Foibles and Issues of (LLM-based) AI

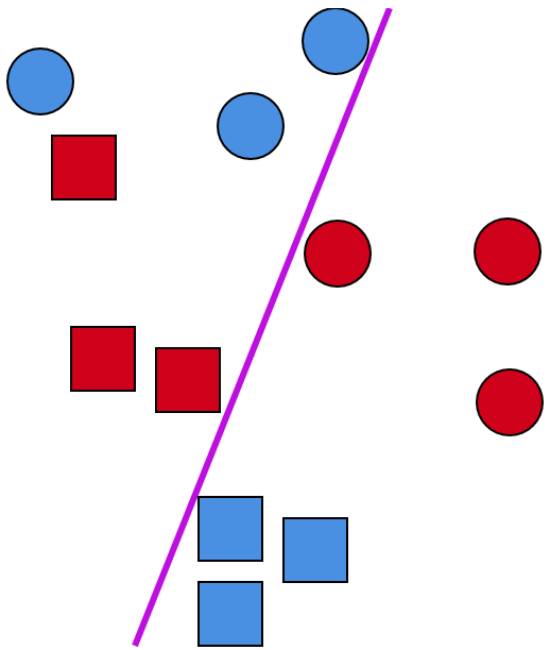
Data, AI, and Society Lectures 3-4 Mashup

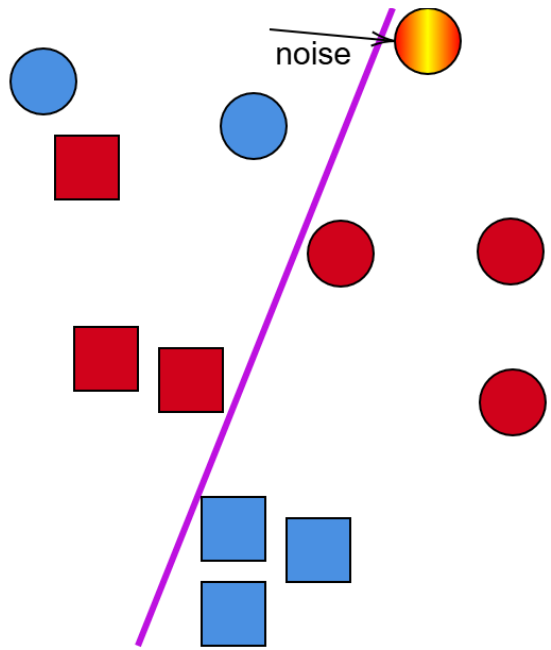
Kenneth W. Regan
University at Buffalo (SUNY)

