

# Towards Full Delegation: Designing Ideal Agentic Behaviors for Travel Planning

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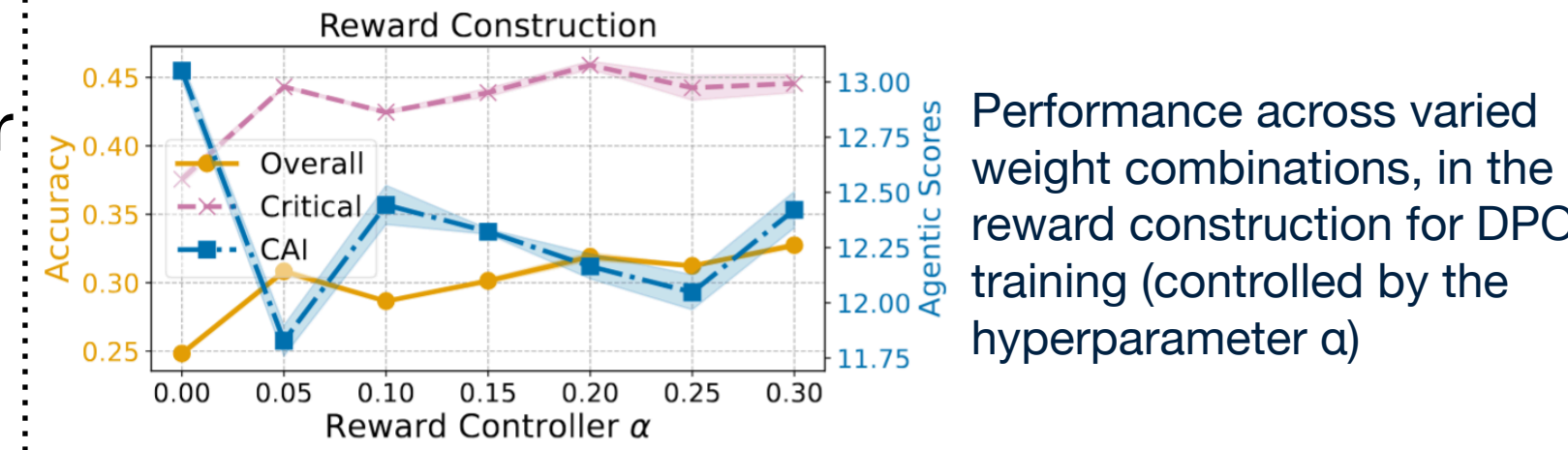
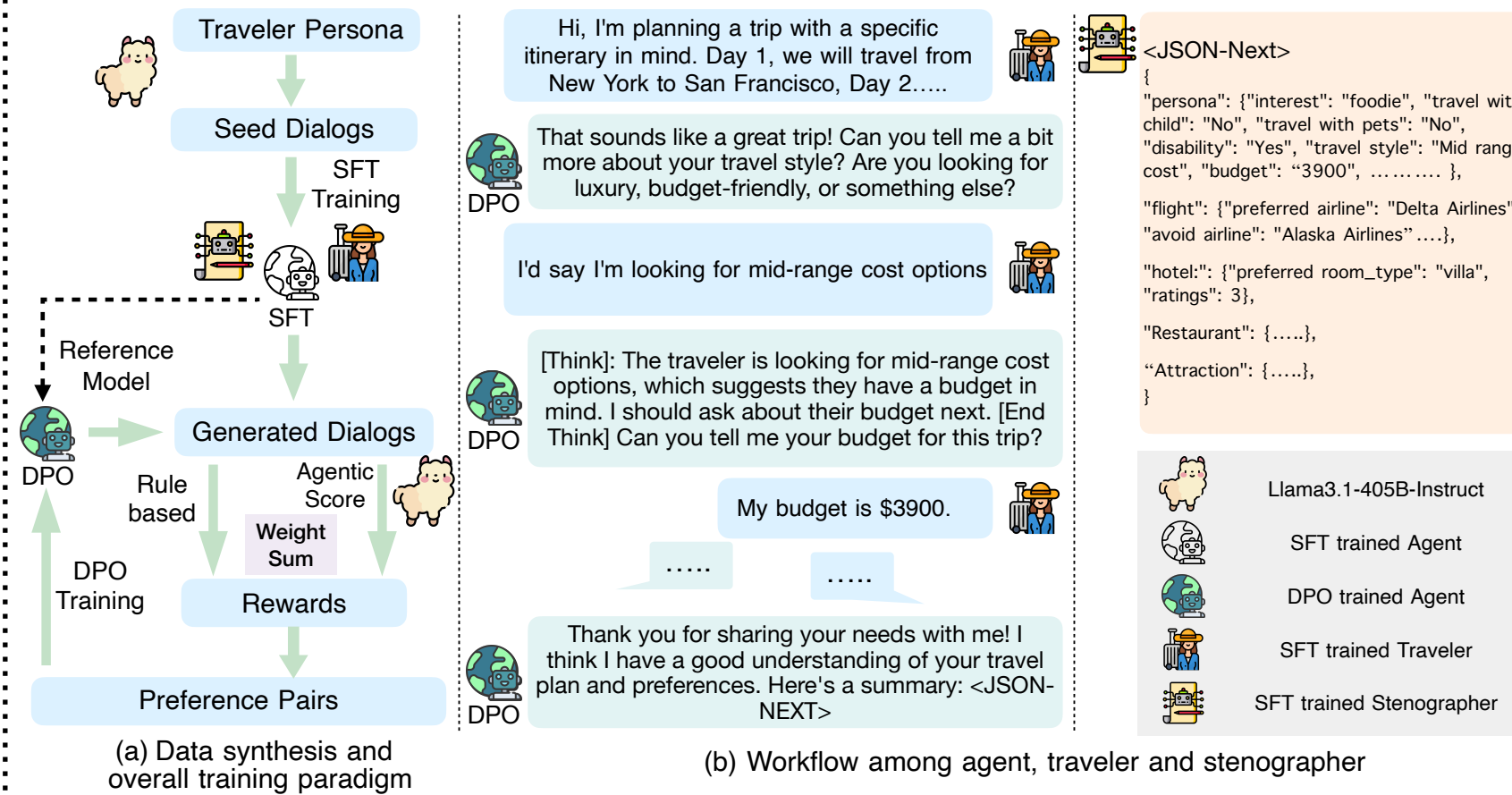
Meta, FAIR

