

# Natural Language Training - Best Practices

## Office Hours - July 10, 2020

This presentation available at: <https://bit.ly/bixby71020>



# Introductions



@rogerkibbe

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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

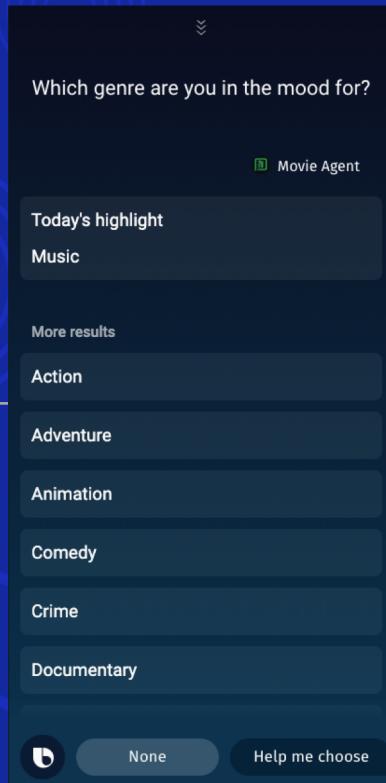
A request from Bixby for more information to complete execution of a goal.

### Continuation

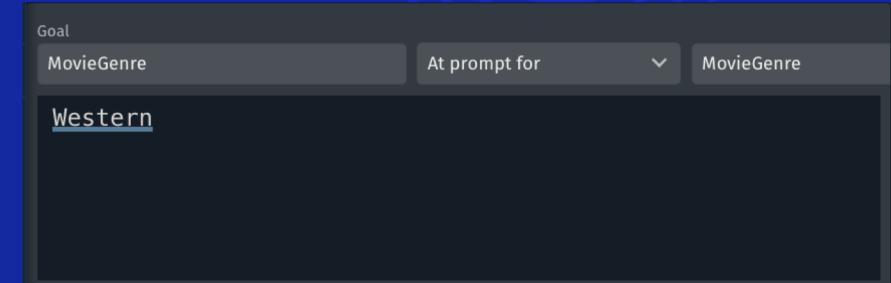
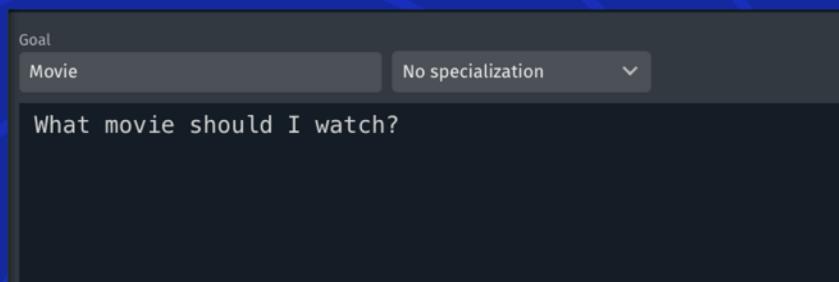
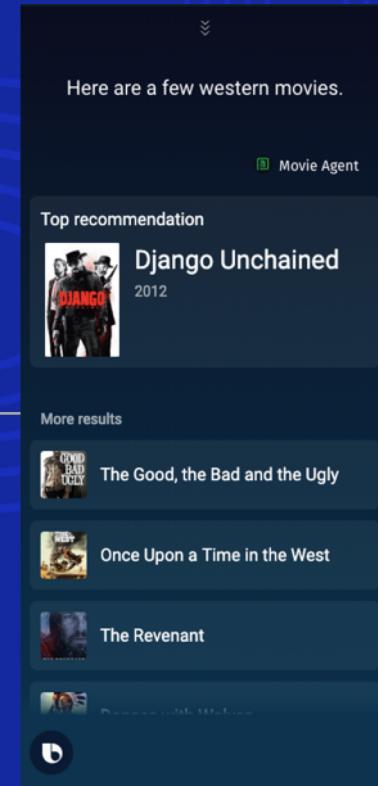
A follow up utterance that relies on the context of the previous utterance.  
- "Show the ones with Tom Hanks"

# Outer and Prompts

“What movie  
should I  
watch?”

