

No fine-tuning and no retrieval. We evaluate our optimal system without any news retrieval and using the base GPT-4-1106-Preview model. The ablated system attains a Brier score of .206.

Recall that in our baseline evaluation (Section 3.4), the lowest Brier score attained by any model is .208. Our ablated system essentially deteriorates to this baseline level. Indeed, without any fine-tuning or retrieval, the only expected advantage of our system over the baseline evaluation setup is its reasoning prompt, found through searching a set of candidate prompts (Section 5). The experiment suggests that this gives fairly a minor improvement.

8 Conclusion

Our work presents the first ML system that can forecast at near human levels. We develop a novel retrieval mechanism that uses a LM to determine which information to source and how to evaluate its relevance. We also give a self-supervised fine-tuning method to generate reasonings with accurate predictions.

To facilitate further research, we release our dataset: the largest and most recent forecasting dataset compiled from 5 real-world forecasting competitions. We discuss a few opportunities to improve these systems further.

Iterative self-supervision. With a larger training corpus, our self-supervised fine-tuning approach can be used for iterative self-improvement. Specifically, after fine-tuning a model on its previous optimal predictions and reasonings, we can generate more fine-tuning data by using the same model again, which can be repeated until training data is exhausted.

Data. While our forecasting benchmark is a good initial corpus to train a system, we believe that it is possible to use LMs with later training cut-offs to teach an earlier LM. This could be done by using later LMs to generate questions it knows the answer to but an earlier LM does not (postdiction). In addition, while we source questions from forecasting platforms, it is possible to collect historical data in the wild and re-formulate them as forecasting questions, leading to a larger training set.

Domain-adaptive training. In Section B.3, we observe that in the baseline evaluations, the Brier scores across categories are correlated with models’ pre-training knowledge. This suggests that we may be able to specialize models to areas of particular interests by fine-tuning them on domain knowledge.

LMs get better at forecasting naturally. We observe that as LMs improve, they naturally also become better at forecasting. In particular, in Section 3.4, we see that newer generations of models forecast better than older ones. For example, GPT-4-1106, released in 2023, outperforms GPT-4-0613, released in 2021, by .02 with respect to the Brier score. If we were to have fine-tuned the more recent model, we would expect better performance.

At a high level, our results suggest that in the near future, LM-based systems may be able to generate accurate forecasts at the level of competitive human forecasters. We hope that our work paves the way for automated, scalable forecasting that can help to inform institutional decision making.

Acknowledgments

We thank Jean-Stanislas Denain, Erik Jones, Ezra Karger, Jacob Pfau and Ruiqi Zhong for helpful discussions, and Jean-Stanislas Denain, Owain Evans, Dan Hendrycks, Horace He and Andy Zou for comments and feedbacks on an early draft of the paper. DH was supported by an award from the C3.ai Digital Transformation Institute. FZ was supported by NSF award CCF-2311648. JS was supported by the National Science Foundation SaTC CORE Award No. 1804794 and the Simons Foundation.

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