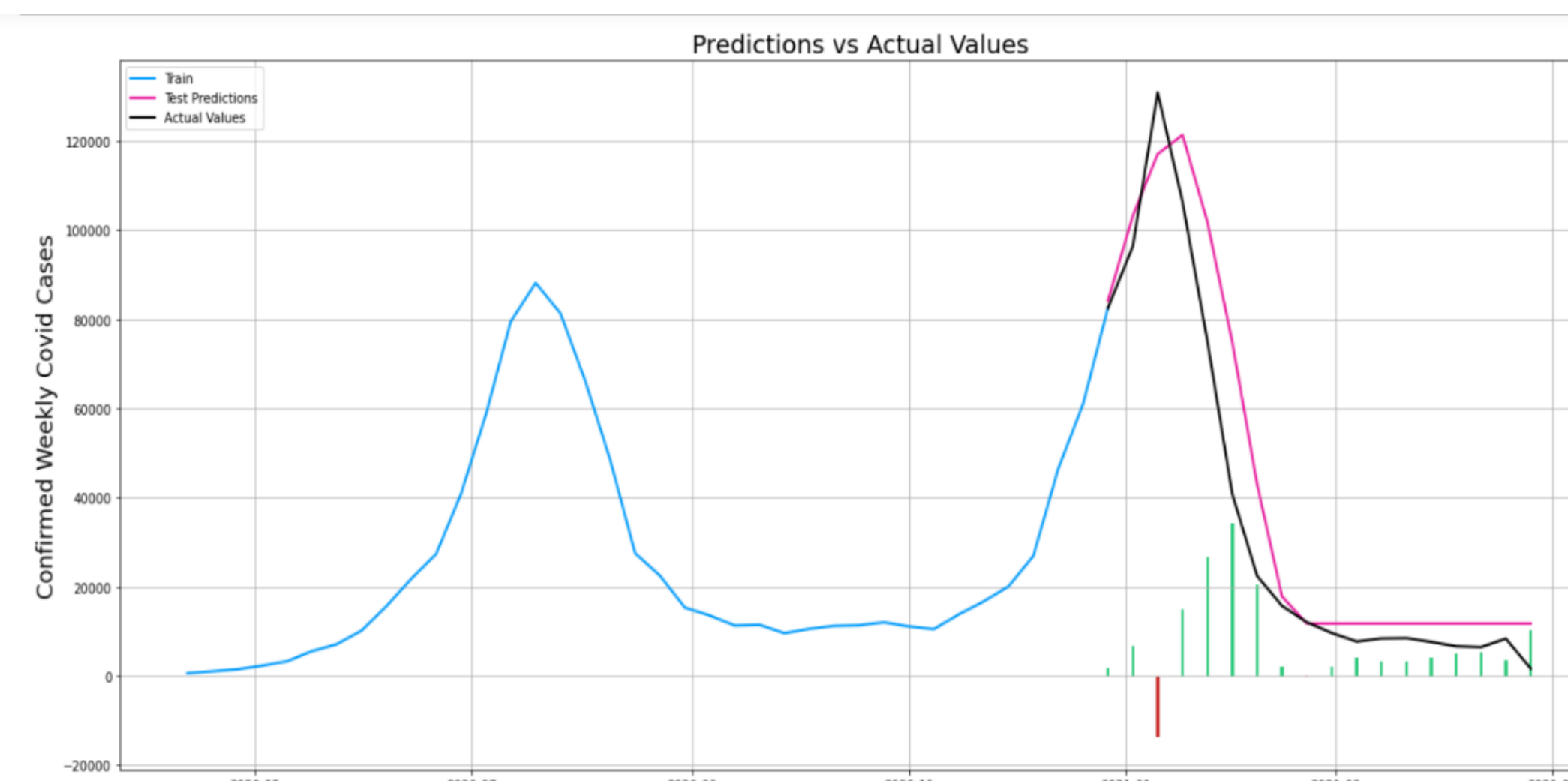
- Data was collected from NHLS and Google
- Features were selected using the Pearson correlation as seen on the correlation matrix figure
- Data was split into training and testing sets
- The LSTM and Facebook Prophet models were fitted

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RESULTS

- The Long Short-Term Memory recurrent neural network model was trained on the weekly Covid-19 cases and the counts of Google terms search data.
- The model was trained on 20 mini batches in order for the model to be able to predict the next sequential time step. The ReLu activation function was used, with 10 input features.
- Data was split into 70% and 30% split into training and testing data set was conducted.

