
MISTYROBOTICS
CONVERSATION BUILDER
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Conversation Builder

The conversation builder allows a non-developer to create complex and interesting conversations for Misty that utilize most of her sensors and inputs.

Using the builder, you can set up conversations where the response to Misty can be speech, bumper pressing, object detection, QR codes, and a variety of other triggers.

You can also use user specific data and inline speech parameters to further expand on how Misty interacts.

Finally, skill messages can also be set up to call other optional skills to do anything they are programmed to do, and optionally return a response as a valid trigger in the conversation.

Building Blocks

ANIMATION

Animations contain the information for how Misty should present herself in an interaction. For example, what she displays on her screen, and what she says. You can also map user defined head, arm and LED transition actions for the animation.

TRIGGER

Triggers for Misty to look for during an interaction, such as hearing speech, sensing a bumper press or cap touch, receiving a message from another skill, seeing an object, and more.

INTERACTION

A mapping of the animation, the expected triggers for that interaction, and the actions to take when a specific trigger in that interaction happens.

CONVERSATION

A group of interactions is saved to a conversation where you also set the starting interaction and a few other conversation specific fields.

CONVERSATION GROUP

Multiple conversations can be mapped to a conversation group, allowing interactions to move to different conversations based upon the trigger action (beta).

CONVERSATION TRIGGER

Triggers that are listened to during the entire conversation, not just within assigned interactions. They can be turned off as desired within each interaction.

Building Blocks

CHARACTER CONFIG.

Extra optional and required fields to map for a conversation, eg: speech configuration, character, starting volume. You can also pass in an optional user defined json payload that will be sent to any helper skills you call through the skill message functionality.

SPEECH CONFIG

Used for current conversation speech capabilities to set the Azure or Google subscription and speech information. Azure or Google Speech Recognition services required at this time for any speech recognition triggers.

SPEECH HANDLER

Used for current free and beta onboard speech handler mappings that interprets text to intent.

ARM MOVEMENT

Arm action for an animation. Arm actions can consist of a single movement or continuous movement during the animation.

HEAD MOVEMENT

Head action for an animation. Head actions can consist of a single movement or continuous movement during the animation, within a range or following a face or object.

LED TRANSITION

LED action to use during the animation.

Building Blocks

SKILL MESSAGE

Can be created to send events to running helper skills during an interaction. These skills can perform actions as needed and respond with trigger responses as part of the conversation.

INLINE SPEECH

Optionally used for creating more dynamic and personalized speech. Uses built in speech fields and user lookup data to allow flexible responses to users.

USER LOOKUP DATA

Optional grouped key-value data pairs that can be referenced in helper skills and inline speech.

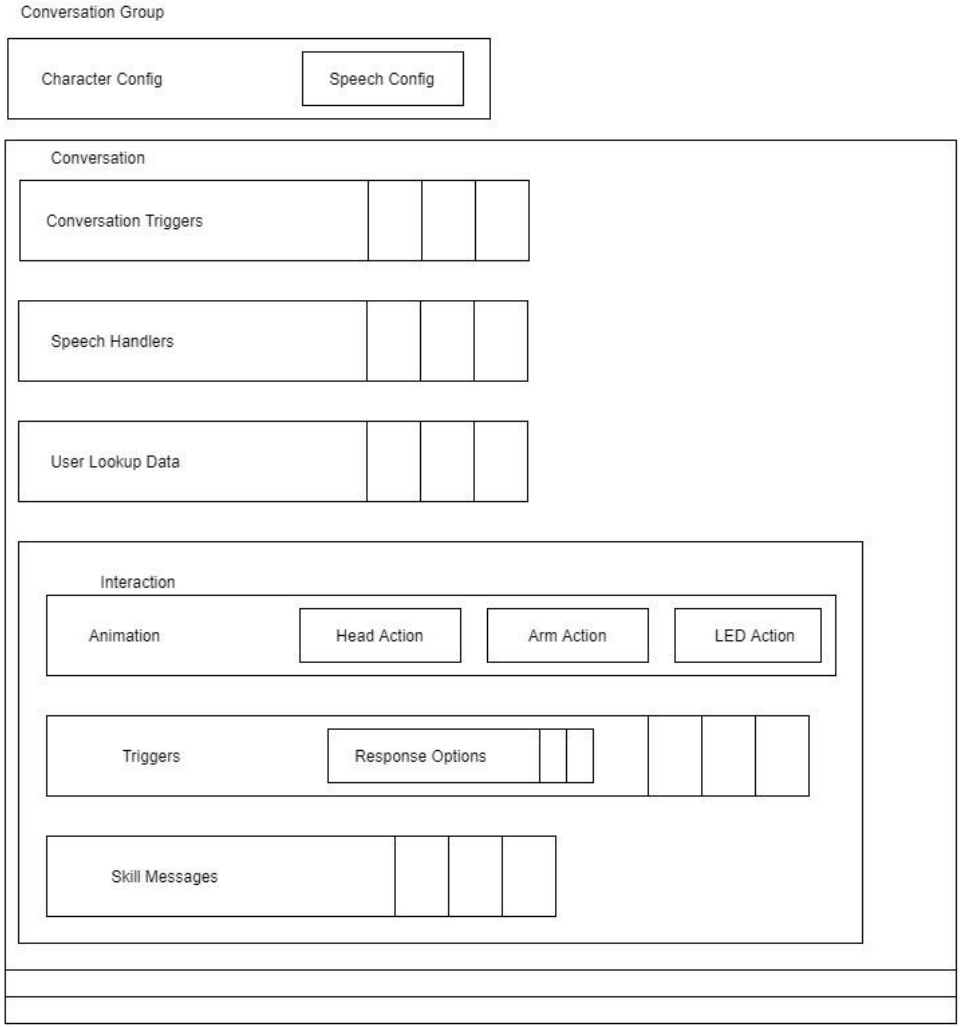
Putting it all together

All these things are put together to make a conversation group.

Inline speech is not shown, as it is handled in the animation by appropriately decorating the entered ‘Speak’ text.

The animations, arm actions, triggers, skill messages, lookup data and other items created by a user in the conversation builder can be reused across all conversations and conversation groups.

Boxes shown with multiple layers implies there *may* be multiple.



Our first conversation

- We are going to create a conversation that uses some of the capabilities of the conversation builder.
- It is usually best to diagram your conversation before creating it, as it will allow you to keep a clear picture of what you want to accomplish and can help to simplify the architecture.
- Piecing together an interaction can be a little confusing, so name things clearly and keep reuse in mind when designing things.
- Your first conversation generally takes longer to build than the subsequent conversations due to the ability to reuse many of the same components.
- We will build this conversation with more delays than you might normally want, so we can get the feel of the flow and see how things work. You may want to experiment and fine tune things once you are done.
- Feel free to choose different text, arm and head actions, or anything you want while making this, to give it your personal touch.

