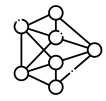
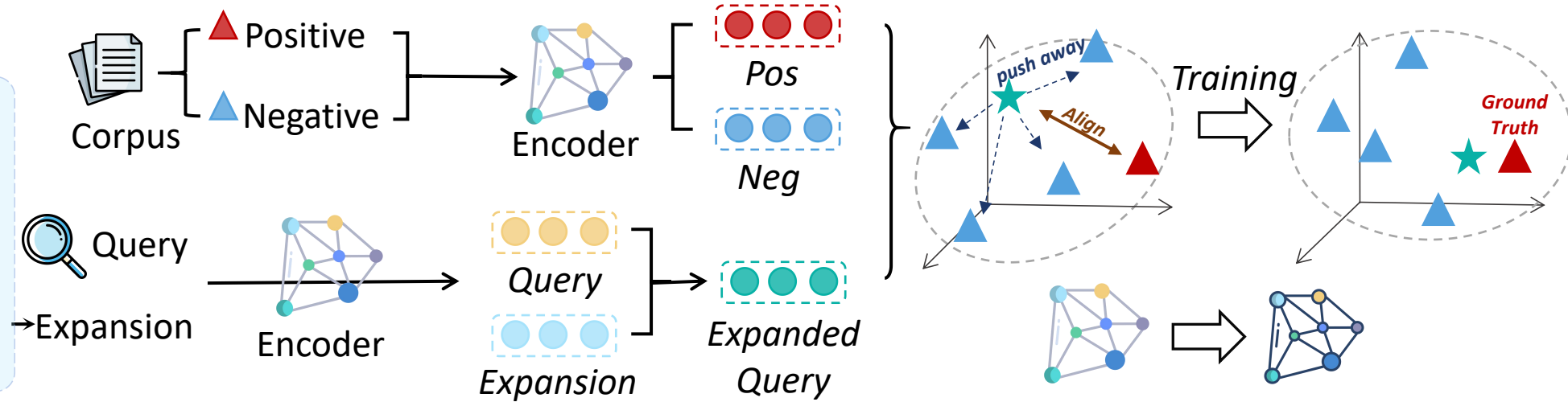


Step A: Optimizing Dense Retriever through LLM-Guided Contrastive Training



LLM Generate :

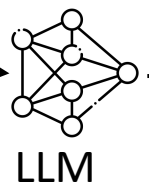
If you apply for an ITIN online, you can expect to receive it from the IRS within 6 weeks from the date of submission. If you apply in person



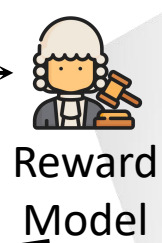
Step B: Optimizing LLM for Aligning with Ranking Preference

Instruct_{q2d}: Write a passage to answer the query.

Query (q): How long does an itin take ?



$\mathcal{D}_q: \{d_1^{exp}, d_2^{exp}, \dots, d_n^{exp}\}$
Expanded Documents

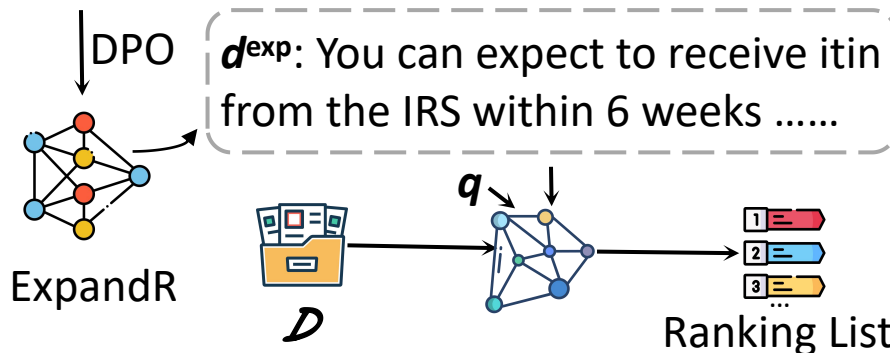


Reward Model

$\mathcal{P}: \{q, d_2^{exp}, d_n^{exp}\}$ Selection

d_2^{exp} (Chosen Response): If you apply for an ITIN online, you can expect to receive it from the IRS within 6 weeks from the date of ...

d_n^{exp} (Rejected Response): The processing time for an I-130 petition, also known as Affidavit of Support, can vary depending ...

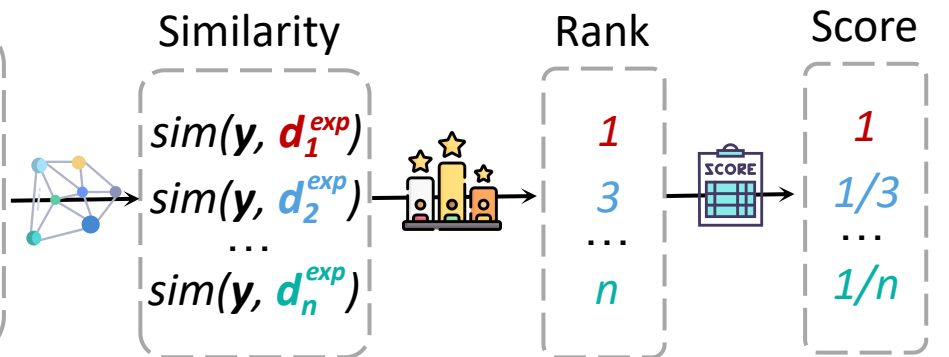


Instruct_{q2a}: You are given a query and a ground truth document. Based on the query, generate a direct and relevant answer ...

Query: How long does an itin take ? / **Ground Truth**: If you qualify...

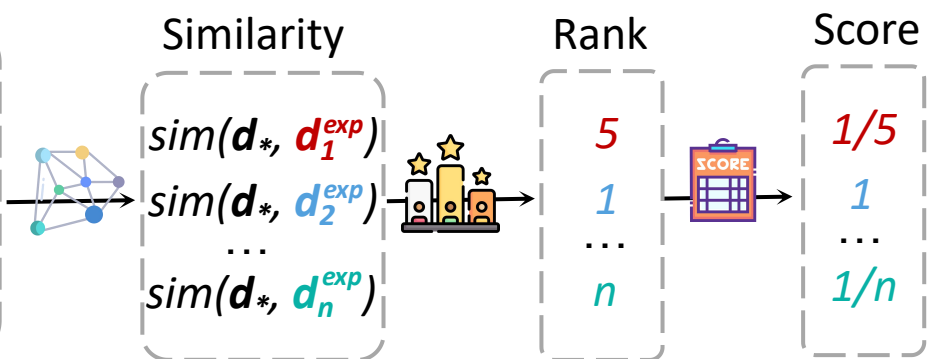


Answer (y):
Apply for itin usually within six weeks.



Self-Reward Model

Ground Truth (d_*):
If you qualify for an ITIN, you will receive a letter from IRS ... within six weeks.



Retriever Reward Model

$\text{Sum}(\text{SCORE}, \text{SCORE}) \Rightarrow R(d_2^{exp}) > \dots > R(d_1^{exp}) > \dots > R(d_n^{exp})$