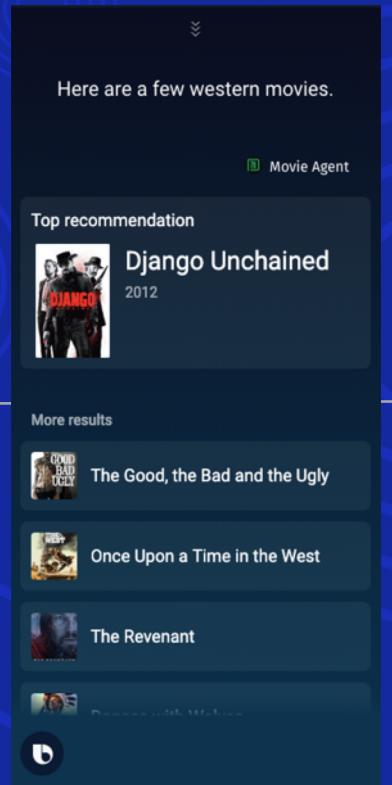


“Western”

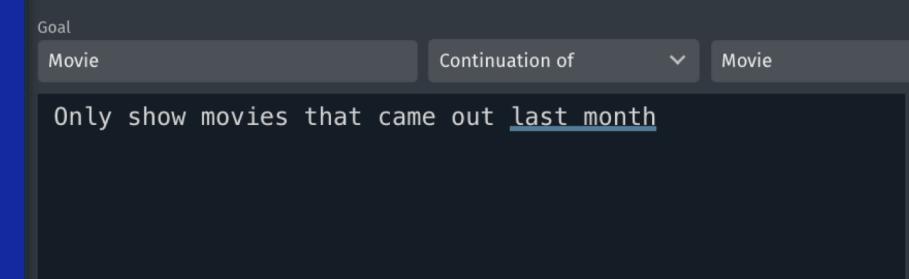
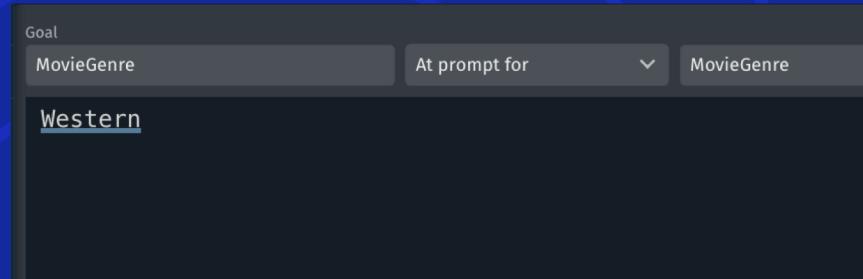
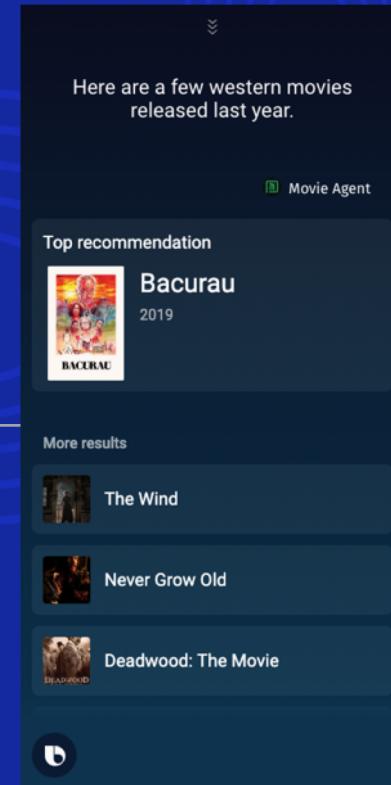


