Course Website

- https://bobshriver.github.io/UNR-EcoForecast/

Ecological Forecasting

What makes forecasting forecasting?

1) Focused on the future

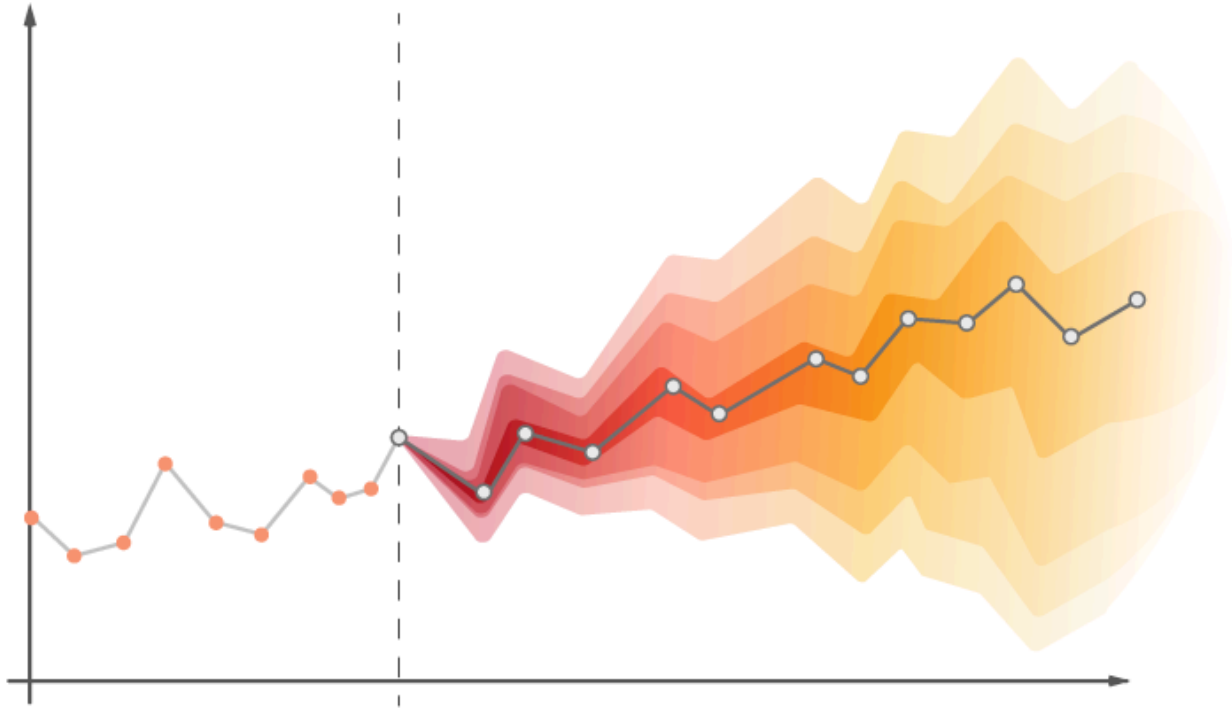
2) Quantitative

3) Uncertainty is central

4) Decision making support

Focused on the future

- Goal is to predict data that has not yet been observed.
- Out-of-sample prediction will be the standard of evaluation



https://medium.com/analytics-vidhya/time-series-forecasting-c73dec0b7533c

Quantitative

- Mathematical and statistical models are key tools to forecasting.
- Improvement comes through quantitative evaluation and updating.

