

Natural Language Training - Best Practices

Office Hours - July 10, 2020



Introductions



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- Senior Developer Evangelist
- Father of two daughters
- UC Berkeley Graduate – Go Bears!



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Jonathan Pan

- Developer Evangelist
- Has 4 too many cats (meow)

Training is as Much an Art as a Science



The Science of Training



Training Terminology Basics

Training

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

Goal

The objective of an utterance.
e.g. *Movie*, *QuizAnswer*

Action

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

Training Terminology Basics

Concept

Concrete or abstract entities derived from NL inputs. e.g. *Movie*, *MovieGenre*, *PersonName*

Plan

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

Tuning Concepts - Enumerations and Vocabulary

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}
```

Tuning Concepts -Vocabulary Only

ActionName.model.bxb

```
1 name (ActionName)
```

ActionName.vocab.bxb

```
1 vocab(ActionName) {
2   "See"
3   "Look at"
4   "Look"
5   "Feel"
6   "Touch"
7   "Drink"
8   "Eat"
9   "Talk"
10  "Walk"
11  "Run"
12  "Escape"
13  "Pick"
14  "Drop"
15  "Kick"
16  "Sing"
17  "Open"
18  "Close"
19  "Turn On"
20  "On"
21  "Turn Off"
22  "Off"
23  "Hint"
24  "Help"
25  "What can I do"
26  "Lean"
27 }
```

Training Terminology

Conversation Steps

Outer

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

Prompt

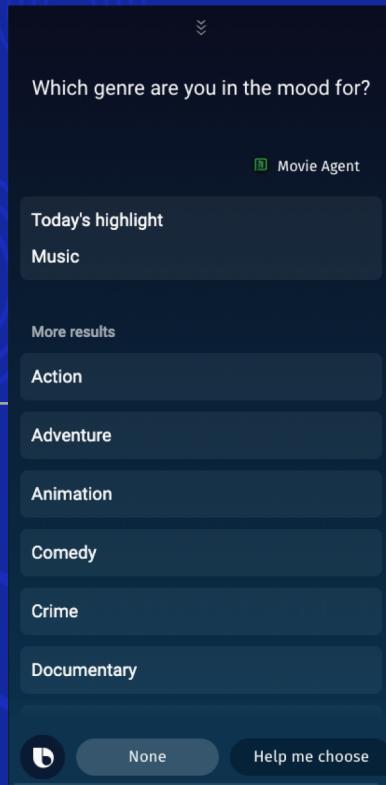
A request from Bixby for more information to complete execution of a goal.

Continuation

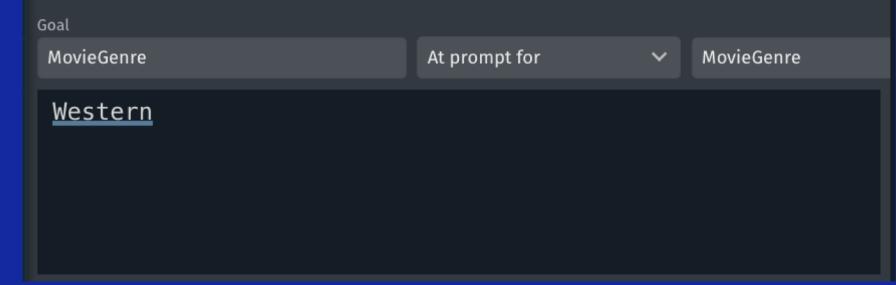
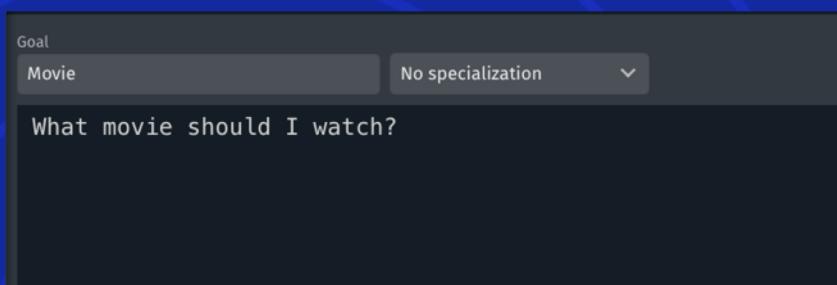
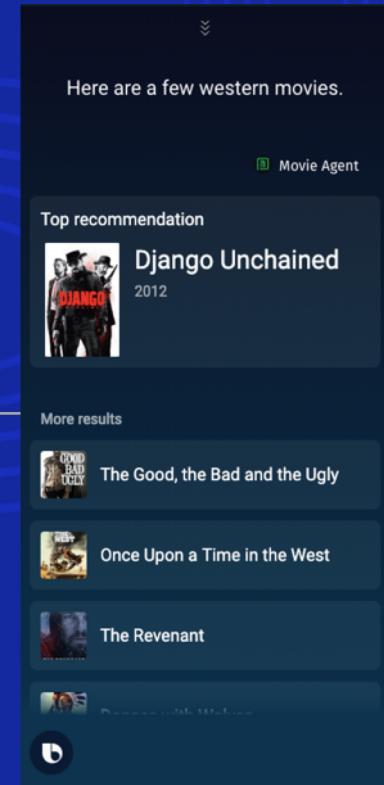
A follow up utterance that relies on the context of the previous utterance.
- "Show the ones with Tom Hanks"

Outer and Prompts