# Continuations

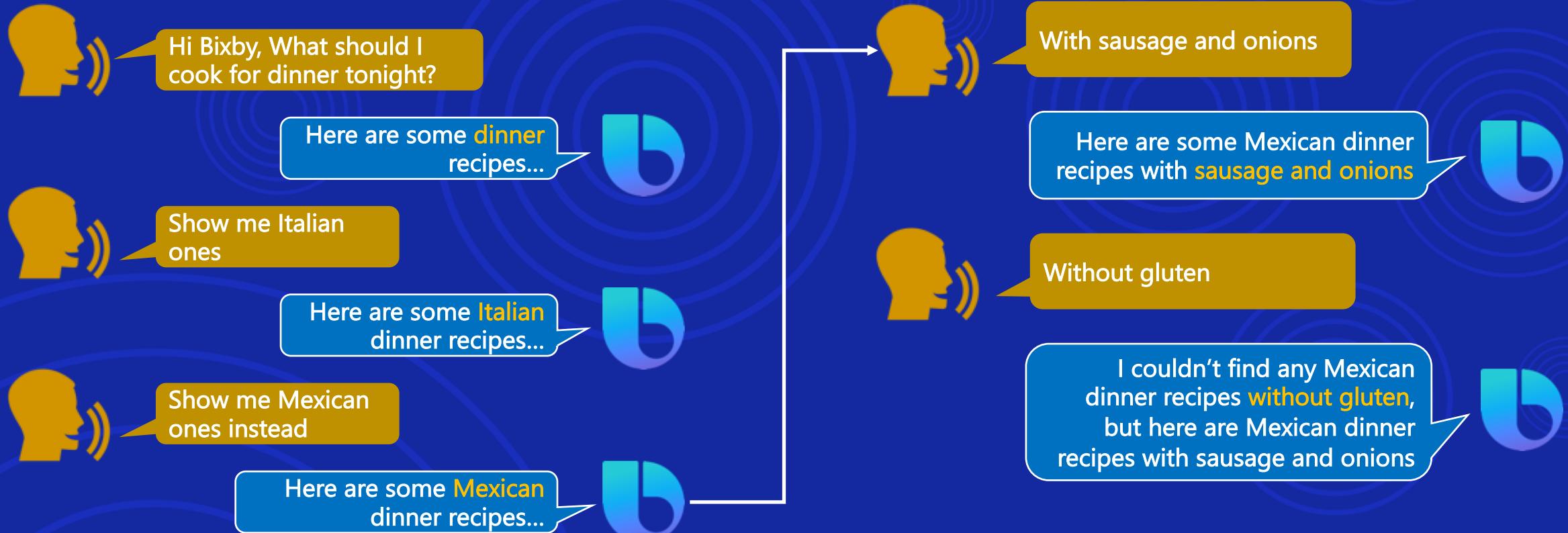
“Western”



“that came out last year”

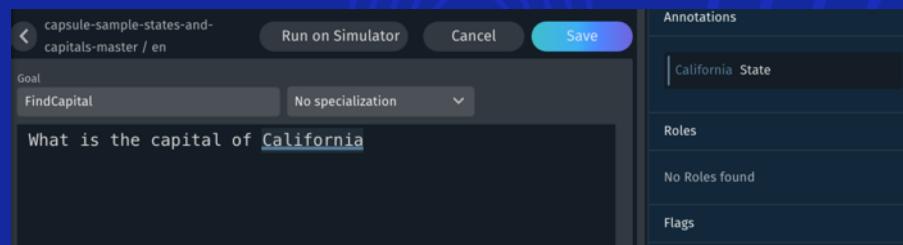


# Continuations and Relaxations



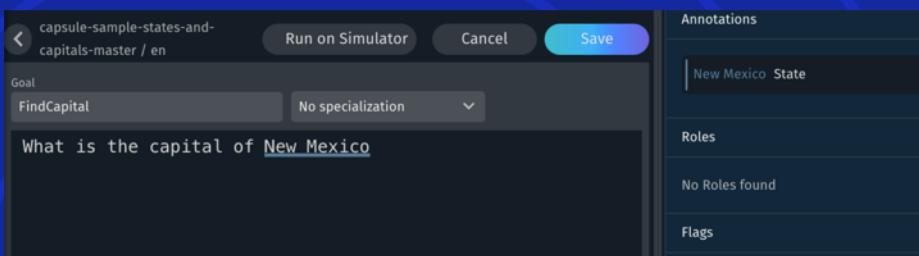
# How Many Words

“What is the capital of Oregon”



- 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

“What is the capital of North Dakota”



# Training Terminology

## Advanced

### Roles

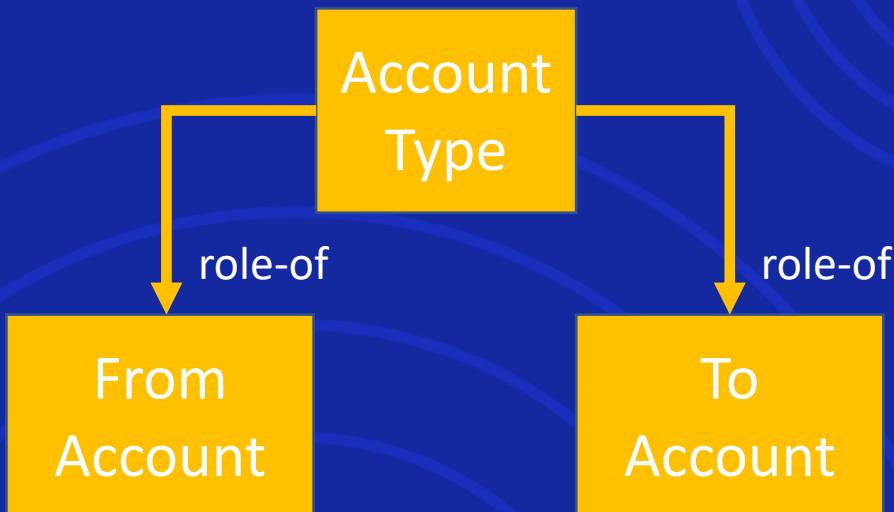
When concepts inherit from a parent content, tells planner what type of concept the value is

