

SIDC19

Where Now Meets Next

Natural Language Training

Best Practices for Bixby

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Natural Language Training: Best Practices

Reviewing Key Terms

Starring: Movie Agent Sample Capsule

What use cases should I train?

The model has been generated! Now what?

My examples aren't learning!

Curating Data with the Capsule Interpreter Report



Bixby 101 Key Terms Recap

Goal

The objective of an utterance

Action

The operation Bixby performs on behalf of a user.
e.g. FindMovie, RunQuiz

Concept

Concrete or abstract entities derived from NL inputs.
e.g. MovieTitle, MovieGenre

Bixby 101 Key Terms Recap

Plan

The procedure Bixby builds to execute a goal based on user provided inputs.

Route

Tells the planner to go through a "waypoint" on the way to the goal, so it can factor in more information or prompt for more information.

Training

The set of example utterances used to train Bixby AI to understand natural human language.

What is the Movie Agent capsule?

- Travel agents help you plan a trip when you're overwhelmed with decisions. Bixby can assist you as a Movie Agent by helping you decide on a film to watch.
- Users can query the movie database by genre, person name (actor, director), movie title and release date.
- Users can take a fun movie quiz to get a recommendation based on their "movie trip" preferences.

Training in Bixby Studio

Starring: Movie Agent sample capsule

Let's start with a basic use case: "What movie should I watch?"

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Training in Bixby Studio

Starring: Movie Agent sample capsule

Let's go a step further with inputs: "Show horror movies with Ethan Hawke"

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Training in Bixby Studio

Starring: Movie Agent sample capsule

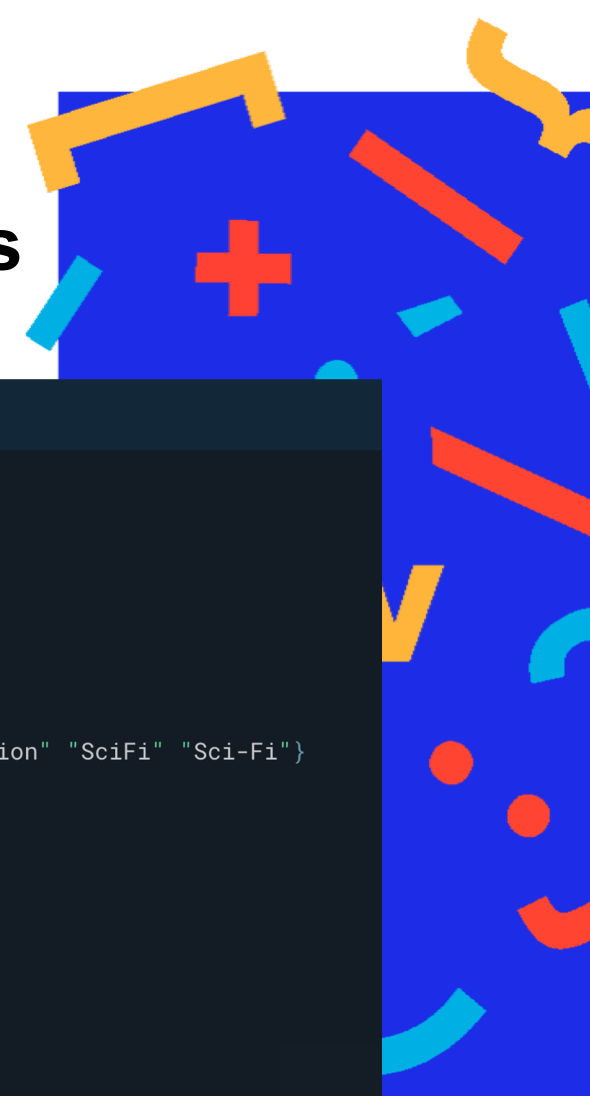
When do we use routes in annotation?

...But how many training examples do I need? (pt. 1)

Let's test it!

