

Robust Training for Conversational Question Answering Models using REINforced Reformulation GENERATION

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SAMPLE CONVERSATION

- Q1: What's the 2022 LOTR TV series called?
 A1: The Rings of Power (TROP)
 Q2: TROP airing on?
 A2: Amazon Prime Video
 Q3: Which actor plays Isildur in the series?
 A3: Maxim Baldry
 Q4: And who in the Jackson trilogy?
 A4: Harry Sinclair
 Q5: Length of an episode?

CONVERSATIONAL QA IS CHALLENGING

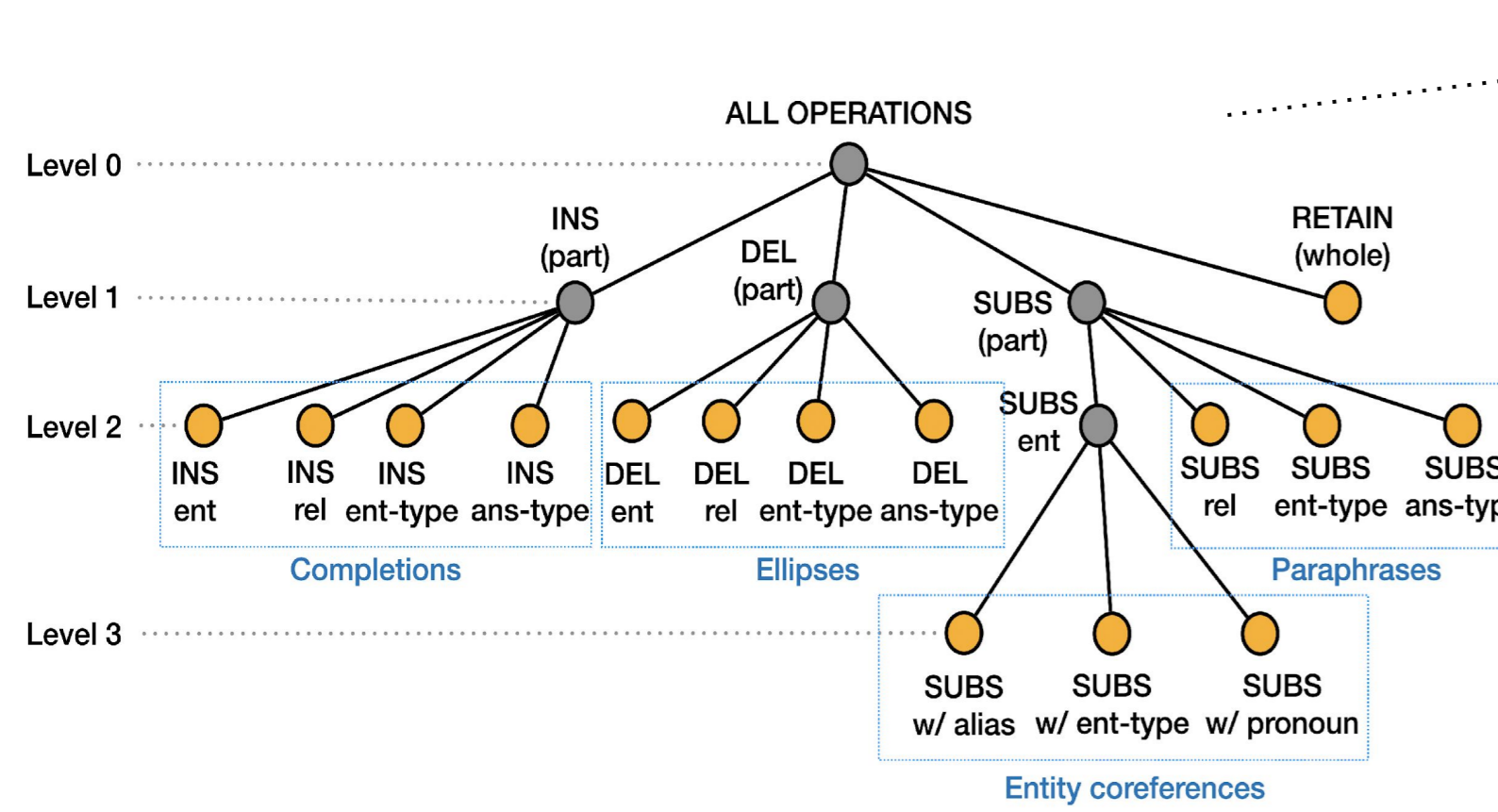
- Short, incomplete questions, implicit context
- benchmark-only training is **not robust** + standard data augmentation is **model-agnostic**, can be **inefficient** and **challenging** for ConvQA



