SAT-Light
Smart Alert Tool to shed light over the World

UN Youth Hackathon
Datarockstars
Sao Paulo
Brazil

Challenges

EPIDEMY

A planet learning to adapt to a new reality and with it great impacts on known concepts, reflected in historical series and projections

DATA

Plenty of bases with forged or false information. Too many incomplete metrics and missing values. Databases with few updates. Surveys suspended.

QUICK ACTIONS

Governments needing to take quick actions to save the population, fight unemployment, help those most in need, but with few trained professionals to generate insights and proposals in a short time.

TOOLS

With the plethora of tools and graphics, conflicts can occur for basic choices of layouts, colors, programming languages and tools causing a delay in taking action.

Solution

What if we had a tool which generates alerts so we could prioritize specific sectors and be more effective in managing the pandemic around the world?

we've created it!

MODULAR: Accepts different types of models and indicators;

VISUALS: Accepts customization from different countries via shapefiles and native graphs

ALERTS: Supports the creation of different alerts and alert policies

COSTS: It reduces time and tooling for new prototypes and is a powerful baseline.


More about
the
STAR-Light

Pandemic Score to readily analyse and take action based on data.

The Pandemic Score is built up from several components, each one designed to assess a specific and relevant factor impacting the pandemic.

Score Factors	Points
Online Learning	100
Learning	100
Schools: Closure	150
Schools: Reopening	50
Schools: Vulnerable Groups	100
Tests and Vaccines	100
Mobility: Time at Home	100
Prediction: New Cases and Deaths	300
Pandemic Score	Total Points

Using scores to drive assertive decision making

- Overall assessment of the pandemic situation for a given country
- Interpretability: understanding the contribution of each factor to the final score and taking action on specific areas to manage the pandemic
- New factors can be modelled to compose a more detailed score and assessment of a country

Pandemic Score Methodology Overview

1. Researching Data

- Look for data specifically for the pandemic period.
  - Education Survey
  - Time spent at home

2. Preprocessing Data

- Survey data: questions and answers were converted into indicators and flags.

3. Creating Factors

- Each factor is built upon some metrics derived from the available variables. The final factor is an equally weighted average over these metrics scaled to the maximum points attributed to the main category.

What does the score components measure?

Online Learning

- Adherence
- Effectiveness assessment
- Inclusion
- Support to teachers
- Engagement

Learning

- Adjustments to curriculum and calendar
- Learning gaps
- Learning losses

School Closures

- Total time of full closure
- Current state of full closures

School Reopening

- Adherence
- Strategies
- Support to staff

Vulnerable groups

- Special support for distance learning and reopening

Tests and Vaccines

- Rate of people fully vaccinated
- Rate of tests
- Rate of vaccination

Mobility

- Relative change of time spent at home relative to the pre-pandemic period.

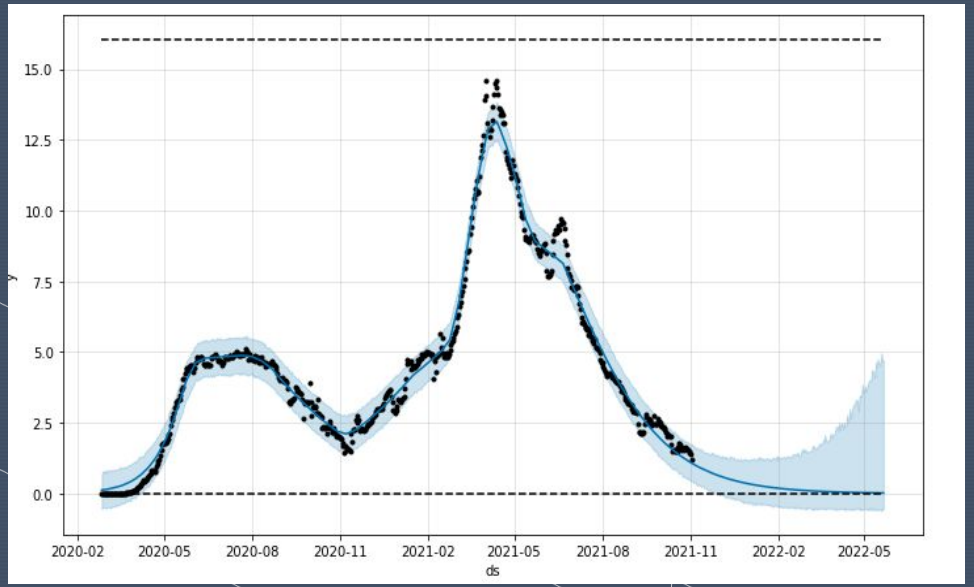
Forecasting

- Relative change in new cases and deaths (forecasted) relative to the previous period (2 weeks window)

Forecasting Methodology

To predict COVID-19 new cases and deaths, we applied an additive model with non-linear trends fit daily. This approach is robust to missing data and shifts in the trend.