CSE199 Freshman Seminar, Fall 2026

How AI Can Be Fragile

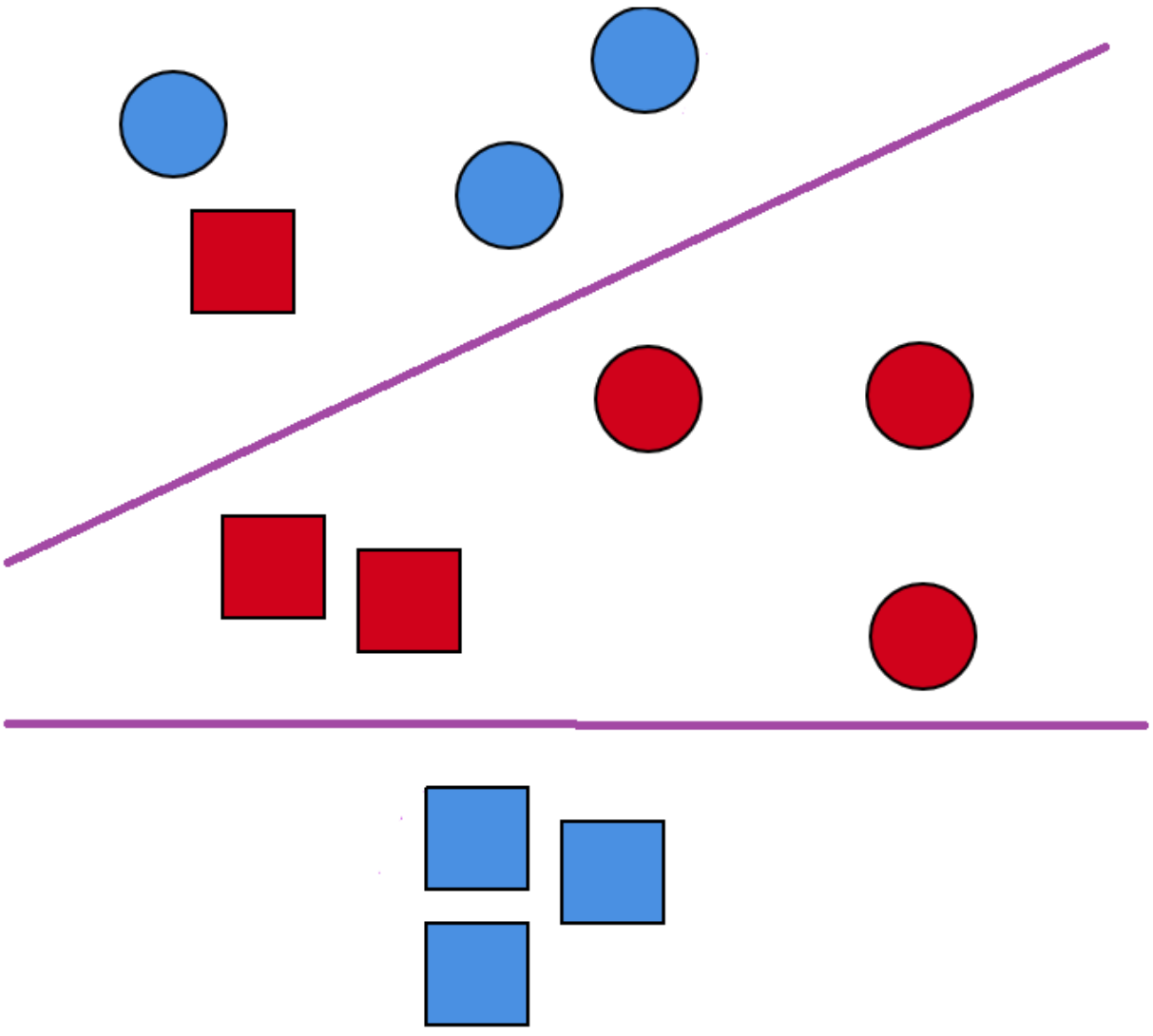
We gain *encoding advantage* by needing just one line to separate both the red shapes and the blue shapes.





But the line cuts things real close. A little noise could make a blue *Circle* be misread as a *Square*, as shown at right.