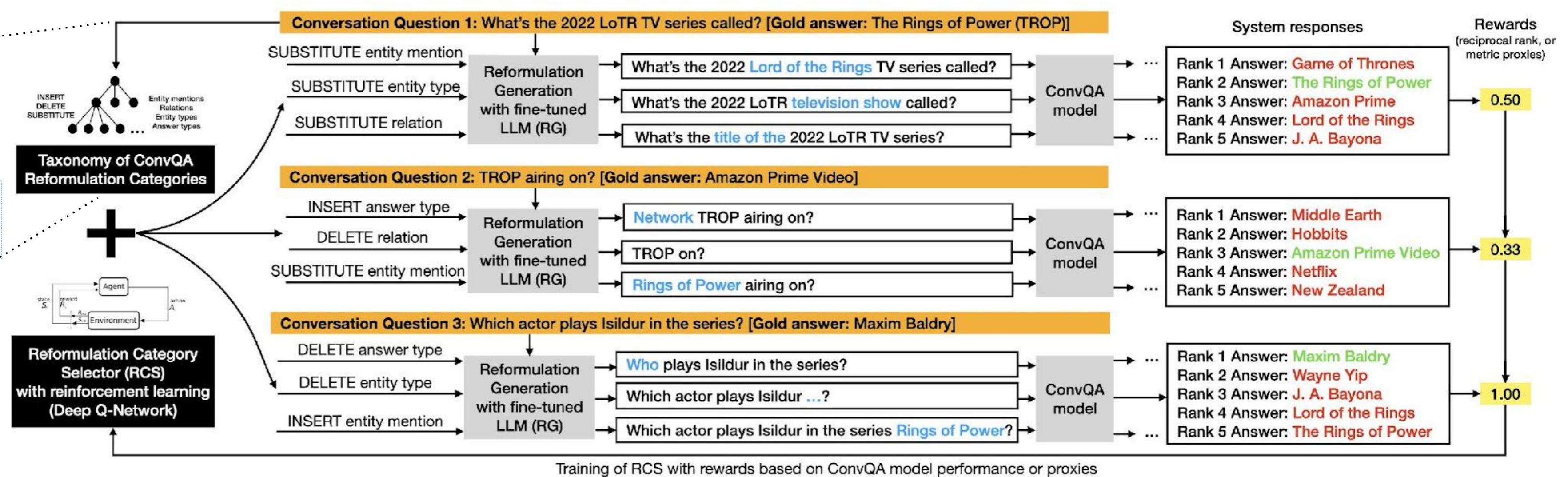
REIGN FRAMEWORK: ROBUST TRAINING OF CONVQA MODELS WITH REFORMULATIONS

- Reformulations are **generated** at scale in a **systematic way** following a **novel reformulation taxonomy**
- **RL model** with **Deep Q-Network** to **judiciously select** most **helpful** reformulations to **augment training data** of a given ConvQA system
- **335k** question reformulations of **test cases** in two ConvQA benchmarks for **large-scale** evaluation of model's **robustness**