Training Bixby with Vocabulary

Optimize training by reinforcing primitive concepts with vocab!



```
MovieGenre.model.bxb
1 enum (MovieGenre) {
2   description ("Supported TMDB Movie Categories")
3   symbol (Horror)
4   symbol (Thriller)
5   symbol (Mystery)
6   symbol (Crime)
7   symbol (Adventure)
8   symbol (Action)
9   symbol (Fantasy)
10  symbol (ScienceFiction)
11  symbol (Family)
12  symbol (Animation)
13  symbol (Comedy)
14  symbol (Romance)
15  symbol (Western)
16  symbol (Drama)
17  symbol (History)
18  symbol (War)
19  symbol (Documentary)
20  symbol (Music)
21 }
22
```

```
MovieGenre.vocab.bxb
1 vocab (MovieGenre) {
2   Horror { "Horror" }
3   Thriller { "Thriller" "Thrillers" }
4   Mystery { "Mystery" }
5   Crime { "Crime" }
6   Adventure { "Adventure" }
7   Action { "Action" }
8   Fantasy { "Fantasy" }
9   ScienceFiction { "Science Fiction" "Science-Fiction" "SciFi" "Sci-Fi" }
10  Family { "Family" }
11  Animation { "Animation" }
12  Comedy { "Comedies" "Comedy" }
13  Romance { "Romance" }
14  Western { "Western" "Westerns" }
15  Drama { "Drama" "Dramas" }
16  History { "History" }
17  War { "War" }
18  Documentary { "Documentaries" "Documentary" }
19  Music { "Music" }
20 }
```

...But how many training examples do I need? (pt. 2)

Let's test it!

Conversation Steps

Outer

The initial utterance to begin a conversation.
- "What movie should I watch?"

Continuation

A follow up utterance that relies on the context of the previous utterance.
- "Show the ones with Tom Hanks"

Prompt

A request from Bixby for more information to complete execute of a goal.

What is a Bixby prompt?

- If a user's utterance does not include all the information necessary to execute a goal, Bixby may interrupt execution to prompt the user for more information. (e.g. "Which genre are you in the mood for?")
- "Prompt training" helps Bixby understand the user's response to a prompt. (e.g. "Crime movies")
- MovieAgent is a quiz, so each quiz question is a prompt.

Prompt Training for Quiz Capsules

Starring: **Movie Agent sample capsule**

Prompt training for MovieGenre and for Quiz answers

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Prompt Training for Quiz Capsules

Starring: **Movie Agent sample capsule**

Prompt training for MovieGenre and for Quiz answers

Defining a Training Set

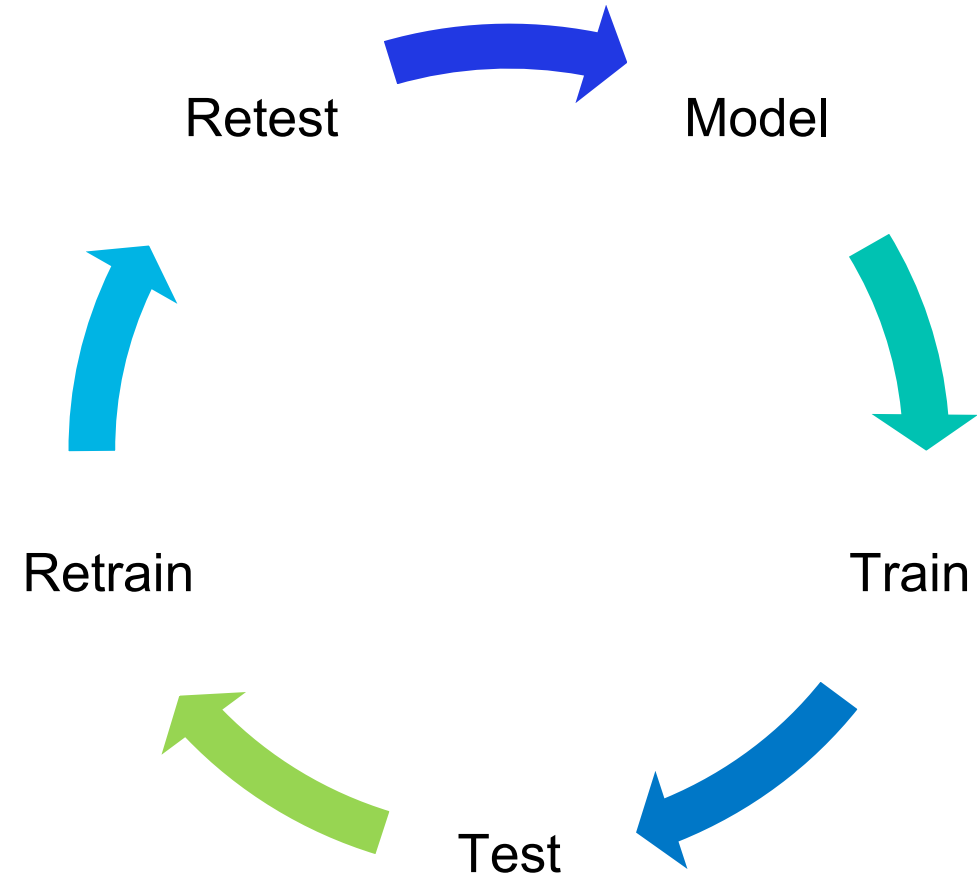
“What should I train in the first place?”