“What movie
should I
watch?”

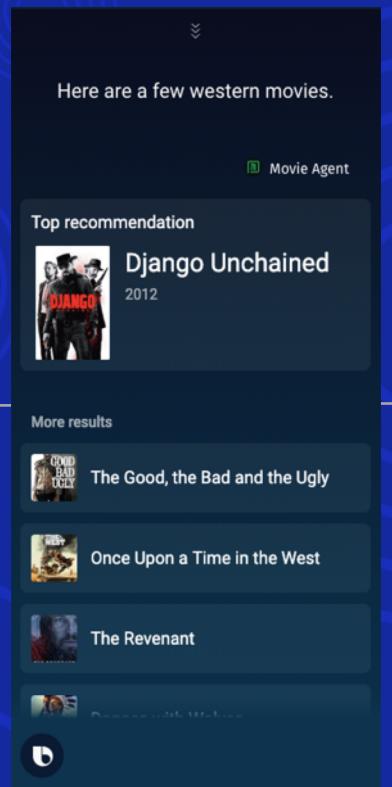


“Western”

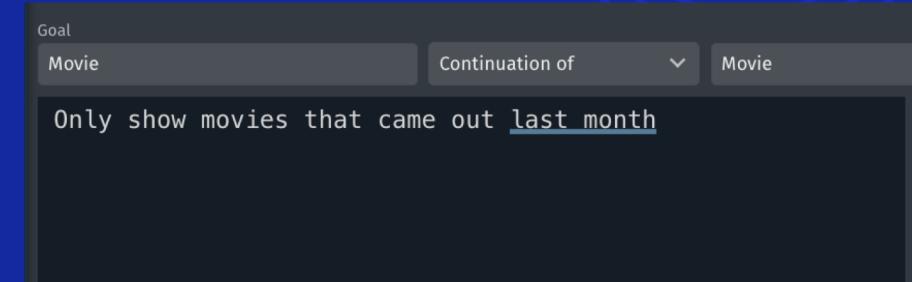
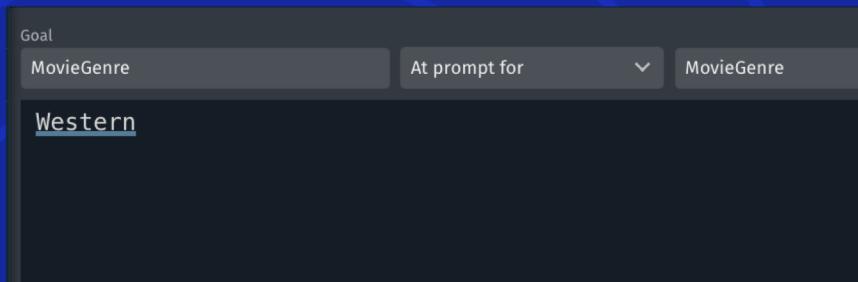
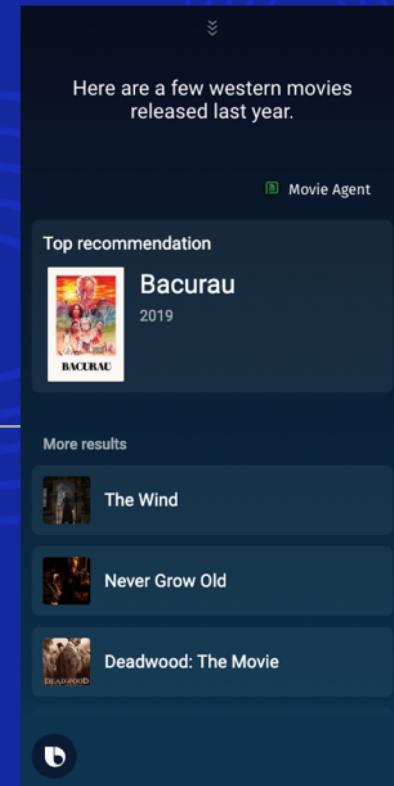


Continuations

“Western”



“that came out last year”



Continuations and Relaxations



Hi Bixby, What should I cook for dinner tonight?

Here are some dinner recipes...



Show me Italian ones

Here are some Italian dinner recipes...



Show me Mexican ones instead

Here are some Mexican dinner recipes...



With sausage and onions

Here are some Mexican dinner recipes with sausage and onions



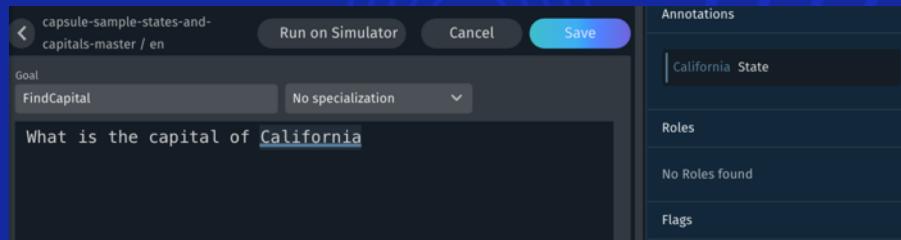
Without gluten

I couldn't find any Mexican dinner recipes without gluten, but here are Mexican dinner recipes with sausage and onions

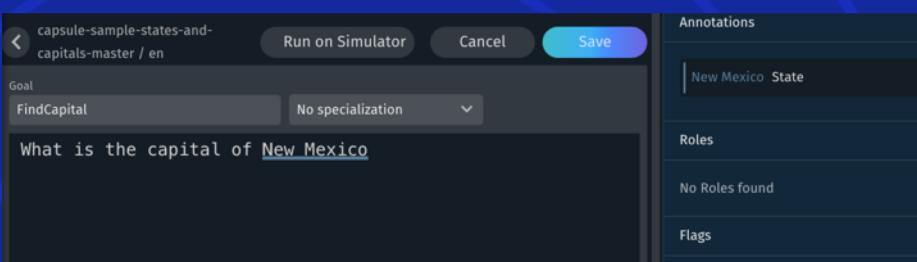


How Many Words

“What is the capital of Oregon”



“What is the capital of North Dakota”