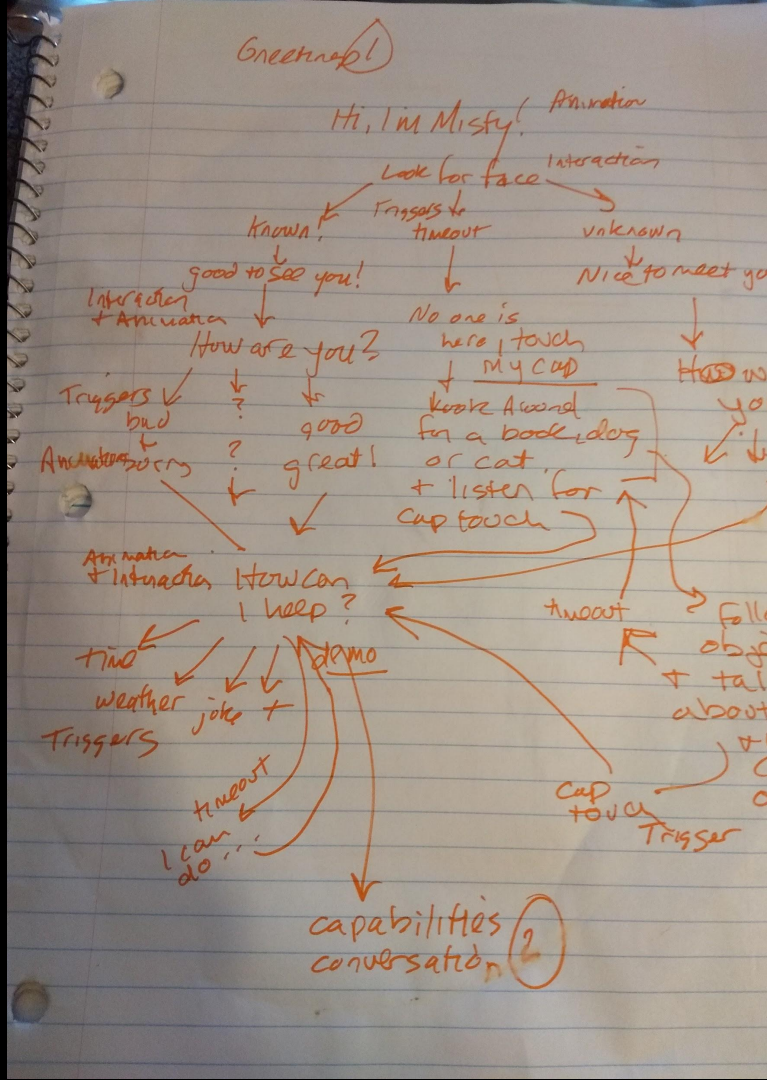
Conversation Diagram

Create a simple diagram of what you want to do to give yourself an idea of the different components you will need, and also knowing that it will probably change a little as you actually build out the conversation.

Here is what we are going to try to build together (we can do the capabilities conversation later).

Not all of these things are built in, so we'll also need a side skill for the weather and jokes.

If these are not installed on your robot, you will need to install those to perform those functions (weather, joke and demo) in the conversation.



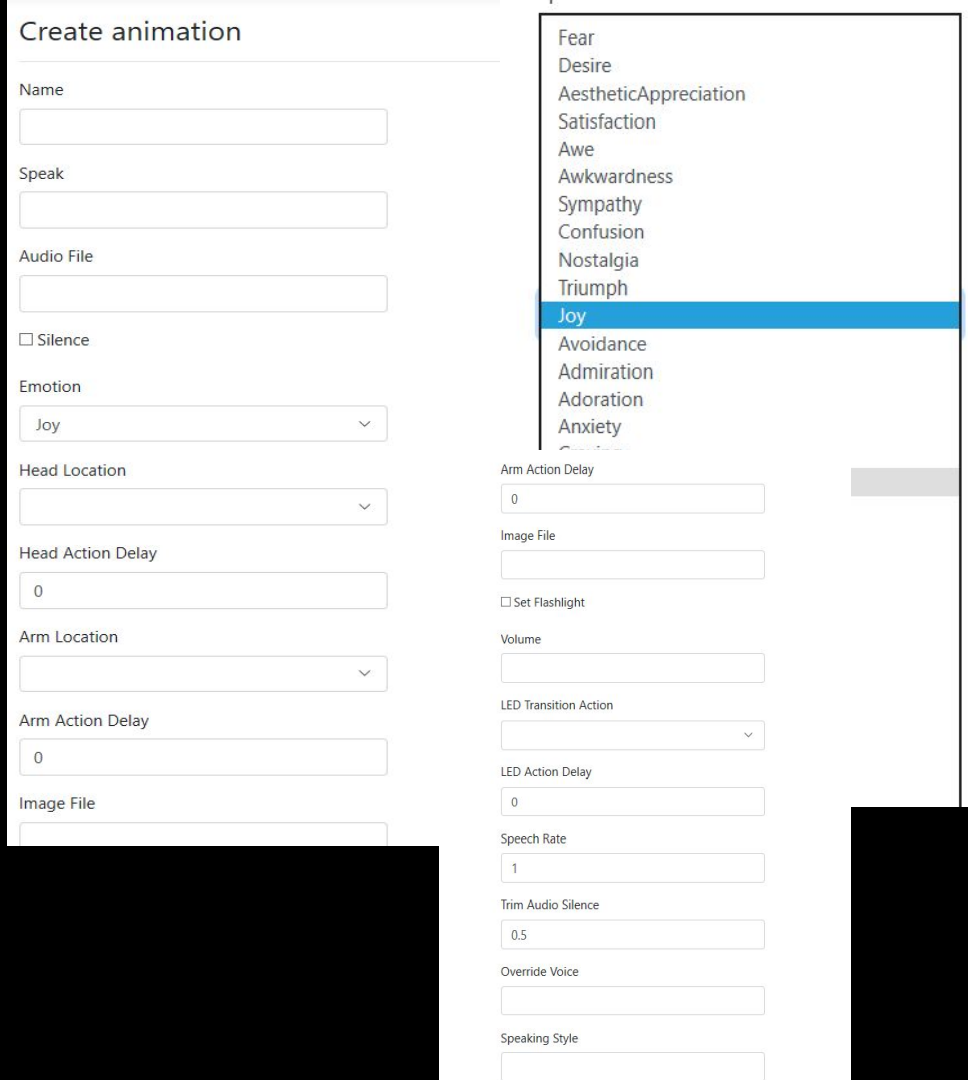
What's in an animation?

Animations consist of audio, images, head and arm movement, LEDs, speech and other fields to help Misty create new experiences.

Misty also has a base Emotion that is set per animation to ***choose default images and audio*** and to allow transition across her emotional range that is accessible to developers and may be used for future capabilities (super-beta).

Many are optional, and others must be created on other pages before they can be selected on the animation page.

The Speak field can be decorated with inline speech parameters and, for Azure speech services users, SSML, speaking style, rate and other fields are available.



Getting a reaction.

Creating an interaction is probably the most confusing part of creating a conversation.

An interaction consists of a default animation (and therefore arm and head movements, speech, etc), the triggers that can set off the next interaction and their options, and any skill messages to send off in this interaction.

In an interaction, you also select whether Misty should start listening after playing the audio or speaking what is in the animation, whether key phrase triggering is allowed, if conversation triggers should be checked in this interaction and more.

