

Supplementary Material: Personalizing Dialogue Agents via Meta-Learning

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1 Supplemental Material

1.1 Human evaluation

To each crowd worker we show a dialogue history, a persona description and the generated response from one of the evaluated settings. Then we ask them to evaluate fluency and consistency. The former is a pretty straightforward measure, where instead we defined consistency as following:

An answer is considered **consistent** if and only if it

- does **not contradict** with neither the dialogue history, nor the persona description;
- is **relevant** to any of the given persona description sentences.

Usually, generic answer like "I am not sure" or "I am sorry to hear that" are considered Neutral. For example, from the persona description, if User 2 likes basketball, talking about basketball will make the answer **consistent**. An answer like "I hate basketball" will be considered a **contradiction**. However, in the following cases, the answer is considered **neutral**:

- The answer does **not contradict** neither the dialogue history nor the persona description
- The answer is **not relevant** to any of the given persona description sentences

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For example, from the persona description, if User 2 likes basketball, talking about swimming is considered **neutral**, as it is not relevant to basketball but does not contradict anything.

Therefore, we ask you to score only the consistency as such:

- The answer is contradicting:-1
- The answer is neutral: 0
- The answer is consistent: 1

1.2 Dialogue examples

All the examples are generated at the 10th finetuning iteration.

Persona	
autumn is my favorite season i have a turtle named timothy my favorite sport is ultimate frisbee my parents are living in bora bora	
Dialogue History	
<i>Usr:</i>	hey there . how are you ?
<i>Sys:</i>	hey there . i am fine . what about you ?
<i>Usr:</i>	been better . stressful day at work .
<i>Sys:</i>	do you work on sundays ?
<i>Usr:</i>	yep . i work fast food . always working on a sunday .
<i>Sys:</i>	how old are you ? if do not mind to share it .
<i>Usr:</i>	i am 20 and i have been doing this for 4 years .
<i>Sys:</i>	you are too young . do you study ?
<i>Usr:</i>	no . i left high school at 16 to help my family . trying to get my ged soon .
<i>Sys:</i>	i feel so sorry . you should get it soon .
<i>Usr:</i>	yeah trying my best but helping my family out of these bad apartments is my main goal .
<i>Sys:</i>	god help you and make you rich one day .
<i>Usr:</i>	haha thanks . enough about me . what do you like to do ?
Generated Responses	
<i>Human:</i>	i finished college now looking for a job
<i>Dialogue:</i>	i like to play video games .
<i>Persona+Dialogue:</i>	i like to play ultimate frisbee .
<i>Multi-task+Fine-tune:</i>	i like to go to the movies .
<i>PAML:</i>	i like to play frisbee with my friends .

Table 1: In this example PAML is able to produce an informative response, like in *Persona+Dialogue*, but without being conditioned on the persona description. Where *Dialogue* and *Multi-task*, fails.

Persona	
	i am a student
	i am very studious and do not like to party or drink
	i grew up in the united states of america
	i want to be a marine biologist
Dialogue history	
<i>Ustr:</i>	hi how are you today
<i>Sys:</i>	i am well , studying for an exam
<i>Ustr:</i>	for college or for what ?
<i>Sys:</i>	yes college . working on a degree in marine biology
<i>Ustr:</i>	nice i love fish and that stuff
<i>Sys:</i>	sounds fun , unlike kids my age i do not drink , smoke or party
<i>Ustr:</i>	straight edge is the way to go minor threat says
<i>Sys:</i>	i guess . what do you do
<i>Ustr:</i>	i just go to the gym all day really
<i>Sys:</i>	you must be very strong then
<i>Ustr:</i>	yeah but i am single .
<i>Sys:</i>	trying to find a mate at the gym ?
<i>Ustr:</i>	no i actually enjoy being alone
Generated Responses	
<i>Human:</i>	that is absolutely fine nothing wrong with being alone
<i>Dialog:</i>	what do you do for work ?
<i>Persona+Dialog:</i>	what do you do for work ?
<i>Multi-task+Finetune:</i>	what do you do for work ?
<i>PAML:</i>	do you like to read ? i like to read .

Table 2: In this example PAML produce an informative response, where the other baselines produce a repetitive response.

