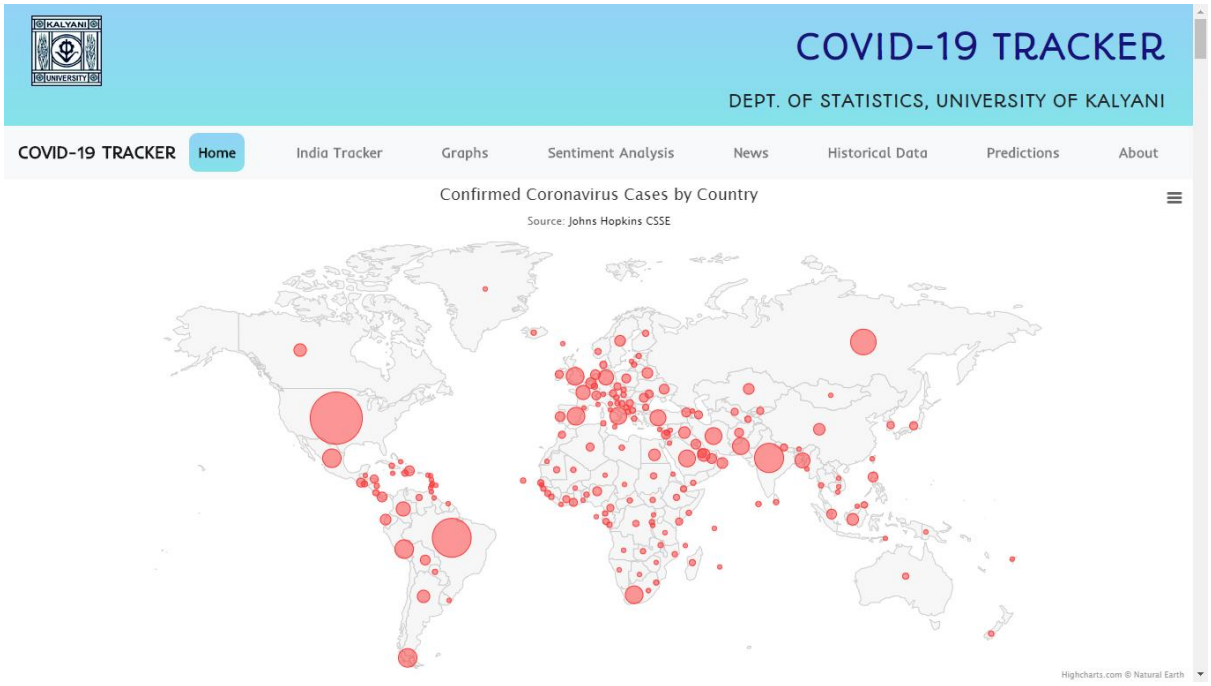
COVID-19 Tracker Documentation

Access our project at the following link:

https://sites.google.com/view/kucovid19stat/ or,
http://3.6.38.122:5000/



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Abstract

Covid-19 has put the world to a standstill. Doctors, healthcare workers and personnel of many other essential services are fighting at the frontline to tackle this global pandemic. Although we are not fighting the battle at the frontline, as students of statistics this is our humble attempt at partaking in the struggle.

Here we have displayed the data from the world as a whole and also country wise. The data is categorised into three components: **confirmed cases, deaths and recovered**. The values are given for both daily and cumulative type. We have tried our best to keep the display simple yet visually appealing. We have used line charts and pie charts and also an exquisite race chart for display. All the above-mentioned charts are interactive and are customized to give the user a clear idea of the intended meaning of the values as all the categories are separated by different colours, this not only made the graphs more appealing to the eyes but also helped in distinguishing different aspects. There are two sections dedicated to graphs, one for India and the other for the entire world, graphs for India are under **Graphs** under **India Tracker** and those for the world are under **Graphs** under **Home**. The entire site is designed to make it as user friendly as possible. Our source for global data is Johns Hopkins University, to access the data click here and to access the data for India click here.

We didn't just stop at displaying the data but went ahead and made predictions for values of **total confirmed cases, deaths and recovered** for both India and the world. We obtained our predictions by using a Facebook Prophet model. Facebook Prophet is an excellent time series model developed by Facebook. It is fast and simple it also automatically takes into account the crucial time points in the data provided. Using this model, we have obtained appreciable accuracy in India predictions and excellent accuracy in world predictions. The predictions are displayed under **Predictions**.

Our joys would know no bounds if our humble effort comes of any use to anyone battling this global pandemic. It is our utmost desire that we overcome this situation with unity and fraternity.