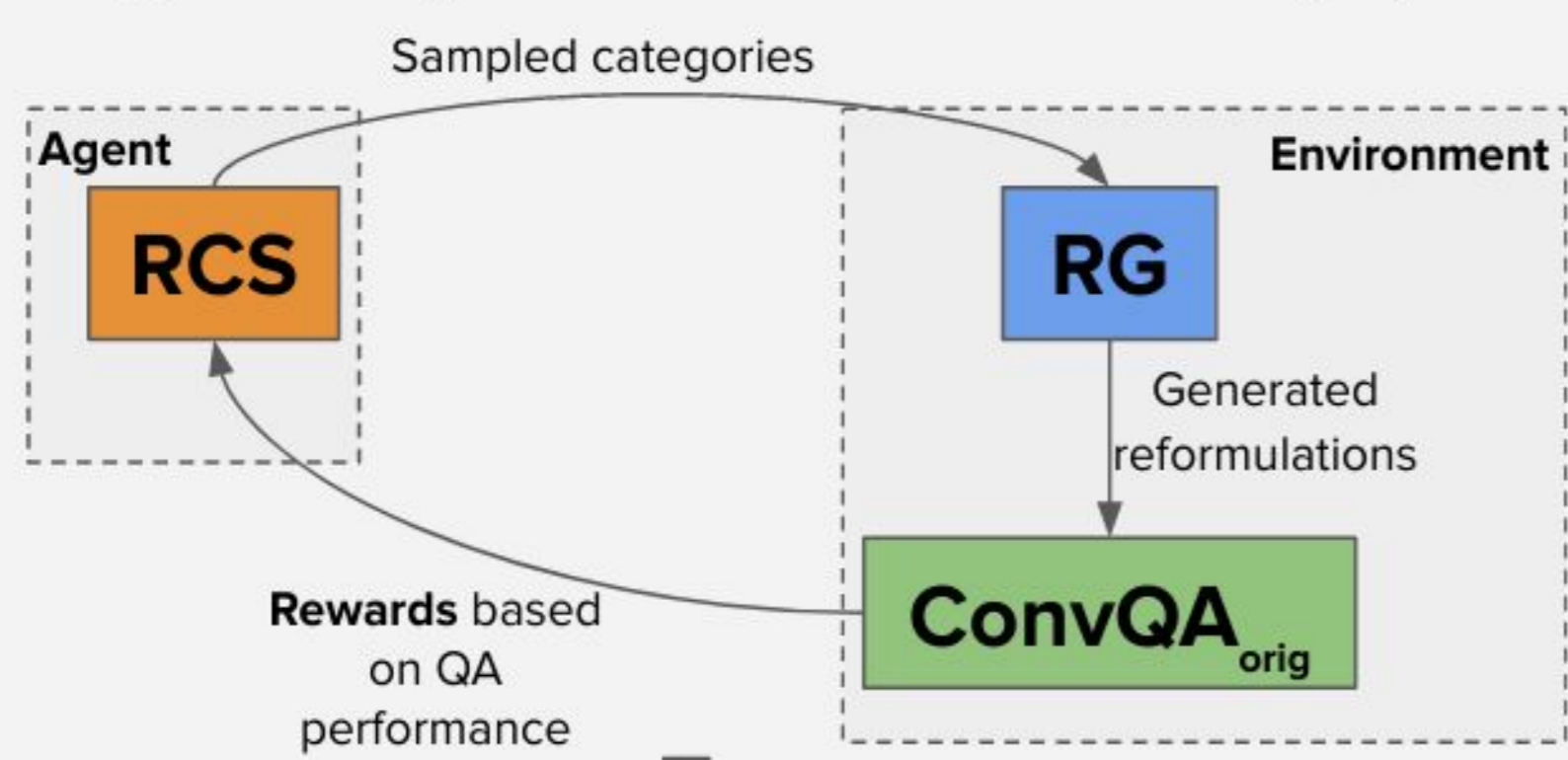
REFORMULATION TAXONOMY



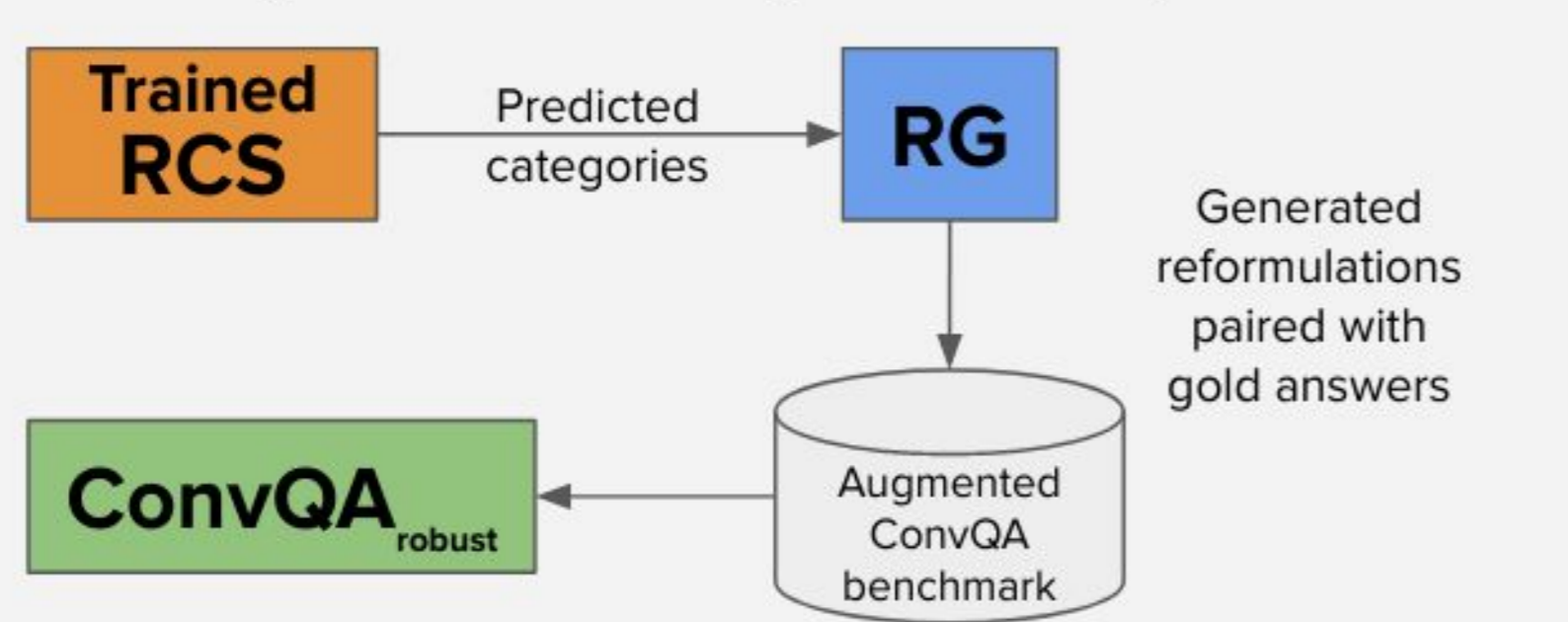
REIGN PIPELINE



RCS training: Learning to select reformulation category



ConvQA training: Robust learning to answer questions

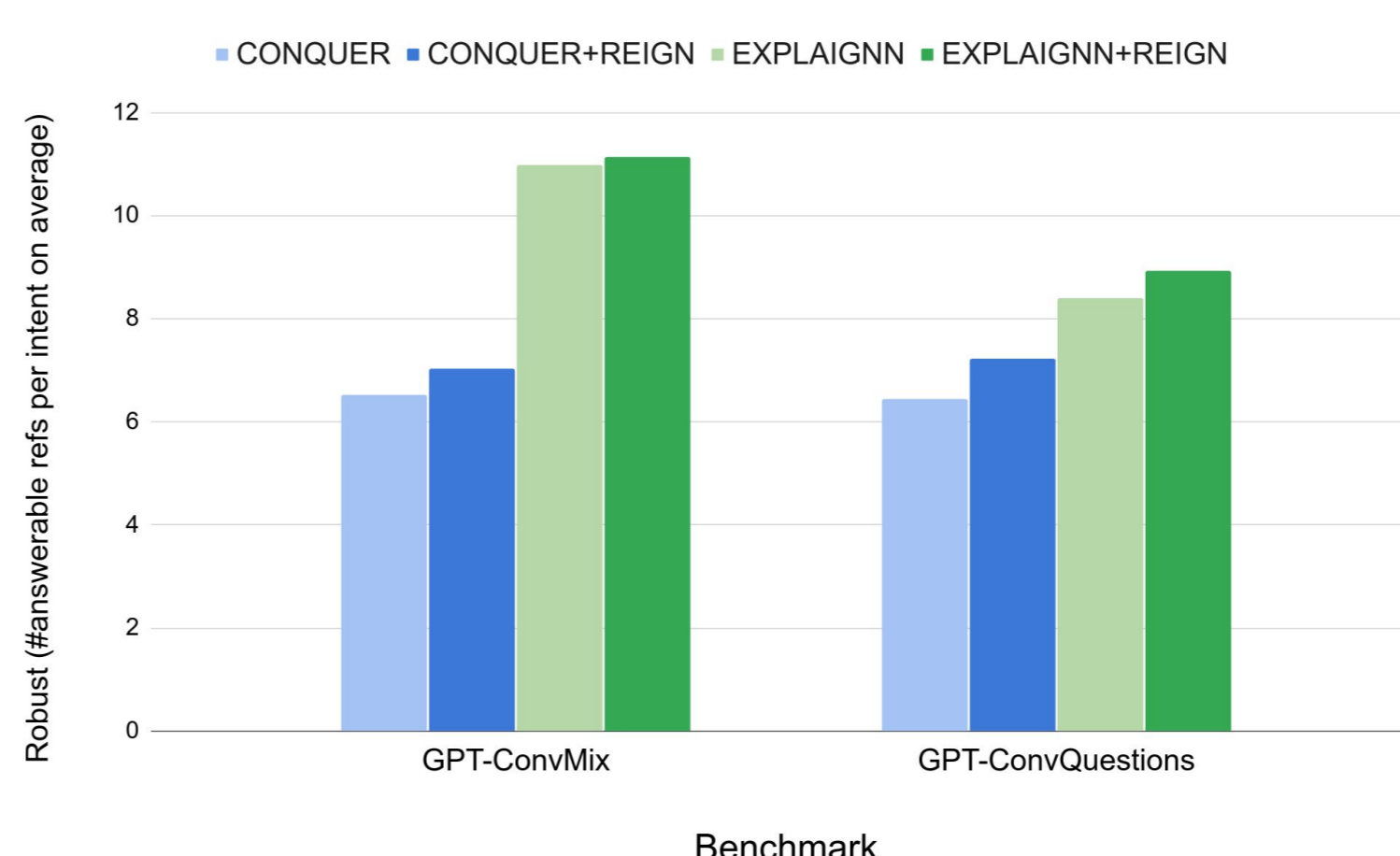