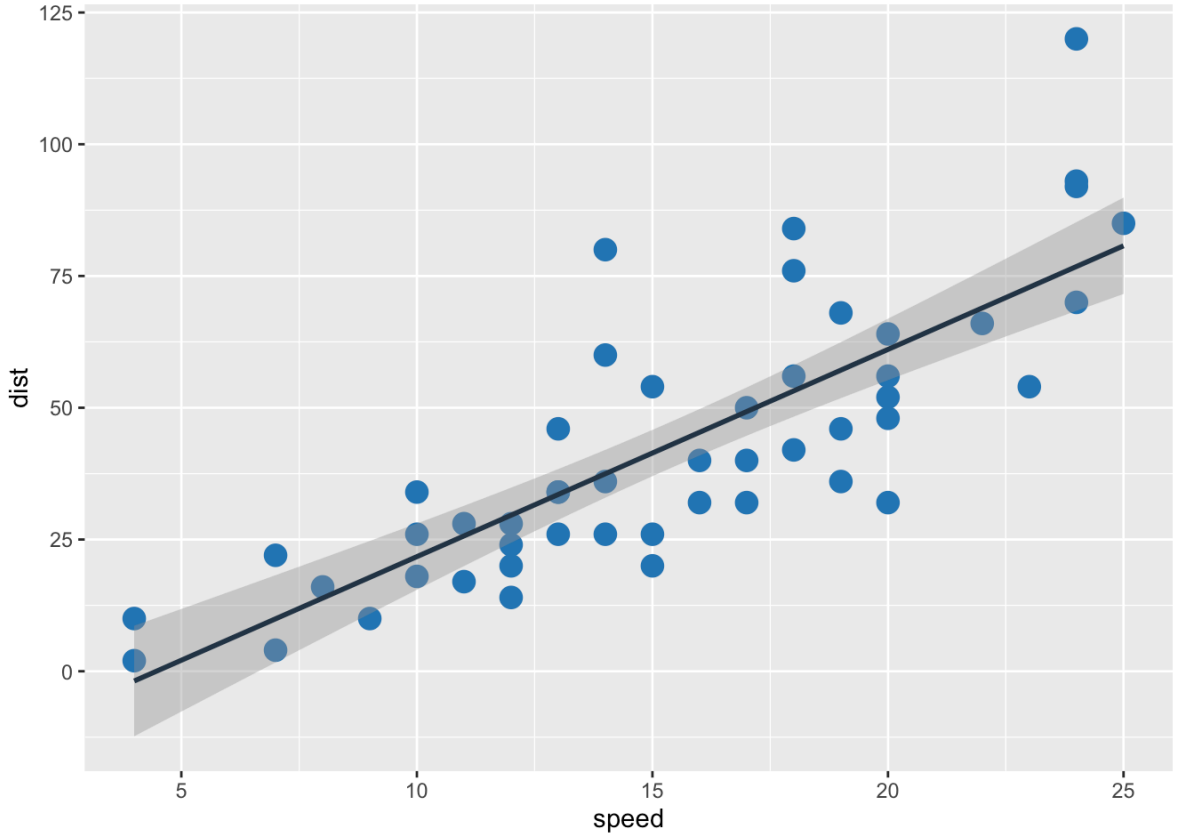
$$\overbrace{\prod_{i\in u}\overbrace{S_{i,0,t}}^{1A}\overbrace{\left(1-S_{i,t,t+\delta}\right)}^{1B}}^{1}\times\overbrace{\prod_{i\in c}S_{i,0,T_i}}^{2}$$

$$S_{i,t,t+\delta}=\prod_{q=t}^{t+\delta}(p_{i,q})$$

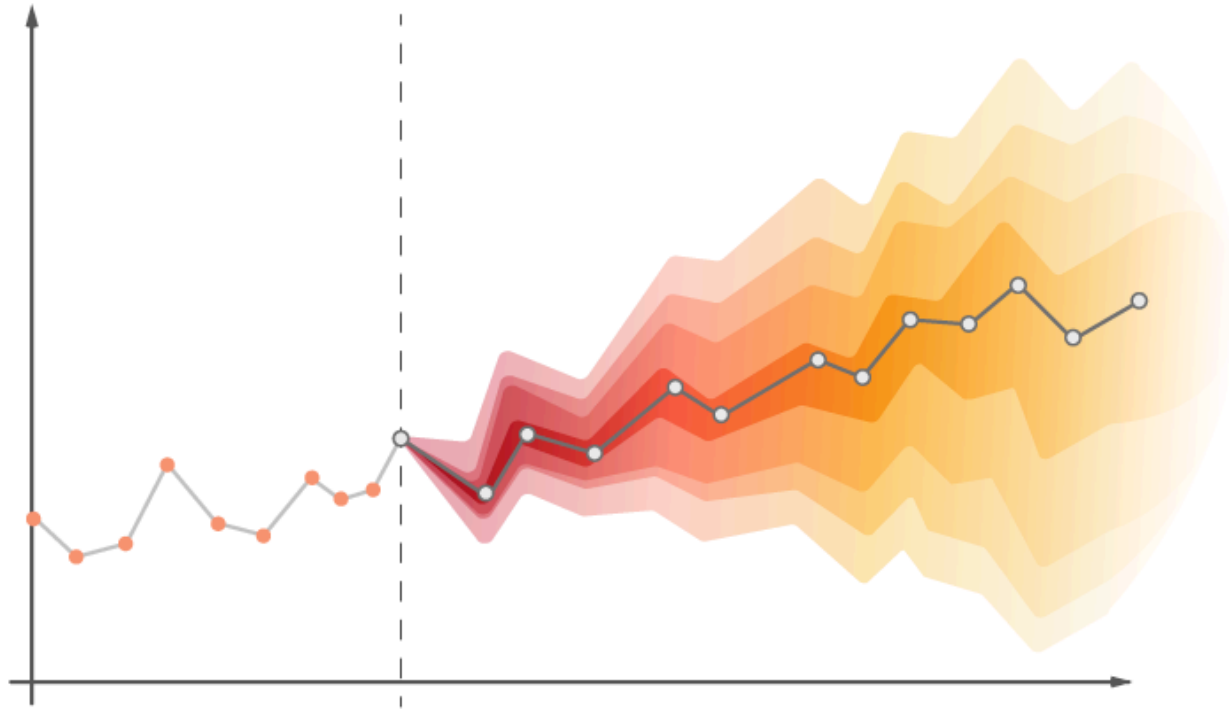
$$log\left(-\log(p_{i,t})\right)=\overbrace{X_{i,t}\beta}^{1}+\overbrace{\sum_{k=1}^{q'}C_{i,t,k}}^{2}$$

Uncertainty is central

- Quantifying and propagating uncertainty is essential to good forecasting.