- What goals will your users achieve in your capsule?
- What are the most common and most natural utterances to reach those goals?
- Keep your goals succinct and tightly scoped.



Training is Iterative

- Always aim for 100% learned utterances
- Add diverse training
- Check annotations and plans
- Are your utterances natural and still within scope?





Curating Data with the Capsule Interpreter Report

Training Status

Not Learned

Default status before compiling a model. This label applies as long as Bixby hasn't generated NL models for those entries. The label can also mean that Bixby doesn't have enough information to actually learn from those training examples.

Unverified Plan

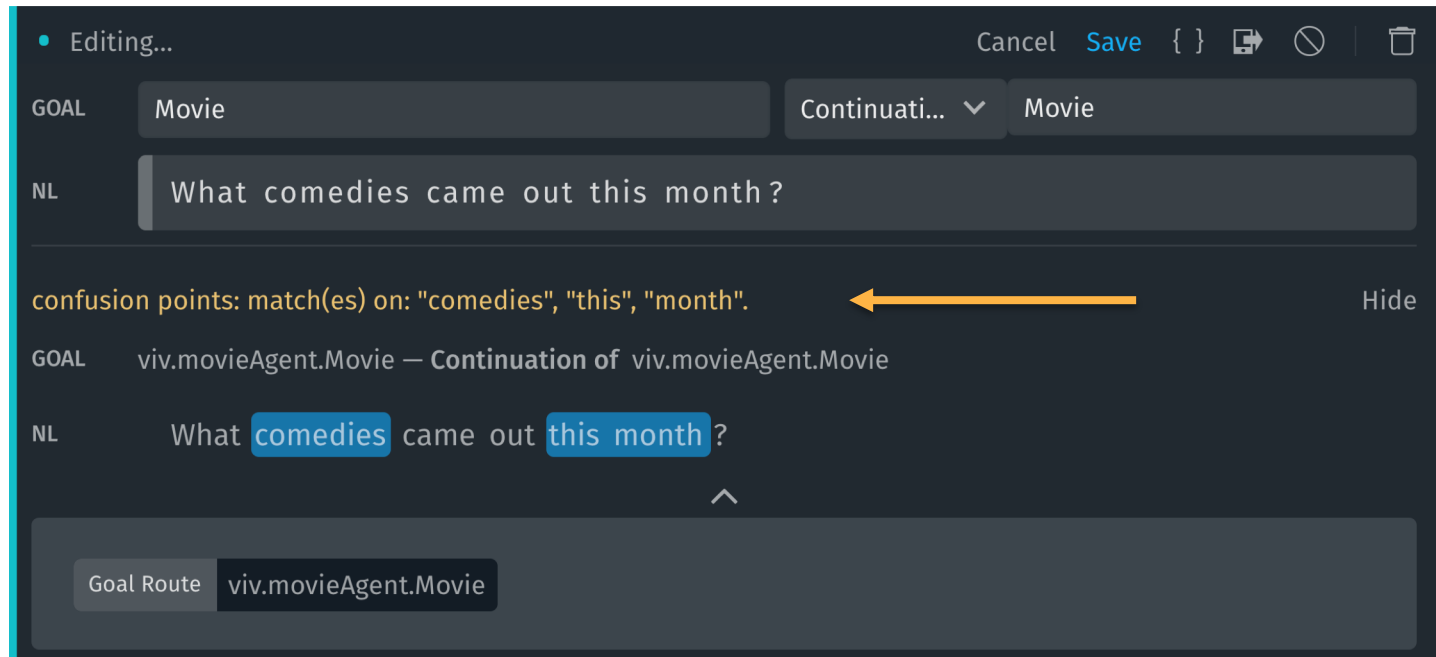
The training entry's current plan differs in a nontrivial way from the plan at the time this entry was saved. This can happen when model changes make the training entry's plan behave differently from the last time it was saved.

