Quick Start Guide

Labeling Discrete Events – 8/30/2023

Contents

1.0 Prerequisites

This guide assumes you have completed the Getting Started guide at the link below:

https://sensiml.com/documentation/guides/getting-started/overview.html

The Getting Started guide goes into more detail on how to use the SensiML Toolkit and should be completed before continuing.

2.0 Quick Start Project

The **Gesture Demo** has five trigger events. This demo detects when a user does a specific gesture with a wearable device. To make this more accessible for the demo we hold the sensor in our hand and make the gestures, but in the real world you would attach the sensor to a wearable strap.

Download the Gesture Demo project at the following link:

https://sensiml.com/documentation/_static/file/gesture-demo.zip

Events of interest: **A, D, L, M, U**
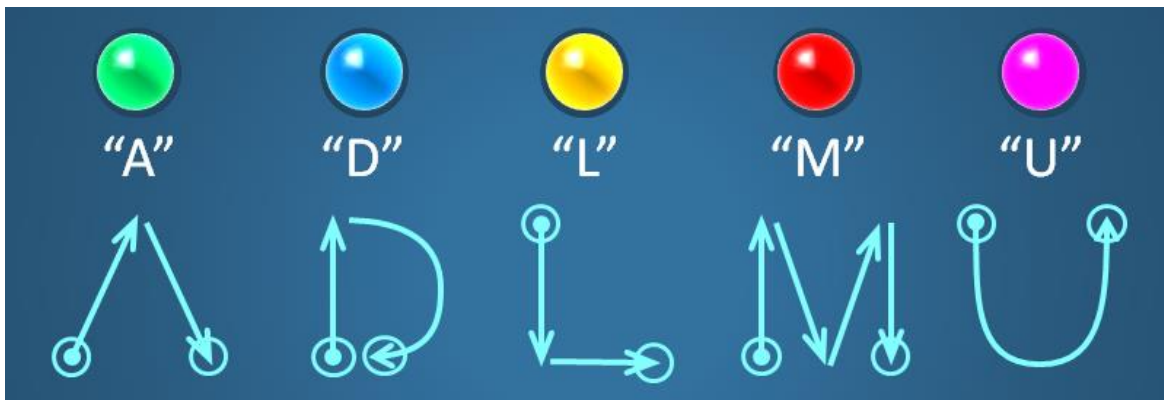
3.0 Labeling Discrete Events

Before we dive into labeling discrete events, let's look at a screenshot of one of the files in the Gesture project.

Depending on the file you opened it may look slightly different with more or less events

Notice that this file has many segments. In the continuous example from the Getting Started Guide the file only had one segment over the entire length of the file. The way you create segments in a discrete example is different from a continuous example because you will be using an **auto session** to detect your events instead of manually placing segments in the graph.

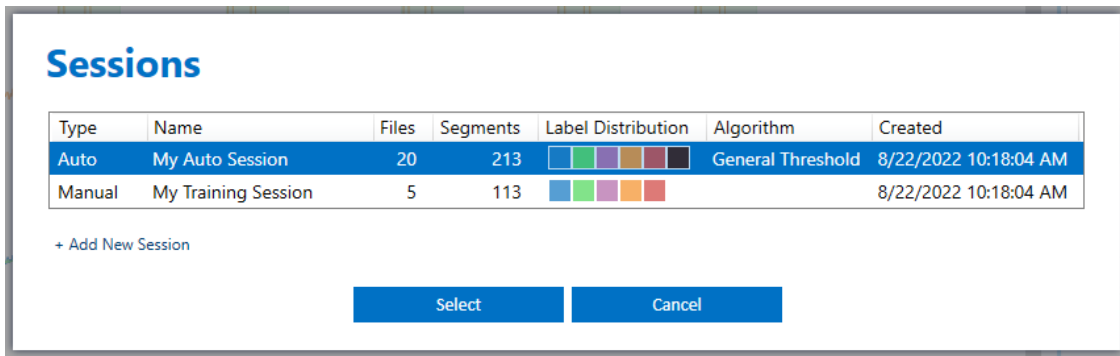## Auto Sessions and Segmentation Algorithms

An auto session is different from a manual session because it uses a **segmentation algorithm** to detect each event in your file, instead of placing events manually. The SensiML Toolkit provides multiple **segmentation algorithms** that can detect events for various use cases.