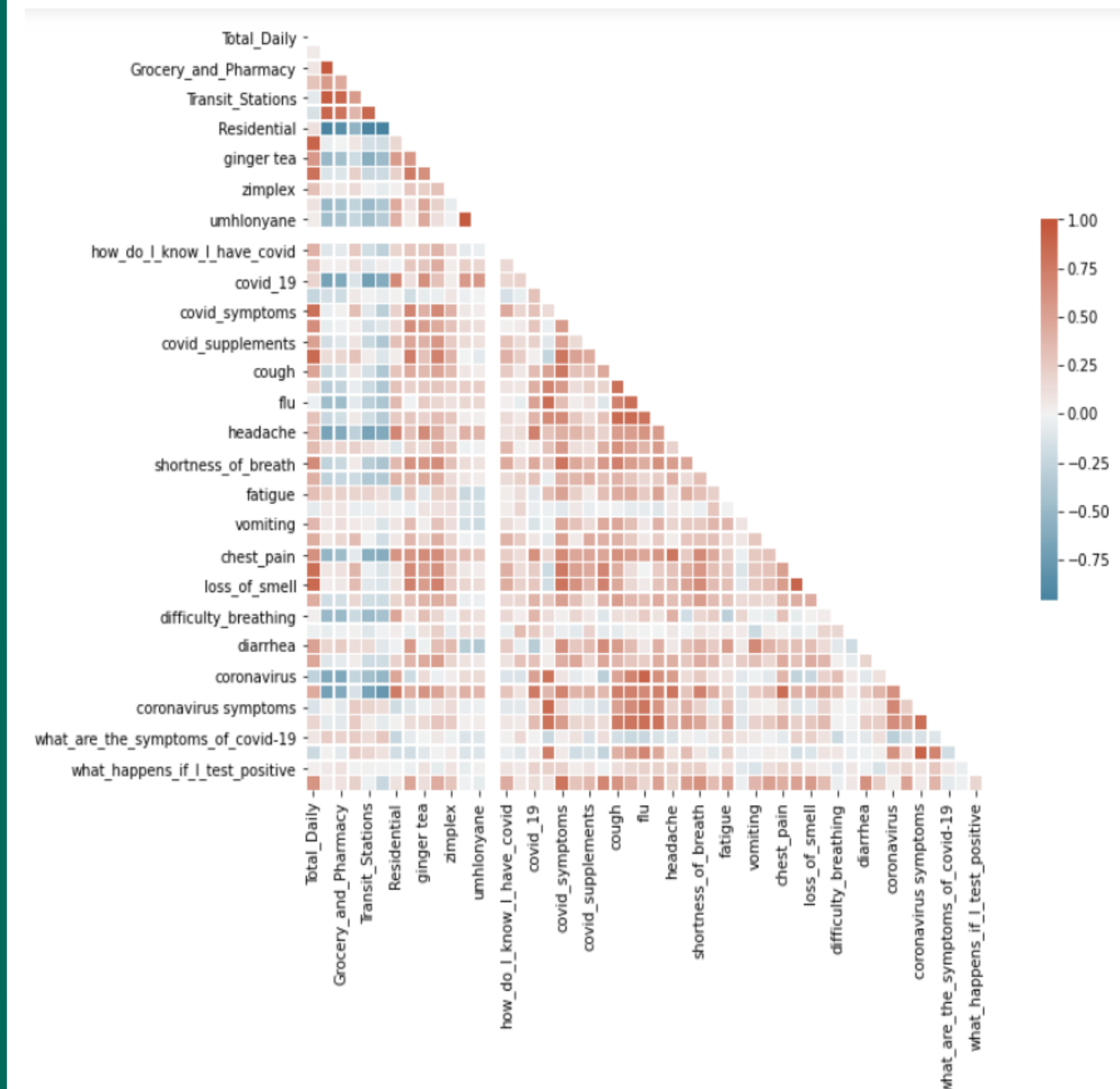
Predicted vs Actual Covid-19 cases using the LSTM model



