D3WA+: A Case Study of XAIP in a Model Acquisition Task for Dialogue Planning

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Designers must understand the imperative consequences of declarative design in order to trust the bots they build.







S D3WA+ Home Model Storyboard CDD D3BA Bootstrap





🕞 Start 🤁 📑 Load Conversation Save Storyboard - Load Storyboard 1 × start_conversation in the seady to record. 💄 🎭 🛛 Brake pads pass. start_conversation_break-p \$ start_conversation 👜 🎭 Ok, brake pads pass. 💄 🎭 What's next? start_conversation_initiative 1 × ask-for_clutch-seal-tightne 👜 🎭 Check clutch seal tightness (+)D3WA Home Model Storyboard CDD D3BA Bootstrap Declarative Dialogue Design ? 🚠 🧠 🚯 Deploy to WA O Build your Bot Bot Name Car-Inspection List of Variables Add new variable Suggest 0% user_initiative Filter actions by Select • Dimiss Filters X Select start action start_conversation * dd new action user_initiative_message 🏢 🗶 🛛 🧶 ask-for_spark-pl... 🏢 🗙 end_conversation List of Intents 💊 ask-for_break-p... 🏢 × 🛛 💊 ask-for_clutch-s... 🏢 × 📖 🗙 👟 state-message ask-for_oil-level 💊 start_conversati... 🏢 🛛 Inset showing minimal proje

-	Debugging area 🗸 Validate 🕐 Investigate 📀 🛤 Sugg	jest
+	This conversation is NOT supported by the current specification.	Feedback area of
	action name> start_conversation outcome name> resolve-start_conversation-eq-start_conversation_break-padcheck-pass_status_options- eq-found	D3WA+ Foil from
•	action name> start_conversation outcome name> resolve-start_conversation-eq-start_conversation_initiative-switch_	the maximal abstraction
	action name> start_conversation outcome name> resolve-start_conversation-eq-start_conversation_oilcheck-oil_status-eq-found	
×	action name> ask-for_clutch-seal-tightness outcome name> resolve-ask-for_clutch-seal-tightness-eq-ask-for_clutch-seal-tightness_detectedcheck- clutch_seal_tightness_status-eq-found	Diagnostics for failed
	Action (dialogue-disambiguation-ask-for_clutch-seal-tightness_detdup_resolve-ask-for_clutch-seal-tightness- eq-ask-for_clutch-seal-tightness_detectedcheck-clutch_seal_tightness_status-eq-found) failed because the precondition (user_initiative) was not met	execution
	LANDMARK: (not user_initiative)	Unachievable
	action name> state-message outcome name> resolve-state-message-eq-state-message-outcome-fallback	subgoal or landmark
ection	action name> ask-for_spark-plug outcome name> resolve-ask-for_spark-plug-eq-ask-for_spark-plug_detectedcheck-pass_status_options- eq-found	

Dialogue actions model how the bot speaks to users. Cloudfunctions allow the bot to ping rest endpoints. Logic actions allow the bot to make logical inferences.



Q_1 Why is this there no solution?

Domains

Tanya has ended up with a specification with no solution.

Solvable Minimal Abstraction. She is presented with the minimal model abstraction to debug. The level of abstraction is identified through a search over a lattice of abstraction [Sreedharan et al. 2019].

Exemplary Failure in Maximal Abstraction. She is also shown the failure of an exemplary plan trace in a maximally abstract model where the problem is solvable. The failure is demonstrated on the minimal model.

Unachievable Subgoal. Finally a subgoal not achievable in the minimal model is shown, abstracted from either the delete relaxation or identified from the last fluent introduced in the search.

Q_2 Why is this not a solution?

Tanya raises a partially specified plan they expected: foil.

1. Constrain the model to generate plans that satisfy the foil.

2. Explain why the constrained model is not solvable. Back to Q_1 .



Tanya is surprised that a solution she didn't expect is part of the generated dialogue graph.

Visualize the dialog tree built from your specification. Chat with the bot as you build it, identify issues. Debug and refine your specification.

D3WA

+ XAIP

Watson Assistant

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Average Percentage size of Average Percentage size of Minimal Abstraction Maximal Abstraction Car inspection 92.93% 14.018% Data Doppelganger 6.407% 94.15% 99.757% Credit Card 0.935%

Not new. The provenance of actions along such a solution of can be communicated through the visualization of causal links [Seegebarth et al. 2012; Chakraborti et al. 2019].



Muise, et al. "Planning for goal-oriented dialogue systems" Technical Report (2019)

Sreedharan, et al. "Why can't you do that HAL? Explaining unsolvability of planning tasks" IJCAI (2019)

Seegebarth, et al. "Making hybrid plans more clear to human users —A formal approach for generating sound explanations" ICAPS (2012)

Chakraborti, et al. "Planning and visualization for a smart meeting room assistant." AI Communications (2019)