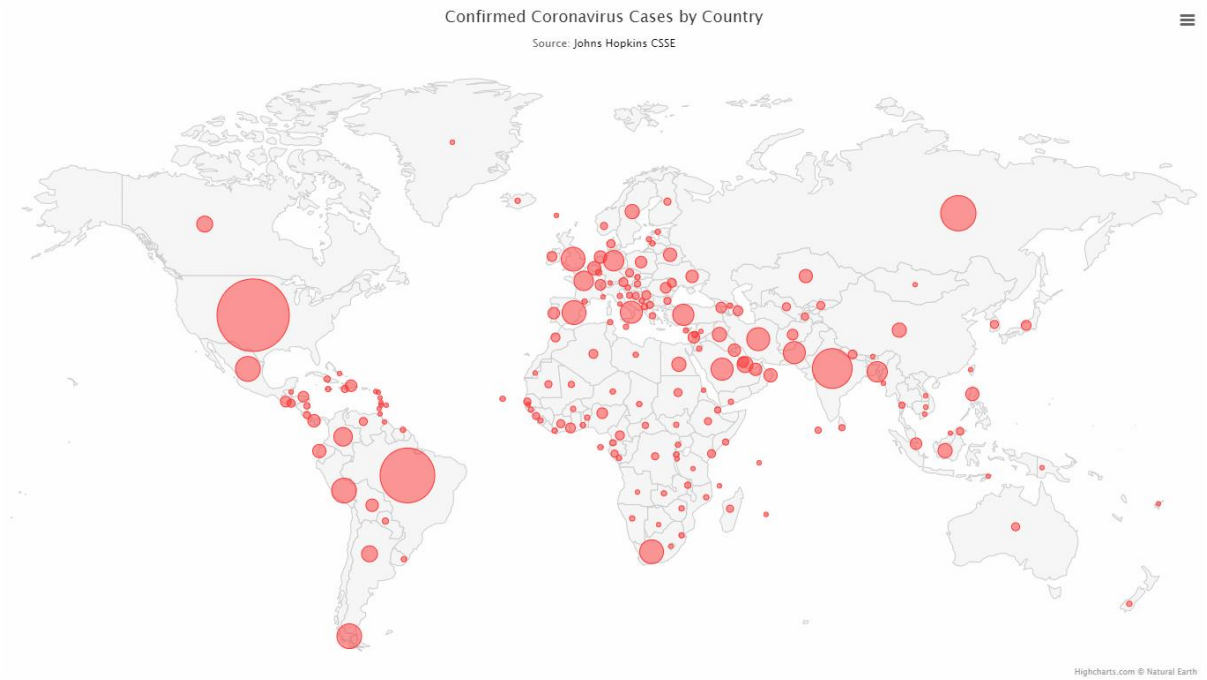
Pages for Global Tracker

- Home page
- Graphs
- Sentiment Analysis
- News
- Historical Data
- Prediction
- About

Pages for India Tracker

- India Tracker
- India Graphs
- India Sentiment Analysis
- India News
- India Prediction
- About

Home Page



- Bubble chart showing the Covid-19 hotspots around the world
- Live total confirmed Covid-19 cases, deaths, recovered and affected countries.

Country / Other	Total Cases	New Cases	Active Cases	Cases/ 1M pop	Total Deaths	New Deaths	Deaths/ 1M pop	Total Recovered	Recovered/ 1M pop	Serious /Critical	Tests	Tests /1M pop
World	13,520,403	71,852	5,035,384	1,735	582,784	2,435	74.8	7,902,235	1,018.19	59,508	279,844,436	36,057.32
USA	3,549,519	4,442	1,809,175	10,721	139,314	171	421	1,601,030	4,835.83	16,337	44,124,272	133,275
Brazil	1,933,655	2,451	645,807	9,095	74,336	74	350	1,213,512	5,707.53	8,318	4,572,796	21,507
India	956,992	19,505	327,665	693	24,703	388	18	604,624	437.98	8,944	12,412,664	8,991
Russia	746,369	6,422	211,350	5,114	11,770	156	81	523,249	3,585.44	2,300	23,754,645	162,773
Peru	333,867		98,377	10,121	12,229		371	223,261	6,768.06	1,325	1,963,921	59,535
Chile	319,493		23,204	16,708	7,069		370	289,220	15,124.82	1,915	1,322,503	69,161
Mexico	311,486	7,051	81,183	2,415	36,327	836	282	193,976	1,503.91	378	756,137	5,862
Spain	303,699		275,290	6,495	28,409		608			617	6,026,446	128,893
South Africa	298,292		147,667	5,027	4,346		73	146,279	2,465.32	539	2,232,738	37,630
UK	291,373		246,405	4,291	44,968		662			162	12,270,317	180,712

- A table showing live total confirmed cases, new cases, active cases, cases per one million population, total deaths, new deaths, deaths per one million, total recovered, recovered per one million population, serious/critical cases, total tests, tests per one million population for each affected country in descending order.

India Tracker

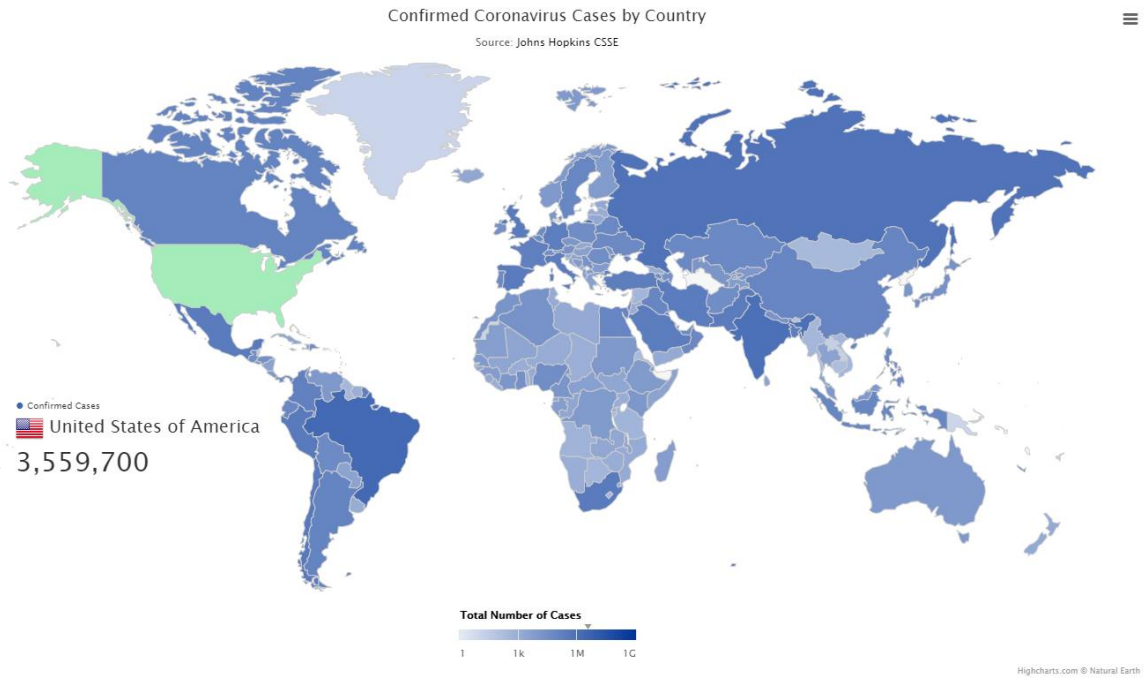
Coronavirus Cases: 958,044
Deaths: 24,713
Recovered: 605,556
Affected States: 35

