Task 2 - Optimizing RAG:

Innovative Techniques:

1: Knowledge Distillation

Knowledge distillation involves training a smaller, more efficient model (student) to replicate the behaviour of a larger, complex model (teacher). In the context of RAG, you can pre-train a large model to generate high-quality answers. Afterward, you can distill this knowledge into a smaller model, making it more lightweight and faster for real-time use in a production environment.

Implementation:

- Train a powerful language model like GPT-3 as a teacher model using diverse datasets.
- Use the generated responses from the teacher model to train a smaller model (student) with fewer parameters.
- Fine-tune the student model on specific business-related data to enhance its performance in your domain.

2: Reinforcement Learning for Answer Ranking

Incorporate reinforcement learning to improve the ranking of generated answers. After using the RAG model to generate responses, employ a reward model that evaluates the quality of the answers. Fine-tune the model using reinforcement learning techniques to improve the ranking of answers based on user feedback or predefined criteria.

Implementation:

- Generate candidate answers using the RAG model for a given query.
- Collect user feedback on the relevance and correctness of each answer.
- Use this feedback to create a reward model that guides the model toward generating more accurate and relevant answers.
- Implement reinforcement learning techniques, such as Proximal Policy Optimization (PPO) or Advantage Actor-Critic (A2C), to update the model based on the reward signals.