Ethics Part II - Week 5 Lab

Question Sheet

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Task 1: Pick one or more topic(s) that interest to you and that has been relatively well explored in the academic literature. Find one report/study relating to your chosen topic at each stage in the hierarchy of evidence.

- Anecdotal Evidence
- Observational study with matched cases/controls
- Prospective observational study (cohort study)
- Randomised Control Trial
- Systematic Review / Meta-analysis

Task 2: Consider an example of an online gaming company trying to predict in-game sales based on player demographic information. Give a short explanation of covariate shift, concept drift and prior shift in this context.

Task 3: A Poisson GLM is used to model the number of faults (Y_i) in a rolls of cloth, each will different lengths (z_i):

$$Y_i \sim \text{Pois}(\lambda_i) \quad \text{where} \quad \log(\lambda_i) = \beta_0 + \beta_1 z_i.$$

Using this Poisson regression as an example, explain the difference between a confidence interval, a credible interval and a prediction interval.

Task 4: The files `point_estimates.csv`, `function_estimates.csv` and `map_estimates.csv` respectively contain bootstrapped estimates of a scalar valued outcome, a 1 dimensional functional outcome and a mapped outcome on a 2-dimensional grid. Explore at least two ways of visualising uncertainty in each of these cases.