Every interaction has a timeout, during which it expects one of its interaction or conversation triggers to happen. If this timeout is hit, Misty will move to the conversation's default No Interaction Interaction or end the conversation if none is set.

See the Boring Field Details section at the end for a description of all the fields.

Here we go

We're going to start creating the building blocks we need for this conversation.

There are actually a number of things to create, so this may take a while to do all the things we want.

A lot of these are building blocks you can reuse in the future, making future conversation creation faster.

We are going to start by building the items we need for other building blocks and end up on the conversation group where we can start our conversation group.

We will only be making one conversation at this time.

First off, you will need to install the **Misty Conversation Skill** and **Example Handler Skill** to your Misty.

Secondly, you need the Conversation Builder UI, if you do not have an active host right now, hassle your engineering team or run it locally on a Windows PC.

On a *local* build it will present an insecure warning, bypass this and continue to the site for now.

Log in. If this is a *local* account, you can use the following...

hello-misty@mistyrbobotics.com and **P@ssw0rd!** for now. That's a zero, not an 'oh', btw.

Don't change the password or email information as this is not a real email address.

Once you are logged in, select the **Home** option at the top.

Keep your hands in the air

Let's give ourselves a couple arm and head movements so we can show off Misty's great moves.

Click on the **Home** menu item at the top and select **Arm Movements** under **Triggers and Actions** and click on the **Create New** link.

Keep Moving

We are going to keep our arms moving randomly throughout the interaction.

Set both of your arm minimum values to -30 (as high as her hands can go) and your maximum values to 90 (straight down).
This will present the range for Misty to move her arms ***randomly*** within.

For the Duration of movement, set the number of seconds you want the arm motion to take. Too fast and her moves can become jerky.
Maybe try a couple seconds here.

For the Delay between repeated movements, set how long in seconds you want to delay before the next movement is triggered.

For this and all other items created in the example, keep the default **Management Access** option as this is under development.

Save this as **Keep Moving**.

To understand how the degrees work in Misty's arms, see https://docs.mistyrobotics.com/misty-ii/rest-api/api-reference/#movearm

More Arm Actions

Click on the **Create New** link again.

Arms Out

Since we want Misty to do one movement for this animation, we will want to set the appropriate max and minimum to the same values.

For arms out, set the Min and Max Right and Left degrees all to 0

For the duration, set the number of seconds you want the arm motion to take. Since the arms may be far away from the 0 position when this is called, don't make it too fast or Misty's movements can become jerky. Two or three seconds might be a good place to start.

Don't worry about delay between movements, because there is only one for this example.

Save this as **Arms Out**.

Can’t keep my eyes off you...

Okay, let’s give Misty something to look at.

Click on the **Home** menu item at the top and select **Head Movements** under **Triggers and Actions** and click on the **Create New** link.
We can call it…

Follow Face

What better a thing to look at than you? Select the Follow face checkbox!
Set the start look around on lost object to 10 seconds.

Set the following fields for the lost face parameters and note that lost face look around moves slower than the following.
Min Pitch: -40 (looking up) - don’t put that text, just the number, don’t put that text either, uh oh...
Max Pitch: 10 (looking down)
Min Yaw: -75
Max Yaw: 75
Min Roll: -5
Max Roll: 5
To understand how the degrees work in Misty’s neck/head, see https://docs.mistyrobotics.com/misty-ii/rest-api/api-reference/#movehead

Following face smoothly can require experimentation with the following parameters...
Since we want to follow closely, set the delay between movements to 0.33 seconds.
But since we don’t want to move too jerky, set the duration to 2 seconds.
Remember, to have good following you need good lighting.

Save this as **Follow Face**.

Love a good book.

Click on the **Create New** link again.
Now, a similar process as follow face, we'll call this one...

Follow Book

Enter **book** in the Follow Object field.
Set the start look around on lost object to 10 seconds.

Set the following fields for the lost object parameters, lost object look around moves slower than the following.

Min Pitch: -40 (looking up)
Max Pitch: 0 (looking forward)
Min Yaw: -45
Max Yaw: 45
Min Roll: -5
Max Roll: 5

Since we want to follow closely, set the delay between movements to 0.33 seconds.
But since we don't want to move too jerky, set the duration to 2 seconds.

Save this as **Follow Book**.

Adding a little color.

Each animation can take advantage of Misty's LED and her built-in transition patterns.
Let's create one…

Click on the **Home** menu item at the top and select **LED Transition Actions** under **Triggers and Actions** and click on the **Create New** link.
I'm gonna call mine…

Red Blue LED

Set the Start Red field to 255, and all of the others to 0.
Start the End Blue field to 255, and all the others to zero.

See https://www.w3schools.com/colors/colors_picker.https://www.w3schools.com/colors/colors_picker.aspasp for more information on RGB colors.

Choose a desired Pattern Time in seconds. This is how long it will take to do one complete transition.

Choose one of the patterns you wish to use.

Save this as **Red Blue LED**.

Did you say something?

Okay, here's the catch. Right now (stay tuned) there is no onboard speech to text processing on Misty, so you have to use Azure or Google for any speech trigger translations. If you can do that, we can help you with intent processing. Also, if you are a developer, you can also overload the default speech handling system and use whatever third party or open source system you choose for speech to text, text to speech, or speech to intent.

At the current time, for text to intent handling, we provide a simple matching system you can use or you can replace it with your own.

So, let's add some matches in the **Speech Handlers** section by clicking on that under the **Speech** section on the **Home** page.

Looking back, we want our conversation to understand a number of things according to my diagram.
Good, Bad, Time, Weather, Demo, and Joke.

So, let's add **Good** as a speech intent.
But, we want more than just good to mean good. So add these to the Utterance String.

good,great,super,fine,awesome

Save it as **Good**.

And feel free to update these as appropriate for how you speak.

You talking to me?

Do the same for the following so we can understand basic speech for these intents too…

Bad
bad, poor, lame, not good
Save it as **Bad**.

Time
time
Save it as **Time**.

Weather
weather, whether, like outside
Save it as **Weather**.

Demo
demo
Save it as **Demo**.

Joke
Joke, me laugh
Save it as **Joke**.

Use the Force.

Misty is well aware of her surroundings and can react to the following triggers during a conversation.
To react to things, Misty uses **Triggers** to know what is appropriate to rect to in a conversation. You can set up specific built in triggers like bumpers or cap touch, or your own like speech intents and external event trigger responses.

The trigger types Misty can understand are...

Speech. Using Azure or Google speech services, Misty can listen for speech as part of an animation, or through key phrase recognition (when I am not already talking or listening for something else). If Misty hears something, she'll try to figure out what you said and trigger the appropriate Speech Heard intent trigger. She will also let you know if she doesn't understand what you said or if she heard nothing.

Cap Touch. There are a number of different regions on Misty's head that you can touch and cause her to react. The top of Misty's head is divided into Front, Back, Left and Right, and there is also the Chin and Scruff. Be aware that the Scruff is also Misty's Halt override spot, so touching there will also cause her head to go limp and may stop her arms and any locomotion she is performing.