- Train with variation on the number of words e.g. if the value/concept can be 1 or 2 words, train with both
- Watch out for Enums & Vocabulary—train for the variations in lengths in your Enums and Vocabulary
- Test, test and more test. Always test with different length inputs
- This is a common reason for certification to fail

Training Terminology

Advanced

Roles

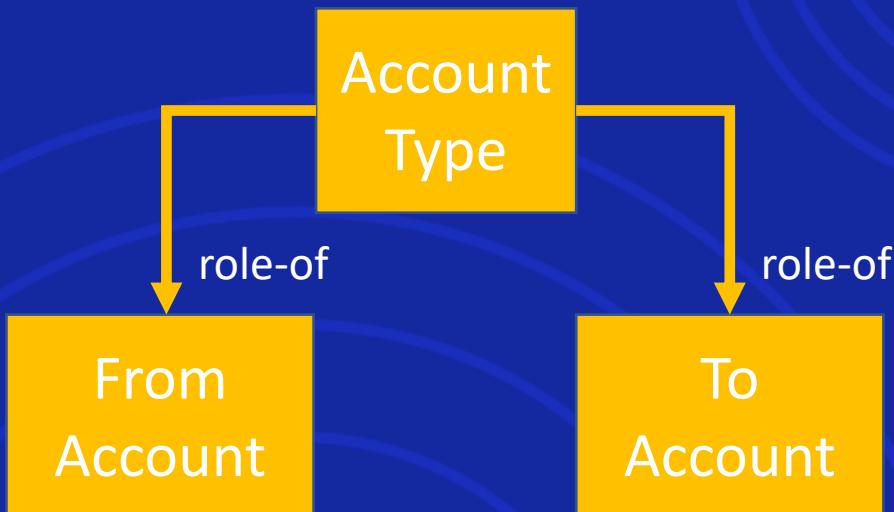
When concepts inherit from a parent content, tells planner what type of concept the value is

Route

Tells planner to go through a “waypoint” on the way to the goal so it can factor in more information or prompt for more information - “Help me choose” or “Remove shirt from cart”

Roles

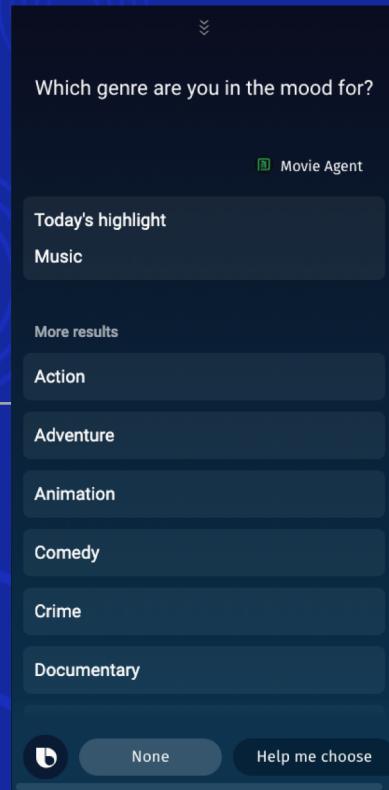
“Make a transfer from savings to checking”



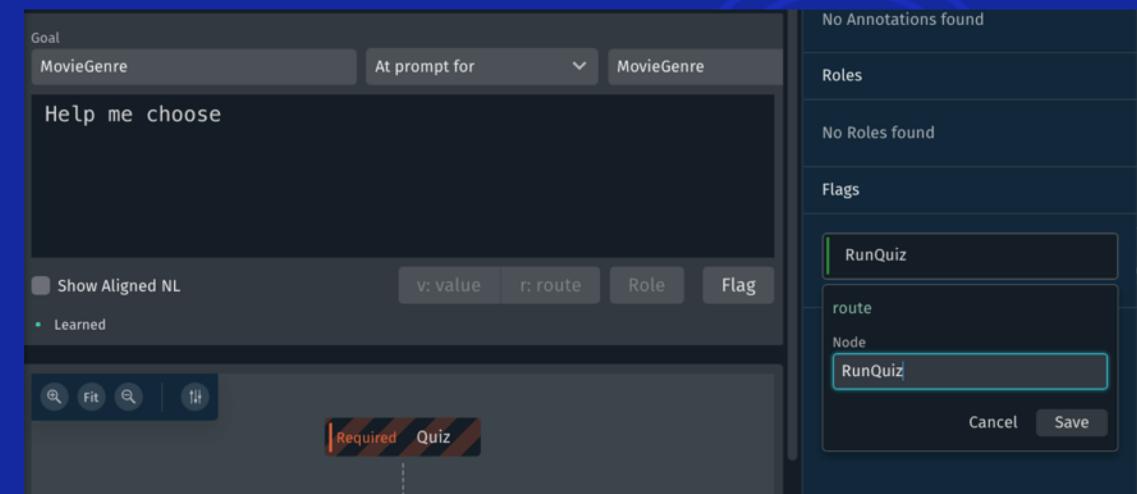
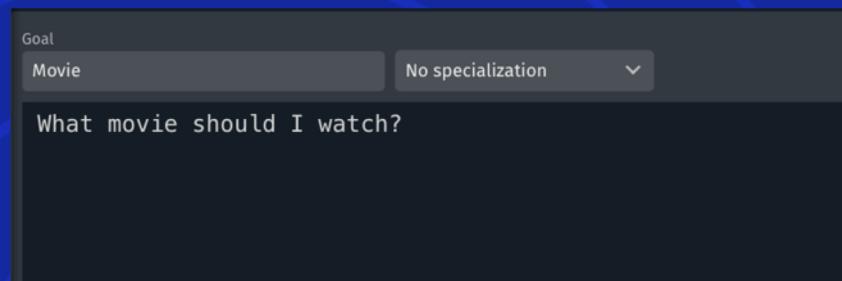
