

Homework 7

Using the assigned reading listed on the course page, answer the questions below with a short response. Note that we are looking for concise statements that show understanding, not quantity. The total discussion should roughly be a page.

Foundation models

Questions in this section are meant to be subjective and will be graded on effort and understanding from the paper. Feel free to be creative and have fun with it.

1. *Foundation models* are standard pretrained models that are easy to adapt for downstream applications. Such foundation models exist for vision (i.e. AlexNet trained on ImageNet, SimCLR) and natural language (i.e. GPT-3, BERT) but are less common for other domains. Pick your favorite domain outside of vision and language and describe how you would go about building a foundation model for it.
(Example domains you could consider: healthcare, climate science, nanotech, astronomy, video games, cooking, etc.)
 - (a) What would be the training data, and how would you acquire it?
 - (b) What would you use for an architecture and loss function?
 - (c) What would be the social and ethical issues you might encounter?
 - (d) What kind of applications would your foundation model be useful for?
2. A primary issue with *foundation models* is that they require a large amount of computation and data resources to train. Hence, research in foundation models is largely driven by the industry.
 - (a) What could be some consequences that arise from industry-led research?
 - (b) Should foundation models be open-sourced? What about the training code?
 - (c) Although foundation models provide a layer of abstraction for downstream applications, it also means that these applications will adopt the existing problems in the foundation model that may not have been initially identified. Who should bear the burden of responsibility for problems that later emerge? (try considering different perspectives of the industry, academia, and volunteer projects).

Submission: Upload a PDF of your response through Canvas by **11/2 at 1pm**.