Unsupervised Human Preference Learning

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All datasets are available at

How can we efficiently personalize language model outputs?

TL;DR

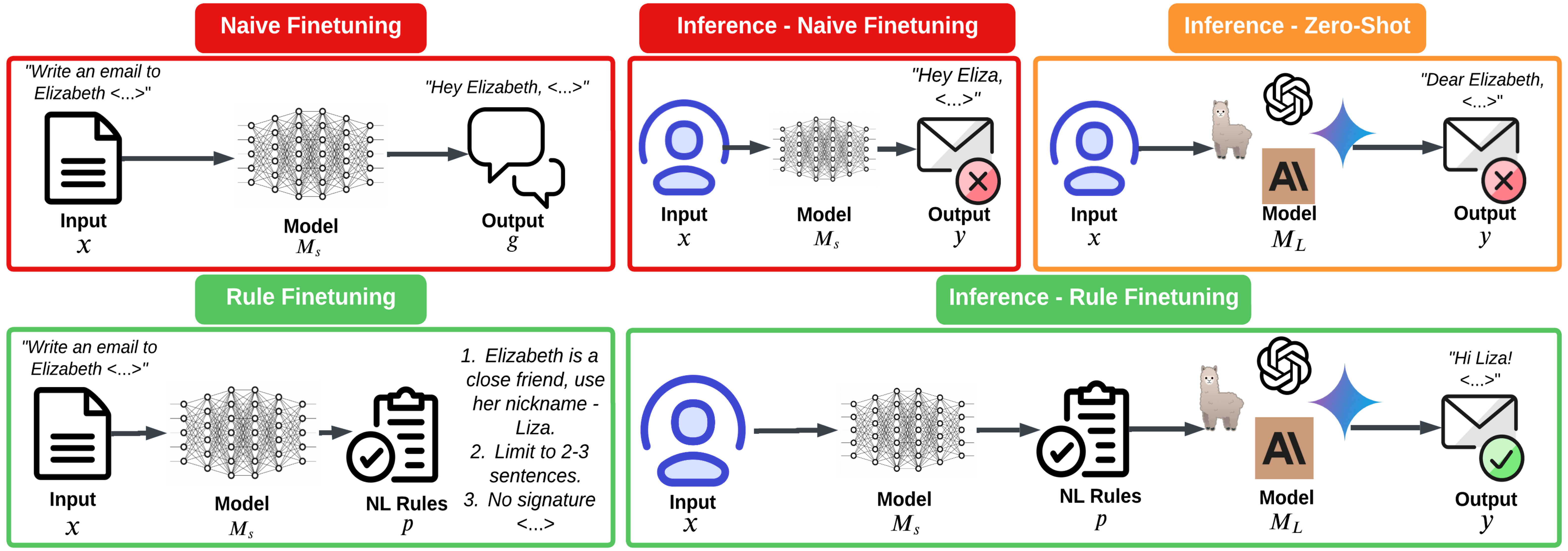
Problems:

- Powerful LMs produce ***impersonal*** outputs.
- Finetuning big LMs is too ***expensive at scale***. Even LoRA!

