EpidemicKabu a new method to identify epidemic waves and their peaks and valleys

INTRODUCTION:The dynamical behaviour of some epidemics is an oscillation between a very low and very high number of incident cases throughout the time. These oscillations are commonly called waves of the epidemic curve. The concept of epidemic waves lacks a consensual definition and a simple a methodology that can be used for many diseases. OBJECTIVE: We describe in this study EpidemicKabu a new method to identify the start and end of past epidemic waves but also their peaks and valleys. METHOD: The methodology is divided into processing of the curve, waves detection, and peaks and valleys detection. For processing the curve, we used a Gaussian kernel to diminish the noise and smooth the curve. For the detection of waves, peaks and valleys, we used the first and second derivative of the curve. The methodology is an open access library in github.com/LinaMRuizG/EpidemicKabu. We tested the method with the unCoVer data about COVID-19 daily cases reported between 2020 and 2022 for different countries. RESULTS: The results of the library are the dates of start and end of waves, peaks, and valleys. The dates are displayed on graphs and added as a new column in a dataset. CONCLUSION: This methodology is simple, easy to use, and very useful to estimate the epidemic waves and make analysis about them as the example we made. The methodology requires expert judgement to set some parameters. Future work could optimise these parameters to make the estimation more systematic.

Key words: Epidemic curve, waves, estimation, modeling,

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