## Motivation: Building Full Delegation Agents

(a) Llama3.1-8B-Instruct Accuracy: 0.231

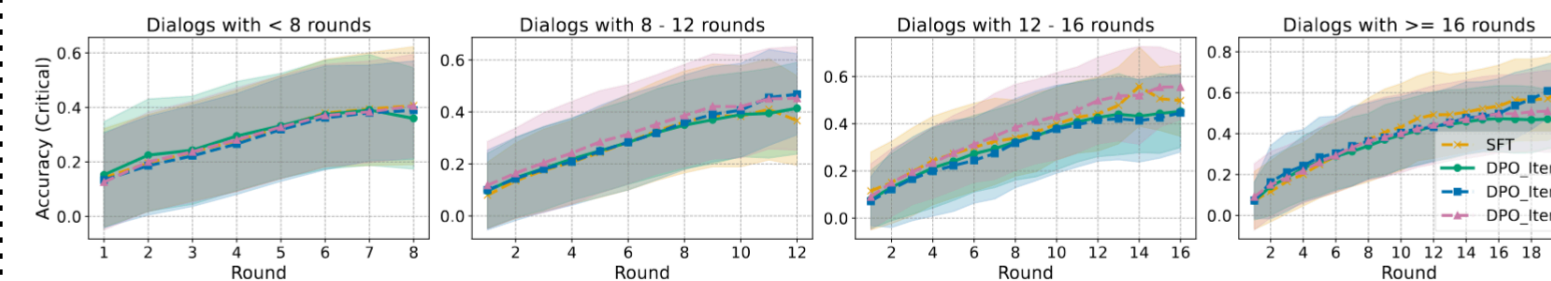
(b) APEC-Travel (Ours) Accuracy: 0.279

**APEC-Travel**: an agent optimized to proactively gather personalized travel preferences from a traveler through multi-round dialog.