For now, let's take a look at **My Auto Session** in the Gesture Demo. This session was already created for this demo, but we will go over how to create your own sessions later in this guide.
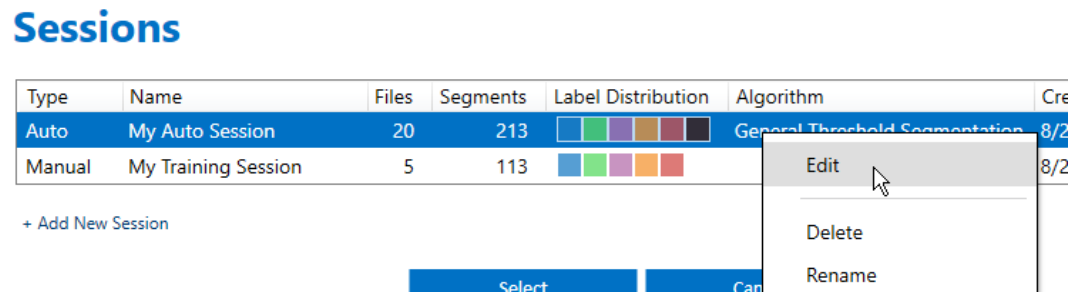
1. In the Project Explorer, click on the session options to change sessions
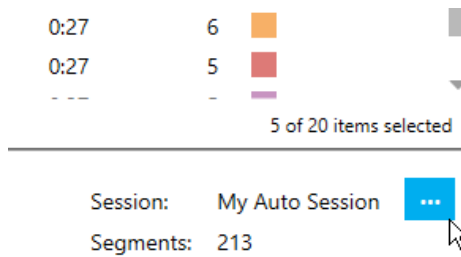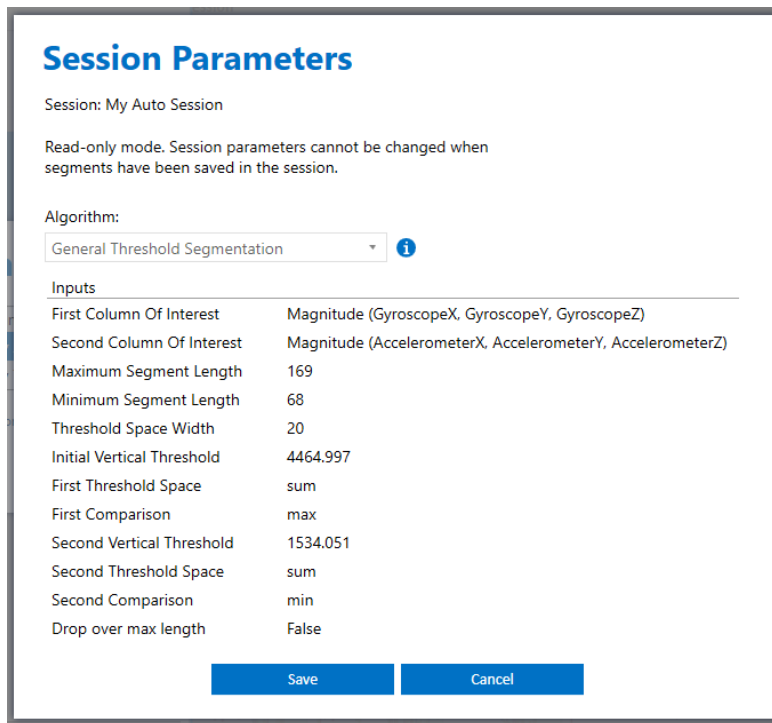
2. Right+Click on **My Auto Session**

3. Click **Edit**

4. Here you can see the parameters we used for the segmentation algorithm used in **My Auto Session**

These parameters may be different depending on the project

Using Auto Sessions

Next, we are show how to use the **segmentation algorithm** in **My Auto Session** to automatically detect our events in a file

