Task-Writing Summary

Time Series and Analysis Video Series by **Director**

Video Part 1.a

Time Series aalysis is all about, doing predictive analytics, prdicting future values of variales or forecasting certain amout along a particular direction

We'll see, What is time series, regression vs time series, look for tred and seasonality, smoothing, ACF, ARIMA, Lagging etc.

In time series , time as a dimension we are trying to forecast. We are dealing with two variables where y axis can be anything like temp, stock price etc.

We can't apply regression everywhere.

Sensex small cap- The statistical properties of this data is not same as sesex, since here it the greater change. Lesse volatility more predictable is the data.

Video Part 1.b

Take relevant slice of data in Time Series Analysis for accurate predictio. Time series iis all about tryig to separate out trend , seasonal variance from the data as in Airline Passenger.

Remove yearly avg, or lets say componets of the data is removed oe y oe from the origial data ad therefore what is left is called Residue.

Video Part 2.a

Valid Time series data must have

-Minimum of 50 data

-Equally Spaced Time iterval

-no missig data point

Statioary: no tred, no seasoality, and o chage i freuecy or amplitude of noise

Frequency: How may times a does an event occur in a given unit of time eg, 4 year

Period: Inverse of frequency eg, once in a 3 month

If we remove seasonal variance in atmospheric Co2 data, we get a trend.

Video Part 2.b

We decompose data into

-Trend : inc or dec over a very long term

-Seasonality: periodic change

-Noise or irregulaities

-Cyclicity

-Other

Main Operations:

-Computing succesive difference

-Apply daily/weekly/monthly etc

-Applying rolling function

- Moving avg

-smoothing a time series

-ACF

--Test for auto corelation: Box plot

-partial autocorelation: pad

-Fitting n arima model

-running diagnostics on an Arima model

-Making forecasting using Arima

-Testing for mean recursion

Video Part 3.a

Using the previous methods to get the forecast data of Airpassenger

and plot the box plots for those data, and other plots by taking avg and all.

Video Prt 3.b

In this video we can see that Co2 had linear trend. Seasonal variance is perfect.

Also we used rainfall dataset and create its object, ad while aalysing we ca see that its too complex to see seasonalty and trends.

Video Part 3.c

Here we have analysed using the previous techniques and plotted the intersection of two time series. And got to know the concept of lagging while using in the plot.

Dtrending: for linear trend use regression to fit line, subtract trend from data values use decomposition function like stl

Video Part 4.a

Smoothing: avg of local values is called moving avg or rolling means

disadvantages: creates mountain for every spike, distort slope of curves

Exponential Smoothing

Single exponential Smoothing only works if there is no trend.

Double exponential Smoothing , we consider diff b/w smooth curr and prev value

Triple exponential Smoothing when trend and seasonality both present

Then we see how to use these value in HoltWinter modeling techniques

Multiplicative cann be used if seasonality is mu;tiplicative

Video Part 4.b

We use holtwinter modeling techniques to analyse data on Airpassenger and forecast the data. Also we got to know that, If you have data points say 100, then you shouldn't predict more than 50 for future case.

Video Part 5.a

We see the concept of auto corelation. Box test returs the value of p

We do few assumptios like oise terms are – Idepedet, Idetically distriuted, ormal distriuted oisig zero meas

Arima- auto regressive movig average

auto regresive- itegrated movig average, Arima if o statioary, iitial diff steps are itegrated to reduce non-statioary. Arima is popular because it can be automated

Video Part 5.b

We saw the value to compute Non seasoal arima, seasonal arima, testing for mean reversion, Augumented Dickey fuller test

Video Part 6.a

We saw the box test for Co2, ad m value for Air passedger. Since m going from -ve to +ve so we should not consider that. Here we checked whether p,q,d values given by auto.arima, really fit for the model or not?

Video Part 6.b

We saw the model by chagig diffrent values of paramater of Arima model for Co2 ad for raifall and we can also see for rainfall data that coefficient value changes from -ve to +ve, so its not a good model

Video Part 7

We saw the advaced time series aalysis methods ad areas like in periodigram,

-converting from time domai to freq. Domain

-seeing various long term values

-doing moving avg

-plotting periiodicity

Heterosdasticity

non constant residual variace, voilatig clusters in financial data, ARCM methods, Application in financial modelling and economics

Graph Analysis

We saw the definition of graphs different characteristics of graphs, parameters related to graphs like

degree centrality, closeness, eigen vector centrality, between centrality.

And than we saw analysis on Ramayan by taking the dataset from english translation and taking charactors involves as nodes and relations as edges between the nodes.charactors.

Then we saw the graph of nodes and edges and find the bbetweenness centrality of top 12 charactors, whereHanuman emerged as 2 most betwenness person after Ram, and similar other relations between them.