Time Series Notes

3/23/2023

* State Space Models
  + Often use state space with Bayesian framework
    - Often combine because instead of having one equation defining yt where others are constant parameters, then parameters can have values too
    - All parameters have equations associated with them
* How to make model better
  + Can add exogenous variables – like holidays etc.
  + OR can use state space
    - Allows the slope of your trend line to change over time
    - can use this to adjust any aspect of a model – season different from trend different from etc.
    - How to do – Kalman Filter
      * Time = 0, have initial believ
        + Then go through model – see difference between observed and predicted – and update model based on that difference
        + Can then limit amount o learning to prevent overfitting
* Bayesian statistics
  + Frequentist: what is the likelihood of this data point given the model
  + Bayesian: what is the likelihood of the model given this data point
  + Bayesian – what is the likelihood that we have this given data point? Based on likelihood of a thing happening given that we have one data point
  + Frequentist – pick distribution and then
  + Frequentist – calculate probability given information
  + Bayesian – have initial beliefs, wait until next event happens, update beliefs
* State space models
  + Use Bayesian to get parameters of models