1. Open any of the files in the Gesture Demo
2. Now let's use the segmentation algorithm to generate segments. Click **Run Algorithm** above the graph and the DCL will use the algorithm to automatically generate segments for this file.
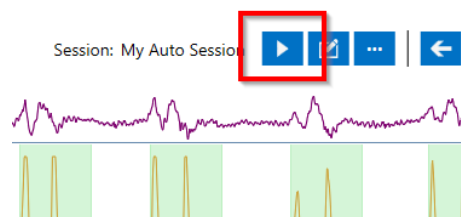
3. After the DCL detects the segments, you still need to label the segments with an event. To do this, **Shift+Click** to highlight the segments you want to label and click the **Edit button**

4. Select the event label

Creating Auto Sessions

In the Gesture demo we already setup the **My Auto Session** algorithm for you with customized parameters. But let's say you are starting a new project from scratch and don't know what algorithm to use. There are two ways you can setup an algorithm; You can customize your own algorithm, or you can have the DCL auto train an algorithm for you.

Customizing Algorithms

There are five standardized segmentation algorithms in the SensiML Toolkit. If you are a data science expert and know the algorithm you want to use, you can select it from the dropdown and setup your parameters yourself.
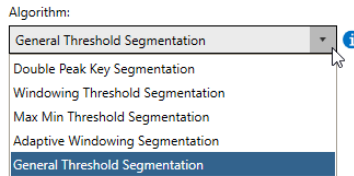
Auto-Training an Algorithm

You can have the DCL automatically find a segmentation algorithm for you without knowing any data science. The DCL can be trained with **example events** and it will automatically find a segmentation algorithm that will detect those events. To train the DCL with example events, create a manual session to work in and then create segments around each of the events you want to use as your example training data. We will go over this in more detail, for now let's take a look at a training session that has already been created in the Gesture demo called **My Training Session**.

1. In the Project Explorer, select the session **My Training Session**

You will notice in the Project Explorer that five files already have segments in **My Training Session**.

To view all of these files together, highlight the files, right + click, and click Compare Files

This shows you all of the training data that was used in **My Training Session**:
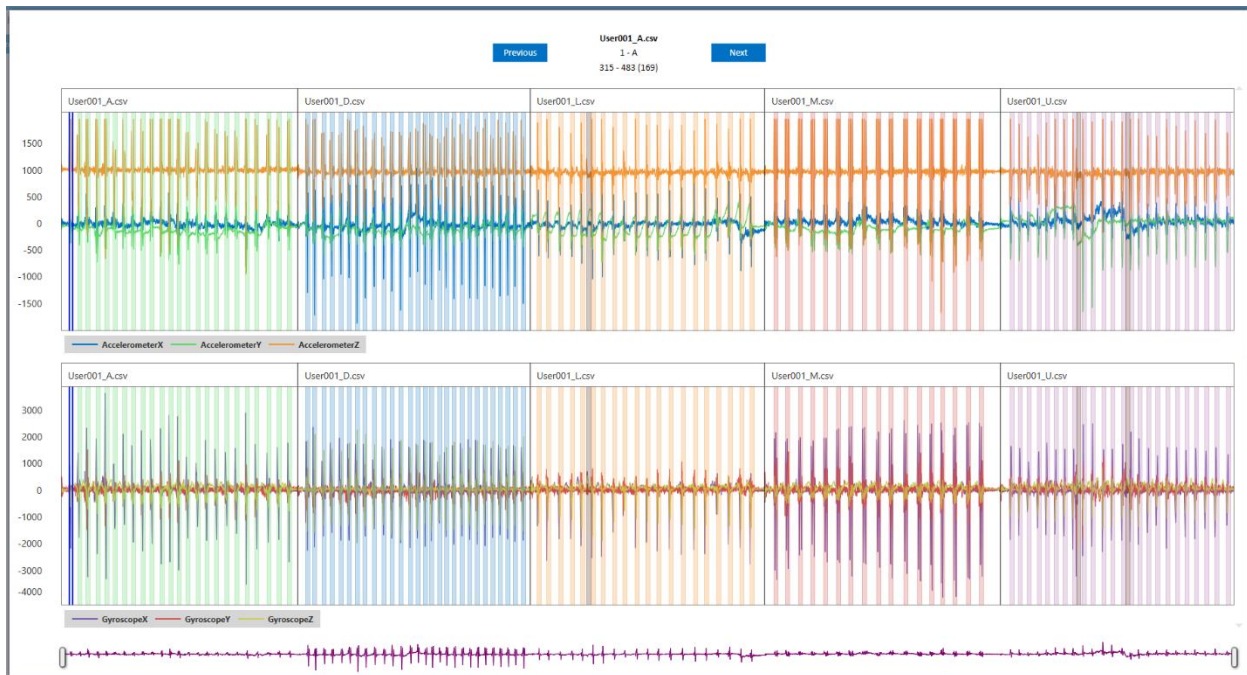
When building a training data set, you want to have a variance of data from each event on your project. For example, if I am training the letter A gesture event, I need to give the DCL some small, medium, and large versions of the letter A so that my algorithm is not overfitting to one size. Collecting variance on your events is very important to build a robust application. I also want to train the DCL with similar variance on every type of event in my project, for the Gesture demo this is the D, L, M, U events.