### 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

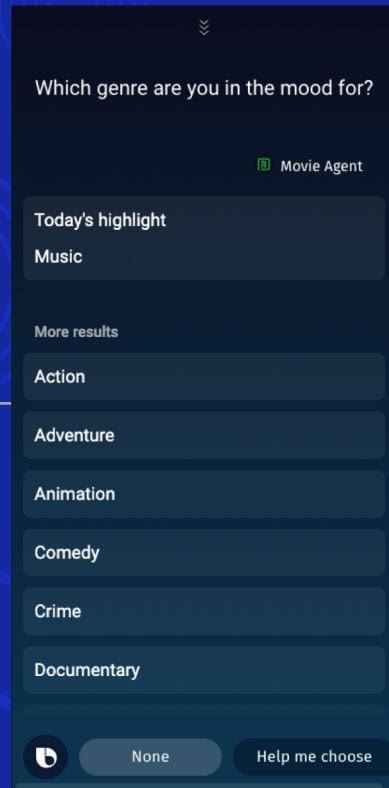
“Make a transfer from savings to checking”



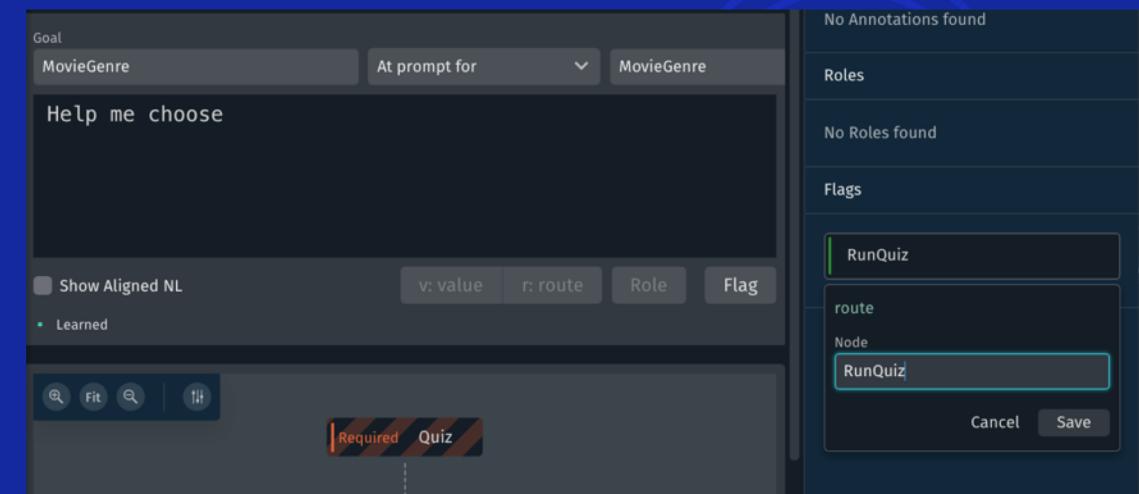
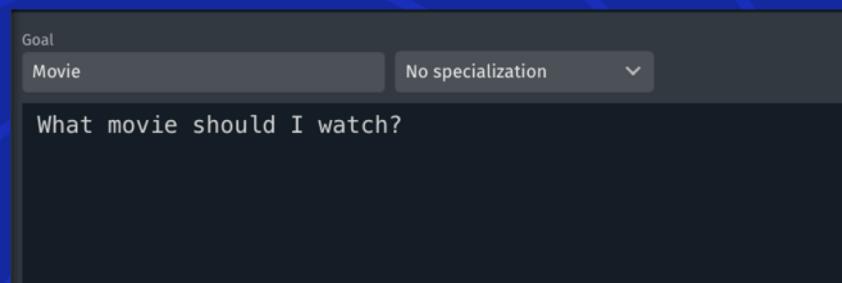
The screenshot shows the Bixby Capsule Editor interface. On the left, under "Goal", there is a "CommitTransfer" button and a dropdown set to "No specialization". Below the button is the natural language input: "make a transfer from [savings] to [checking]". At the bottom of the screen, there are several buttons: "Show Aligned NL", "v: value", "r: route", "Role", and "Flag". A status message at the bottom says "Not Compiled - Learned status unknown". On the right side, there is a sidebar titled "Roles" containing two entries: "savings FromAccount" and "checking ToAccount".

