

[M1] TER Generative AI

Fine-tuning and RLHF for a SMALL AI MODEL

Objectives of the TER

- **Project Objective**

- Develop a specialized small AI model by distilling knowledge from an existing, larger language model.
- Apply Reinforcement Learning from Human Feedback (RLHF) to enhance and personalize the model's performance according to human feedback.

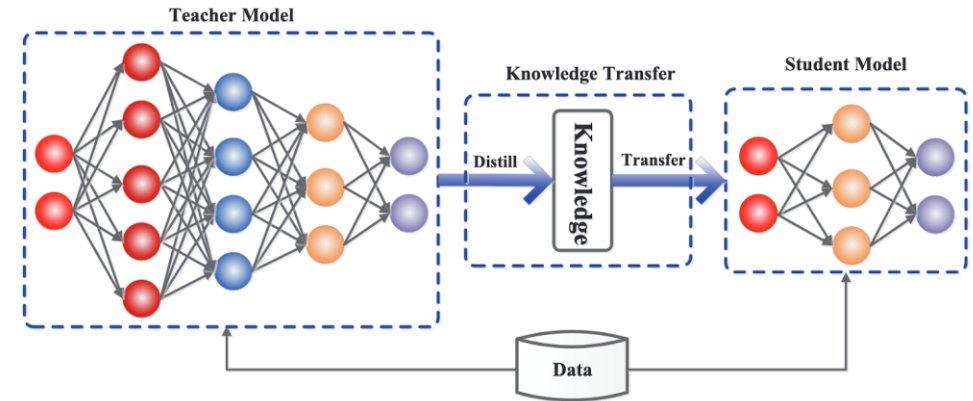
- **Expected Benefits**

- **Frugality** : An efficient, specialized model capable of operating in resource-limited environments.
- **Policy** : High alignment of the model to human preferences and continuous improvement via feedback.

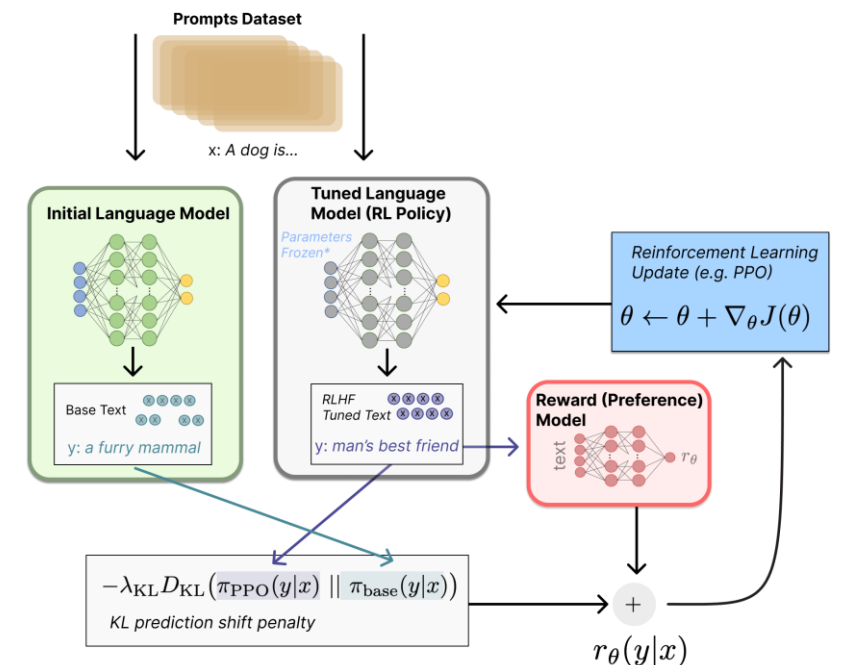
- **Possible applications :**

Forecasting in healthcare, nutrition, ...

Distillation



RLHF



Implementation, Skills, and Deliverables

- **Methodology**
 - **Literature Review:** Explore recent research on model distillation and RLHF.
 - **Model Design:** Define the task, select the appropriate base model, and prepare initial data sets for distillation and RLHF.
 - **Implementation:** Develop the student model using suitable frameworks like TensorFlow or PyTorch.
 - **Evaluation of Results:** Measure the effectiveness of the refined model using pre-defined metrics and compare with the unrefined model.
 - **Presentation of Results:** Prepare reports and presentations to share findings and performance indicators.
- **Skills to Develop**
 - **Machine Learning Techniques:** Mastery of model distillation and reinforcement learning practices.
 - **Analysis and Critique:** Ability to analyze outcomes critically based on empirical data.
 - **Project Management:** Organizational skills to lead the project from inception to completion.
- **Deliverables**
 - **Technical Report:** A document detailing the approach, technology choices, evaluations, and analyses.
 - **Presentation of Results:** Final slides summarizing the work done, model performance, and lessons learned.
 - **Code and Implemented Models:** Sharing of technical resources used and the model developed during the project.

TER Subjects

1. Data Management

Handle data acquisition, cleaning, and preparation for model distillation and RLHF processes.

2. Model Distillation

Implement and optimize the process of distilling knowledge from a large model to a smaller one.

3. Reinforcement Learning from Human Feedback (RLHF)

Develop and apply RLHF, integrating human feedback to refine the model's responses.

4. Model Integration, Evaluation and Presentation

Assess the performance of the post-distillation and RLHF-enhanced model and prepare results for presentation.

5. Ethical Considerations and Impact Assessment

Analyze ethical implications and assess potential impacts of the developed model in various deployment scenarios.

6. (Optional) Network Quantification and Optimization

Assess and optimize the network architecture of the model, focusing on reducing computational cost and resource usage while maintaining performance.