Adding More Training Data

The session **My Training Session** already has enough data to be used as a training session, so this step is optional. Here are the steps to add more training data to the session. Follow the steps below for how to add more training data. This is useful when you have a specific event that is not performing how you expect it to.

1. Open the Project Explorer
2. Select the session **My Training Session**
3. Open any file that has 0 segments. These files were not used as training data for this project
4. To add more training data, manually place new segments around each event and save

> **Important:** It is important to put a segment on every event in the file. If you skip events, then the DCL will be attempting to find an algorithm that also skips those events

How to Use Your Training Session to Auto-Train a Segmentation Algorithm

After you have created your training session, you can auto-train the DCL to find a new segmentation algorithm. Select the session you wish to use as your training session and then click *Generate auto session*.

1. Open the project explorer

2. Select the session **My Training Session**
3. Highlight the five files that are labeled with segments
4. Right+Click
5. Click **Generate auto session**
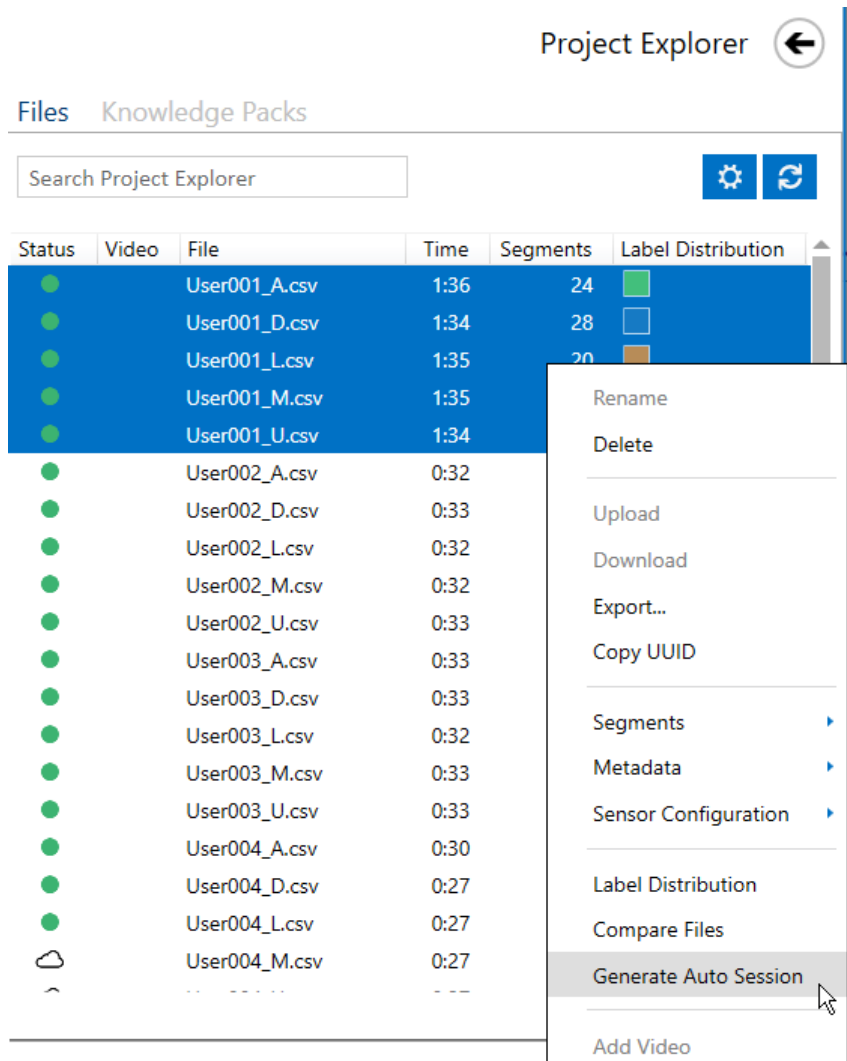
6. Once the DCL has found an algorithm it will create a new session called **Generated Session** with a new algorithm selected

