Statement of Work for Project

Team Members

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Problem Statement

We will create a fine-tuned LLM bot for price negotiations in e-commerce settings.

Minimum Components for a Good Project

Large Data: Collection and utilization of a varied and substantial dataset of e-commerce related negotiations (initial dataset: https://huggingface.co/datasets/stanfordnlp/craigslist_bargains).
Scalability: Ability to handle multiple users querying the chatbot simultaneously.
Complex Models: Use of LLM fine-tuning and heuristic constraints on bot recommendations.
Computationally Expensive Inference: Implementation of efficient algorithms to minimize latency during live negotiations.

Objectives

Our primary goal with this project is to build an LLM bot that is human-passable in a text-to-text negotiation setting, or a chat bot. If time allows, we will wrap speech-to-text and then text-to-speech on each end of the chatbot to allow the user to speak to the model to make it more realistic.

Learning Emphasis

This project will help the team learn various elements of productionizing models. While our team has had experience on different components of the ML pipeline, this project will help us bring it together in a comprehensive project that includes dataset identification, model development, UI development, and deployment.

Application Mock Design

The application will feature two main interfaces:

- A chatbot interface for users to negotiate with our negotiation bot.
    - Depending on time constraints, this may be expanded into a speech-based interface.

- A review screen where our negotiation bot provides a score and specific pieces of feedback about the user's performance in the negotiation.

Research and Development

Papers we will review about prior efforts in this space are:

- Xia, He, Ren, Miao, 2024, Measuring Bargaining Abilities of LLMs: A Benchmark and A Buyer-Enhancement Method
- He, Chen, Balakrishnan, Liang, 2018, Decoupling Strategy and Generation in Negotiation Dialogues

Fun Factor

Many of us are currently enrolled in the Negotiation course at the business school and would love to have a tool such as this to practice and improve our skills.

Limitations and Risks

1. Finding a reliable, applicable data set for the project given that the objectives are more open-ended than other ML projects.
2. Evaluation of the model might be harder given the lack of objective evaluation of the objective.

Milestones

1. Dataset collection and evaluation: Go through the available online data sets and determine which data sets are most applicable.
2. Model development: Develop and test various models locally.
3. Deployment: Begin work on backend deployment of model and endpoints.
4. Frontend development: Develop the initial UI frontend for the chat app.
5. Final testing and deployment: Integrate and test all components together following deployment.