Bumpers. Named as expected due to their position, Front Left, Front Right, Back Left and Back Right are triggered upon press.

Faces: Can trigger when she sees any face, sees an unknown face, sees any known face, sees a new known face, or when I see a specific face.

Objects: Can recognize a fair number of things, and let you know when she sees one.

Use the Force.

AR Tags: Can let you know when she sees any AR Tag or one with a specific id.

QR Tags: Can let you know when she sees any QR Tag or one with specific information.

External Event: Can listen to events that come from other skills or through Misty's User Event http endpoint and react based upon their trigger data.

Serial Message: Can let you know if Misty received any serial message or a specific one.

Audio Completed: Can let you know when Misty has completed speaking a phrase.

Okay, stay on target. Not only can you use triggers like the ones we are talking about to cause the next interaction to happen. You can also use them to start and stop the listening of other triggers.

Let's say I want to say something and wait for a response, and if no ones speaks after 10 seconds, start looking for a face. I could do this by adding more interactions in my conversation, but by allowing triggers to start and stop other triggers within an interaction while still waiting for the transitioning trigger, you can greatly simplify conversations (and maybe complicate interactions).

So, we also have…
None: No trigger, only used for the Stopping Trigger information to indicate it doesn't end being listened for in an interaction.

Timers and timeouts

Interaction Timeout
Every interaction gets a default timeout you can change. If it hits this timeout, the conversation either goes to the No Trigger Interaction you can select, or exits the conversation if there is none selected.

Timeout Trigger
You can also create a timeout for each interaction to send it to a different interaction rather than the interaction timeout default.

You create a Timeout Trigger a little differently that other triggers.

Timeout triggers are started immediately when the interaction starts and last as long as the **Starting Trigger Delay** for this trigger.

Also, for this to ever trigger, it will need to be a shorter duration than the interaction timeout.

Timeout triggers cannot be used as a starting or stopping trigger, because once they trigger, they send the interaction to the next interaction.

Timer Trigger
Generally used for starting and stopping other triggers and can be stopped itself. Most triggers default to have their starting trigger be a timer trigger with a zero second delay, meaning, it starts looking for this trigger immediately.

We'll go over this more when we make our interactions and triggers.

Reacting to triggers.

Looking at my overzealous first example, it appears we are going to add the following triggers to respond to.
We are preparing these to be used in our interactions later.
We want to be able to respond to the following things…

Heard Bad
Heard Good
Heard Time
Heard Weather
Heard Joke
Heard Demo
Saw Known
Saw Unknown
Saw Book
Any Cap Touch
External Event

We will also need a number of Timeout triggers for the different durations of our interactions since I know I want some interactions to move on faster than others.
10 Second Timeout
30 Second Timeout
1 Minute Timeout

Reacting to triggers.

Go to the **Triggers** page and let's create these. For the speech filters, ensure what you enter matches the name of the speech handler.

Heard Bad
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Bad**.
For this and all of the others, unless otherwise specified, keep the defaults.

HeardGood
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Good**.

Heard Time
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Time**.

Heard Weather
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Weather**.

Heard Joke
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Joke**.

Heard Demo
Choose the **SpeechHeard** Trigger and in the User Defined Trigger add the name of the appropriate speech intent trigger, **Demo**.

Any Cap Touched
Choose the **CapTouched** Trigger and leave the filters empty.

Reacting to triggers.

Saw Known
Choose the **FaceRecognized** Trigger and in the Trigger Filters select **See Known Face**.

Saw Unknown
Choose the **FaceRecognized** Trigger and in the Trigger Filters select **See Unknown Face**.

In this example we only want to start looking for an unknown person after looking for a known person
Change the Starting trigger delay to 3 seconds.

Saw Book
Choose the **ObjectSeen** Trigger and in the Trigger Filters select **object: book**.
Change the Starting trigger delay to 3 seconds.

Reacting to triggers.

Finally, we want to override our default “no interaction” timeout, that is triggered if no defined triggers happen during the interaction period, by adding a few Timeout triggers.

We have three different periods for this example that we wait upon. So let’s create these final three triggers...

10 Second Timeout
We want to be able to end an interaction early.
Set trigger to Timeout
Set Starting Trigger Delay to 10.

30 Second Timeout
Set trigger to Timeout
Set Starting Trigger Delay to 30.

1 Minute Timeout
Set trigger to Timeout
Set Starting Trigger Delay to 60.

Any External Event
Set trigger to External Event

Okay, all of the triggers we want to react to in this conversation should be ready!

What a character

Okay, we're getting there. Now, how do you want Misty to act? What do you want her to say?

We are going to create some animations to use in our interactions. We will follow face for all of these.

Wake up: Our starting animation.
Good To See You: Greeting someone she knows.
Nice To Meet You: Greeting someone she doesn't knows.
Sorry: Empathetic to someone having a rough day!
Good To Hear: Happy they are having a good day.
How Can I Help: Ready to handle a variety of requests,
No One Is Here: Apparently talking to self, in this case,.
Silence: A silent template animation. Used in this example to allow a skill to do the speaking.

We also need a distinct animation for the object we want to follow

Follow Book: An animation to use the follow book head action.

What a character

On the **Home** page select the **Animations** link and create the following animations…

Wake up
We are going to call this when Misty first starts the conversation.
In the Audio File place enter **030-Beewe.wav** or your favorite audio file.
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.
Choose the **Confusion** Emotion.
I am going to use the rest of the field defaults.

Good To See You
In speak, place something like “Hello {{face}}, how are the {{face:team}} doing?”
Select the **Follow Face Head Location** you created earlier.
Select the **Arms Out Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.

Nice to meet you
In speak, place something like “Hello, my name is {{robotname}}, how are you today?”.
Select the **Follow Face Head Location** you created earlier.
Select the **Arms Out Arm Location** you created earlier.
Choose the **Interest** Emotion.
Select the **LED Transition Action** you created earlier.

What a character

Sorry
In speak, place something like “I am sorry to hear that, how can I help?”.
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.
Choose the **Sadness** Emotion.

Good To Hear
In speak, place something like “That is great to hear you say {{text}}, how can I help?”.
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.

No One Is Here
In speak, place something like “Not sure anyone is around.”
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.
Choose the **Boredom** Emotion.

What a character

Follow Book
In speak, place something like “I like books!”.
Select the **Follow Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier

Tell Time
In speak, put “The time is {{time}}.””.
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier

How can I Help?
In speak, place something like “How can I help you? I can tell the time, weather, a joke or give you a demo.”
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.

What a character

Silence
Select the Silence checkbox.
Select the **Follow Face Head Location** you created earlier.
Select the **Keep Moving Arm Location** you created earlier.
Select the **LED Transition Action** you created earlier.
Choose the **Calmness** Emotion.

Why do I need to check the Silence checkbox?

Misty's animations have default audio and image files based upon the selected Emotion.
If you leave the Speak and Audio File fields empty in an animation, but do not select the Silence checkbox, Misty will play that default audio sound instead.

Go {{face:team}} win!

We are going to add a simple user data item for the faces you have trained on your Misty.

Faces not trained? See https://docs.mistyrobotics.com/tools-&-apps/web-based-tools/command-center/#face-training-amp-recognition

Go to the **User Lookup Data** page under the **User Data** section and create a new item.