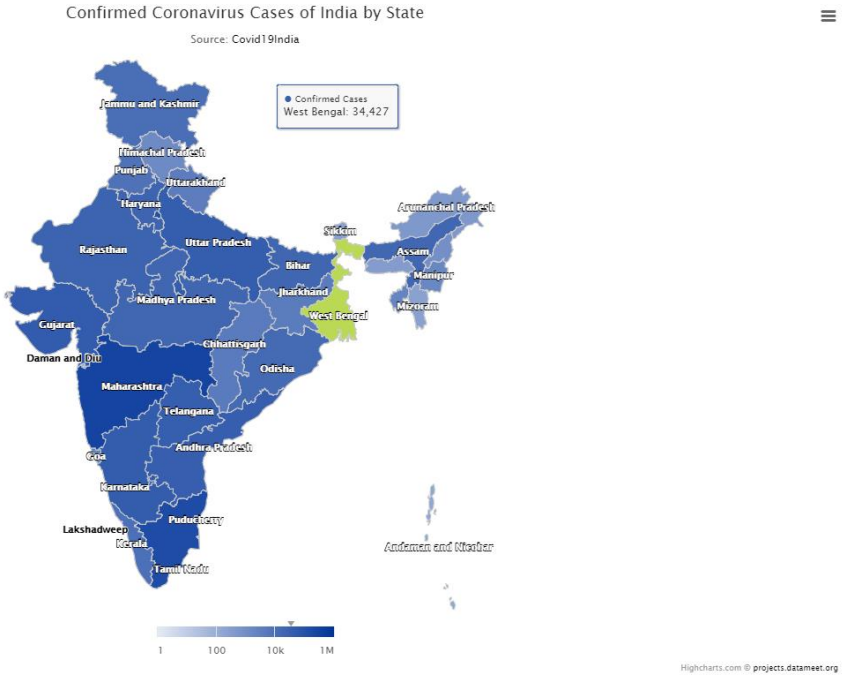
Search...

State / Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	New Recovered	Active Cases
Total	958,044	20,482	24,713	398	605,556	12,467	327,386
Maharashtra	275,640	7,975	10,928	233	152,613	3,606	111,801
Tamil Nadu	151,820	4,496	2,167	68	102,310	5,000	47,343
Delhi	115,346		3,446		93,236		18,664
Gujarat	44,648	925	2,080	10	31,346	791	11,222

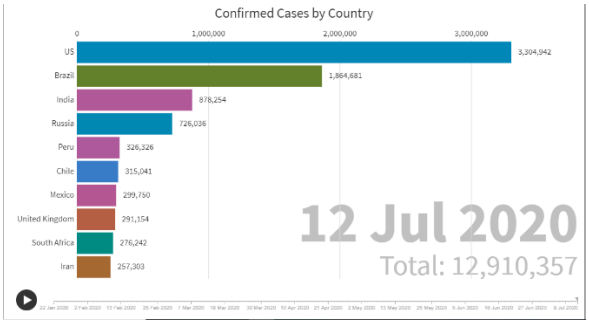
- Live total confirmed Covid-19 cases, deaths, recovered in affected states.
- A table showing live total confirmed cases, new cases, total confirmed deaths, new deaths, total confirmed recovered, new recovered, active cases.

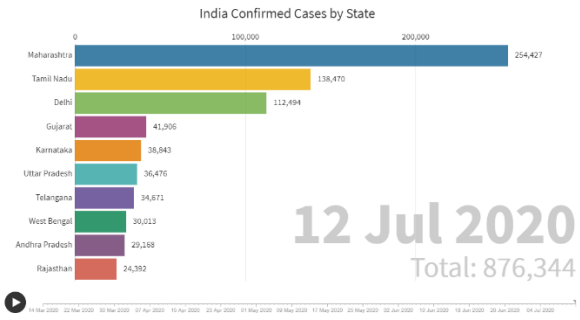
Graphs (World/India)



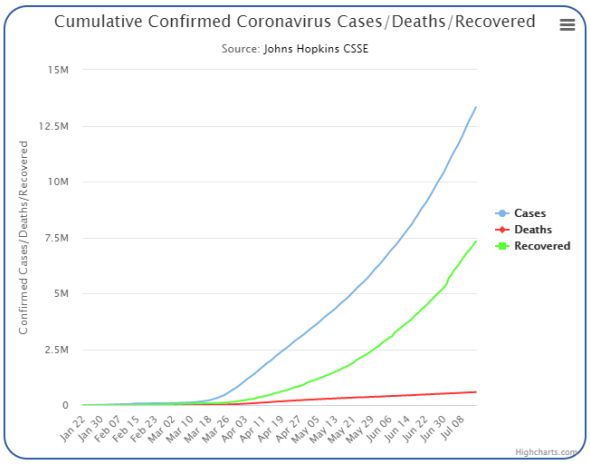


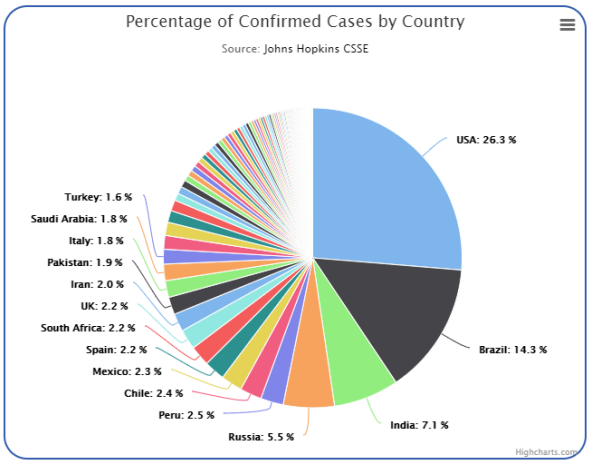
- Hover able responsive world map showing total confirmed cases for each affected country/state.

