STAT157 HW 7

March 1, 2023

Due Tuesday, March 7 at 11:59pm

Deliberate Practice: Prioritizing Information

Expected completion time: 90 minutes

In this deliberate practice, produce a forecast for the following question:

> What will the price of crude oil be on March 8, 11:59 pm PT? (Specifically WTI Crude Futures)

using techniques from lecture, by going through the following steps: (note that for this exercise, we intentionally want you to limit the time you spend on each step, since we are practicing prioritizing the most important considerations given time constraints – set a timer if it would help!)

1. Spend **10 minutes** brainstorming key considerations that would affect your forecast.

2. Spend **5 minutes** assigning ratings to each of the considerations for importance, uncertainty, and how quickly you can resolve the uncertainty (as in Lecture 11).

3. Using those ratings, rank the considerations in order of priority to reduce uncertainty. Spend **30 minutes** using Google/other resources to reduce uncertainty on those top ranked considerations.

4. Spend **10 minutes** to re-evaluate the uncertainty on your considerations.

5. Spend **30 minutes** writing up this exercise. Please include:

   - Your considerations, ratings, which considerations you chose to research, and how much uncertainty you reduced using external sources.
   - Your final point estimate (mean estimate) for the forecast.
   - Reflections on the exercise – were some considerations harder than expected to research? If you were to do this again, would you have chosen different considerations to research with your 30 minutes?

Submit this writeup to Gradescope.

On Gradescope, please also submit the time it took to complete this exercise.

Deliberate Practice: Structural vs. Numerical Uncertainty

Expected completion time: 110 minutes

Using the forecast you created for the above question, assess the uncertainty of your point estimate with the following steps:

1. Assess structural uncertainty:

   - Brainstorm 2 considerations relevant for structural uncertainty, i.e. considerations that could cause your previous estimate to be totally off (see Lecture 12 for examples).
   - For each of these considerations, quantify how much they would change your estimate, and quantify the probability that these considerations turn out to be true and relevant.
   - Based on this, create an 80% confidence interval around your original point estimate based on structural uncertainty.

2. Assess numerical uncertainty:

   - For 2-4 of the considerations you generated above in Deliberate Practice: Prioritizing Information, assess the sensitivity of your forecast to numerical uncertainty in these considerations.
   - Based on this, create an 80% confidence interval around your original point estimate based on numerical uncertainty (if you had additional considerations beyond these 2-4, there's no need to do extra work to explicitly assess their sensitivity, but try to subjectively include their uncertainty in this 80% interval).

3. Combine the structural uncertainty confidence interval and the numerical uncertainty interval into a final 80% confidence interval for the forecast question.

4. Write up your considerations, quantifications, and reflections on the final confidence intervals you produced.

On Gradescope, please also submit the time it took to complete this exercise.

Predictions

Expected completion time: 120 minutes

Register the following predictions. You can submit them by going to this URL and following the form's instructions. For these predictions, (and all predictions about the future throughout this class), we encourage you to use external sources – by googling things, reading news articles, talking to friends who follow politics or music stats, etc.

1. How much money will be raised during Berkeley Big Give 2023?

   - This question resolves based on the total amount raised during Cal Big Give 2023, which will be posted on its official website after the event.

2. How many new entries will be added to Spotify's daily Top 50 USA chart on March 11?

3. Will Counter-Strike: Global Offensive reach its all-time peak of 1,500,000 players before the end of March 28?

   - This question will resolve positively if the "all-time peak" figure of CS: GO on Steam Charts is greater than or equal to 1,500,000 at 11:59 PM, March 28.

4. Who will win the 2023 Indian Wells Men's Singles tournament? Give a probability that it's Novak Djokovic, Carlos Alcaraz, Stefanos Tsitsipas (the current ATP top 3), Rafael Nadal (last year's winner), or someone else.

For each question, submit an inclusive 80% confidence interval or your probabilities, as well as an explanation of your reasoning (1-2 paragraphs). **Please include a copy of your google form responses with your Gradescope submission.** On Gradescope, please also submit the time it took to complete this exercise.