In the name put the label name you used for your trained face and create it.

Now click the **Details** on that user data and then select **Manage Data**.

Here is where you can add lookup key value pairs that are associated with that label.

In this example we simply have **team**, so add a Key of **team** and in the Value field add your favorite team here (the correct answer is Iowa Hawkeyes).

You can repeat this process for other trained face labels as needed.

This data will be used in the animation where we set the Speak field as

“Hello {{face}}, how are the {{face:team}} doing?”

Skill Messages

We are going to provide and use an existing example skill to handle a few of our responses.

By default, the conversation skill doesn't tell jokes or get the weather.

But, I wrote a little code to do that for me and then call it when I am in the conversation.

When I write skills for the conversation builder, I write them such that I can start them when the conversation starts and then they wait for user events to ask them to do things.
When they complete their tasks they respond with a trigger in the conversation or interaction and keep waiting for the next request.

Let's create two skill messages.

Tell The Weather and **Tell A Joke**

Skill Messages

Go to the **Skill Messages** page and et's create the skill message, **Tell The Weather**

For skill, enter: 0e971056-d222-4b64-a289-7fd0c75683bf
For Event Name enter : **Weather**
Uncheck Include Latest Trigger Match as this request doesn't require any data from the conversation.
Leave the rest at their defaults.
Save the new skill message.

Now, create **Tell A Joke**

For skill, enter: 0e971056-d222-4b64-a289-7fd0c75683bf
For Event Name enter : Joke
Uncheck Include Latest Trigger Match.
Leave the rest at their defaults.
Save this skill message as well.

Building the conversation

We should now have the pieces we need to make a conversation.

From the **Home** page, go to the **Create and Map Conversations** page and create a conversation.

You don't have any interactions yet, so choose a starting emotion if you want, and select the checkbox next to Initiate Skills at Conversation Start as we are going to add a simple pre-built conversation trigger handler skill to this example that is configured to work this way.

Once you save your conversation, go into the **Details**.

Managing Speech Handlers
Add all of the speech handlers we have created so far as they will all be needed for our conversation.

Managing User Data
Add all of the user data we have created so far.

Adding our interactions

According to our diagram, it looks like we need to add the following interactions.

Looking for Face

Known face how are you?

Unknown face how are you?

How can I help?

No one here

Handle Time Request

Handle weather request

Handle joke request

To add these , first go to the **Details** page for the conversation and select **Manage Interactions.**

Adding our interactions

Create the following interactions first and then link them later.

Looking for Face
In this interaction we are going to look for and handle known and unknown faces, handle a timeout if finding a face takes too long, and always handle cap touch as an override to the **How can I help** interaction. Since we are going to want cap touch to be available in all interactions, and it will always go to the same interaction, we won't add it here, and instead we will add it to the conversation triggers.

So for this interaction, we'll call it **Looking for face**
For the default animation (which can be changed when the interaction is mapped) we'll choose **Wake Up**
Keep the interaction failed timeout at 120 second for now. Remember, this is the fail-safe timeout that sends you to the No Trigger Interaction for the conversation (or ends the conversation if this isn't mapped).

We will add more specific timeout triggers per interaction to manage how long the interaction should be and where to go if something takes too long.

Uncheck Start Listening and keep the others at the defaults.

Known face how are you?
For the default animation we'll choose **Good to See You**

Unless otherwise specified, keep fields at their defaults.

Adding our interactions

Unknown face how are you?
For the default animation we'll choose **Nice To Meet You.**

How can I help?
Default animation of **How can I help?.**

No one here
Default animation of **No One is Here.**
Uncheck Start Listening

Handle Time Request
Default animation of **Tell Time.**
Uncheck Start Listening

Handle weather request
Default animation of **Silence.**
Uncheck Start Listening

Adding our interactions

Handle joke request
Default animation of **Silence.**
Uncheck Start Listening

Look At Objects
Default animation of **Silence**
Set the Interaction timeout to 500.
Uncheck Start Listening

Mapping the interactions

I see the light at the end of the tunnel.

At the bottom of each of your interaction details page you should see **Manage Interaction Handlers**.

Clicking that will bring you to a page where you can add and remove triggers and skills.

This is where you finally get to say, Hey! She hit my bumper, well, then I'm gonna do this…

You *can* choose more than one item to do if this happens, and Misty will choose one of them, using any weighting you may have added when deciding.

Looking at our previous diagram and using the interactions we just made, we can now map them.

Mapping the interactions

All the interactions will handle cap touch through the conversation triggers instead of adding it to every one.
Just a recap of what we are going to do...

Looking for Face
We only care about our unknown face, known face and timeout triggers. We don't start any skills at the start of this interaction.

Known face how are you?
We saw a known face, and now we care about speech intents Good, Bad, unknown speech, silence speech, and timeouts..

Unknown face how are you?
We saw an unknown face, and now we care about speech intents Good, Bad, unknown speech, silence speech, and timeouts..

How can I help?
Something happened to cause us to ask how we can help. We are now waiting for a number of speech heard triggers; time, weather, demo, joke...

No one here
Timed out waiting for a face or someone to say something. Basically starts Misty looking around for one of the objects.

Handle Time Request
Someone asked for time. Will use inline speech in animation

Mapping the interactions

Handle weather request
Someone spoke the **Weather** intent which triggered this interaction. This interaction should call the Weather skill message and wait for it's response or a timeout.

Handle joke request
Someone spoke the **Joke** intent which triggered this interaction. This interaction should call the Joke skill message and wait for it's response or a timeout.

Prepping our interactions

We know what we want, so, for each interaction, go into their details and add these skills and trigger mappings in the Manage Interaction Handlers section..

It's a bit of a chicken and egg at the start, as you have no interactions. I find it easiest to add the triggers and skills to all of my interactions and create them first. Then, go back through and map the response handlers.

Looking for Face
Add the Saw Unknown face trigger,Saw Known face trigger and the 10 second timeout.

Known face how are you?
Add the speech triggers Heard Good and Heard Bad, and a 30 second timeout.

Unknown face how are you?
Add the speech triggers Heard Good and Heard Bad, and a 30 second timeout.

No one here
Add the object trigger Saw Book, and add the 1 minute timeout.

Handle Time Request
Add the 10 second timeout.

Prepping our interactions

Handle weather request
Add the Any External Event trigger and the 30 second timeout.
This interaction should also call the **Tell the Weather** skill message.

Handle Joke request
Add the Any External Event trigger and the 30 second timeout.
This interaction should also call the **Tell A Joke** skill message.

How can I help?
Add the 30 second timeout, Heard Joke, Heard Time, and Heard Weather.

Look At Objects
Add 1 minute Timeout , Saw Known and Saw Unknown.

Mapping our handlers

Now we are going to go back and map all of these…
When mapping these, if you want the default animation, select the Default Animation option from the drop down.

Looking for Face
Saw Unknown face trigger to Unknown Face How Are you?
Saw Known face trigger to Known Face How Are you?
10 second timeout to How can I help?.