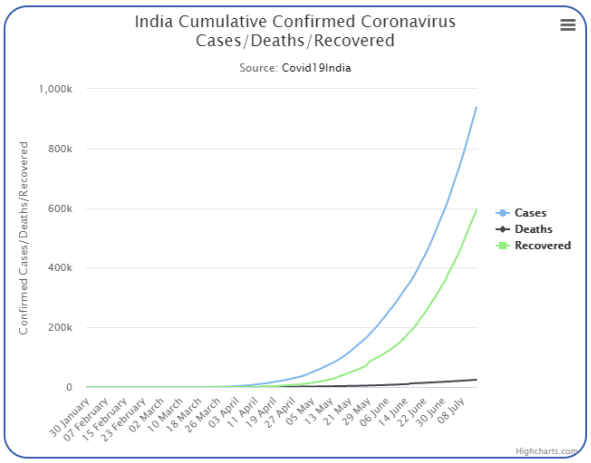


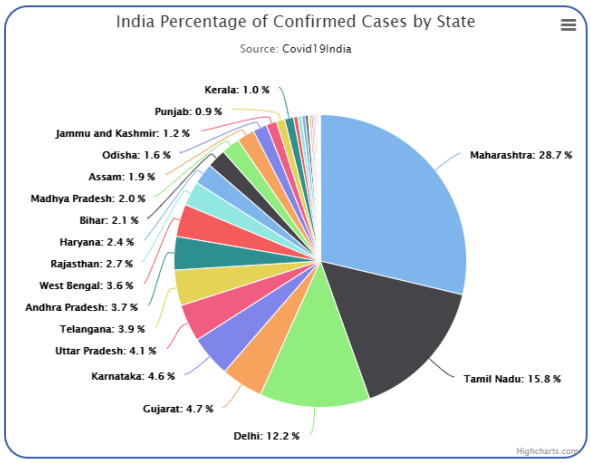


- A bar chart race showing top ten countries/states with highest confirmed cases at a given point of time.

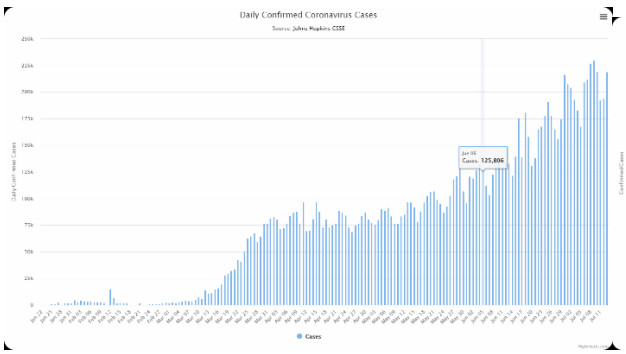


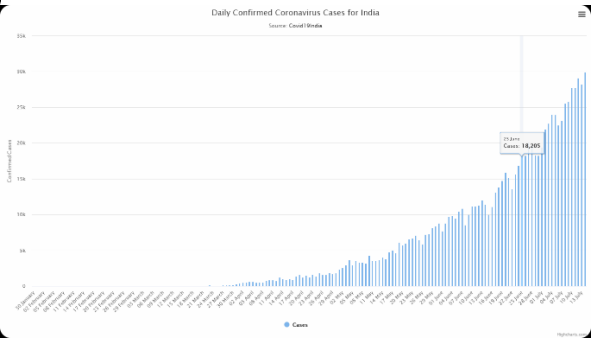


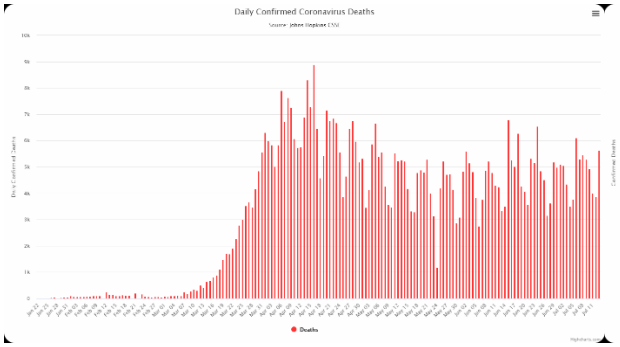


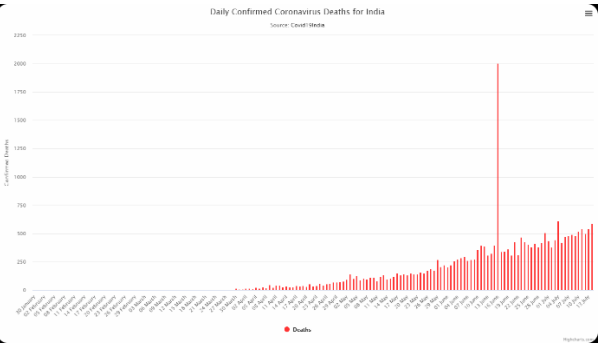


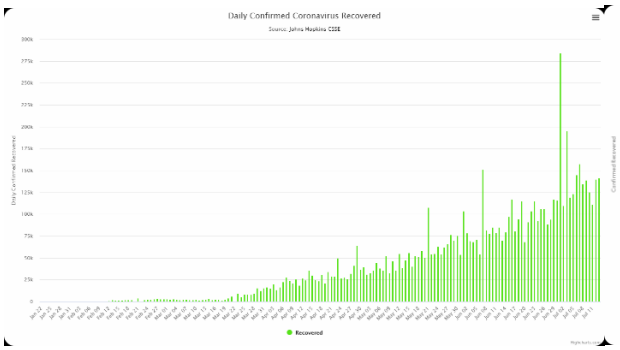
- A line chart showing global/India cumulative confirmed Covid-19 cases, deaths and recoveries.
- A multi-coloured pie chart showing percentage of confirmed cases by country/state.

