Continually Improving Extractive QA via Human Feedback

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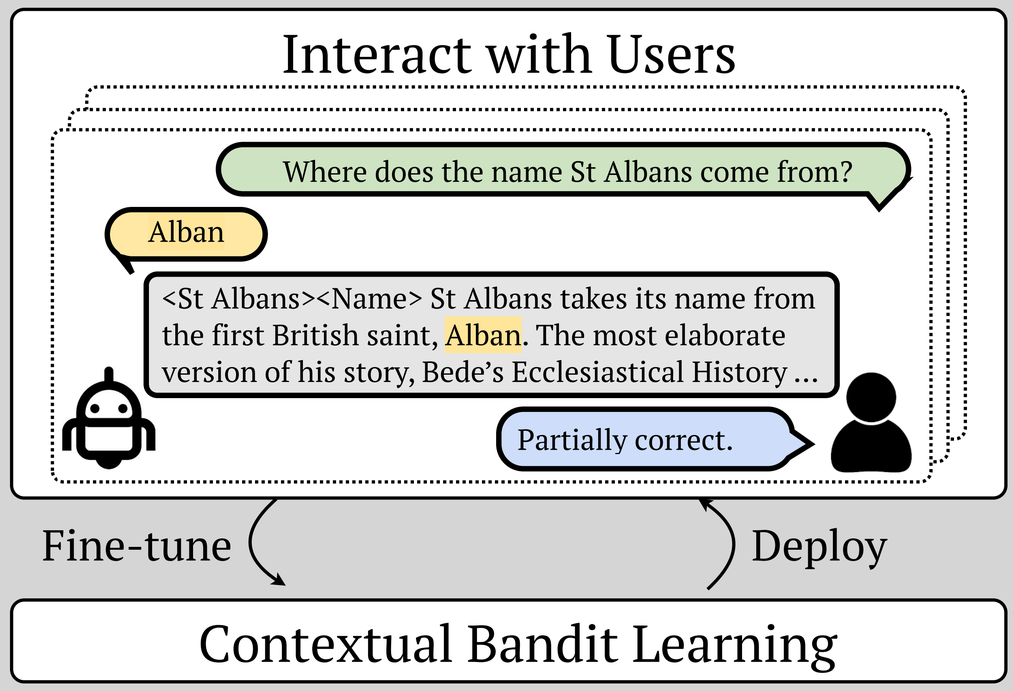
Code & Data

How to improve NLP systems by learning from user feedback?

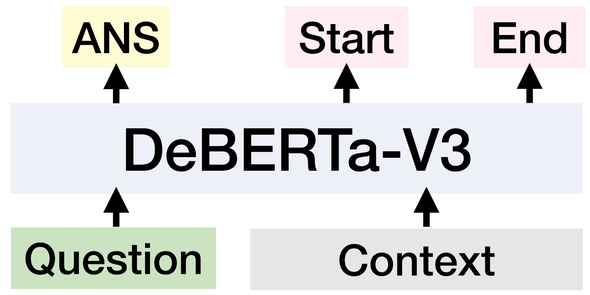
We present a user feedback study through **bandit learning** on **extractive QA task**

- 200 examples per round, 9 rounds
- Information-seeking MTurk workers pose questions and give feedback
- Topics/contexts from Wikipedia



Approach

- Model classifies if question is answerable, and answer span (if answerable)
- We heuristically map user feedback into two reward values (r_1, r_2).
- After each round of deployment, update the model with policy gradient



QA model

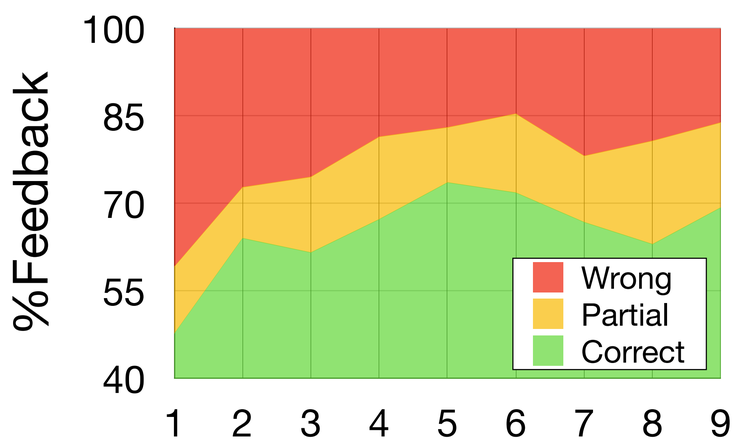
Inverse Propensity Score (debiasing reward) $\frac{\pi_\theta(\cdot|\bar{q},\bar{c})}{\pi'_\theta(\cdot|\bar{q},\bar{c})}$