DISCUSSION

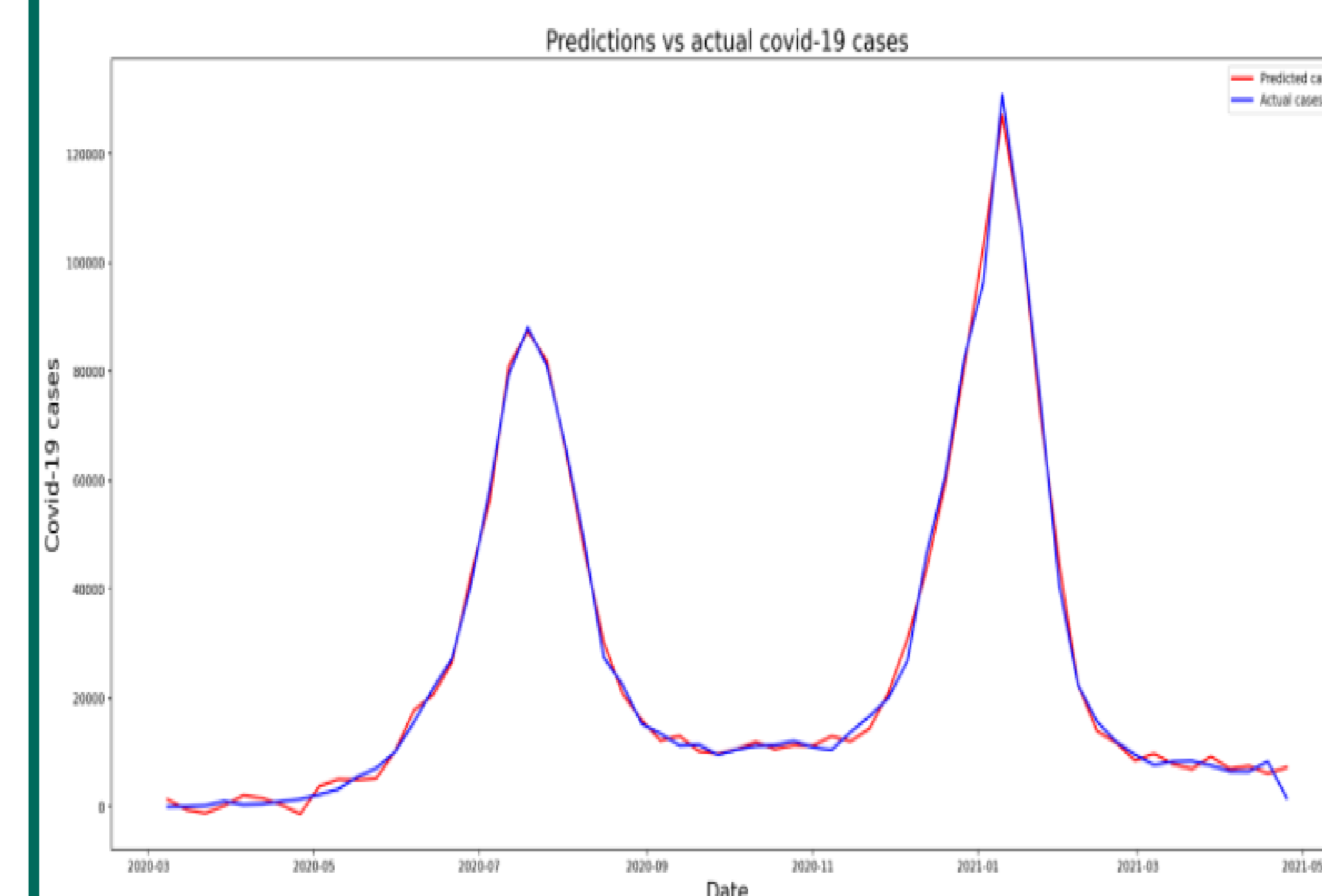
- The LSTM model achieved a Mean Absolute Error (MAE) of 1 115, which was relatively lower than the MAE achieved from the implementation of the Facebook Prophet model with MAE 1568
- The unseen testing data set was able to forecast the trend of the 2nd wave of Covid-19 in South Africa.
- The model can be improved by optimizing the number of iterations required and by increasing the data set.

Covid-19 correlation matrix



Predicted vs Actual Covid-19 cases using the Facebook Prophet

Predicted vs True Covid-19 cases on the entire data



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