Algorithm Bayes

Parameters: Prior distribution $p_1 \in \Delta_N$; number of trials T.

Algorithm: Iterate for $t = 1, 2, \ldots, T$

1. Predict with the weighted average of the experts' predictions:

$$\hat{y}_t = \sum_{i=1}^{N} p_t(i) y_t(i)$$

2. Observe outcome y_t.
3. Update the posterior distribution:

$$p_{t+1}(i) = \frac{p_t(i) L(y_t(i), \hat{y}_t)}{Z_t}$$

where the normalizing factor is:

$$Z_t = \sum_{i=1}^{N} p_t(i) L(y_t(i), \hat{y}_t)$$

Algorithm SBayes

Parameters: Prior distribution $p_1 \in \Delta_N$; number of trials T.

Algorithm: Iterate for $t = 1, 2, \ldots, T$

1. Predict with the weighted average of the predictions of the awake specialists:

$$\hat{y}_t = \frac{\sum_{i \in S_t} p_t(i) y_t(i)}{\sum_{i \in S_t} p_t(i)}$$

   where S_t is the set of awake specialists.
2. Observe outcome y_t.
3. Update the posterior distribution:

$$p_{t+1}(i) = \frac{p_t(i) L(y_t(i), \hat{y}_t)}{Z_t}, \quad \text{for } i \in S_t$$

   Otherwise, if $i \notin S_t$, then $p_{t+1}(i) = p_t(i)$.

$$Z_t = \sum_{i \in S_t} p_t(i) L(y_t(i), \hat{y}_t)$$