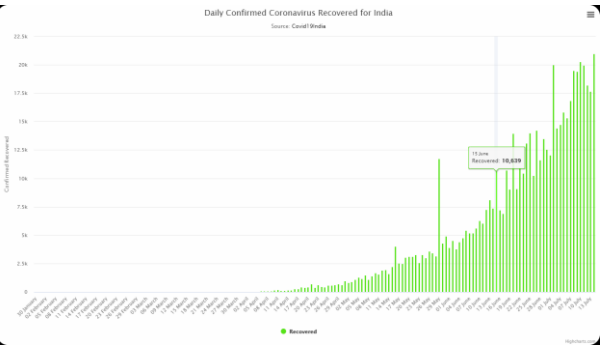










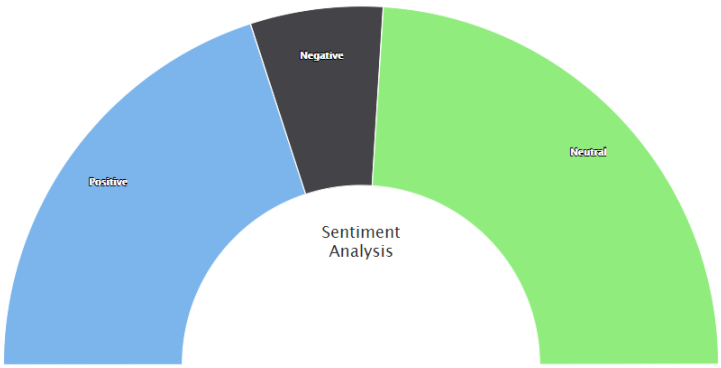


- Bar charts showing daily confirmed cases, deaths and recoveries in a time series format.

Sentiment Analysis (World/India)

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative, or neutral. A sentiment analysis system for text analysis combines natural language processing (NLP) and machine learning techniques to assign weighted sentiment scores to the entities, topics, themes and categories within a sentence or phrase.

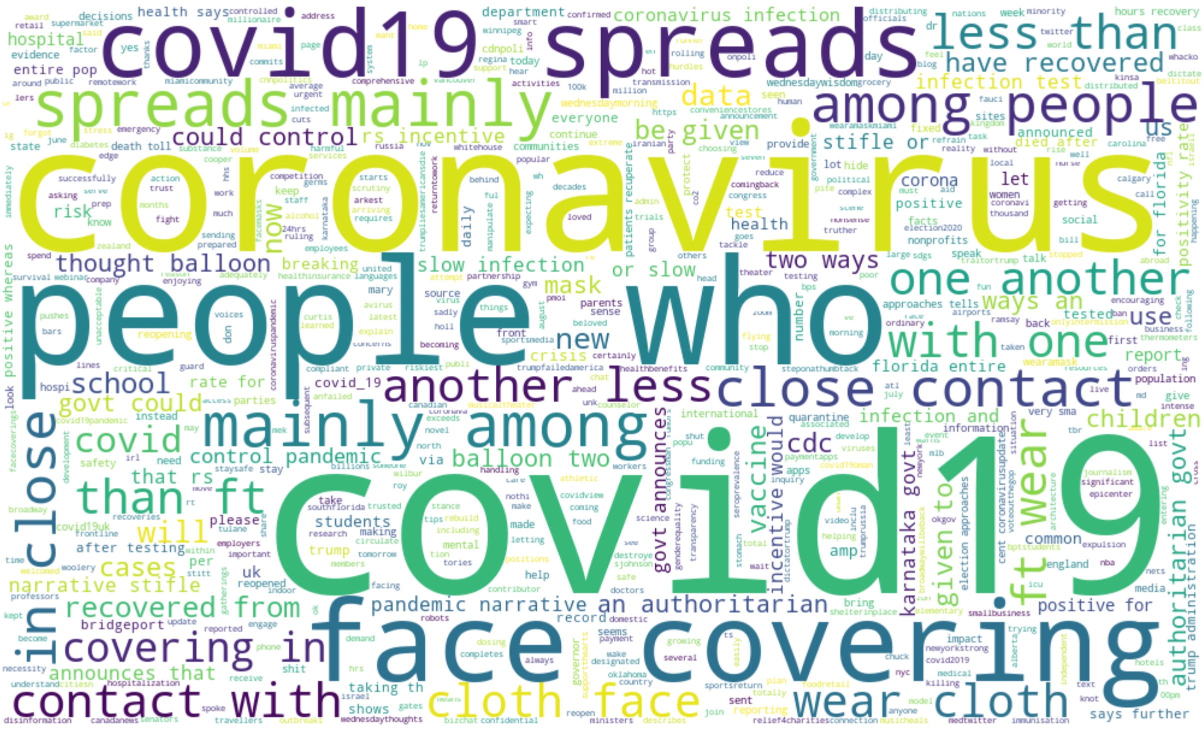
- Here we used the twitter API to fetch 100 recent tweets on the hashtags #coronavirus and #covid19.
- We analysed the fetched tweets and categorised them into three categories namely positive, negative, and neutral.
- We used a semi-donut chart to display the result from the sentiment analysis.



Word Cloud Visualization

A word cloud (wordle or weighted list in visual design) is a novelty visual representation of text data, typically used to depict keyword metadata (tags) on websites, or to visualize free form text. Tags are usually single

words, and the importance of each tag is shown with font size or colour. This format is useful for quickly perceiving the most prominent terms to determine its relative prominence. When used as website navigation aids, the terms are hyperlinked to items associated with the tag.



- ➢ Here we used the fetched tweets to generate a word cloud visualization.

#	Name	Tweet	Sentiment
1	Faith	RT : Thought balloon : Two ways an authoritarian govt could control a #pandemic narrative: 1.) Stifle or slow infection test...	Negative
2	Ashish kumar	RT : Karnataka govt announces that Rs 5,000 incentive would be given to people who have recovered from coronavirus infection and a...	Neutral
3	Maurice Wilson	RT : #COVID19 spreads mainly among people who are in close contact with one another (less than 6 ft). Wear a cloth face covering in...	Neutral
4	General Bethlehem	RT : BREAKING: The Department of Health says a further 85 people in the UK have died after testing positive for #COVID19, taking th...	Positive
5	COVID-19 HQ	RT : Extreme. Give me party or give me expulsion? Tulane will ban all parties or large gatherings of more than 15 people, inclu...	Positive
6	StrudelHundt	RT : Thought balloon : Two ways an authoritarian govt could control a #pandemic narrative: 1.) Stifle or slow infection test...	Negative
7	pradeip nanda	RT : Will someone please wake them up and explain them that Covid19 race is not an athletic event where being No 3 is an award...	Neutral

- ➢ A table showing the name of the person, the tweet, and the sentiment of the tweet.

