Forecasting Rate of Spread of Covid19 using Linear Regression and LSTM

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# Introduction

The spread of COVID19, the respiratory disease origination from coronavirus occured in Wuhan, China, is on the rise and has shaken the world. The World Health Organization named the disease COVID-19 when the first case of this virus was reported.

The Global spread of COVID19 has affected most countries and was defined as a pandemic by the WHO in March 2020.

This paper tracks the spread of the novel coronavirus, also known as the COVID-19. COVID-19 is a contagagious respiratory virus that first started in Wuhan December 2019.

The two types of coronaviruses, named as, severe acute respiratory syndrome coronavirus (SARS-COV) and Middle East respiratory syndrome coronavirus (MERS-COV) have affected more than 20,000 people in past decade .

According to the Centres for Disease Control and Prevention (CDC), this novel coronavirus has some similarities with SARS-COV and MERS-COV. These diseases are spread through respiratory droplets from one human being to other. Respiratory infections can be transmitted through droplets of different sizes: when the droplet particles are in diameter they are referred to as respiratory droplets, and when then are in diameter, they are referred to as droplet nuclei. According to current evidence, COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes. In an analysis of 75,465 COVID-19 cases in China, airborne transmission was not reported. Droplet transmission occurs when a person is in in close contact (within 1 m) with someone who has respiratory symptoms (e.g., coughing or sneezing) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets. Symptoms as fever, cough, and shortness of breath after a period ranging from 2 to 14 days are observed as the outcomes of the disease. Detailed investigations found that SARS-CoV was transmitted from civet cats to humans in China in 2002 and MERS-CoV from dromedary camels to humans in Saudi Arabia in 2012. Several known coronaviruses are circulating in animals that have not yet infected humans. For helping combat coronavirus machine learning and deep learning models are used in this paper.These model will gives us a rough estimate as to how the disease will spread in the upcoming days how many more people will be effected.It will a rough estimate to the government of various countries about how the spread and will enable them to be prepared well in advance for the epidemic.

Most of the data driven approaches used in previous studies have been linear models and often neglects the temporal components of the data.

In this report data preprocessing techniques are applied on the confirmed cases data and then the preprocessed data is applied to two models i.e. LSTM and Linear Regression .The real and predicted cases are compared on a predefined metrics.A comparative study is drawn to see the performance of LSTM and Linear regression model to see which model best for the data.

# Related Work

In , an AI based approach is proposed as an alternative to epidemiological model for monitoring transmission dynamics for Covid-19. This AI based approach is executed by implementing modified stacked auto-encoder model.

In , and deep learning based approach is proposed to campared the predicted forcasting value of LSTM and GRU model. The Model was prepared and tested on the data and a comparison was made using the predifined metrics.

In , LSTM and Linear regression model was used to predict the COVID-19 incidence through ANalysis of Google Trends data in Iran. The Model were compared on the Basis of RMSE metrics. In , an AI based approach is proposed as an alternative to epidemiological model for monitoring transmission dynamics for Covid-19. This AI based approach is executed by implementing modified stacked auto-encoder model.

# Methods and models

## Data

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