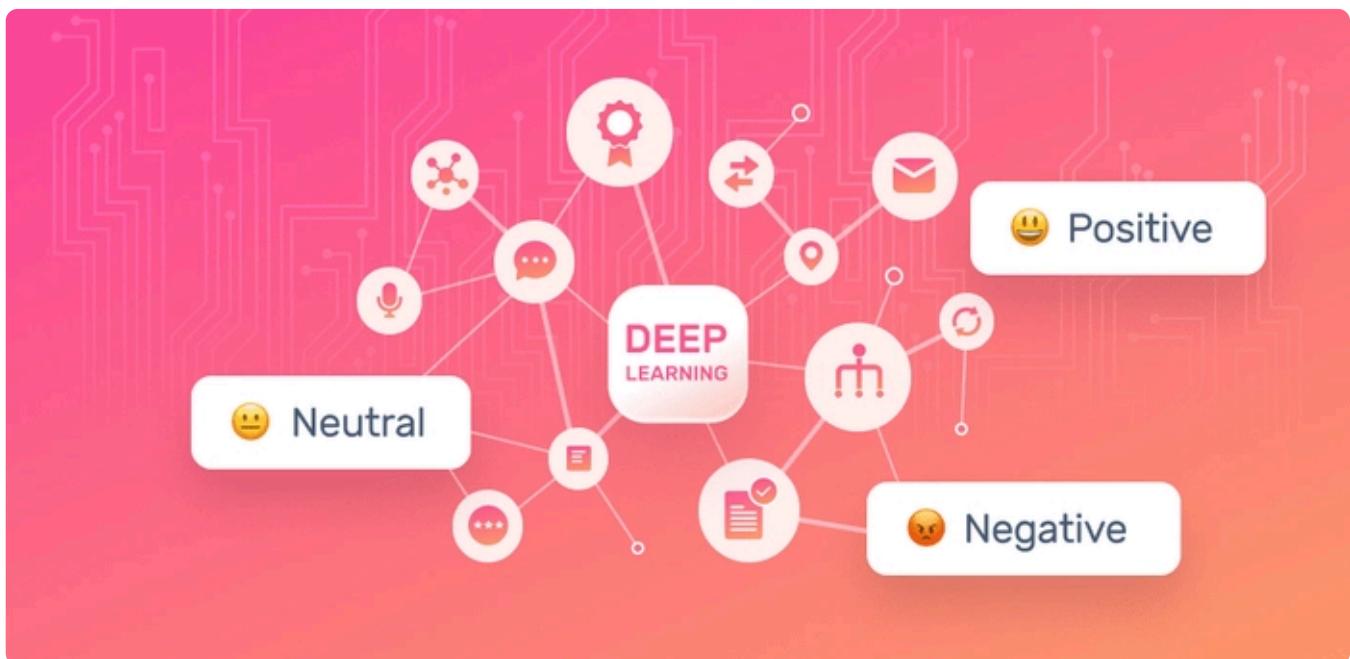




Learn How to Do Sentiment Analysis with Deep Learning



Sentiment analysis is a powerful text analysis tool that automatically mines [unstructured data](#) (social media, emails, customer service tickets, and more) for opinion and emotion, and can be performed using machine learning and [deep learning](#) algorithms.

Deep learning (DL) is considered an evolution of machine learning. It chains together algorithms that aim to simulate how the human brain works, otherwise known as an [artificial neural network](#), and has enabled many practical applications of machine learning, including [customer support automation](#) and self-driving cars.

Let's take a closer look at sentiment analysis with deep learning, and show you how easy it is to get started. Jump to one of the sections, below, or keep reading.

- [What Is Sentiment Analysis With Deep Learning?](#)
- [Sentiment Analysis With Deep Learning Tutorial](#)
- [Take Your Sentiment Analysis to the Next Level](#)

What Is Sentiment Analysis With Deep Learning?

Sentiment analysis is the classification of emotions (positive, negative, and neutral) within data using [text analysis](#) techniques. Harnessing the power of deep learning, sentiment analysis models can be trained to understand text beyond simple definitions, read for context, sarcasm, etc., and understand the actual mood and feeling of the writer. For example:



Danny Brown #WearAMask   @DannyBrownCA · 21h

I'm not sure who designed the new Facebook UI, but I don't think it was an actual UX designer... [#Facebook](#) [#UX](#) [#UI](#)