News (World/India)

Trump administration orders hospitals to send coronavirus data to Washington, not the CDC

The Trump administration has ordered hospitals to bypass the CDC and send all COVID-19 patient information to Washington starting Wednesday. - Google News

Tap Here

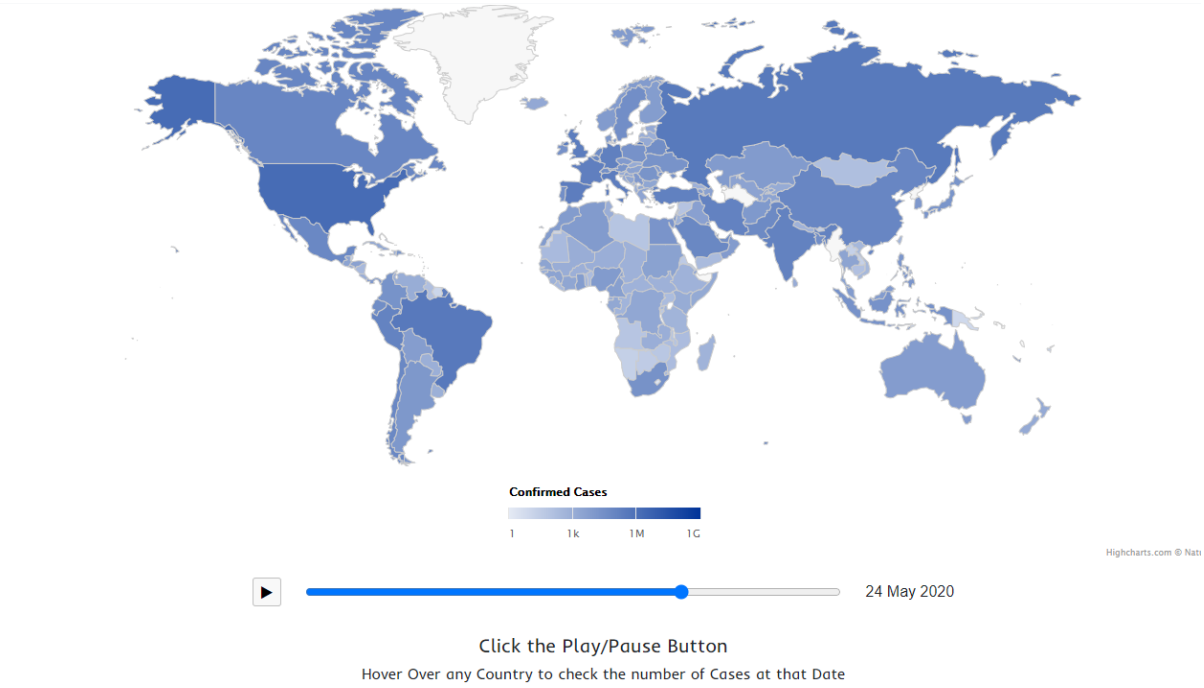
India Sees Highest Recorded Spike of 29,429 Cases Taking India's Tally Over 9.3 Lakh, Death Toll at 24,30... - News18

The number of recoveries stands at 5,92,031, while there are 3,19,840 active cases of coronavirus infection presently in the country, the updated data at 8 am showed. - News18

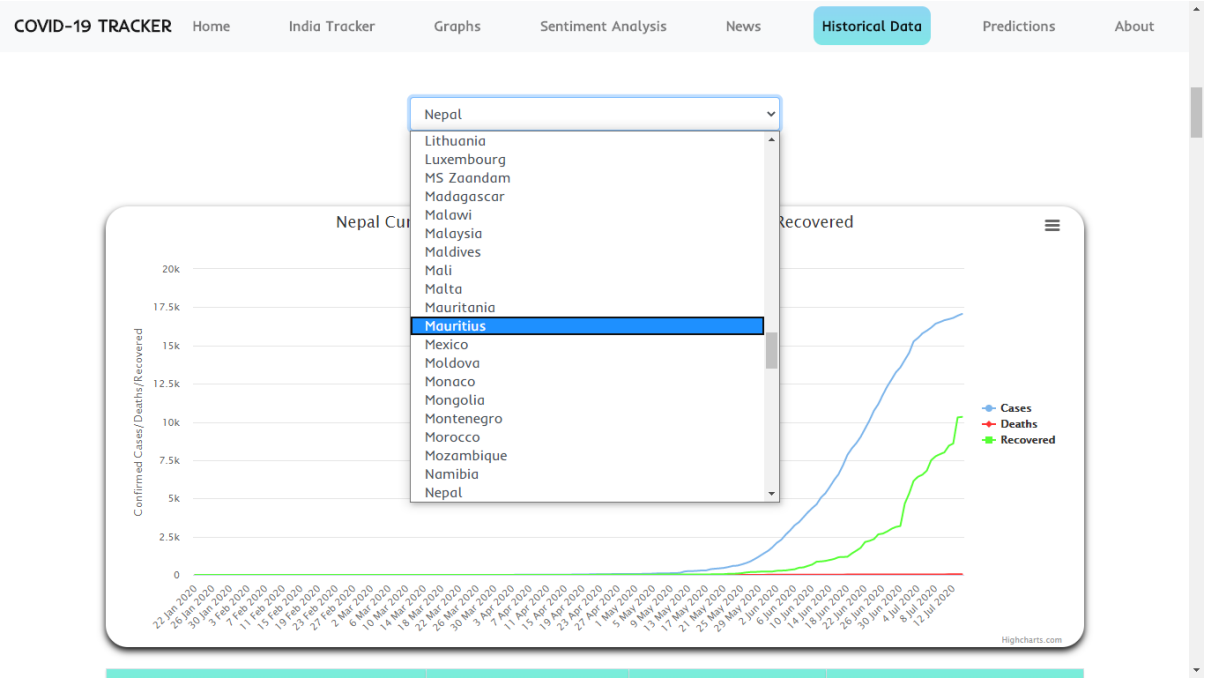
Tap Here

- We have showcased the trending news regarding Covid-19.
- Each and every news can be listened to in an audio format by tapping the audio button.
- Every news showcased contains the link to the complete news article.