The screenshot shows the Bixby Capsule Editor interface. On the left, under "Goal", there is a "CommitTransfer" action with "No specialization". Below it, the natural language input is "make a transfer from [savings] to [checking]". At the bottom, there are buttons for "Show Aligned NL", "v: value", "r: route", "Role", and "Flag". On the right, there are sections for "savings AccountType" and "checking AccountType" under "Roles". Below these, under "FromAccount", there is a "savings FromAccount" entry, and under "ToAccount", there is a "checking ToAccount" entry.

Routes

“What movie should I watch”



“Help me choose”



The Art of Training



Art of Training

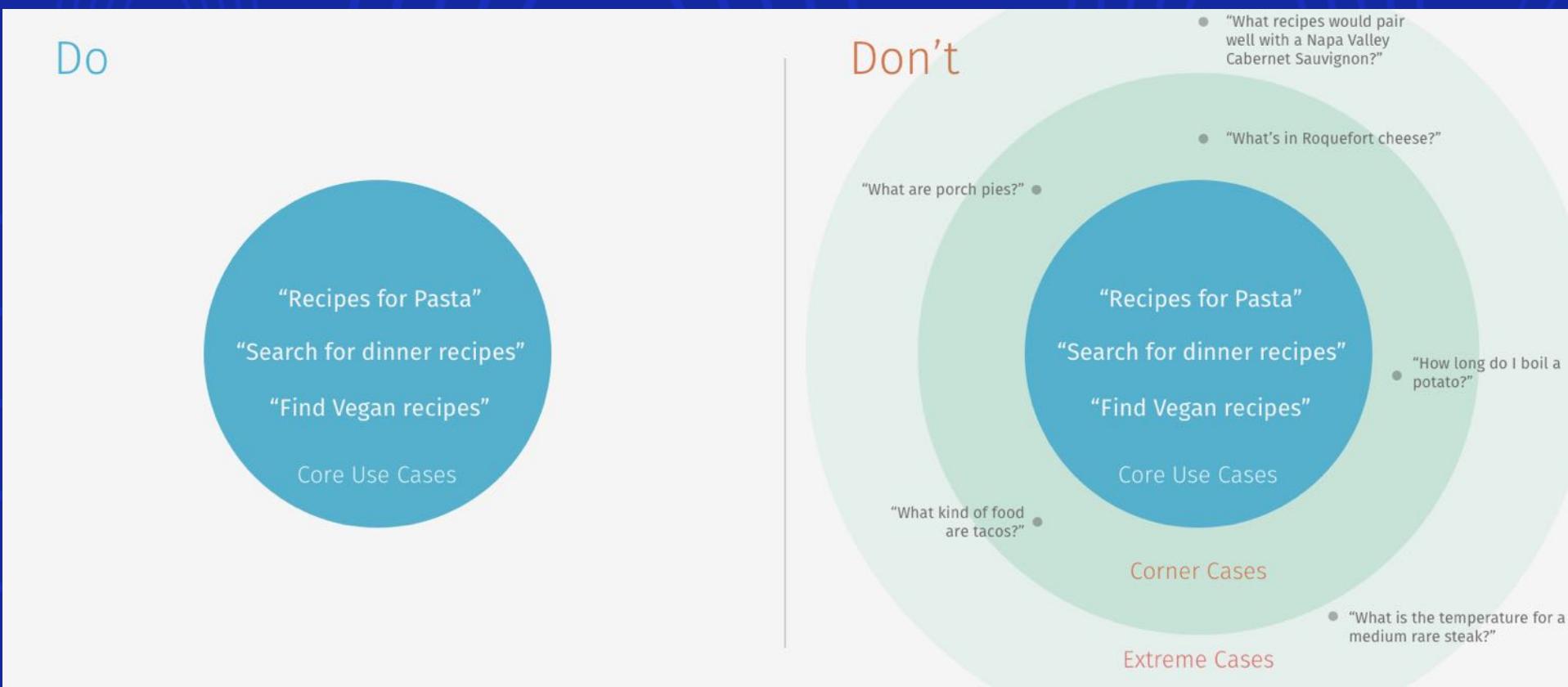
- Training ≠ Developing
- Follow Principles
- Test, Test and Retest

Training Principles

- Tightly Scoped
- Well Discriminated
- Obviously Annotated

Tightly Scoped

Train as little as possible while still providing a useful experience



Well Discriminated

Well Discriminated Queries:

- Recipes for [Chicken]
- Status of [AA] flight [1600]