Known face how are you?
Heard Good to Interaction How can I help and Animation **Good to Hear**
Heard Bad to Interaction How can I help and Animation to Sorry.
30 second timeout To **No One is Here**

Unknown face how are you?
Heard Good to **Good to Hear**
Heard Bad to Interaction How can I help and **Animation** to Sorry.
30 second timeout To **No One is Here**

No one here
Saw Book to Look at Objects and Animation Follow Book
1 minute timeout to Looking for Face with the Animation Wake Up.

Mapping our handlers

Handle weather request
Any External Event to How can I help?
30 second timeout How can I help?

Handle Joke request
Any External Event to How can I help?
30 second timeout How can I help?

Handle demo request
1 Minute timeout to How can I help?. TODO!!

How can I help?
30 second timeout to No One is Here
Heard Joke to Handle Joke Request and the Silence Animation
Heard Time to Handle Time Request and the Tell Time Animation
Heard Weather to Handle Weather Request and the Silence Animation

Handle Time Request
10 second timeout to How can I help?

Mapping our handlers

Look At Objects
Map 1 Minute timer to Looking for Face and Animation Wake Up
Known Face to Known Face How are you and Animation How can I help?
Known Face to Unknown Face How are you and Animation How can I help?

Now, when you view your Manage Interactions page you should not have any Unmapped options in any of your interactions.

Before we forget, go to the Conversation and edit it.

Set the Startup Interaction and the No Trigger Interactions.

Set both of them to Looking For Face

Conversation Triggers

Let's add cap touch to our conversation triggers so that any time the cap is touched, in any interaction, we go to the **How can I help?** Interaction.

One the **Details** page for the **Conversation** select **Manage Conversation Triggers**.

In the drop down list select **Any Cap Touch**.

In the trigger handling mapping section select the same conversation and the interaction **How can I help?**

Now, unless you explicitly deny conversation triggers when creating your interaction, it will check the conversation triggers after interaction triggers.

Speech Configurations

A reminder that this was the catch I talked about earlier.

At the current time we **require** Azure or Google speech services for speech intents to translate the audio file to a text file for trigger checking. You ***can*** create conversations without speech, but speech does create a more inviting experience.

You will need an account for these and different information based upon the type of account.

You can also use Google or Azure's text to speech in the system, but by default we use Misty's onboard TTS system as it is faster and free.

Please note, that if you choose to use Azure or Google for Text to Speech, be aware that the first time a phrase is uttered, it will need to be processed, causing a delay in responses (and possibly causing your timeouts to trigger). This can also have an effect if you are using inline speech as it can change what it is saying all the time. It can be used, but you would need to trigger most paths at least once before it would become fully operational and it is NOT recommended if you are using inline speech that could create a lot of audio files. Misty uses her own onboard Text to speech services by default.

If you know what I am talking about when I say regions and endpoints, you should know what to do here.
If you don't, please ask someone who does for now.

Character Configurations

Give it the name **Example** and also set the character to **basic.**

Select the speech configuration we have set up and check the box next to Heard speech to screen.

Face pitch offset is set to 0 to indicate the camera staying focused on the object or face it sees.

But, if the camera stays focused on the object, Misty's head is askew and she looks like she is not looking at your face. Therefore and forthwith and with or without you, I generally set it to -10 to make her look up 10 more degrees.

Select the Log Interaction checkbox to give more data in the logs.

To use the Open Weather API, add the authorization in the **Payload** field as follows (you will need to get your own auth code at https://openweathermap.org/), substituting in the values for your auth and area:

{ "OpenWeatherApiAuth": "_your_code_here", "OpenWeatherCountryCode" : "US", "OpenWeatherCity" :"Boulder" }

If you live somewhere else, you will need to lookup your country code and city on OpenWeather.com

This payload will be sent to the trigger skill we call to manage our open weather data.

You can leave the remaining fields at their defaults.

Conversation Groups and Breathe

Now we just need to add our conversation to a conversation group and select the starting conversation.

While we are here, give the robot a name that is used in inline speech, with {{robotname}}.

We also need to assign the character configuration so everything knows how and has the authority to work together.
Select the only character configuration.

Add a description if you would like.

Once you save this, this becomes a valid conversation group and you can go to the details page and enter your robot ip in the box and start the skill from this page if it is a locally running UI.

If the UI is not running locally, you can start the skill by going to the Skill Runner (http://sdk.mistyrobotics.com/skill-runner/index.html) and choosing the gear near the skill name. Enter in the **ConversationGroupId** and the **Endpoint** keys and their values as specified on the Conversation Group details page.

As long as neither of us have done anything wrong, it should work.

See how simple that was! :|

I promise (no guarantees, use at own risk) all the others will be easier now that you have created some reusable building blocks.

If you ever wonder what all those default fields were, stop. But if it persists, seek help below.

BORING FIELD DETAILS

ANIMATIONS

- Name: Used in interaction creation.
- Speak: What to say.
- AudioFile: Audio to play.
- Silence: No sound. Currently, if you do not check this, but keep AudioFile and Speak empty, Misty will play the default sound for the selected emotion (beta).
- ImageFile: image to display on the screen. Currently, if you do not set this, Misty will display the default image for the selected emotion (beta).
- Emotion: Affect default fields and emotion transition (beta).
- Head Location: You can select from your head actions here.
- Head Action Delay: How long to wait in seconds from the start of the animation to starting the new head movements.
- Arm Location: You can select from your arm actions here.
- Arm Action Delay: How long to wait in seconds from the start of the animation to starting the new arm movements.

ANIMATIONS CONTINUED

- Set Flashlight: turn the head flashlight on and off.
- LED Transition Action: You can select from your LED transition actions here.
- LED Action Delay: How long to wait in seconds from the start of the animation to starting the new LED transition movements.
- Volume: New default volume to set Misty.
- SpeechRate: Adjust her speaking rate (Azure only).
- SpeechStyle: Adjust her speaking style (Azure only).

TRIGGERS

- Name: A name to which to refer to this trigger in other pages, mainly interactions.
- Trigger: The trigger to listen for during this interaction.
- Trigger Filter: optional robot specific Filter on the trigger
- User Defined Trigger Filter: optional user defined or speech heard filter on the trigger
- Starting Trigger: The trigger that kicks off listening for this trigger during this interaction
- Starting Trigger Filter: optional robot specific Filter on the starting trigger
- User Defined Starting Trigger Filter: optional user specific Filter on the starting trigger
- Starting Trigger Delay: how long to wait after the starting trigger to listen for this trigger
- Stopping Trigger: An optional trigger that stops listening for this trigger during this interaction
- Stopping Trigger Filter: optional robot specific Filter on the stopping trigger
- User Defined Stopping Trigger Filter: optional user specific Filter on the stopping trigger
- Stopping Trigger Delay: how long to wait after the stopping trigger to stop listening to this trigger

ARM ACTIONS/MOVEMENTS

- Name: Used in animation creation.
- Min Left Arm: The minimum degrees to which to move the left arm.
- Max Left Arm: The maximum degrees to which to move the left arm.
- Min Right Arm: The minimum degrees to which to move the right arm.
- Max Right Arm: The maximum degrees to which to move the right arm.
- *If the MinLeftArm is the same as Max Left Arm and Min Right Arm is the same as Max Right Arm, the arm will only move once per animation to the specified location.*
- *If they are different, Misty will keep moving her arms throughout the interaction using the following fields.*
- Movement Duration: How long in seconds the movement should take.
- Movement Velocity: How fast the movement is from 0 to 100 (in percent of maximum arm speeds). You should only enter a value for this OR Movement Duration.
- Random Range: If true, will pick a **random** value within the min and max choices. Otherwise will attempt to move completely between those ranges during animation.
- Delay Between Movements: How many seconds between each movement start.