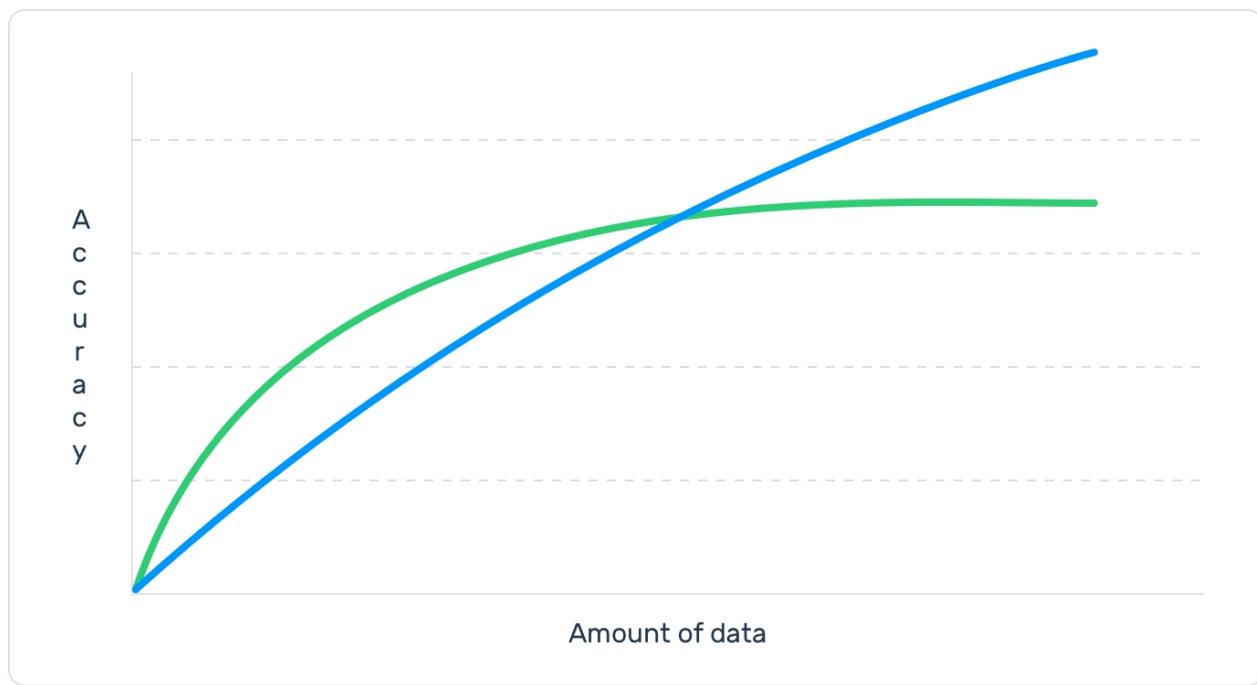
ReplyRetweetLikeUpvote

Based on word definitions, alone, the above tweet wouldn't give us much information. But when run through a well-trained [sentiment analyzer](#), the program would understand that this is definitely a *negative* tweet.

In order to exploit the full power of sentiment analysis tools, we can plug them into deep learning models. As we mentioned earlier, deep learning is a study within machine learning that uses "artificial neural networks" to process information much like the human brain does.

Deep learning is hierarchical machine learning that uses multiple algorithms in a progressive chain of events to solve complex problems and allows you to tackle massive amounts of data, accurately and with very little human interaction.

Deep learning and machine learning are sometimes used interchangeably. Deep learning is, indeed, machine learning, but it is more advanced. When basic machine learning makes a mistake, human input is required to correct it – to change the output and “force” the model to learn. In deep learning, however, the neural network can learn to correct itself through its advanced algorithm chain.



■ Deep Learning ■ Traditional Algorithms

That said, the initial training of a deep learning model is extremely time-consuming and often requires millions of data points until it begins to learn on its own. To continue with the comparison to the human brain, think about how long it takes a child to build correct sentence structure or learn basic math. However, once they do, they can learn more advanced language or

mathematics on their own because they have learned the essential rules and processes.

Once fully trained to effectively teach themselves, machine learning models can perform phenomenal feats. Text analysis, for example, uses [natural language processing \(NLP\)](#) to break down language and understand it much as a human would: subject, verb, object, etc. It's not until the computer has broken a sentence down, mathematically, can it move on to other analytical processes.

And, of course, it's much more complex than simply dissecting a sentence into subject, verb, object, and moving on. Successful NLP models have taken years to train. However, with the use of NLP, deep learning models can break sentences, paragraphs, and entire documents into individual [opinion units](#):

I like the new update, but it seems really slow, and I can't get tech support on the phone.
[Opinion Unit 1] [Opinion Unit 2] [Opinion Unit 3]

Once broken into opinion units, the model could perform [topic classification](#) to organize each statement into predefined categories, like *Usability* (*Opinion Unit 1*), *Functionality* (*Opinion Unit 2*), and *Support* (*Opinion Unit 3*).

From there, the deep learning model can perform sentiment analysis on each statement by topic: "like the new update" - **Positive**; "seems really slow" - **Negative**; "can't get tech support on the phone" - **Negative**.

Now we have sentiment analysis performed on our topic categories:

- Usability: Positive
- Functionality: Negative
- Support: Negative

Imagine this kind of deep learning analysis performed on thousands of customer reviews, social media posts, questionnaires, etc. You can get a broad

overview or hundreds of detailed insights.