Historical Data



- There is an interactive animation portraying the spread of Covid-19 confirmed cases worldwide.



- There is a dropdown menu consisting of countries and the world as a whole, upon selection of a specific country timeseries of cumulative confirmed cases, deaths and recovered for that specific country is

displayed in a table format. Same thing is displayed upon selecting world from the dropdown menu.

Predictions (World/India)

Facebook's Prophet Model

When a forecasting model doesn't run as planned, we want to be able to tune the parameters of the method with regards to the specific problem at hand. Tuning these methods requires a thorough understanding of how the underlying time series models work. The first input parameters to automated ARIMA, for instance, are the maximum orders of the differencing, the auto-regressive components, and the moving average components. A typical analyst will not know how to adjust these orders to avoid the behaviour and this is the type of expertise that is hard to acquire and scale.

We use a decomposable time series model with three main model components: trend, seasonality, and holidays. They are combined in the following equation:

$$y(t) = g(t) + s(t) + h(t) + \epsilon_t$$

- ***g(t)**: piecewise linear or logistic growth curve for modelling non-periodic changes in time series*
- ***s(t)**: periodic changes (e.g. weekly/yearly seasonality)*
- ***h(t)**: effects of holidays (user provided) with irregular schedules*
- ***ε_t**: error term accounts for any unusual changes not accommodated by the model*

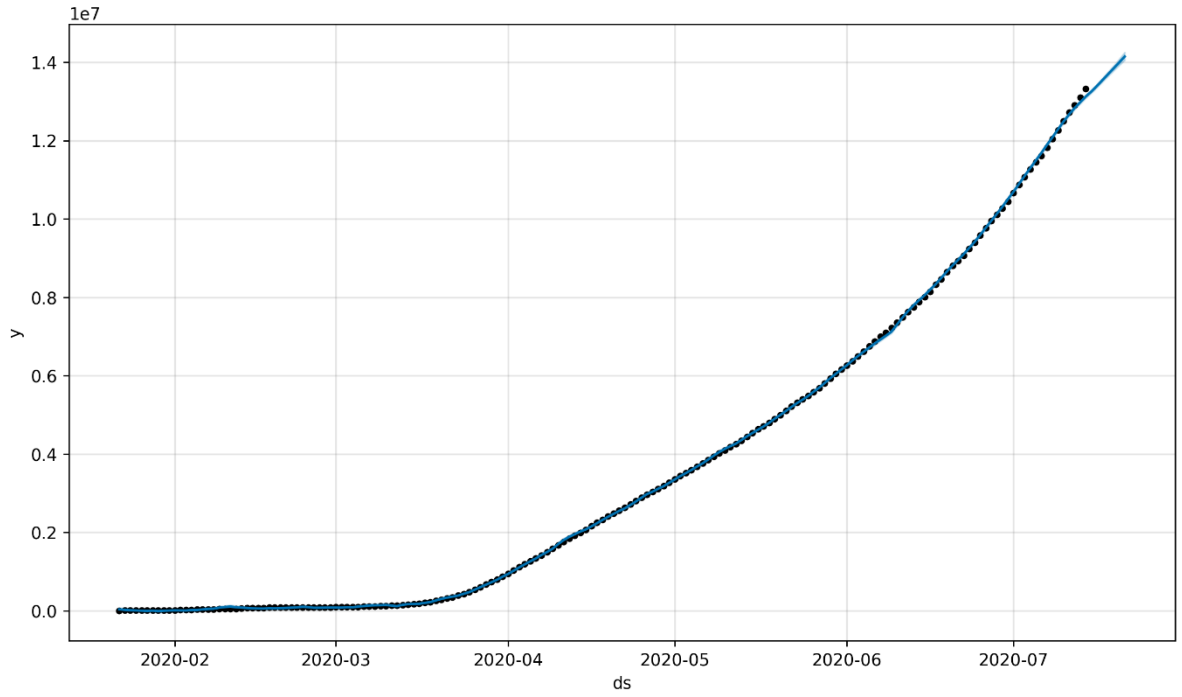
Using time as a regressor, Prophet is trying to fit several linear and non-linear functions of time as components. Modelling seasonality as an additive component is the same approach taken by exponential smoothing in Holt-Winters technique. We are, in effect, framing the forecasting problem as a