# Routes

“What movie should I watch”



“Help me choose”



# The Art of Training



# Art of Training

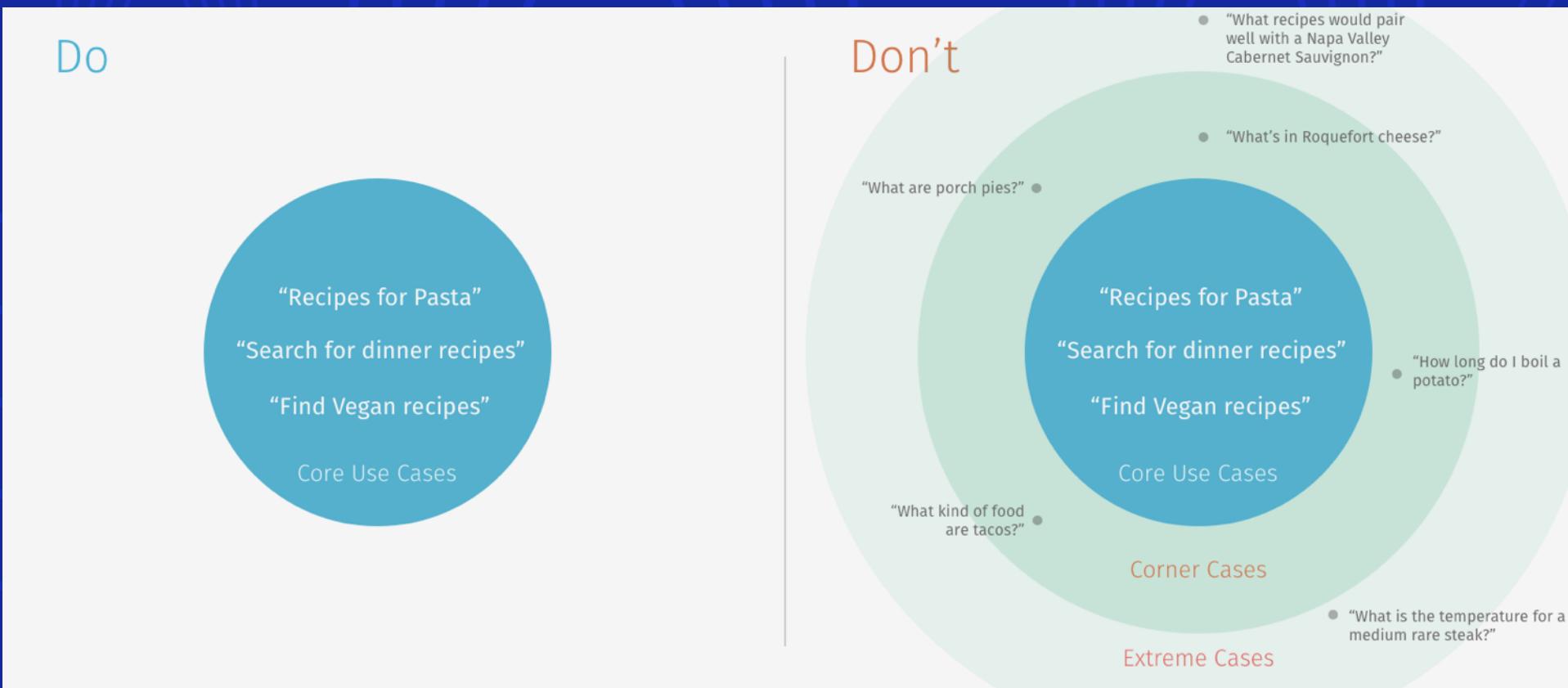
- Training ≠ Developing
- Follow Principles
- Test, Test and Retest

