Zero-Shot Bot

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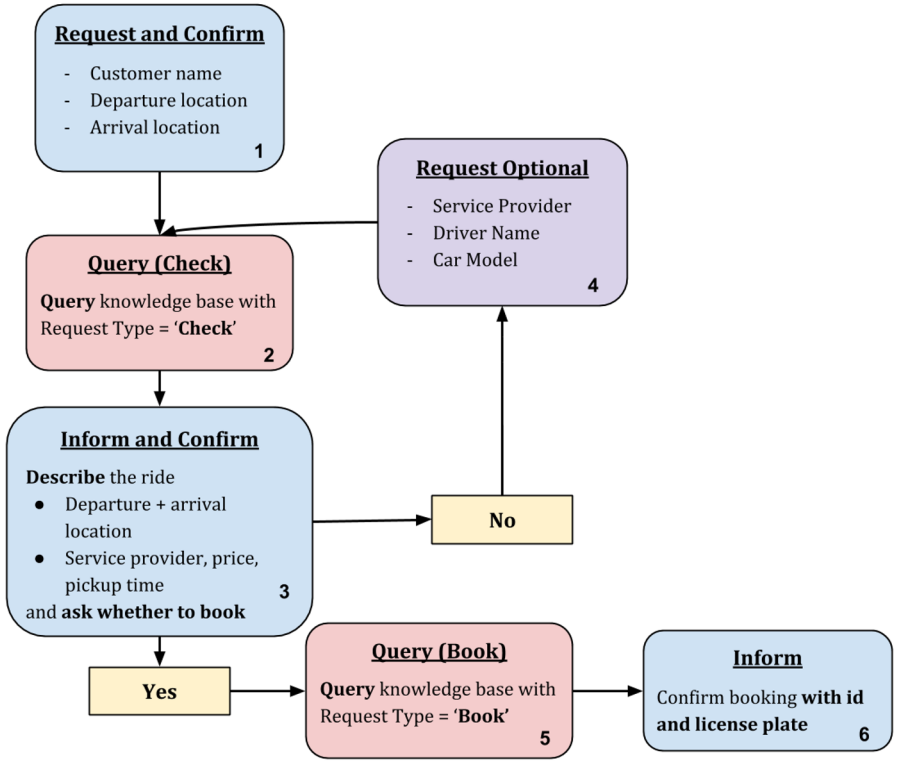
Motivation

- Designing a task-oriented dialogue system for a new domain can be **data hungry**
- **Schema-guided dialogue + zero-shot** transfer approaches aim to transfer knowledge to a new task using just a **concise description of the new task.**