$$\alpha_1 r_1 \nabla_\theta \log \pi_\theta(\hat{u}|\bar{q},\bar{c}) + \alpha_2 r_2 \nabla_\theta \log \pi_\theta(\hat{y}|\bar{q},\bar{c}) + \gamma \nabla_\theta H(P_u(\cdot|\bar{q},\bar{c}))$$

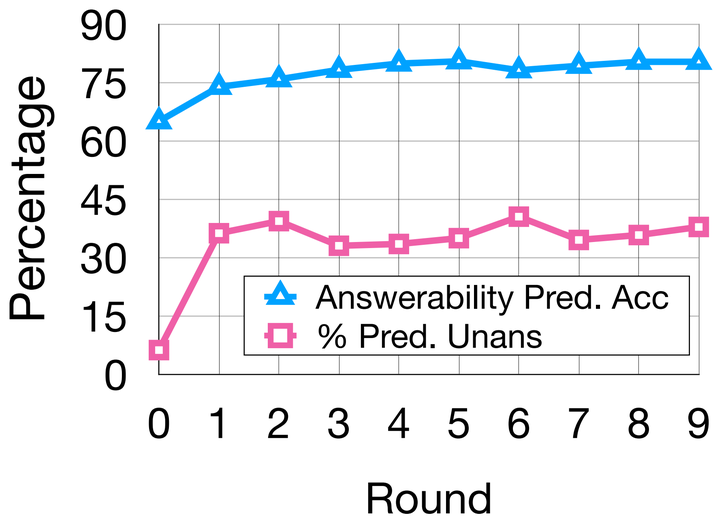
Answerability reward · Model-predicted answerability · Span reward · Model-predicted span · Entropy penalty

Results

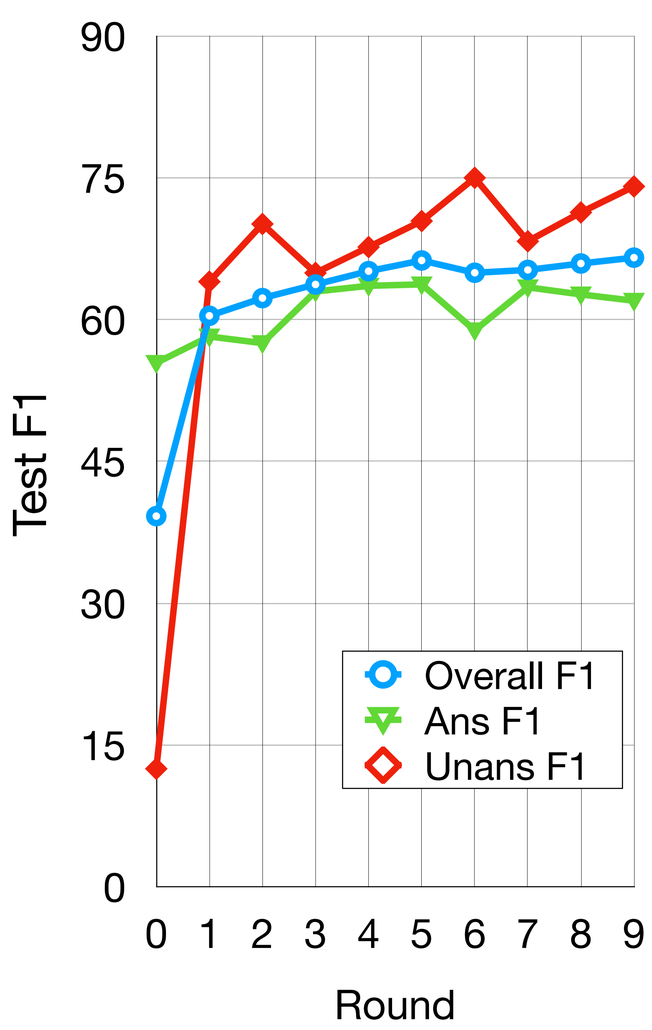
User Feedback Distribution



Answerability Prediction



Test Set Performance



- Domain Adaptation: NewsQA-trained model adapts to user distribution
- Performance degrades without answerability classifier