ML COURSE MINI PROJECT

PREDICTING CORONA SECOND WAVE IN INDIA

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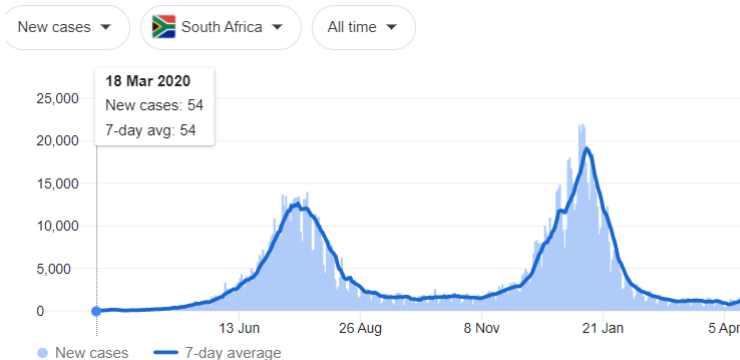
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IIIT Allahabad

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PROBLEM STATEMENT

The burning questions in India right now

1. how dangerous is the second wave
2. When this second wave ends

In South Africa and 72 other countries second wave has already passed. Why cant we use that data to predict second wave of our country

PROBLEM STATEMENT

We decided to solve this problem using Multiple Linear Regression

1. InDependent Variables
   1.1 Total population of the country
   1.2 Population density of the country
   1.3 Health Care Index
   1.4 Average Temperature
   1.5 Days between wave1 end and wave2 start
   1.6 Peak cases in wave1
   1.7 Duration of wave1

2. Dependent variables
   2.1 Days between Peaks of two waves
   2.2 Peak cases in wave2
   2.3 Duration of wave2

Intuitively we believe these dependent variables influence these independent variables

APPROACH

1. We collect the data for above mentioned 10 features for 72 countries for which second wave has already passed

2. We then run linear regression model based on this data to get weights

3. We then pass the dependent variables of india (already known data) into the model to get independent variable (unknown data)

4. Based on obtained coefficients for each independent feature we establish the relation between dependent and independent variables

5. Finally we suggest how this project can be taken further in future and conclude

RESULTS

After running the MLR model with data we collected these are the
results we obtained

1. Obtained Coefficients for peak cases, duration of wave2 and distance between
   peaks of two waves are given below respectively
    1.1 [-1.56763798e-01, 3.05575809e-05, 3.65749713e+02, -7.38872051e+01,
        2.02228101e+01, 1.35098347e+00, -1.14261443e+01]
    1.2 [6.02251677e-04, 7.75177809e-08, 1.18144797e+00, -2.28735542e+00,
        -5.39498561e-02, -2.06617453e-03, 2.99992623e-01]
    1.3 [-2.13464672e-03, 1.07269974e-08, 1.33974669e+00, -1.25178598e+00,
        8.43163755e-01, -9.35952292e-04, 2.71562353e-01]
2. Second wave features obtained for India are mentioned below
    2.1 Peak New cases in wave2 - 168175
    2.2 Duration of wave2 - 71 days
    2.3 Days between Peaks of two waves - 121 days
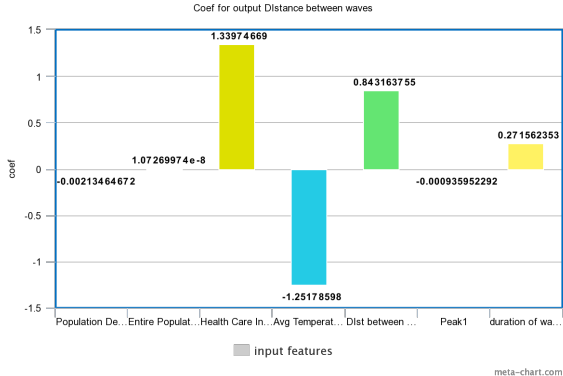
Coef for peak of wave2
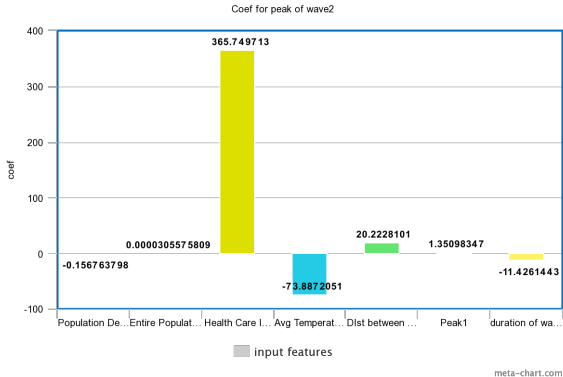
1. Peak new cases of wave2 increases with increase of total population, Distance between waves and peak new cases of wave1
2. Peak new cases of wave2 decreases with increase of Avg temperature of the country, Duration of wave1

