



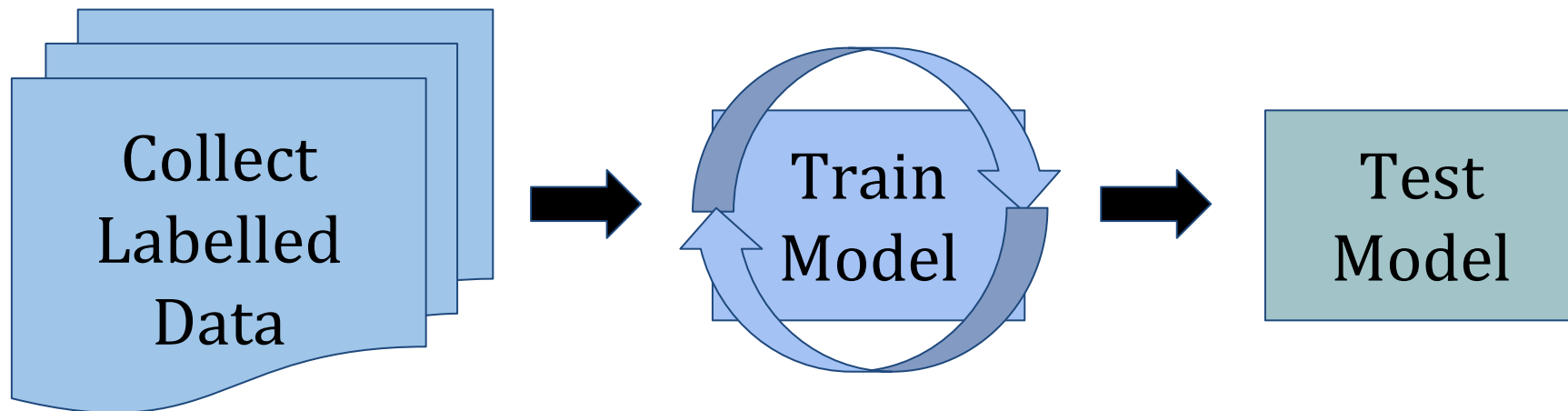
Dialog as a Vehicle for Lifelong Learning

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Standard Supervised Learning Pipeline



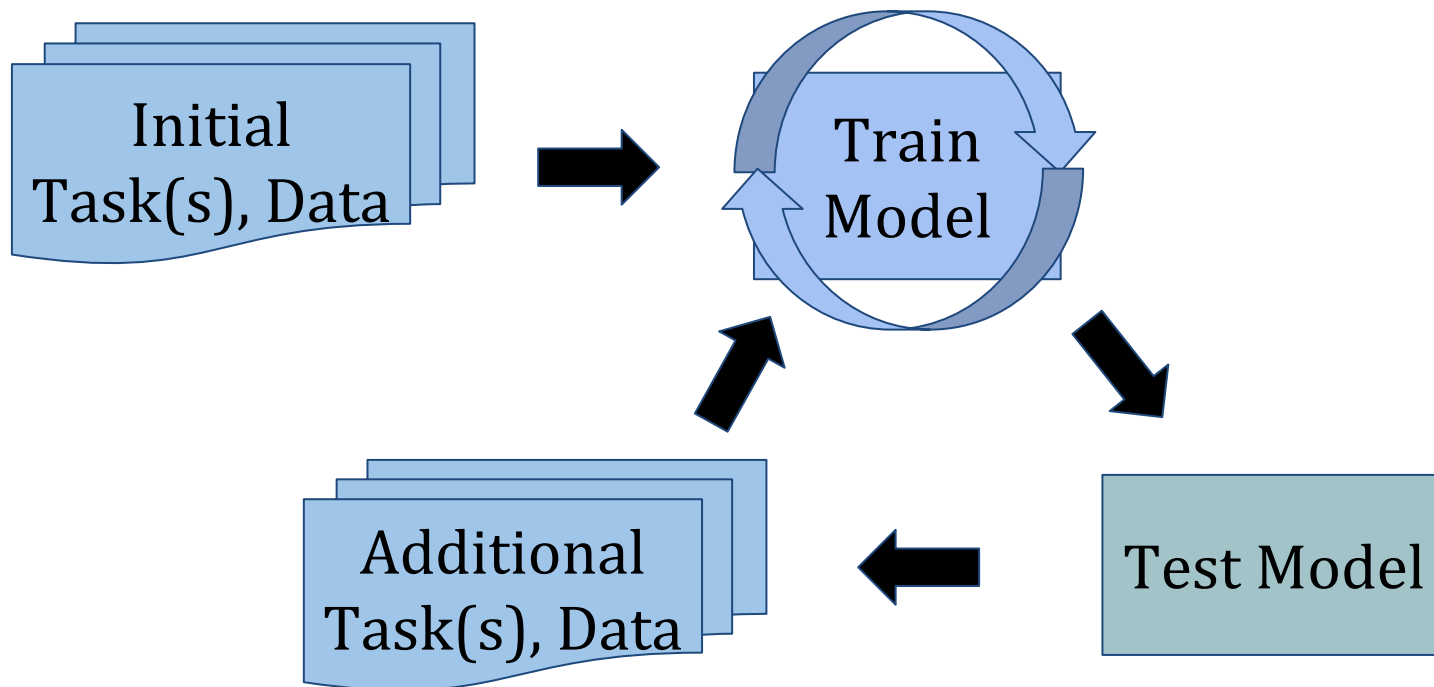


Standard Machine Learning Pipeline - Disadvantages

- Real world test data may look different from training data.
- Test distribution may change over time.
- Tasks needed by users may change over time.
- Needs dedicated dataset for each task.



