**Agenda :** Time series forecasting for hospitalisation based on vaccination and geography

**Description :** This model will predict the count of hospitalised patients on daily basis and in a specific location which will help in planning the requirement for hospitalisation

**Model Used :** ARIMA ([Autoregressive Integrated Moving Average](https://www.investopedia.com/terms/a/autoregressive-integrated-moving-average-arima.asp#:~:text=Autoregressive%20integrated%20moving%20average%20(ARIMA)%20models%20predict%20future%20values%20based,to%20forecast%20future%20security%20prices.))

**Steps to be followed during implementation : -**

**STEP 1: Data Preparation**

* Deciding my prediction target
* Segregating columns based on my target
* Analysing dependent / Independent data points

Performing the data pre-processing such as Filling null values

sequential date ordering etc.

**STEP 2:** checking the stationarity of data

To check stationary we use 2 tests

* Rolling statistics (used to assess the model's stability over time)
* Dicky fuller test (the Dickey–Fuller test tests the null hypothesis that a unit root is present in an autoregressive time series model) -finding p value

**STEP 3**:

* Estimating trend
* moving average

calculating difference between moving average and actual target data

(Performing a transformation in order to make time series stationary based on nature of data)

**STEP 4:**

performing stationarity tests again and finding p of dicky fuller test expecting p value to be relatively less than previous value

AR – auto regressive

MA – moving average

I – integration

Finding the trend ,seasonality and residual of out datapoints

(irregularity = residual)

To find the value of p and q using graph

ACF - Auto corelation graph (finding q)

PACF - Partial auto corelation graph (finding p)

P - auto regressive lags

d - order of differentiation

q - moving average

**STEP 5:** substituting the findings in the ARIMA model

plotting the graph and finding the Residual Sum of Squares

sticking towards very less RSS

**STEP 6:** finding the future forecast using our model