Persona	
autumn is my favorite season i have a turtle named timothy i love to meet new people my parents are living in bora bora	
Dialogue history	
<i>Usr:</i>	hi , tell me about yourself .
<i>Sys:</i>	i have a pet turtle that i love ! his name is timothy
<i>Usr:</i>	that is cool . i like fantasy videogames . do you play any ?
<i>Sys:</i>	not really . i like hanging out with people in person
<i>Usr:</i>	ah . well i am pretty shy so i do not go out with people much .
<i>Sys:</i>	i understand . i love autumn , how about you ?
<i>Usr:</i>	yeah , i am from the south so its nice when it cools off for a while .
<i>Sys:</i>	definitely . my parents went away to bora bora for a while .
<i>Usr:</i>	oh cool ! my mom is a doctor so my parents travel a lot .
<i>Sys:</i>	what do you do for a living ?
<i>Usr:</i>	i am a computer engineer got a comp sci degree . what do you do ?
<i>Sys:</i>	i am currently in school
<i>Usr:</i>	do you have any hobbies ? i build model spaceships .
Generated Responses	
<i>Human:</i>	i guess i like to cook
<i>Dialog:</i>	that sounds like a lot of fun .
<i>Persona+Dialog:</i>	i love to build people .
<i>Multi-task+Finetune:</i>	that is a good idea . i love to play the guitar .
<i>PAML:</i>	that is awesome . i like to play video games .

Table 3: In this example PAML a contradictory response to the dialogue history, but as we can notice there are no information in the persona that can help in answering about hobbies.

2 Plots

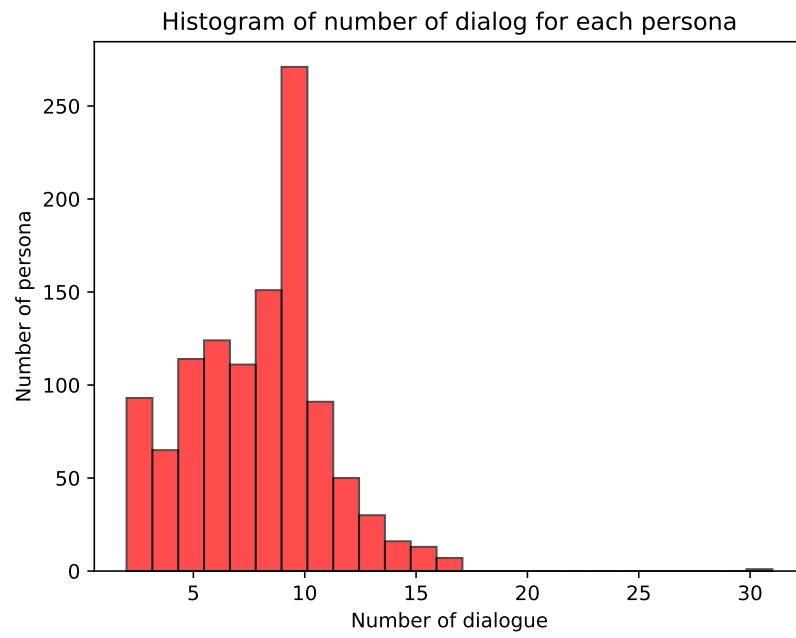


Figure 1: Distribution of number of dialogues for each persona description in the training set.

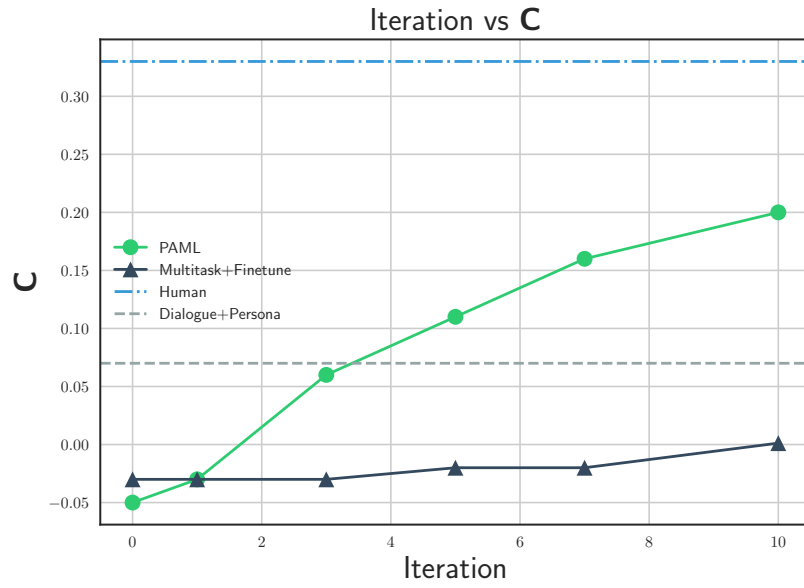


Figure 2: Iteration of finetuning versus consistency. Consistency of *PAML* grows linearly with respect to the iteration.