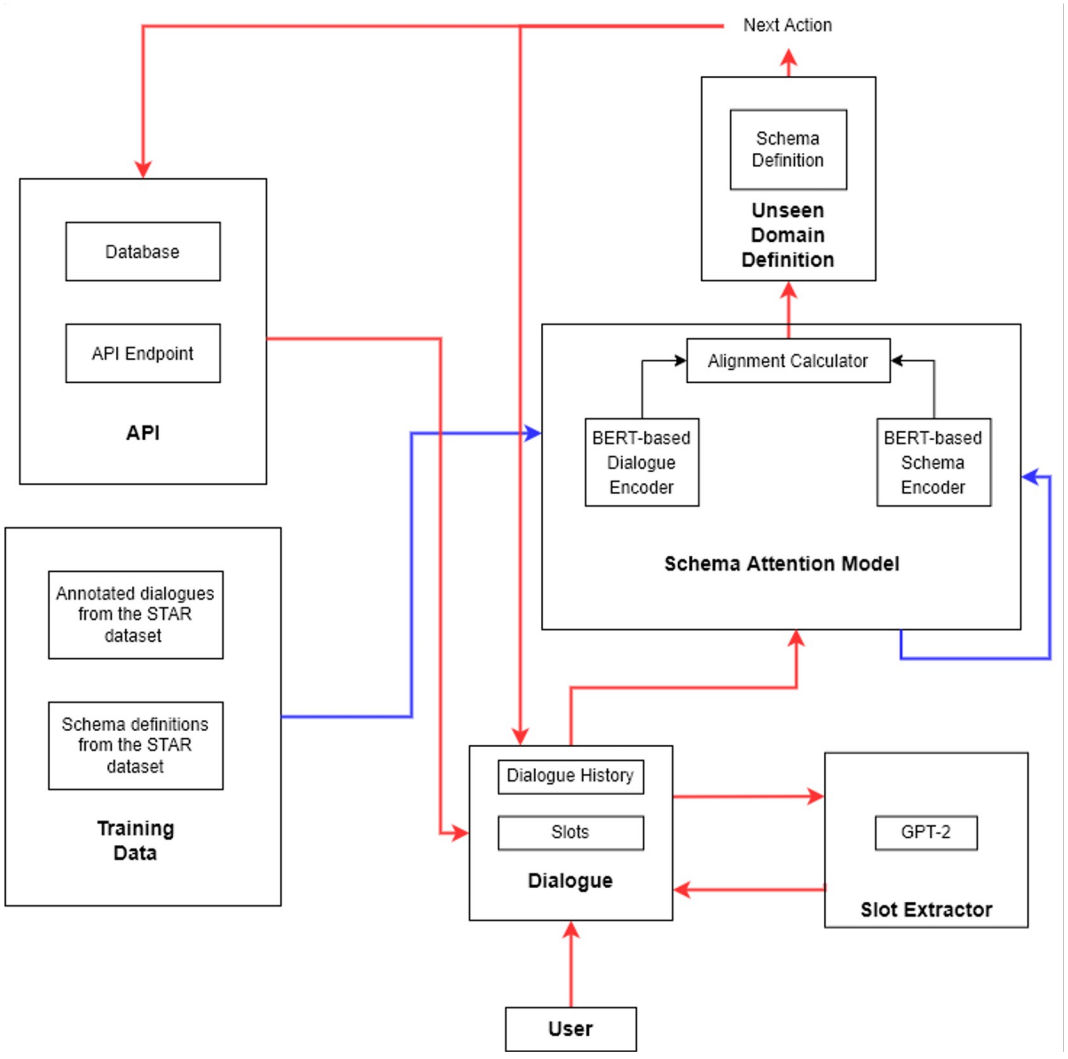
- Research papers evaluate these models on test datasets.
- **We wanted to see for ourselves the first-hand challenges in using such a model for interactively chatting with an end-user.**

Domain and Task

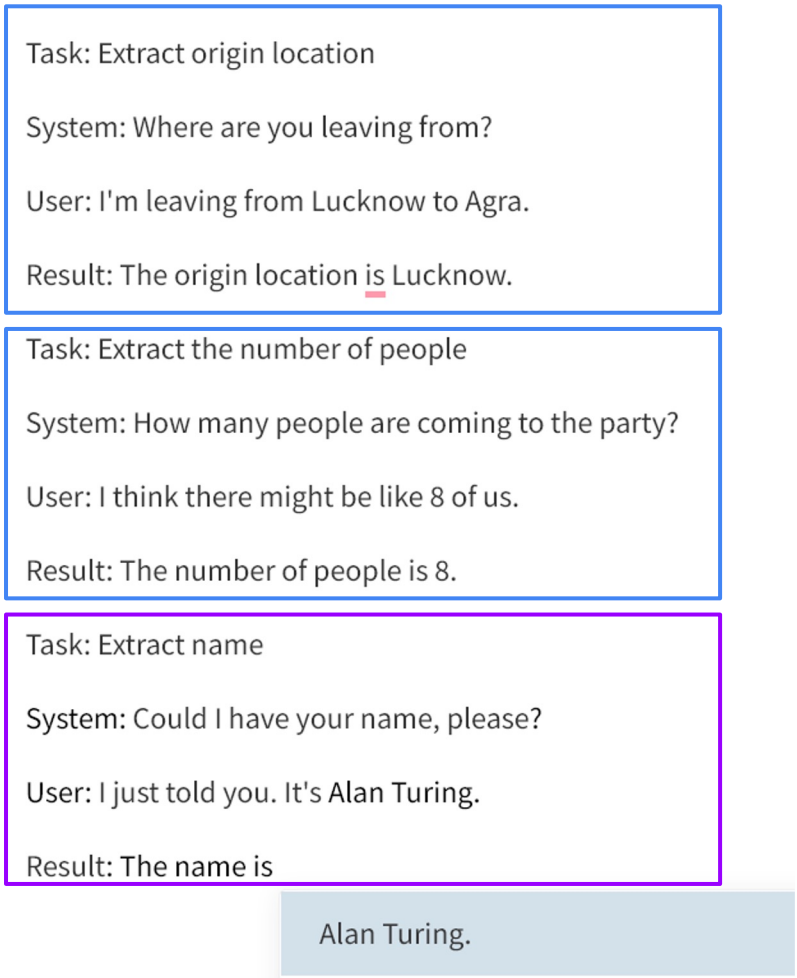
- We chose **ride booking** as the task for our agent, which helps users book a cab.
- We trained the zero-shot model on dialogues from “sibling-domains” such as restaurant table booking, hotel booking, doctor appointment scheduling, etc., and transferred it to this unseen task.