HEAD ACTIONS/MOVEMENTS

- Name: Used in animation creation.
- Follow Face: If checked, Misty will attempt to follow the face during this interaction.
- Follow Object: If specified as a known Misty object (see...), and follow face is not checked, will attempt to follow the object during the interaction.
- Start Looking Around On Lost Object: The time in seconds to start looking around when it hasn't seen the expected object or face.
- Min Pitch: The minimum degrees to which to move the pitch.
- Max Pitch: The maximum degrees to which to move the pitch.
- Min Roll: The minimum degrees to which to move the roll.
- Max Roll: The maximum degrees to which to move the roll.
- Min Yaw: The minimum degrees to which to move the yaw.
- Max Yaw: The maximum degrees to which to move the yaw.
- *If the respective min and max items are the same, and you are not following, the head will only move once per animation to the specified location.*

HEAD ACTIONS/MOVEMENTS CONTINUED

- *If respective min and max are both empty, and you are not following, Misty will not change that axis.*
- *If the respective min and max are different, and you are not following, Misty will keep moving her head throughout the interaction using the following fields.*
- Delay Between Movements: If using object or face follow, this is the event check time in seconds for the expected face or object.
- Movement Duration: How long in seconds the movement should take.
- Movement Velocity: How fast the movement is from 0 to 100 (in percent of maximum arm speeds). You should only enter a value for this OR Movement Duration.
- Random Range: If true, will pick a **random** value within the min and max choices. Otherwise will attempt to move completely between those ranges during animation.
- If you are following, and these fields are set, Misty will use them as the range to look around in for the lost face or object if that flag is set.

LED TRANSITION ACTIONS

- Name: Used in animation creation.
- Start Red: The 0-255 RGB red color value for the start of the led transition.
- Start Green: The 0-255 RGB green color value for the start of the led transition.
- Start Blue: The 0-255 RGB blue color value for the start of the led transition.
- End Red: The 0-255 RGB reg color value for the end of the led transition.
- End Green: The 0-255 RGB green color value for the end of the led transition.
- End Blue: The 0-255 RGB blue color value for the end of the led transition.
- Pattern: The pattern to use. None, Breathe, Blink, or Transit Once.
- Pattern Time: How long in seconds for a single transition to take.

SPEECH HANDLER

- Name: Currently a name to use as the User Defined Trigger on the Triggers page and which to refer to this action in other pages.
- Description: Optional description.
- Utterance String: Comma separated list of utterances that can be used to indicate a specific speech intent/trigger.

- **NOTE! Currently the Name is used as a trigger filter for a speech intent, so be sure what you put here matches what you put in for the user defined filter in the triggers page.**

SPEECH CONFIGURATION

- Name: Referred to in character configuration creation.
- Speech Recognition Service: The service to use for speech recognition.
- Text To Speech Service : The service to use for text to speech.
- Spoken Language : the language spoken by the user.
- Speaking Voice: The voice used by the text to speech service if it is not Misty.
- The remaining fields can be obtained from your speech providers.

SKILL MESSAGES

- Name: Used in interaction creation.
- Description: Optional description.
- Skill: the helper skill id to call.
- Event Name: The name of the event sent to the skill.
- Payload: User defined extra payload that can be retrieved by a skill.
- MessageType: An extra top level field for more information... TODO may remove since Payload has been added.
- Start If Stopped: Attempts to start the skill if the system thinks it is stopped. It only checks once every 10 seconds, so you may not get initial triggers if it has stopped. I 'd recommend checking the box to always start the skill at the start of the conversation, unless the are resource heavy.
- Stop If Running: Will stop a skill if running.
- Stop On Next Animation: Will send event during interaction, but will stop the skill when it moves to the next interaction.

SKILL MESSAGES CONTINUED

- Include Character State: Indicates the CharacterState data should be sent to the helper skills on triggered events.
- IncludeLatestTriggerMatch: Indicates the latest trigger match data should be sent to the helper skills on triggered events.
- Stream Trigger Check: Will send an event to the skill everr time a trigger start or stop event is processed. This is very data heavy and in beta.

CHARACTER CONFIGURATION

- Name: Used in conversation group creation.
- Speech Configuration: The speech config to use. You must include a valid one here.
- LogLevel: The log level to run the skill at.
- Face Pitch Offset: Misty's camera is a little higher than her face, so to imitate looking at the face, you can change the pitch offset here if desired. (Note: negative looks up!)
- Log Interaction: If checked, logs a lot of interaction data.
- Stream Interaction: if checked, streams interaction data out of skill websockets.
- Start Volume: The volume to start the skill at.
- Heard Speech To Screen : If true, will show what it thinks you said on the screen.
- Payload: User defined extra payload that is passed into all skills started by the conversation skill.

CHARACTER CONFIGURATION CONTINUED

- Character: A base character you can use to provide different startup checking and other capabilities, ran as part of the conversation skill, not as a separate skill. To use, see below... TODO
- Skill: The Conversation Skill id, not necessary to add unless you created and are using a new core conversation skill with this UI. Probably will remove.
-

CONVERSATIONS

- Name: Name of the conversation.
- Description: Optional description.
- Startup Interaction: Required startup interaction for the conversation.
- Starting Emotion: The emotion to use at the start of the conversation (beta)
- No Trigger Interaction: The interaction to go to if the interaction timeout (not timeout trigger) happens in an interaction. If empty, ends the conversation.
- Initiate Skills At Conversation Start: If you have other helper skills you use for the conversation, check this to start it at the start of the conversation. Highly recommend this is how you do side skills.

Actions

- Manage Speech Handlers
- Manage User Data
- Manage Interactions
- Manage Conversation Trigger Handlers

MANAGING SPEECH HANDLERS

- Add and remove the speech handlers you want this conversation to understand.
- If a speech handler is removed, that speech intent will be treated as unknown speech (not silence).

MANAGING USER DATA

- This is where you add the data you want sent to the conversation.
- If data is not added here, it will not be sent when the conversation starts.

INTERACTIONS

- Name: A name to which to refer to this interaction when pointing to it from other interactions and the conversation.
- Default Animation: the default animation to use with this interaction, can be changed when mapping interaction responses if desired.
- Start Listening: If misty should start listening after speaking. If she does not speak, she start s listening right away.
- Allow Key Phrase Recognition: Allow in the interaction if checked. Will only turn on if Misty is not speaking or listening at the time. This sometimes causes Misty to hear herself at this time and kick off her own key phrase rec, and is still beta.
- Allow Conversation Triggers: If the interaction allows failover conversation triggers to be checked for matches after the interactions fail to find a match.
- Allow Voice Processing Override: Beta experiment, just keep checked for now 😄
- Listen to speaker timeout: How long to wait in seconds, after Misty has started listening, before assuming the user isn't speaking and stop recording.