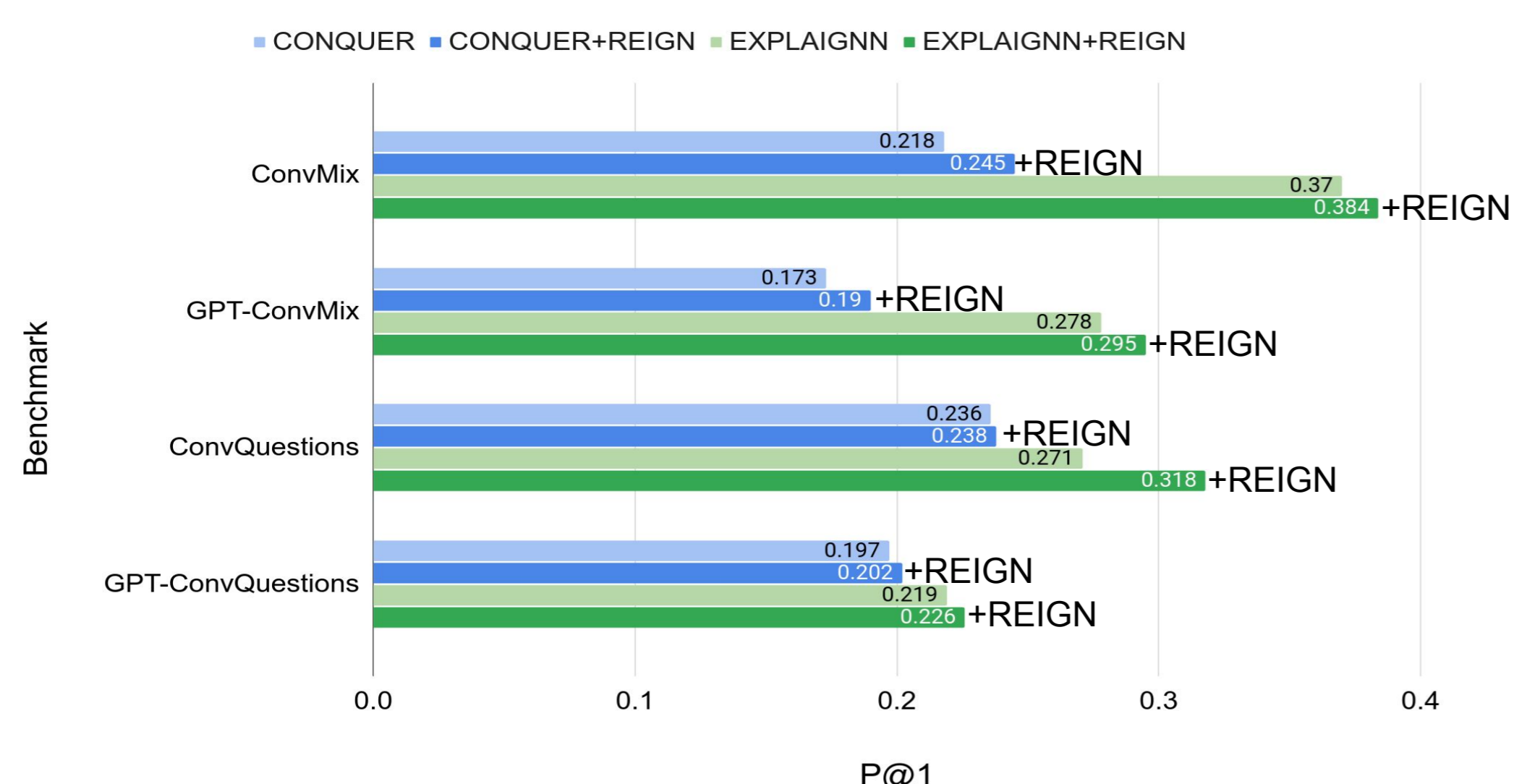


REIGN WORKFLOW

1. Learn to select **most suitable reformulation categories** (RCS with **DQN**) per question in training set (categories based on taxonomy)
2. Use a **fine-tuned LLM** to **generate reformulations given question and category** as input (fine-tuned on noisy rule-based reformulations)
3. **Augment training set** with newly generated reformulations to **train the ConvQA model more robustly**

LARGE-SCALE EVALUATION & RESULTS

- GPT-ConvMix/GPT-ConvQuestions test sets **generated** with **GPT-3.5** (335k reformulations, 20 refs per original question)
- Models coupled with REIGN:
 - reach **higher** answering **performance**
 - answer **more** reformulations per question **intent correctly**



More details at:
reign.mpi-inf.mpg.de