Making AI Solutions More Robust



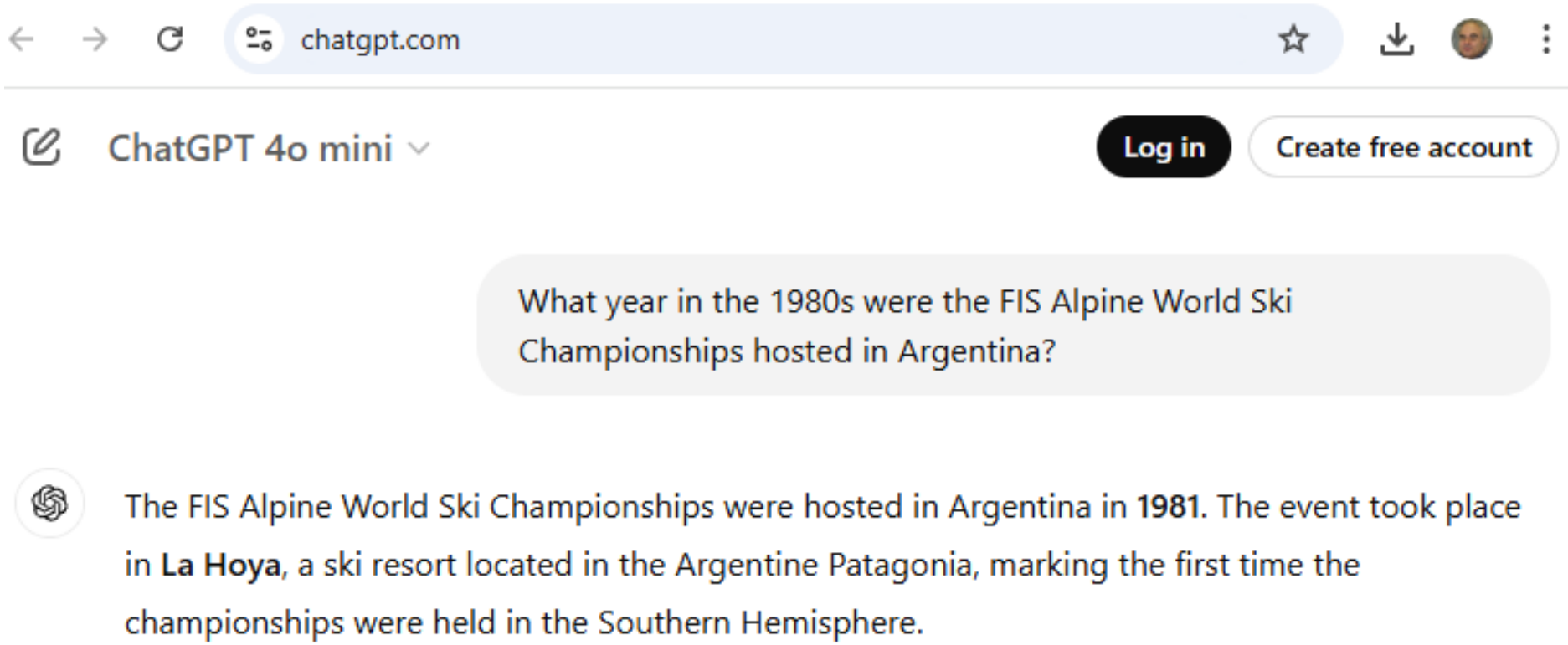
Can we guide the training so that the LLM will prefer solutions with more "wiggle room" even while using more weights to do them?

This is an example of the utility-function end of the Alignment Problem.

The issue is that it's hard to tell in advance how the LLM training will orgainze itself. LLMs may become better at mounting these mods themselves: **RSI** for **Recursive Self-Improvement.**

How AI Can Be "Truthy"

I reproduced an example in a Medium article on AI hallucinations.



In the article, the response was, "The FIS Alpine World Ski Championships were hosted in Argentina in 1985."

It Got Worse (Fact Checks: FIS, Wenzels)

The FIS Alpine World Ski Championships were hosted in Argentina in **1981**. The event took place in **La Hoya**, a ski resort located in the Argentine Patagonia, marking the first time the championships were held in the Southern Hemisphere.