Lifelong Learning





Lifelong Learning - Benefits

- Generalizable - adapt to a variety of test data distributions
- Versatile - same model can be shared between multiple tasks, that are not necessarily pre-defined



Lifelong Learning - Benefits





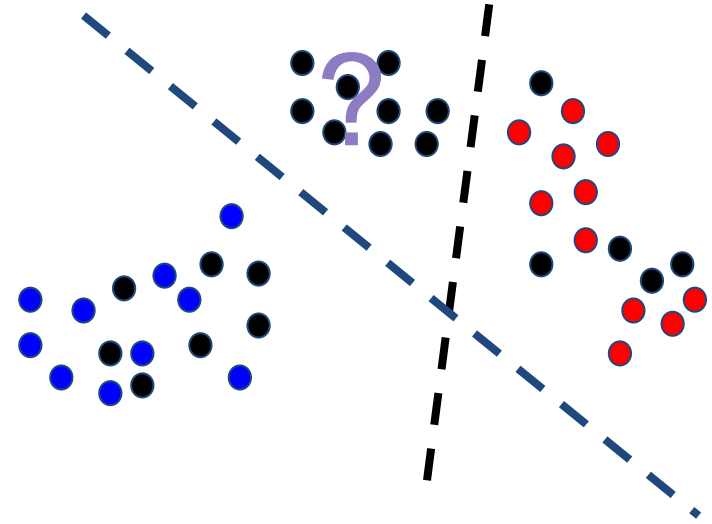
Challenge Area

- Dialog for Supporting Lifelong Learning -
New challenge area for dialog researchers
- Dialog systems interact with users by design - Provide a mechanism to collect labeled data at test time.



Active Learning

Query for labels most likely to improve the model.





Opportunistic Active Learning

- Asking locally convenient questions during an interactive task.
- Questions may not be useful for the current interaction but expected to help future tasks.

Opportunistic Active Learning

Bring the blue mug
from Alice's office

Would you use the
word "blue"
to refer
to this object?

Yes

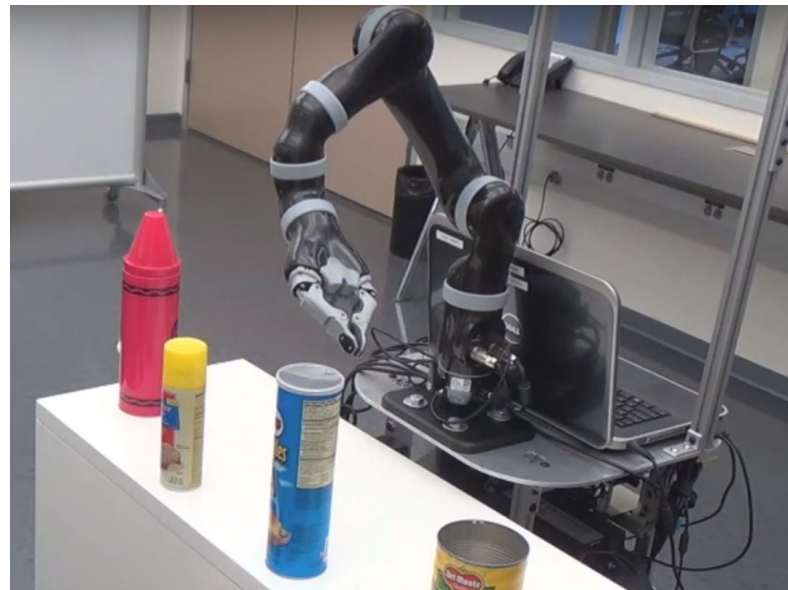


Opportunistic Active Learning

Bring the **blue mug**
from Alice's office

Would you use the
word "**tall**" to refer to
this object?

Yes





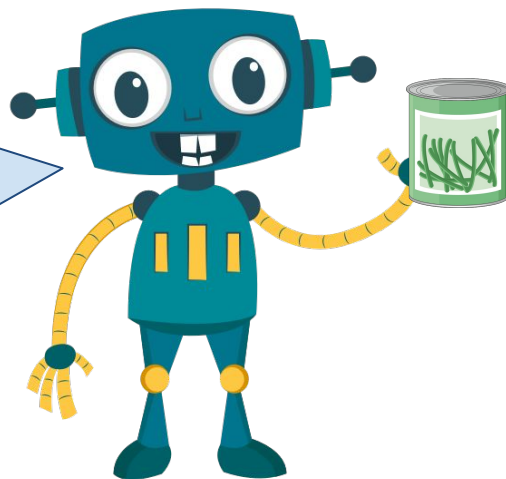
Challenge Problems for Dialog Researchers



Challenge: Dialog Act Design

Design new dialog acts that collect labeled data or combine this with task-completion objectives

Can you show me how to open this with a knife?





Challenge: Dataset Collection and Simulation

Collect annotations to provide correct answers in simulation to a wide range of queries.



Challenge: Prosodic Analysis

- Identify urgency, stress, sarcasm and frustration in users to determine when it is appropriate to include or avoid data collection queries.
- User studies to identify best practices for demonstrating learning.



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Thank You!

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