INTERACTIONS CONTINUED

- Listen to speaking silence timeout: How long to wait hearing silence (in seconds), after a user has spoke, before assuming user isn't speaking and stop recording.

Manage Interaction Handlers

- Add interaction level trigger handlers here and then map their actions to the next conversation/interaction in the list that is populated below.
- If you add more than one trigger option it will choose one randomly using its weight in the random calculation.

Skill Integration

- When a skill message is added here, it is called at the *beginning* of this interaction. So in using skills at this time, an action or speech intent ("Get the weather") could trigger a new interaction that includes and calls the skill and waits for the skill response triggers in that interaction (or timeout or other trigger).

CONVERSATION TRIGGERS

- You can add conversation level trigger handlers here and then map their actions to the next conversation/interaction in the list that is populated below.
- If you add more than one trigger option it will choose one randomly using its weight in the random calculation.
- Conversation triggers are checked *after* interaction triggers and *only* if the interaction specifies it is okay to do so.

CONVERSATION GROUPS

- Name: A good name to describe the group of conversations.
- Description: Optional description.
- RobotName: How Misty refers to herself using inline speech {{robotname}}.
- Startup Conversation: the conversation to start with. Must be set.
- Character Configuration: the character configuration to use. Must be set.

Manage Conversations

- Use this page to add and remove conversations from the group.
- Conversation mapping under groups is still being developed and improved for easier reuse.
- If you have a valid conversation group (has a startup conversation which has a startup interaction, has a character configuration, and more) then on the *Details* page for the conversation group you will be presented with the options to download the configuration, start the skill and stop the skill.
- To start or stop, enter the robot's IP and select the appropriate button.

USER LOOKUP DATA

You can set up grouped key value pairs that can be referenced in helper skills or in inline speech.

- Name: Create a name for the group, it will be used for lookups so make it short and distinct.
- Save the data. You can now look at the details and select the Manage Data and add key value pairs as needed. This data can be used in triggered side/helper skills and in inline speech as shown below.

INLINE SPEECH

Misty currently has a few **built-in** inline speech handlers that can be used by wrapping {{ }} around the item.

face: input the last seen face.

qrcode: input the last seen QR code.

arcode: input the last seen AR code.

text: input the last trigger Text.

intent: input the last trigger intent.

filter: input the last trigger filter.

time: input the current time.

robotname: input the robot name as defined by the conversation group.

INLINE SPEECH EXAMPLES

Built-In

To use the built-in capabilities, you can use these in the Speak field on the animation.

eg: Hello {{face}}, my name is {{robotname}} and it is {{time}}, did you say {{text}}?

User Data Replacement

You can also use the user lookup data in speech to create your own speech replacements, using the following formats.

To use a *simple* named data item, the format is {{name:key}}

Hello, the last showing is at {{movie:last_showing}}.

INLINE SPEECH EXAMPLES CONTINUED

To use a *variable* lookup data item, use the current default inline speech handlers in the speak text string (face, text, intent, etc) with a key, and the system will swap out the handler name, with the current value and then look up by that name. For example: in the UI I add 2 generic data handlers.

Sally, with key value pairs:

hair : black AND eyes : brown

Harry

hair : blue AND eyes : green

And in my speech field I can write:

Hello {{face}}, your hair is {{face:hair}} and your eyes are {{face:eyes}}.

INLINE SPEECH EXAMPLES CONTINUED

But Wait!

If it cannot find an appropriate name and key match, currently it replaces the data with an empty string, so you may want to ensure a face is seen first by using appropriate trigger handling, or you could set it up a little differently, or else it could sound a little weird.

Sally with key value pairs: hair : your hair is black and eyes : and your eyes are brown

And Harry : hair : your hair is blue and eyes : and your eyes are green

Now in my speech field I can write the following which is less bad 😄

Hello {{face}}, {{face:hair}} {{face:eyes}}.

Following the pattern {{Name:Key}} is replaced with Value and any default inline handlers (text, intent, etc) are replaced with the active data known to the character at that time.

INLINE SPEECH EXAMPLES CONTINUED

If you add a Name in the user data that is the same as the built in (text, intent, etc) it will override the default handlers.

But Wait again!

Beta Functionality: You can now replace strings if there is no match as follows using || between the options and by further dividing different data lookup groups with [[and]].

Eg: Hello {{face}}, your hair is {{[[face:hair]]||[[face:hat]]||beautiful}} and your eyes are {{[[face:eyes]]||open}}.

Inline speech can also treat Keys as comma separated intent utterances and replace any matches with the value.

Eg: {{Recalls:text||I don’t believe that is recalled.}}

TRIGGER OPTIONS

- To trigger on specifics, add the appropriate a user defined trigger for speech and external events or a robot trigger filter for robot events. If you leave both blank, it will trigger on any of the type.

Speech Heard

- Heard speech. Not necessarily known speech and can also listen for silence.
- Can filter on a specific speech intent, any heard speech, or heard silence.

Object Seen

- Saw an object. Not necessarily one we are looking for.

Face Recognized

- See a face, not necessarily recognized (need to fix name).
- Can filter on specific name, unknown face, known face and new known face.

TRIGGER OPTIONS CONTINUED

External Event:

- Unspecified external event trigger from another skill.

Cap Touched

- Someone touched the cap.

Cap Released

- Someone stopped touching the cap.

Bumper Pressed

- Someone pressed the bumper.

Bumper Released

- Someone released the bumper.

TRIGGER OPTIONS CONTINUED

Timer

- Will call back as per specified time.

Timeout

- An timeout trigger for an interaction. Not the same as the Interaction timeout which is a fail-safe that happens if no triggers happen in the interaction timeout period.
- Managed different than most of the other triggers.
- Timeout triggers are started immediately when the interaction starts and they last as long as the Starting Trigger Delay in seconds.
- The timer and timeout options are prolly gonna get shuffled around as we fine tune.

Serial Message

- Received a serial message. Not tested.

TRIGGER OPTIONS CONTINUED

Audio Completed

- Misty completed speaking, most likely only be used for a starting trigger.

None

- In theory, only used for stopping trigger option.

QR Tag Seen

- Saw a QR Tag. Not tested.

AR Tag Seen

- Saw an AR Tag. Not tested. Should just work.

RUNNING THE UI AND SHARED DB

To run the UI locally.

Unzip the ConversationBuilder.zip file (or build the Conversation Builder in **Visual Studio Code**).

Start **Visual Studio Code** (**https://code.visualstudio.com/Download**) and select to open a folder. Select the top level ConversationBuilder folder.

On the first load, it may tell you that you need to restore references. Allow it to do so.

You should be able to select the Run/Debug button (the arrow that looks like a Play button) which should take you to the debug section where you can hit another arrow to run it (arrow says .NET Core Launch next to it) and the system should start up locally and attach to the remote database.

It will start your default Visual Studio Code browser and drop you on a warning page.

Continue on to the website and login.