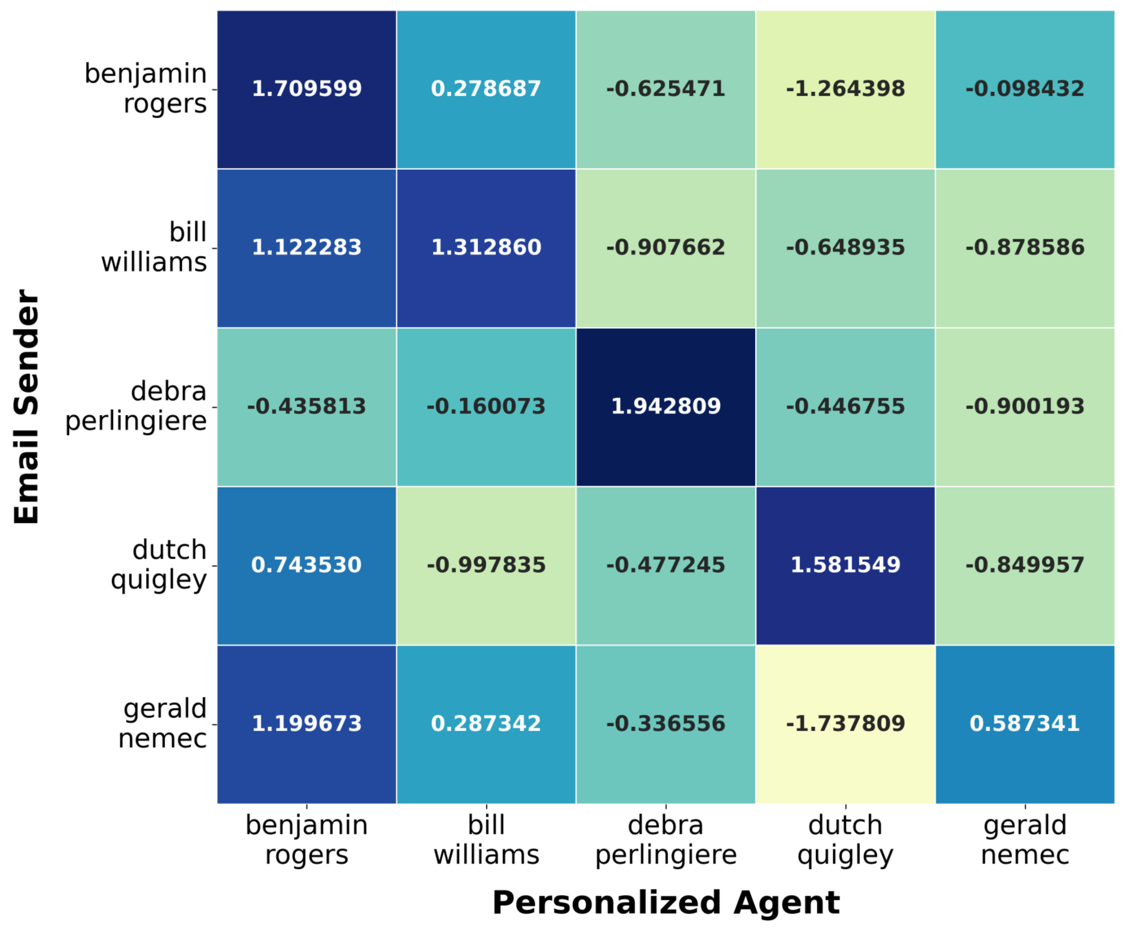
Opportunity: People have ***personal*** preferences that can be learnt from!

Our Solution: LLM Personalization via ***lexicalized rules***:

- Train a ***small, local model*** on personalization rules.
- Use it to ***guide foundational models*** in tasks, aligning with user preferences.



Ablation Study



Empirical Examples

Write an email to Sylvia informing her that the NG contract is complete and ready for legal review, and that it should be available by tomorrow morning.

Dear Sylvia,
Thank you for your email regarding the status of the NG Energy contract. I'm pleased to let you know that the contract is now complete and ready for an attorney review. [...]
Best regards,
<Your Name Here>

Write an email to Sylvia informing her that the NG contract is complete and ready for legal review, and that it should be available by tomorrow morning.

Email guidelines:
- Start with talking about NG Energy Contract
- Don't use an introductory name
- Use direct tone, concise sentences

The NG Energy contract is finished. I need a lawyer to review it. It will be ready in the morning.

Results

Preference Agents	New Yorker			Enron			LAMP 3U			Aggregated	
$M_L \rightarrow$ vs $\downarrow$	Llama3 70B Instruct	Claude 3.5 Sonnet	Gemini 1.5 Pro	Llama3 70B Instruct	Claude 3.5 Sonnet	Gemini 1.5 Pro	Llama3 70B Instruct	Claude 3.5 Sonnet	Gemini 1.5 Pro	LLM Evaluation	Human Evaluation
Small Baseline	77.4	91.5	80.0	88.4	96.1	89.8	74.6	84.0	75.3	84.1	91.0
Large Baseline	67.7	75.2	66.9	85.6	83.7	88.2	66.5	69.5	63.8	74.1	84.5
Few Shot	68.3	62.0	66.7	61.1	68.0	57.4	58.3	57.4	59.4	62.0	73.4
Naive Finetune	80.3	82.4	81.8	75.3	87.8	81.3	85.0	92.7	89.0	83.9	92.2
No Baseline Agent	65.1	68.8	63.8	58.4	61.3	62.5	63.8	67.2	60.4	63.4	52.0

Table 1: **Win Rates** of Llama3 8B M_s combined with various M_L, evaluated by GPT4o and human evaluation.

PeFT on User Data vs Rules