Session Parameters

Session Name: Generated Session

Algorithm:

General Threshold Segmentation

First Column Of Interest (column used to identify the start of the segment):

AccelerometerZ

Second Column Of Interest (column used to identify the end of the segment):

Magnitude (GyroscopeX, GyroscopeY, GyroscopeZ)

Threshold Space Width (the size of the window to transform into threshold space):

15

Maximum Segment Length (maximum number of samples a segment can have):

186

Minimum Segment Length (minimum number of samples a segment can have):

91

First Threshold Space (space to transform signal into to compare against the first vertical threshold):

variance

Save   Cancel

7. Click Done

Now you can use the **Generated Session** to detect segments like how we showed in Using Auto Sessions. Notice that we only use five files in our training data set. As mentioned before, if you pick events that have enough variance in them, then the DCL will be able to find a **segmentation algorithm** that can detect all events in your project without you having to manually train every file.

4.0 Building a Model for Discrete Events

Next, we are going to show some of the differences between building a continuous model and a discrete model through the Analytics Studio.

Query

The only difference in the Query step is you will select **My Auto Session** as the Session instead of the manual training data. See screenshot:

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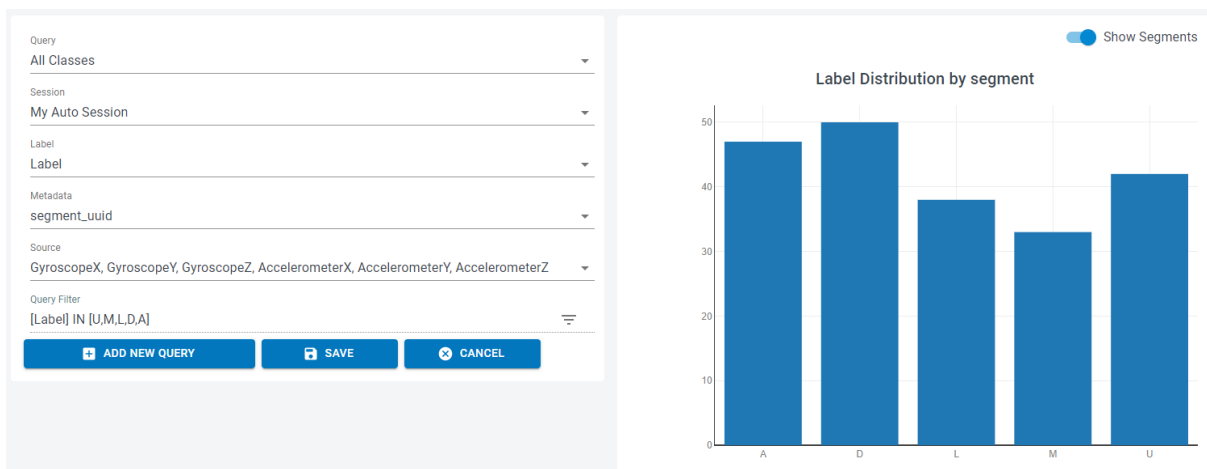
Model Building

The main difference between continuous and discrete events in the Build Model screen is the **Segmenter** step will automatically be filled with the segmenter properties in your auto session instead of the windowing segmenter.
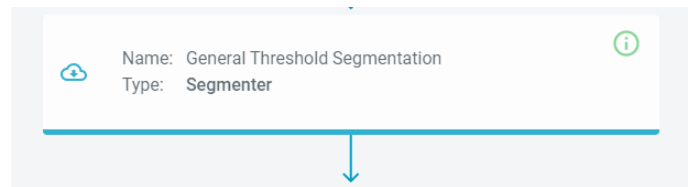
Next Steps

Everything else in the model building process stays the same as the Getting Started Guide. The Getting Started Guide also gives more detailed descriptions on terms and ways to explore your model data within the Analytics Studio.