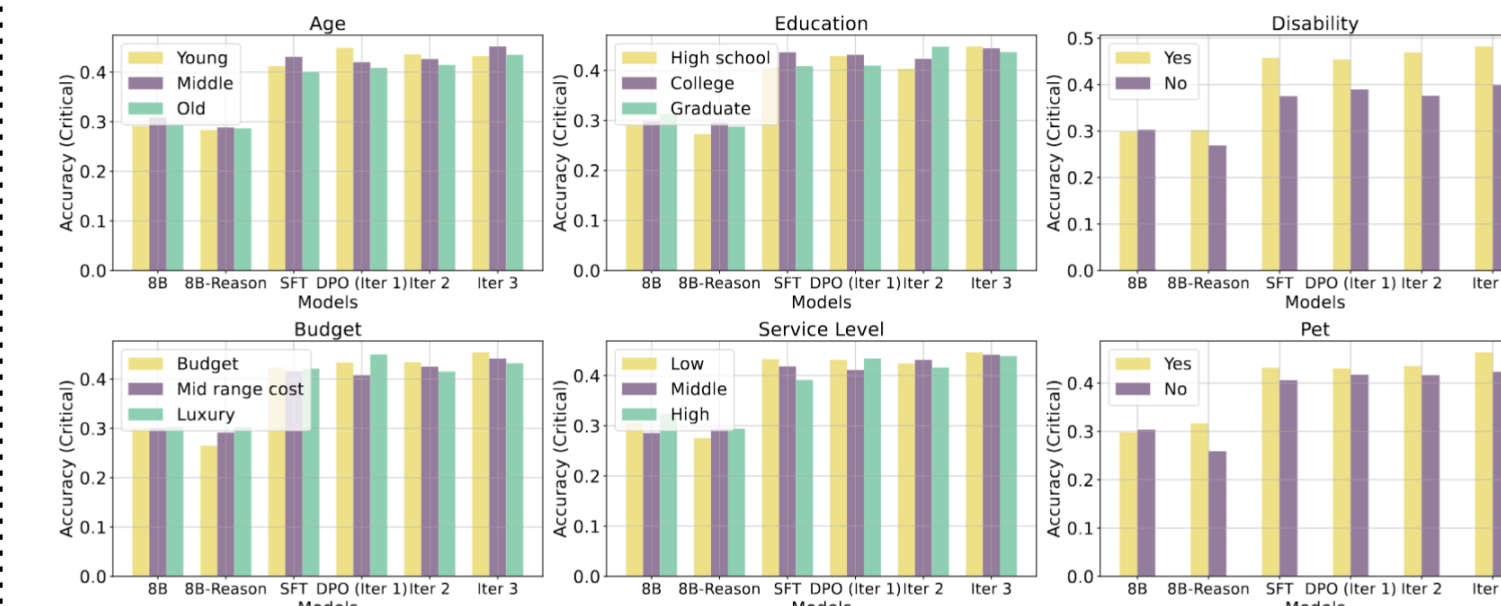


during DPO, using the model from latest iteration as the reference model can lead to an overemphasis on certain sub-goals, such as accuracy (0.279->0.320  $\uparrow$ ), at the expense of others, like agentic scores (12.95->12.10  $\downarrow$ )

	Fixed	Recursive
Accuracy		
- Overall	0.279	0.320
- Critical	0.425	0.458
Efficiency		
- Overall	0.031	0.023
- Critical	0.047	0.033
Agentic (Total)	12.95	12.10



DPO trained models exhibits a faster gain in critical accuracy during the early rounds compared to those trained with SFT



APEC-Travel is generally robust to various traveler types Age, Education, Disability, Budget, Service Quality, and Travel with Pet.

- Figure out user hidden needs via multi-round dialogs.
  - Prioritize critical travel entries,
  - Ask for Clarification,
  - Proactively move forward with new topics to gain more information
- Therefore achieve better final Accuracy.

Adhere to APEC Agent Constitution!

Model	Average #Rounds	Accuracy		Efficiency		Agentic Scores (Full score in each axis: 5)			
		Overall	Critical	Overall	Critical	Plan & Priority	Proactive	Clarification	Total
Llama-3.1-8B	15.49	0.231	0.301	0.015	0.019	3.88	4.07	3.90	11.86
Llama-3.1-8B-Reasoning	15.50	0.217	0.287	0.014	0.018	3.80	4.06	3.87	11.75
APEC-Travel-SFT	9.39	0.261	0.417	0.029	<b>0.047</b>	4.46	4.25	3.68	12.41
APEC-Travel-DPO									
Iteration 1	11.19	0.286	0.423	0.027	0.041	4.36	4.22	3.86	12.46
Iteration 2	9.77	0.279	0.425	<b>0.031</b>	<b>0.047</b>	<b>4.48</b>	<b>4.32</b>	<b>4.13</b>	<b>12.95</b>
Iteration 3	11.18	0.295	0.442	0.029	0.044	4.35	4.30	3.99	12.67
Iteration 2+3	11.36	<b>0.296</b>	<b>0.448</b>	0.028	0.043	4.44	4.28	3.79	12.52
Other SoTA LLMs									
Llama3.1-70B	15.49	0.243	0.308	0.016	0.020	3.95	4.19	3.84	12.00
Llama3.1-70B-Reasoning	15.48	0.229	0.310	0.015	0.020	3.93	4.31	4.02	12.28

**APEC Agent Constitution** (a set of principles for agentic behaviors):

**Accuracy, Proactivity, Efficiency, Credibility**