System Architecture



GPT-2 for Slot Extraction



Midterm and Final Evaluation Round Robins

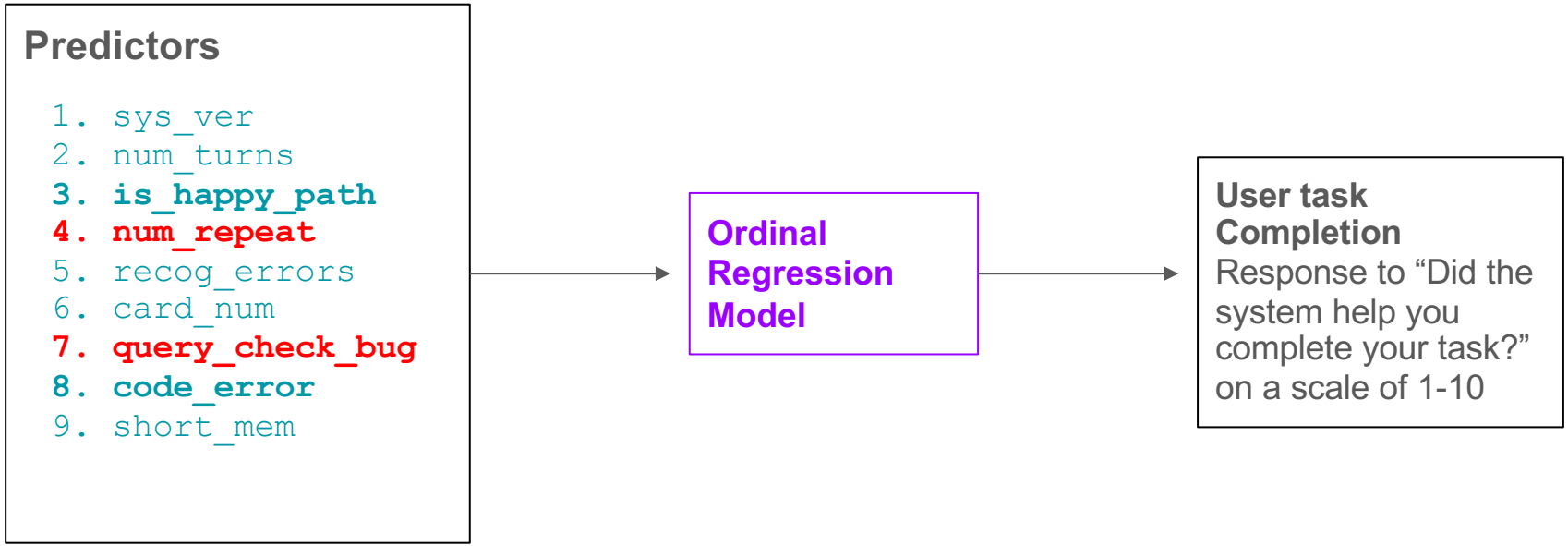
Midterm State

1. Ability to interactively chat with the model
2. No persona
3. Inability to extract entities from input
4. Bugs in API querying