Coef for duration of wave2
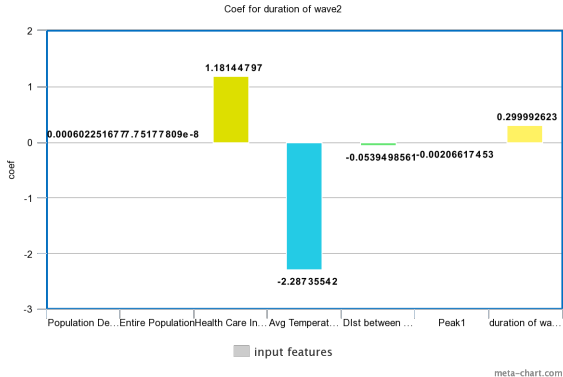
1. Duration wave2 increases with increase of total population, Duration of wave1
2. Duration of wave2 increases with decrease of Avg temparature, Distance between 2 waves and peak cases of wave1

Coef for output Distance between waves

1. Distance between peaks increases with increase population, Distance between waves and duration of wave1
2. Distance between peaks increases with decrease of Avg temperature, Peak new cases of wave1

OBSERVATIONS -1

1. There is a strong correlation between peak new cases of wave2 and total population - So in countries like Russia and USA we can see more new cases per day than smaller countries like manoco and san mario

2. Peak new cases decreases with increase in avg temperature, So even though brazil and nigeria has almost same population brazil has more new cases per day

3. India with 136 billion population we got a value of 168175 for peak new cases for wave 2

4. As of 15-April-2021, Total average cases in India for past 7 days is 175911

OBSERVATIONS -2

1. There is a strong inverse correlation between Duration of wave2 and Avg temperature- So in countries cold like Norway, Russia and Canada second wave last for longer time than hotter countries like south africa and nigeria

2. According to this observation second waves is going to less time compared to first wave

3. MLR says that in India second wave lasts for 71 days

QUESTIONS ANSWERED USING ML

X-AXIS - 1 unit = 10 days
Y-AXIS - 1 unit = 10000 cases
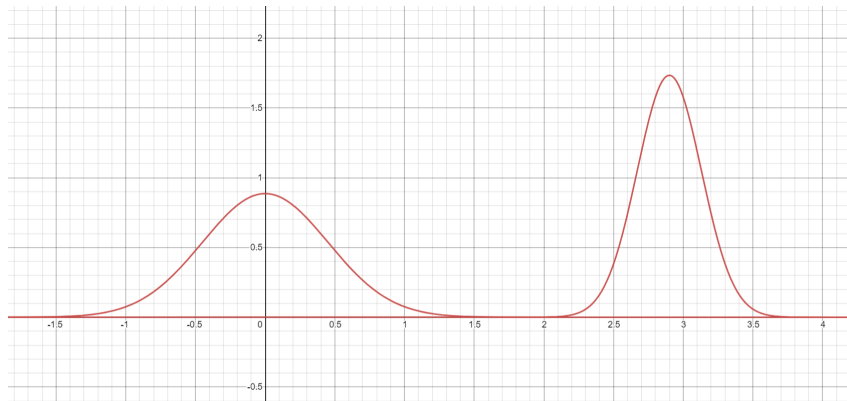
1. Second wave in india is peaked and intense

FURTHUR WORK

1. More feature like how many people comming to country, Govt policies on lock down, vaccination percentage and developement index of a country can be added to get more accurate results

2. In countries like canada, Peru and Netherlands 3rd wave has already started or completed. We can take data of those countries to predict intensity of third wave in India. So that we can take neccessary precautions before disaster