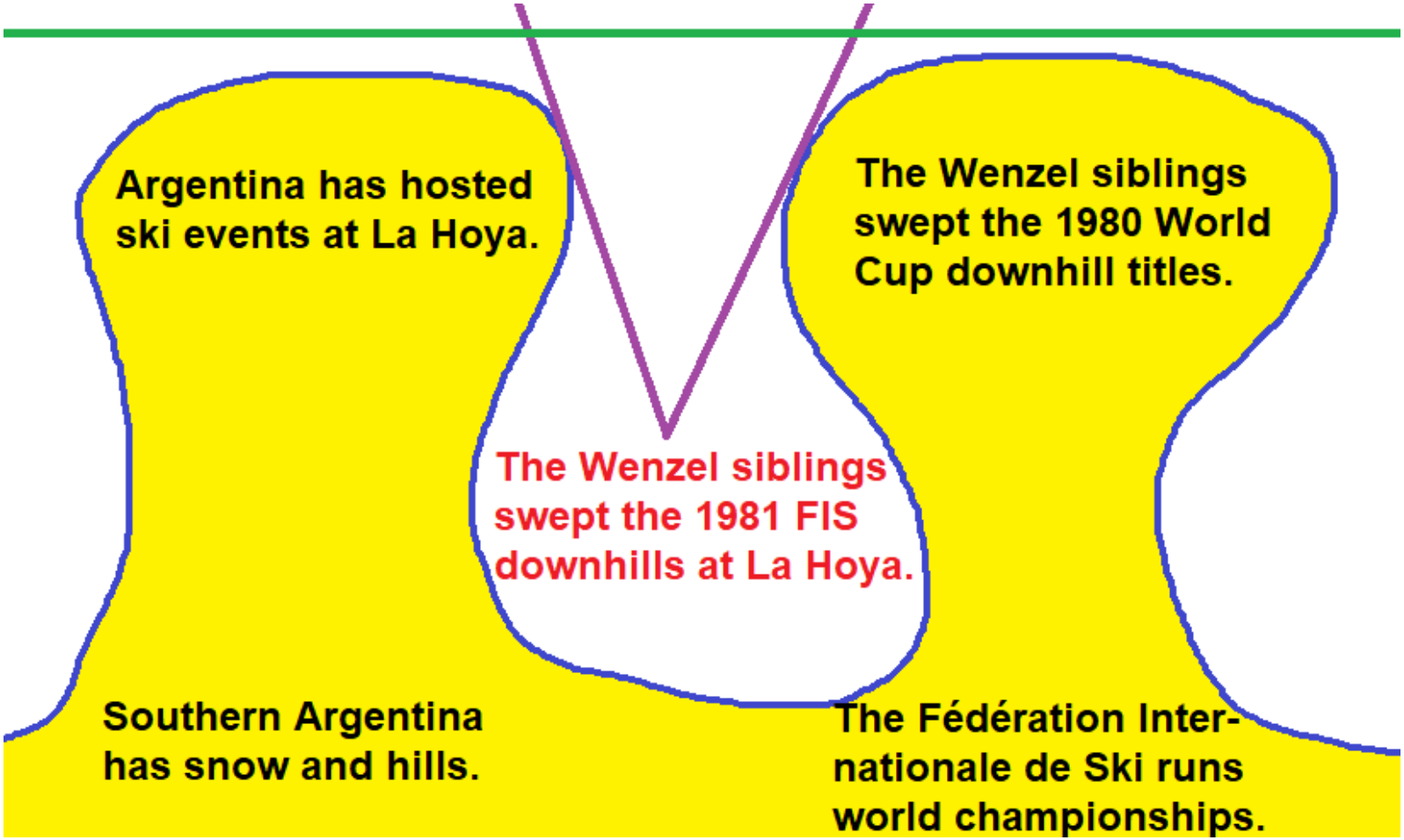
Who won the women's and men's downhill races at those championships?

At the 1981 FIS Alpine World Ski Championships in Argentina, the winners of the women's and men's downhill races were:

- **Women's Downhill**: **Hanni Wenzel** (Liechtenstein) won the gold medal in the women's downhill.
- **Men's Downhill**: **Andreas Wenzel** (Liechtenstein) won the gold medal in the men's downhill.

The Wenzel siblings made history with their victories in both events.

Rough Diagram of What Could Have Happened



The red is a *positive linear combination* of the four true items in black. When combos sit in "truth pockets," linear separators (in purple and green) cannot penetrate far enough to rope them off.

ChatGPT 5.5 Fixed This Last December

Prompt: In which year of the 1980s were the FIS Alpine World Ski Championships hosted in Argentina?

Followup: Who won the women's and men's downhill races at those championships?

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Lower-level embedded models can still err: Yahoo error, fixed by Google.

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More Improvements—Old and New

"Jesus flipping over the tables in the Temple." From the movie *Jesus Christ Superstar*—then try it on Cutout or NightCafe or Simplified:



