Prediction of deaths involves by COVID2019 using LSTM neuronal network

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General topic

We use Long Short-Term Memory (LSTM) Models to forecast new COVID death. Model is trained in data from early COVID deaths from Switzerland. The model is able to use predictor variables such as policy measures, epidemiological variables to assess the impact of these variables.

Motivation

COVID-19 first appeared in the world in December 2019. Since then, it has caused more than thousands of deaths and millions of infections. With this massive number of deaths, it has become one of the biggest crises in this world.

In addition to the loss of human lives, this pandemic has also caused severe damage to the global economy. Due to lockdowns and distancing strategies, it has also had a negative impact on psychological and social spheres. Thereby the call for accurate prediction methods is crucial to quantify the impact of the regulations.

Data

The data comes from an open dataset from COVID-19 Data Hub. It is compiled from various sources hourly crunched. Among other things, the data set contains:

- standard COVID-19 variables (total population, cumulative number of cases, tests, deaths, recovered, daily number of cases, . . .)
- policy measures
- geographic information
- external identifiers
- google and apple mobility reports

Guidotti, E., Ardia, D., (2020), "COVID-19 Data Hub", Journal of Open Source Software 5(51):2376, doi: 10.21105/joss.02376.

Data processing

- Data Cleaning
- Explorative Data Analysis (EDA)
- Splitting data in to training (70%) and test set (30%)
  - Validation set: to compare our forecast
- Create features and labels (specific time length → optimal time lag needs to be determined)
- Scaling/Normalization

Research Question

1. Visual timeline of cases, deaths in relation to Policy
2. How accurately is the prediction of COVID19 deaths

Analysis Techniques / algorithms

Time Series Deep Learning, Forecasting Covid deaths with Keras Stateful LSTM