November 9, 2021 Joint Methods & CI Working Group Call

Attendees: Libby Mohr, Jake Zwart, Carl Boeetiger, Matt Brousil, Josh Cullen, Jody Peters, Cee Nell, Rob Kooper, David LeBauer
Regrets: Mike Dietze, Kelly Heilman

Agenda/Notes:

1. From Mike: Discuss next steps beyond the current task views (2 done, 1 in progress, 1 on deck). In particular, I think we've completed enough of the task views that we could have some useful discussions about identifying gaps and bottlenecks in current methods and tools and ways we might think about moving forward on identifying and addressing those (e.g. surveys, workshops, hackathons, group projects, virtual panels / webinars, etc). This is also motivated by some recent interagency (NOAA, NASA, CDC) roundtables that EFI has been sponsoring where standards and community CI are emerging as priority items for the federal agencies (caveat, that doesn't mean there's any funds). It is also relevant to the next round of the EFI NEON challenge and the upcoming EFI2022 "all-hands" conference
    a. People have been recreating forecasting workflows for similar tasks and would be good to recycle workflows for use across projects
    b. Target audience would be federal agencies, academics, anyone creating forecasts
    c. What we have learned so far - there are people creating the forecast and there are people running the Challenge. Need a format that works for both of those and work well for challenges that go across multiple types of forecasts
    d. For the NEON Challenge, the design is dictated by how the forecasts are scored. Point forecast vs distribution forecast.
    e. Standards can be dictated by tools especially if there are dominant tools. Forecasting has a couple of different pockets of tools so isn't limited to just one or a few dominant tools
    f. Would like a tool for converting a wgrib to csv or netcdf - something that is easy for people to use. We have that now with the NEON Challenge
        i. This is a good way to pull back the onion - you see the file format, then once you open it, you see what the structure is. Having a standard defined gives language to talk about the different bits and pieces. But the current standards were created without many users providing input. We are currently in the process of updating the original standards based on experience with the NEON Challenge. We are getting into the weeds with updates we are making to the Standards

based on the experience of the Challenge, but these are the things we will want to discuss with other users.

ii. Figuring out how to score probability forecasts is a pain, but if forecasts are all formatted the same, then we don't have to do the hard part of scoring. Show the immediate benefit that people will get by using a specific format for the forecast metadata/output. This is also true for visualization - if there is a format/standard that people can follow, then you can get a cool visualization because the data is in the right format. This provides the payoff for using the standardized format.

g. On the flip side - don't think anyone would use wgrib today. But once you have been doing forecasts decades on decades, there is a reluctance to change format.

h. Concrete gap - representing distributions. We had a crude pass at it with the NEON Challenge. This was a gap that we partially filled, but needs to be expanded even more. We want more parametric distributions. Want to see if this resonates with the other groups/agencies.

i. Implicit gap - scoring forecasts, particularly in the context of a Challenge where there are many sites and many different forecasts. Think we have filled this gap with the updated scoring protocol. But want to hear how others deal with this.

i. Scoring seems like one of the top needs for having a standard. Something that lets you compare apples to apples across a bunch of forecasts

ii. Visualization is right after that, including visualizing the scores

iii. Visualization is hard in the context of phenology when you are forecasting every day. When you have a point forecast for Oct 3, you have forecast 30 days out, another 29 days out. So visualizing that complexity is not always clear how to do that.

j. Community CI is emerging priority

i. how to keep a forecast running w/o further maintenance from group that created it

k. Where is this going? Check in with Mike for more details about what this gap information will be useful for

i. If there is a planned meeting with agencies and have opportunities to get together to talk.

ii. USGS could also contribute

2. Visualization/Decision Support Tools, User Interface Task View

a. What will work best for continuing to write?

i. continue to edit in-place a bit longer until we closer to the final formatting steps
ii. Manually put the Rmd syntax into the Google doc to make later exporting easier
iii. Try out one of the new packages like trackdown for integrating Google doc and Rmd
iv. For now continue to make edits in the Google doc

b. Any thoughts on how to incorporate examples throughout?
   i. See notes below about adding examples of plots
c. Go over Section 1 - Core Principle with Jessica if she is available.
   i. Where to put the bibliography and background material? In section 0 - intro?
   ii. Do we want to move section 13 on environmental decision support into IDEA 3.
   iii. Is Section 12 on user interfaces and dashboards best practices (if so then move to section 1) or is it a list of tools (if so then keep as its own section)
d. From today's call:
   i. Sections 12-14 seems like best practices so could merge them into Section 1 and then Section 6 would have the tools
   ii. Would be good to have some social scientist to look over it to make sure there isn't a bunch of other things that need to be included.
      1. Jody will bring this up to the Social Science group on their next call
   iii. Static Section 4 looks good
      1. Network plot - not sure if this is useful for forecasting. Could take it out
      2. Libby hasn't plotted much in Python, but seems the 3 libraries people use most often are Matlib, Pandas, and Seaborn, so could look for the packages there - Does anyone else knows Python better?
         a. Could just go with R. In the recap Jody sends out she will ask if anyone has experience with plotting in Python and can drop in those packages. If they don't then, we'll just go with the R packages.
      3. Would be nice to have visual examples of plots in this section along with the text about them
         a. See this example example with plots in the margin https://bookdown.org/yihui/rmarkdown/tufte-figures.html#margin-figures
         b. Palmer penguin dataset - has enough continuous and categorical variables that could be used

   c. Had also talked about using forecasting from the EFI Challenge
   d. Libby and Matt have some bandwidth to work on providing example plots
   e. Carl/Quinn have been doing a lot of java based visualization for the NEON Challenge
      i. https://projects.ecoforecast.org/neon4cast-dashboard/phenology
      ii. Source code: https://github.com/eco4cast/neon4cast-dashboard
   f. Dashboard is an exploding content. R Studio is making tons of packages for making these dashboards. There is a whole wealth of website design/visualization information
   g. The dashboard changes how to do the design - html and javascript. You are not quite a web designer, but you are in the world for visualizing data in terms of how people think of visualizing with html as opposed to running code such as in R Shiny
4. Interactive Spatial Visualization section - has a number of tools listed, would be good to get some text added with brief description. Can check in with Chris about this.

3. Uncertainty Quantification & Propagation, Modeling & Stats and Workflow Task Views to use as Reference: https://projects.ecoforecast.org/taskviews/

4. Data Ingest, Cleaning, Management
   a. Placeholder until we are further along with the other Task Views or have an identified leader for this

5. NEON Ecological Forecast Challenge CI Update