Illegal Plan

The training entry has unsatisfied input constraints or unconsumed signals. This means that the intent of what you have trained does not match with the way the models have been designed to work.

Troubleshooting: Status Won't Learn!

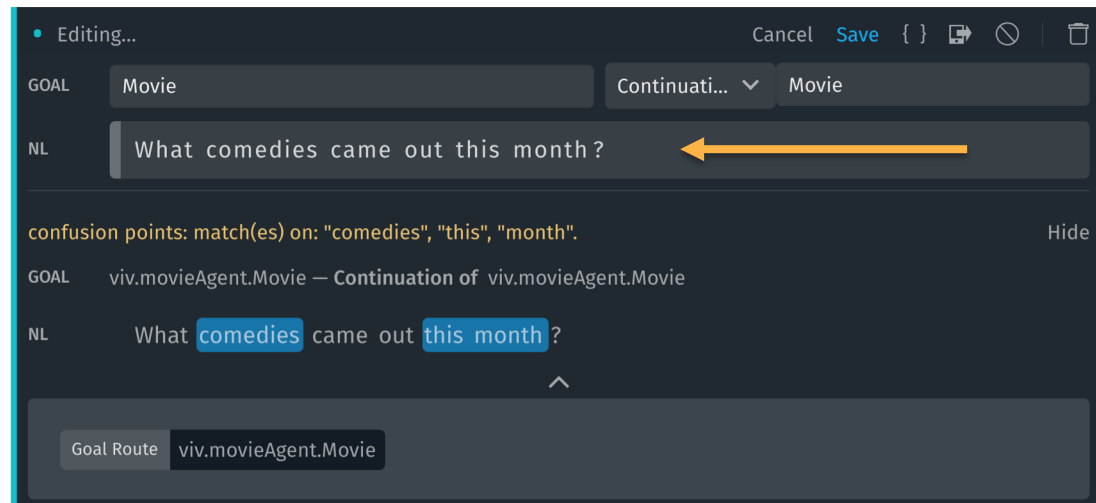
- Your example may not be learned because of **conflicting annotation**, or **conflicting NL**.
 - **Conflicting Annotation:** Compare the annotation of your Not Learned example with Learned use cases. Usually there is a minor annotation error you can fix. Bixby Studio will show confusion points if your Not Learned example does not match similar Learned examples.



Troubleshooting: Status Won't Learn!

- Your example may not be learned because of **conflicting annotation**, or **conflicting NL**.
 - **Conflicting NL**: Compare the NL of your Not Learned example with Learned use cases. One common issue is continuation training matching outer training.

By definition, **continuation training** relies on a previous utterance for context. If your continuation example can stand alone as **outer training**, it should be trained as an outer. “What comedies came out this month” conflicts with the NL of other outer examples.



Getting Ready for a Public Submission

Check your training data in the Capsule Interpreter Report

```
=====
1.0.0-viv.movieAgent
=====
```

```
Status: ACCEPTED
```

```
-----
      state |  count |    pct
-----
      LEARNED |      34 | 100.00%
      NOT_LEARNED |      0 |   0.00%
UNVERIFIED_PLAN |      0 |   0.00%
      ILLEGAL_PLAN |      0 |   0.00%
ERROR_ANNOTATION |      0 |   0.00%
-----
      Total |      34 | 100.00%
-----
```

Training Checklist

Assessing your training

- Aim for 100% Learned
- Reflect natural, real world speech
- Train diverse use cases for balance
- Test frequently, train iteratively



Thank you!