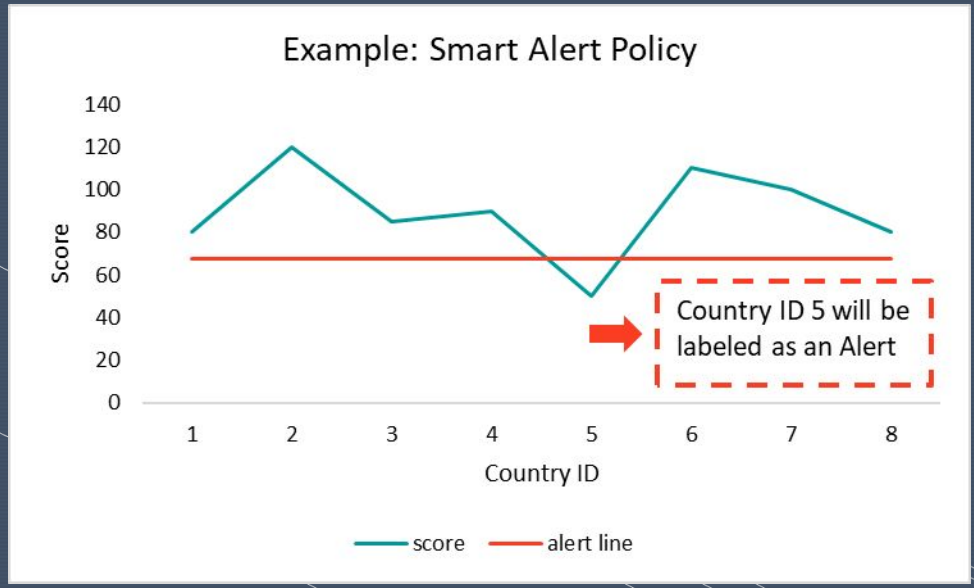
Algorithm: Prophet
Y: Smoothed new cases and deaths per million
Training data: JAN/2020 - OCT/2021
Validation: NOV/2021
Out of time prediction: JAN/2022
Mean Squared Error: 8,65



Forecasting example for brazilians new cases per million

Using Scores to design a Smart Alert Policy

- An alert is flagged for a country whenever one of its components score falls below an alert line.
- An alert line is created based on the behaviour of a set of countries being analysed and consists in the limit in which a score falls below one standard deviation from the median score of the set of countries.
- A country may have several alerts based on each factor that composes the overall Pandemic Score.



The Future

Pandemic Score evolving to SDG Score

The build up approach used to model the Pandemic Score can easily be expanded to incorporate other important factors to come up with a more detailed analysis.

Factors related to any SDG can be incorporated to this score depending on the availability and quality of data.

As we progress in these areas, we can have a complete score to monitor how countries are dealing with the pandemic in each specific sector related to all SDGs. The Pandemic Score proposed here can evolve to a SDG Monitoring Score.

Smart Alert Policy evolving to Predictive Modelling

The first application of the metrics and scores that we've created here was an alert policy but all this framework created has greater potential.

The collection of these metrics periodically as time evolves will generate new data making viable many other interesting analysis.

Using other data sources to characterize a country combined with the time series of these scores can open the way for predictive modelling in the future.

Leaders could make decisions prior to an event and the overall impact of the pandemic can be smoothed around the world. Let's collect these data!

The Team

Diógenes Cipriano Lopes

www.linkedin.com/in/llopesdi/

João Victor Pacheco Dias

www.linkedin.com/in/joaovictordias

Lidia Tomoko Sawakuchi

www.linkedin.com/in/lsawakuchi/

Nicolas Sathler de Araujo

www.linkedin.com/in/nicolas-sathler-de-araujo-681a2518b

See you soon