# 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

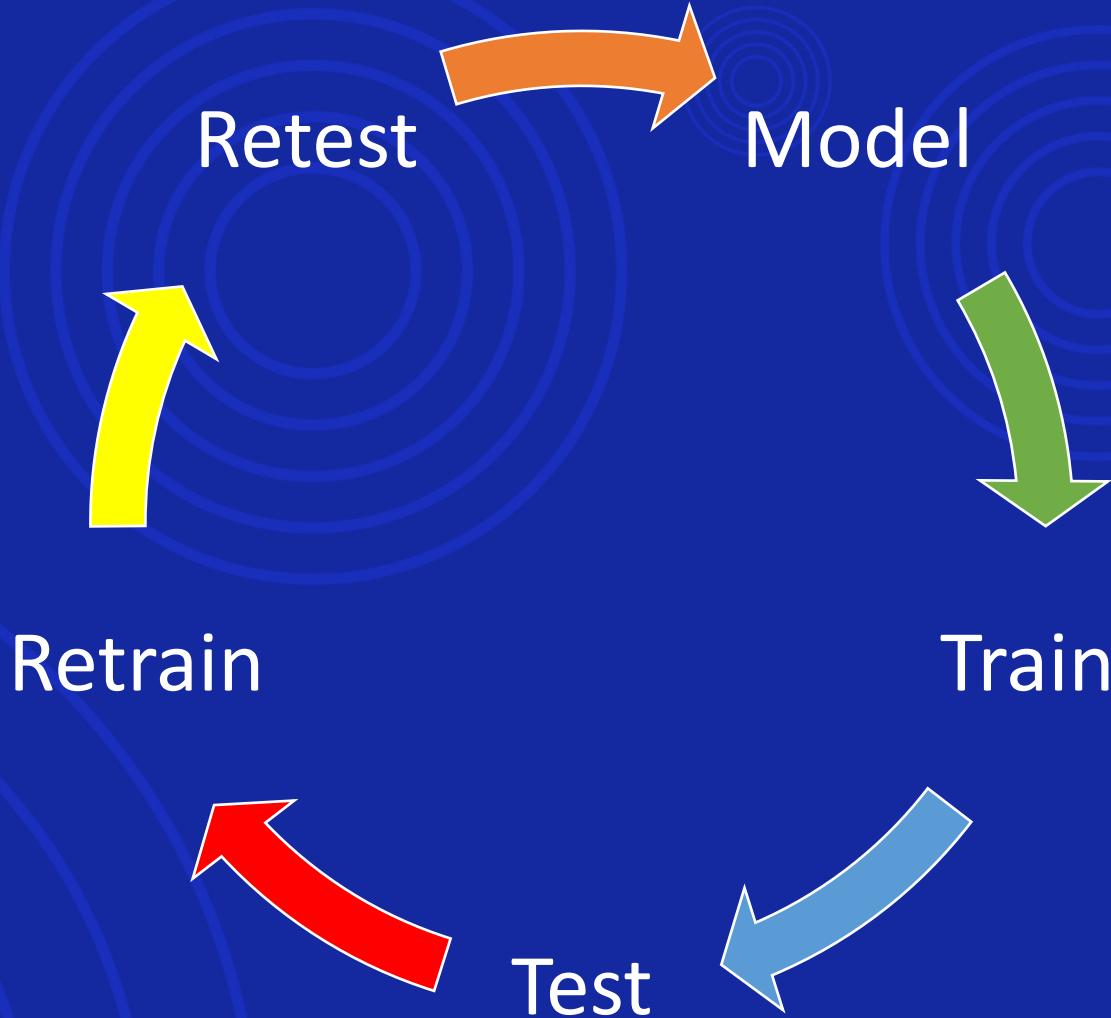


## *Confusing Annotations*

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

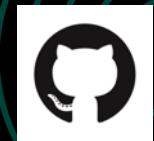
## Bank Sample

[github.com/bixbydevelopers/capsule-sample-bank](https://github.com/bixbydevelopers/capsule-sample-bank)

## Shirt Sample

[github.com/bixbydevelopers/capsule-sample-shirt](https://github.com/bixbydevelopers/capsule-sample-shirt)

# Bixby Developers Resources



[bixbydevelopers.com](http://bixbydevelopers.com)

[github.com/bixbydevelopers](https://github.com/bixbydevelopers)



[www.youtube.com/c/BixbyDevelopers](https://www.youtube.com/c/BixbyDevelopers)



[bixbydev.buzzsprout.com](https://bixbydev.buzzsprout.com)



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# AMA Time

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