STAT165 / 265: Forecasting

Discussion 5: Combining Forecasts

2/21/2024

You will work through this sheet in class on Friday, 2/21 in groups of 2-3. In the first question, you'll apply the techniques from the Combining Forecasts lectures. In the second question, you will combine confidence intervals around Fermi estimates. Finally, in the third question, you will discuss a forecasting question from this week's homework with your group.

Please submit the Discussion sheet for participation points on Gradescope under the "Discussion 5 Worksheet" assignment. Submit what you have at the end of the hour – it's ok if you didn't finish every question thoroughly!

For students who have contacted us about absences this Friday, please spend an hour on this sheet and submit to the same Gradescope assignment.

Part I. Combining Forecasts

For each of the following questions, combine the 80% confidence intervals using the methods covered in the Combining Forecasts lectures. Which method makes the most sense to you?

Q1: How many visits to Google.com were there in December 2023?
Answer: 84.2 billion (source: Statista)

- Interval 1: [10 billion, 1 trillion]
- Interval 2: [1 billion, 100 billion]

a) Taking the mean:

[5.5 billion, 550 billion]

b) Taking the mean in log space:

We average the exponents
[10^9.5, 10^11.5] which is approx. [3.2B, 320B]

Q2: What will the total worldwide box office gross be for Avatar 2 in the 12 months after its release, in dollars?
Answer: 2.32 billion dollars. (source: Metaculus)

- Interval 1: [1.3 billion, 1.9 billion]
- Interval 2: [1.9 billion, 2.5 billion]
- Interval 3: [2.5 billion, 3.1 billion]

a) Taking the mean:

We average the lower bounds to get 1.9B
We average the upper bounds to get 2.5B

[1.9B, 2.5B]

b) Taking the mean in log space:

Rewrite the intervals as powers of 10.
We average the exponents of the lower bounds to get 1.83B
We average the exponents of the upper bounds to get 2.45B

[1.83B, 2.45B]

c) Estimating a central value μ and a standard deviation, as in lecture 9:

$$\mathrm{LB}^* = \mu - \sqrt{\frac{1}{n}\sum_i (\mathrm{LB}_i - \mu)^2}, \quad \mathrm{UB}^* = \mu + \sqrt{\frac{1}{n}\sum_i (\mathrm{UB}_i - \mu)^2}$$

In linear space:
Approx. [1.6255B, 2.7745B]

In log space:
Approx. [1.5635B, 2.7153B]

Part II. (Fermi) Estimations

In groups of 2-3, estimate the following two known quantities. Use estimation techniques to try to get an accurate point estimate, and **additionally create an 80% confidence interval.** After finalizing an estimate in those groups, please pair up with another group, and among the 4-6 of you, discuss how you would merge the two different estimates. In the space below each question, jot down your notes and reasoning. Also jot down any difficulties or interesting things that came up when you merged estimates between groups.

Estimation 1. How many people visited Yosemite National Park in 2019?
Answer: 4.42 million (source: Statista)

Reflections from merging estimates:

Estimation 2. What was the median price for 2-bedroom houses in the Bay Area in 2020 (as reported by Statista)?

Answer: 1,058,000 dollars (source: Statista)

Reflections from merging estimates:

Part III. Future Forecast Discussion

Discuss in groups of 2-3 this forecasting question from this week's homework:

> *What will be the **sum of the durations**, in minutes, of the films that win the following awards at the 96th Academy Awards?*

1. Best picture
2. Best actress
3. Best animated feature film
4. Best original song
5. Best animated short film

> *For example, if "American Fiction" (117 min) wins best best picture, Annette Bening from "Nyad" (121 min) wins best actress, "Spider-Man: Across the Spider-Verse" (140 min) wins best animated feature film, "What Was I Made For?" from "Barbie" (114 min) wins best original song, and "Our Uniform" (7 min) wins best animated short film, then the answer would resolve as 117+121+140+114+7=**499**.*

The next page includes some background info that could be helpful. In the space below, jot down notes about the different considerations you are weighing for this forecast, what other information you would like to look up later, etc.

Nominations by Category (source)

DISCLAIMER: There may be typos in the figures below. Double check any data taken from here for accuracy before using it in your final forecast. Durations taken from imdb.com.

Best picture

- "Anora" (Neon) (2h 19 min)
- "The Brutalist" (A24) (3h 34 min)
- "A Complete Unknown" (Searchlight) (2h 21 min)
- "Conclave" (Focus) (2h)
- "Dune: Part Two" (Warner Bros.) (2h 46 min)
- "Emilia Pérez" (Netflix) (2h 12 min)
- "I'm Still Here" (Sony Classics) (2h 17 min)
- "Nickel Boys" (Amazon/MGM) (2h 20 min)
- "The Substance" (Mubi) (2h 21 min)
- "Wicked" (Universal) (2h 40 min)

Best Actress

- Cynthia Erivo, "Wicked" (2h 40 min)
- Karla Sofia Gascón, "Emilia Pérez" (2h 12 min)
- Mikey Madison, "Anora" (2h 19 min)
- Demi Moore, "The Substance" (2h 21 min)
- Fernanda Torres, "I'm Still Here" (2h 17 min)

Best animated feature film

- "Flow" (Janus Films/Sideshow) (1h 25 min)
- "Inside Out 2" (Disney/Pixar) (1h 36 min)
- "Memoir of a Snail" (IFC Films) (1h 35 min)
- "Wallace & Gromit: Vengeance Most Fowl" (Aardman/Netflix) (1h 22 min)
- "The Wild Robot" (Dreamworks/Universal) (1h 42 min)

Best original song

- "Never Too Late," "Elton John: Never Too Late" (Elton John & Brandi Carlile) (1h 42 min)
- "El Mal," "Emilia Pérez" (Clement Ducol, Camille & Jacques Audiard) (2h 12 min)
- "Mi Camino," "Emilia Pérez" (Clement Ducol & Camille) (2h 12 min)
- "Like a Bird," "Sing Sing" (Adrian Quesada & Abraham Alexander) (1h 47 min)
- "The Journey," "The Six Triple Eight" (Diane Warren) (2h 7 min)

Best animated short film

- "Beautiful Men" (18 min)
- "In the Shadow of the Cypress" (20 min)
- "Magic Candies" (21 min)

- "Wander to Wonder" (14 min)
- "Yuck!" (13 min)

Kalshi Prediction Markets (as of Thursday, Feb 20)

Oscar for Best Picture:
Anora: 69%
The Brutalist: 18%
Conclave: 8%

Oscar for Best Actress:
Demi Moore: 50%
Mikey Madison: 42%
Fernanda Torres: 6%

Oscar for Best Animated Feature:
The Wild Robot: 68%
Flow: 29%
Wallace and Gromit: Vengeance Most Fowl: 4%

Oscar for Best Original Song:
El Mal: 70%
The Journey: 13%
Mi Camino: 4%