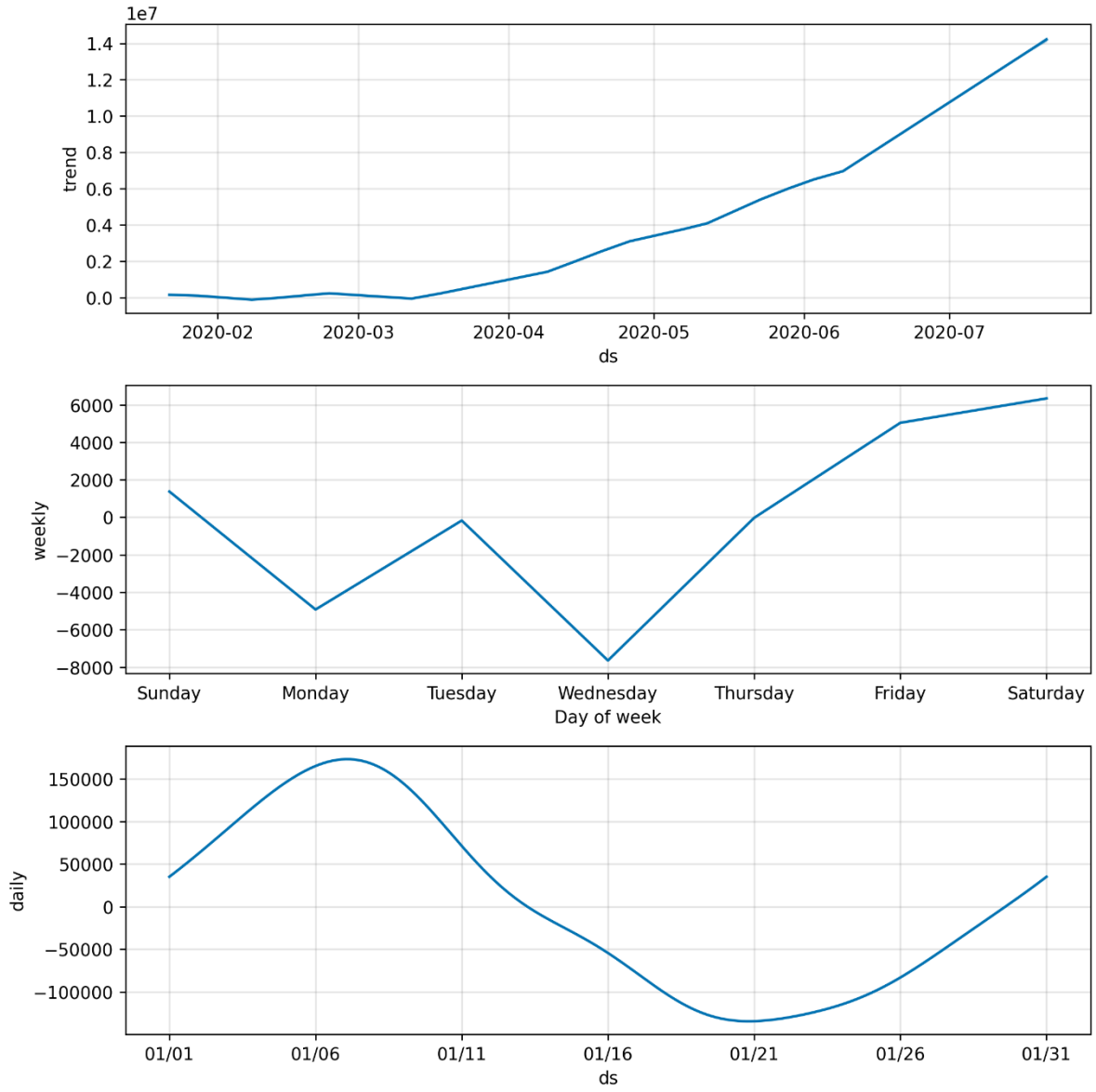
curve-fitting exercise rather than looking explicitly at the time-based dependence of each observation within a time series.

7 Day Forecast for Total Confirmed Cases, Deaths & Recovered

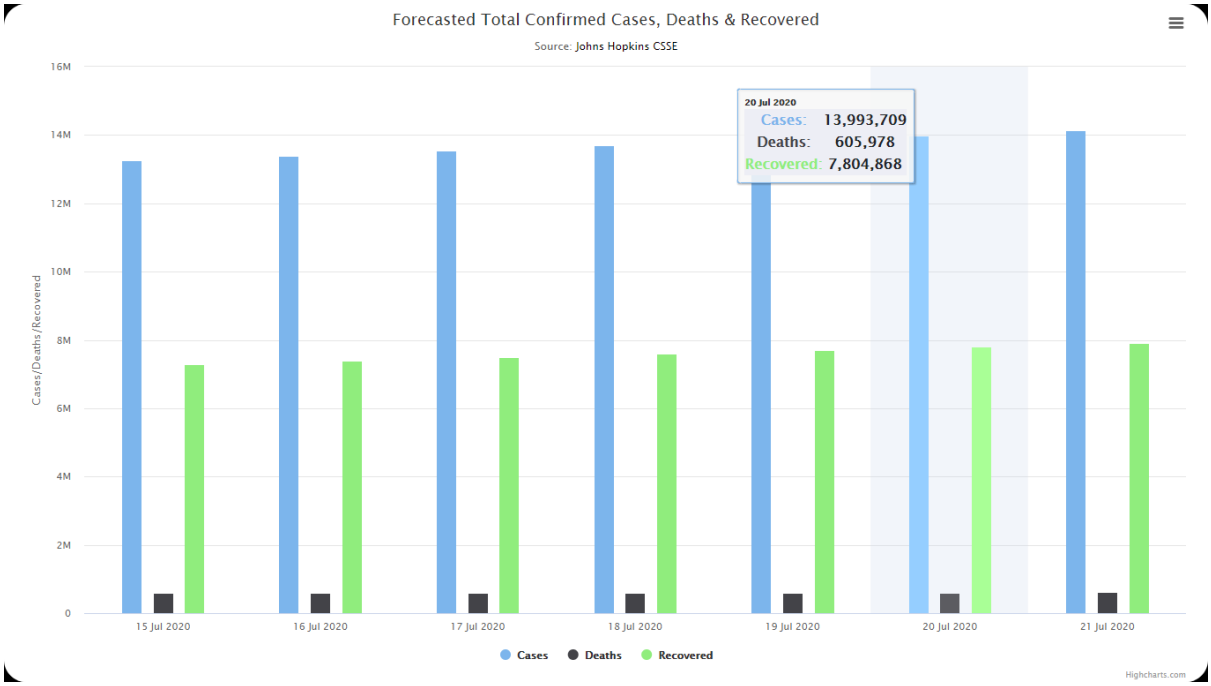
Date	Cases	Deaths	Recovered
15 Jul 2020	13,254,123	582,686	7,286,979
16 Jul 2020	13,397,404	588,163	7,387,096
17 Jul 2020	13,545,252	593,565	7,486,623
18 Jul 2020	13,697,128	598,182	7,593,485
19 Jul 2020	13,846,657	602,019	7,694,828
20 Jul 2020	13,993,709	605,978	7,804,868
21 Jul 2020	14,148,339	611,292	7,917,347

- We have used the Fb Prophet model to predict the outcome for confirmed cases, deaths and recoveries for a seven-day period.
- This prediction has been done for both India and the entire World.





- The predictions are displayed using graphs generated by the by the Fb Prophet model showing the predictions as well as trends.



- They are displayed using multiple bar charts.

Further description of the project is provided in the **About Page**