Response Sampling & Semantic Cluster

High uncertainty cases in Semantic Entropy



Answer 1: The last U.S. state to reintroduce alcohol ... was **Kentucky**.

Answer 2: The last U.S. state to reintroduce alcohol ... was **Kentucky**.

Answer 3: The last U.S. state to reintroduce alcohol ... was **Wyoming**.

Answer 4: The last U.S. state to reintroduce alcohol ... was **Wyoming**.

Answer 5: The last U.S. state to reintroduce alcohol ... was **Mississippi**. 0.1 0.1

Ground truth: Utah



Low uncertainty cases in Semantic Entropy

Question2: How many seconds are there in an hour?

Answer 1: There are **3, 600 seconds** in an hour. Answer 2: There are **3600 seconds** in an hour.

Answer 3: There are **3, 600 seconds** in an hour. 0.2

Answer 4: There are **3600 seconds** in an hour.

Answer 5: There are **3600 seconds** in an hour.

Ground truth: 3600



Question3: Where are the Huron Falls?

Answer 1: The Huron Falls ... **Huron Mountains** of **Michigan**, USA. Answer 2: The Huron Falls ... **Huron River** in **Michigan**, United States. 2 0.2

Answer 3: The Huron Falls ... **Huron River** in **Michigan**, USA.

Answer 4: The Huron Falls ... **Huron River** in **Michigan**, United States. 2 0.2

Answer 5: The Huron Falls ... **Huron Mountains** of **Michigan**, ...

Ground truth: Ricketts Glen State Park, Pennsylvania



This situation accounts for a large proportion.

0.3

0.2

0.2

0.2

0.2

0.2

0.2

0.2

0.2

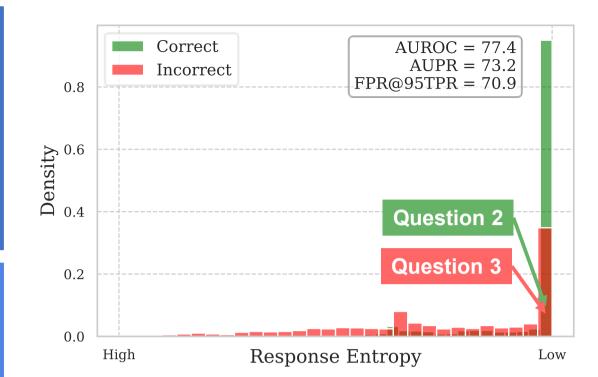
0.2

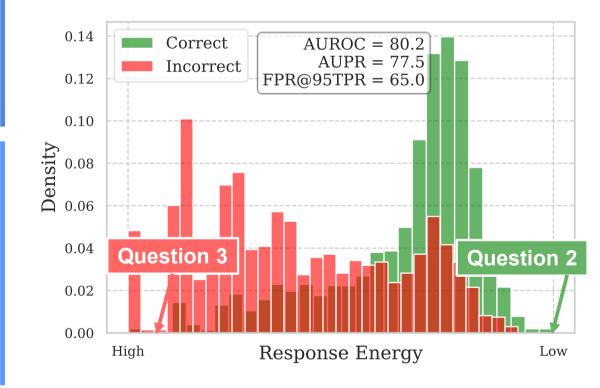
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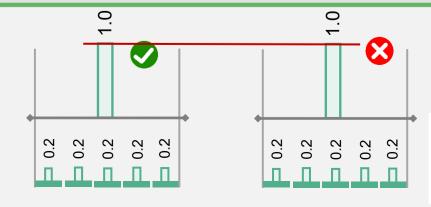
0.5

0.4

Performance







Uncertainty Estimation

Cannot be distinguished based on probability

$$H_{SE} = -\sum_{k=1}^{K} p(C_k) \log p(C_k) \qquad U = \frac{1}{nT_i} \sum_{x(i) \in E} \frac{1}{nT_$$

Can be distinguished based on energy

$$U = \frac{1}{nT_i} \sum_{x^{(i)} \in C_L} \sum_{t=1}^{T_i} -z_{\theta}(x_t^{(i)})$$