Improvements in Final State

1. Ability to extract entities from user utterances
2. Fixed API query bugs
3. Added persona to the system utterances to mimic the zero-shot bot's objective

PARADISE Model and Analysis



PARADISE Result and Analysis

Predictors	Coefficients	P-Value
sys_ver	1.7848	0.112
num_turns	2.3762	0.259
is_happy_path	2.6594	0.021
num_repeat	-6.7434	0.006
recog_errors	2.7348	0.206
card_num	-2.2844	0.1
query_check_bug	-4.9508	0.038
code_error	2.9224	0.034
short_mem	-0.0432	0.973

Significant predictors:

1. **Straying off the happy path** is negatively correlated with task success rate
2. The number of times the system asks ***"I didn't quite catch that. Could you please phrase that more explicitly?"*** is indicative of the dialogue not going as expected.
3. **API Query Bugs** in our system were correlated with lower task success rate.

Predictor Collinearity

	feature	VIF
0	sys_ver	13.544087
1	num_turns	17.259665
2	is_happy_path	7.952089
3	num_repeat	6.207188
4	recog_errors	6.146092
5	card_num	5.461382
6	query_check_bug	3.674522
7	code_error	2.565087
8	short_mem	1.220899

Goals Review

Minimal Goals:

1. **Run the evaluation script for the Schema attention model.**
2. **A chat interface to talk to the ZS-bot.**

Basic Goals:

1. **Run the ZS-bot on a custom user-domain.**
2. **Bug fixes and improvements.**

Stretch Goals:

1. Ability to process voice input
2. Answering some research questions

Collaboration Summary

Amogh Mannekote

- Came up with the project idea. This involved identifying the research paper in question, understanding it, and brainstorming with Vyom Aasit Pathak and Oluwapemisin Bandy-toyo about ways to turn it into a usable system.
- Set up the source code and bug tracking management systems.
- Implemented a wrapper layer over the existing model to support chatting with the model.
- Added support to the model for handling previously unseen schemas.
- Co-worked on the entity extraction module based on GPT3-Neo for the mid-term round robin with Vyom Aasit Pathak
- Co-developed the study protocol with Vyom Aasit Pathak for the mid-term round robin.
- Helped identify areas of improvement for the system from the mid-term round-robin interactions.
- Was actively involved in creating the reports and presentations.
- Worked on developing the PARADISE model

Oluwapemisin Bandy-toyo

- Creation of a React UI. This is something that we plan to incorporate in future iterations.
- Creation of persona/scenario cards which allowed the user to personify someone attempting to complete specific tasks such as booking a ride somewhere.
- Transcribing user interactions that occurred during the round robins.
- Formulating different portions of the project reports i.e a portion of system architecture description.
- Creating alternative schemas for user interactions. This allows for different variations in how the system responds to users .
- Taking users through our bot's testing and survey process during the round robins.
- Worked on developing the PARADISE model

Vyom Aasit Pathak

- Brainstormed with Amogh Mannekote about the idea on how to use the paper as a viable commercial system.
- Co-worked on the entity extraction module based on GPT3-Neo for mid-term round robin with Amogh Mannekote.
- Co-developed the protocols and the process to follow for the mid-term round robin with Amogh Mannekote.
- Built a more robust GPT-2 entity extraction module with decent priming for final round robin which was a significant improvement.
- Was actively partaking in developing the reports, and presentations.
- Worked on developing the PARADISE for testing the usability of the dialogue system.

Thank you