Two Results From 2023—one famous, one mine



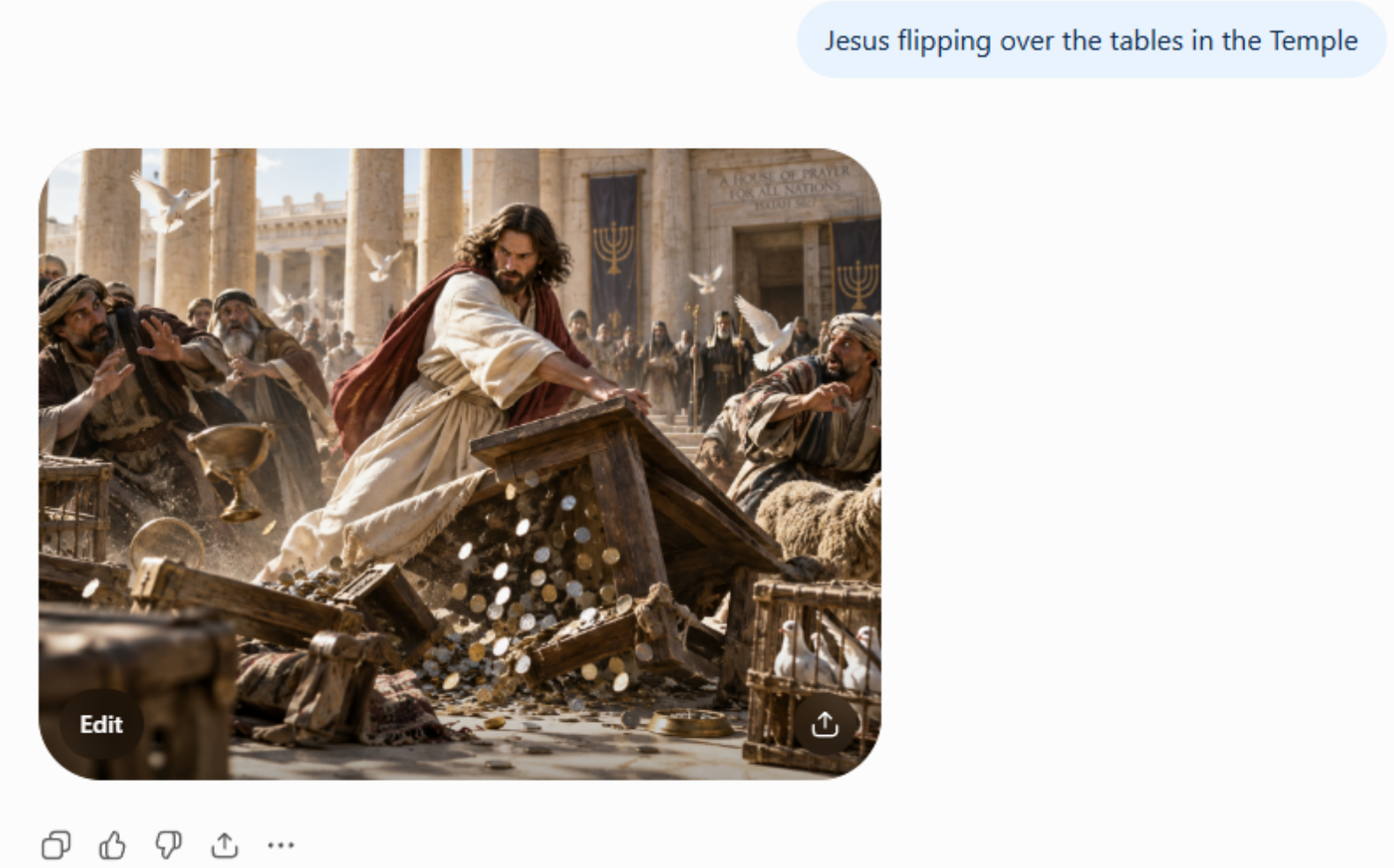


Now Well Understood (GPT6-Astra)