- Can I recycle [receipts]

Well Discriminated Enumerations/Vocabulary:

- Will it be rainy? [rainy, snowy, sunny, ~~nice~~, ~~bad~~]
- Find [Starbucks, Taco Bell, ~~The Starbucks, A Taco Bell~~]

Obviously Annotated

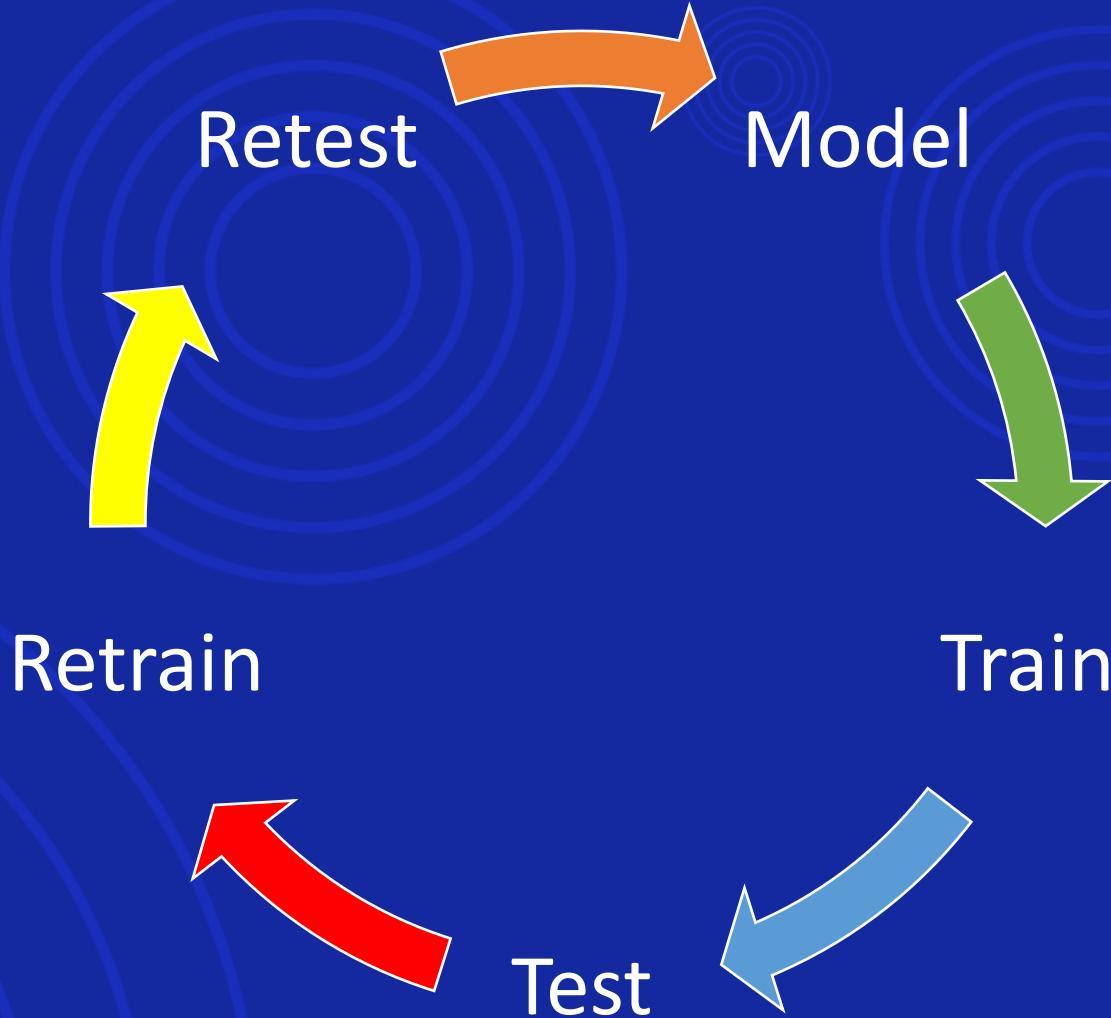


Confusing Annotations

Split[r:ChangeBillSplit] the bill.
What is the total split 4[v:SplitAmount] ways?

Do I (need an umbrella)[v:WeatherCondition:rain] today?
Will it rain[v:WeatherCondition:rain] today?

Test, Test and Retest





over**Train**

Useful Sample Capsules

Bank Sample

github.com/bixbydevelopers/capsule-sample-bank

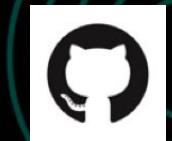
Shirt Sample

github.com/bixbydevelopers/capsule-sample-shirt

Bixby Developers Resources



bixbydevelopers.com



github.com/bixbydevelopers



www.youtube.com/c/BixbyDevelopers



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AMA Time

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