https://rstudio-pubs-static.s3.amazonaws.com/195401_20b3272a8bb04615ae7ee4c81d18ffb5.html

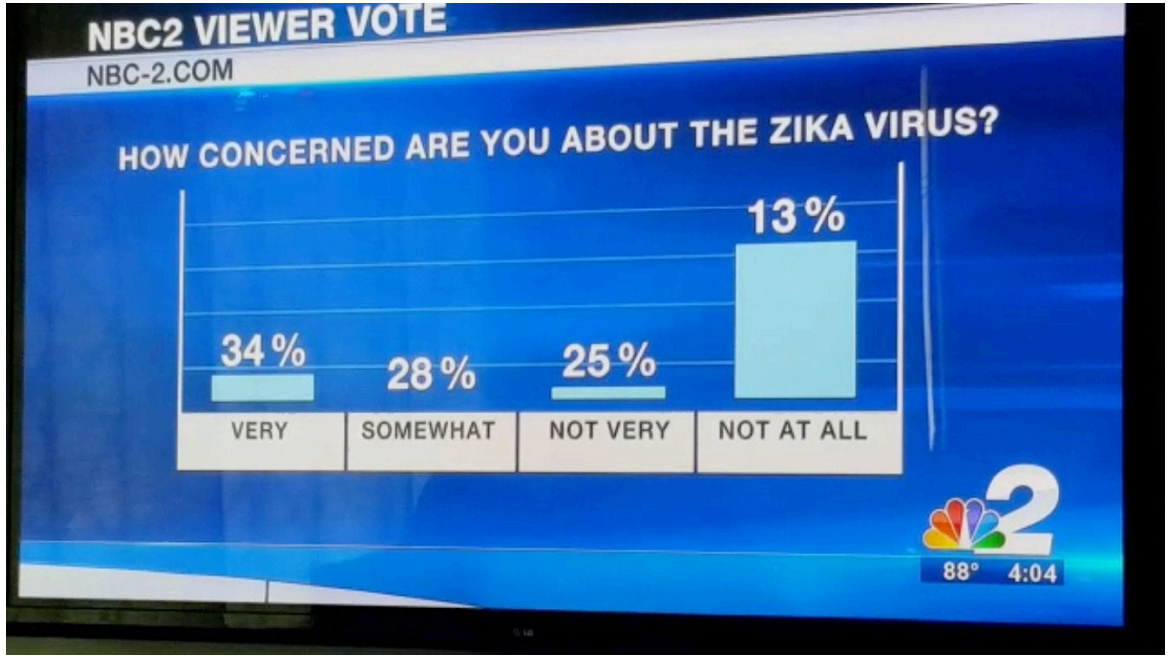


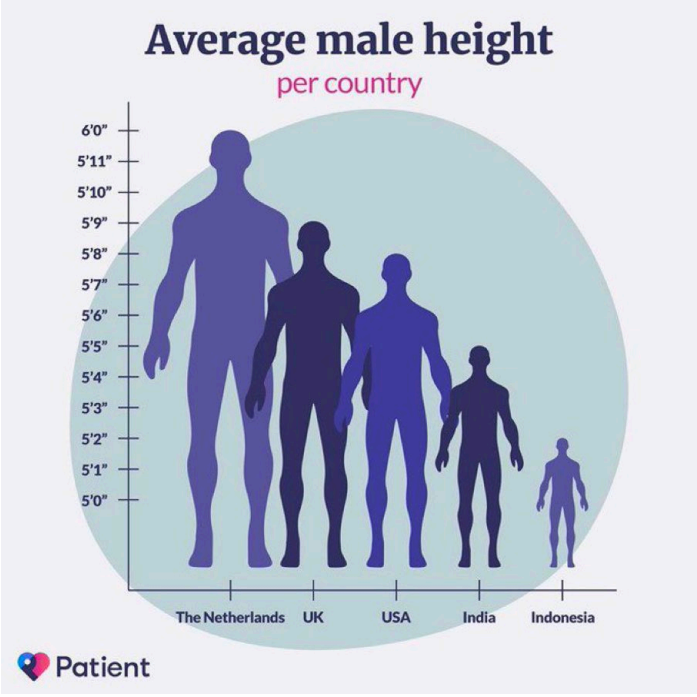
https://medium.com/analytics-vidhya/time-series-forecasting-c73dec0b7533c

Decision making support

- In many (most?) cases the goal of forecasting is to support decision making.

  - Communicating information in clear way is critical.





Class structure

- **Lectures:** Introduce concepts and approaches.

- **Labs:** Application of concepts in (semi) real world setting. Labs are meant to be done in class.

- **Discussion:** We will have periodic discussions of forecasted related readings. Pairs of students will lead one discussion in the second half of the semester

- **Project:** Opportunity to build your own forecast in system of interest to you. 2nd half of class.

Next several weeks.

1. General intro to forecasts
2. Simple time series models and forecasts
3. Intro to Bayesian stats and programming
4. Quantifying and propagating uncertainty
5. Forecasting competitions!
6. Discussions and individual projects

What do you want from the course?