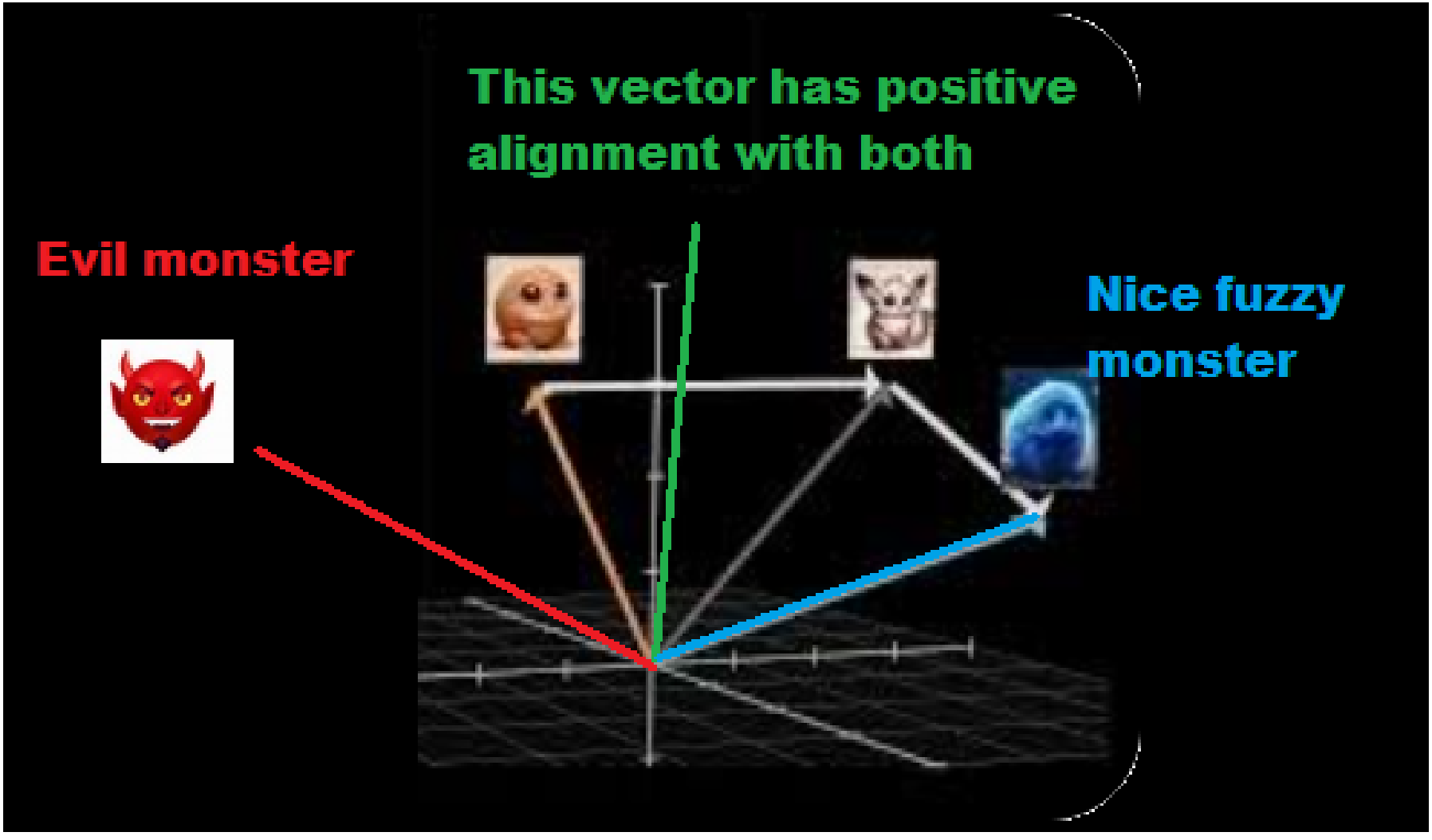
Maybe this one is “overdone.”

Now Well Understood (GPT6-Astra)



Maybe this one is “overdone.” Possibly misunderstandings are being pushed “deeper under the hood” where it is harder for us to tell them.

Multiple Alignments (mod of 3Blue1Brown source)



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- Go into assignment and https://alkjash.github.io/ai-risk//

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- They may help critique solution ideas for next week's presentations.

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- This is on top of how *open systems* are more powerful and versatile.

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- See also: Brcic and Yampolskiy, Impossibility Results in AI: A Survey. (Yampolskiy got his PhD at UB in 2008.)

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How do we get off from "starting at square 1"? (Note also slide 12 here.)

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- There are other issues with *determining collectively optimal utility functions* that havelong been known in *social choice theory*, before the advent of AI—and before discussion of crafting utility functions that are *safe* and *stable*.

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- Explanation is needed for human understanding...and human understanding is needed for human control.
- Further relevant: LLMs are grown, not crafted.

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- [Segue to describing the activity and other data science material as time allows.]

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- Note various forms here, including using AI to *do* sentiment analysis.