Now, it's time for you to have a go at using sentiment analysis on your own data. Follow the tutorial below to learn how easy it is to use sentiment analysis with deep learning.

Sentiment Analysis With Deep Learning Tutorial

Sentiment analysis models become even more accurate when you train them to the specific needs and language of your business. To get the results you need, there are two options: [build your own model or buy a SaaS tool](#).

Building your own tool can be effective if you have years of data science and coding experience behind you, but it takes a lot of time and can end up costing hundreds of thousands of dollars. SaaS tools, on the other hand, require little to no code, can be implemented in minutes to hours, and are much less expensive, as you only pay for what you need.

[MonkeyLearn](#) is a powerful SaaS platform with sentiment analysis (and many, many more) tools that can be put to work right away to get profound insights from your text data. Try the [pre-trained sentiment analysis model](#) to see how it works or follow along to learn how to build your own model with your own data and criteria.

1. Choose your model

[Sign up for free at MonkeyLearn](#) to get started. Once you've signed up, go to the dashboard and click 'Create a model', then click '*Classifier*,':



NEW MODEL

Choose a Model Type



Classifier

Classify texts into the tags that you define.

[Create Classifier](#)



Extractor

Extract specific pieces of data from your text.

[Create Extractor](#)



Workflow

Compose extractors and classifiers.

[Create Workflow](#)

or [Explore our Model Library](#)

2. Choose your classifier

Choose '*Sentiment Analysis*':



NEW MODEL

What kind of classification do you want to do?



Topic Classification

Classify texts based on topic, aspect or relevance.



Sentiment Analysis

Detect sentiment in text, eg: positive, negative or neutral.



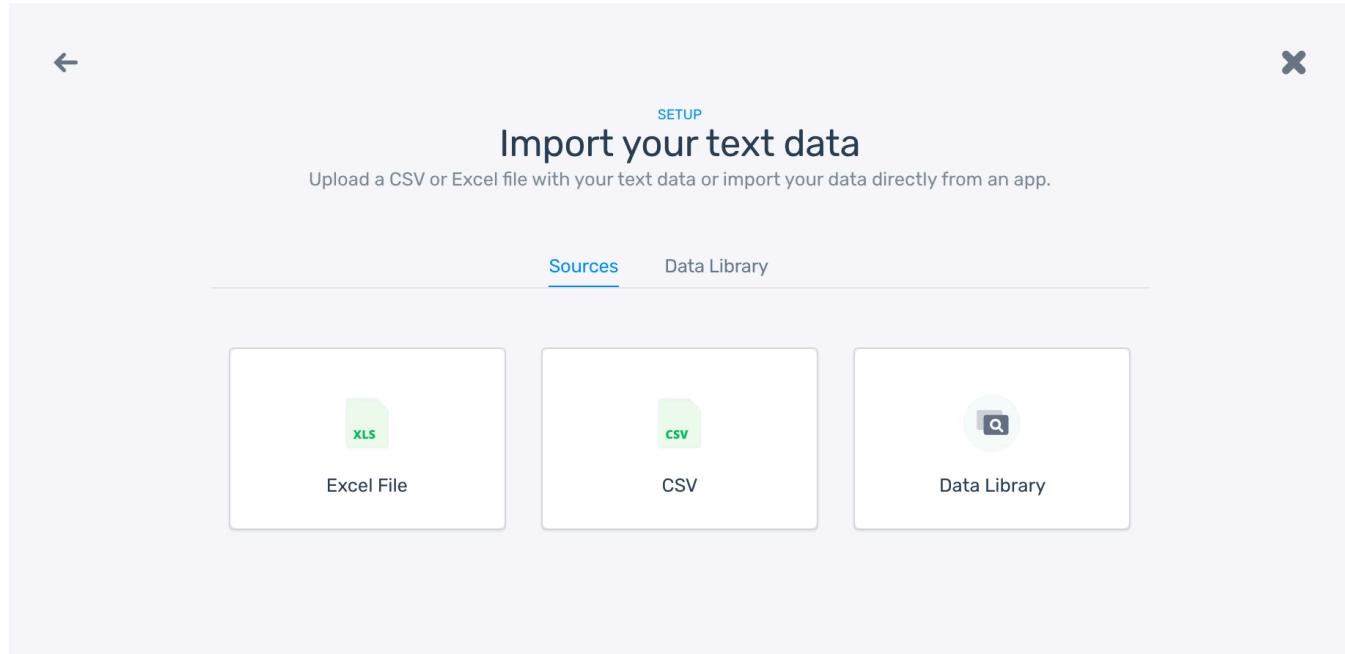
Intent Classification

Classify text based on intent, eg: complaint, request, feedback.

3. Import your data

You can import data from an app or upload a CSV or Excel file. This will be used to train your sentiment analysis model. For this example, we're using a CSV dataset of reviews of Facebook.

If you don't have a dataset at the ready, you can click into '*Data Library*' to download a sample. Or connect directly to Twitter and search by handle or keyword.

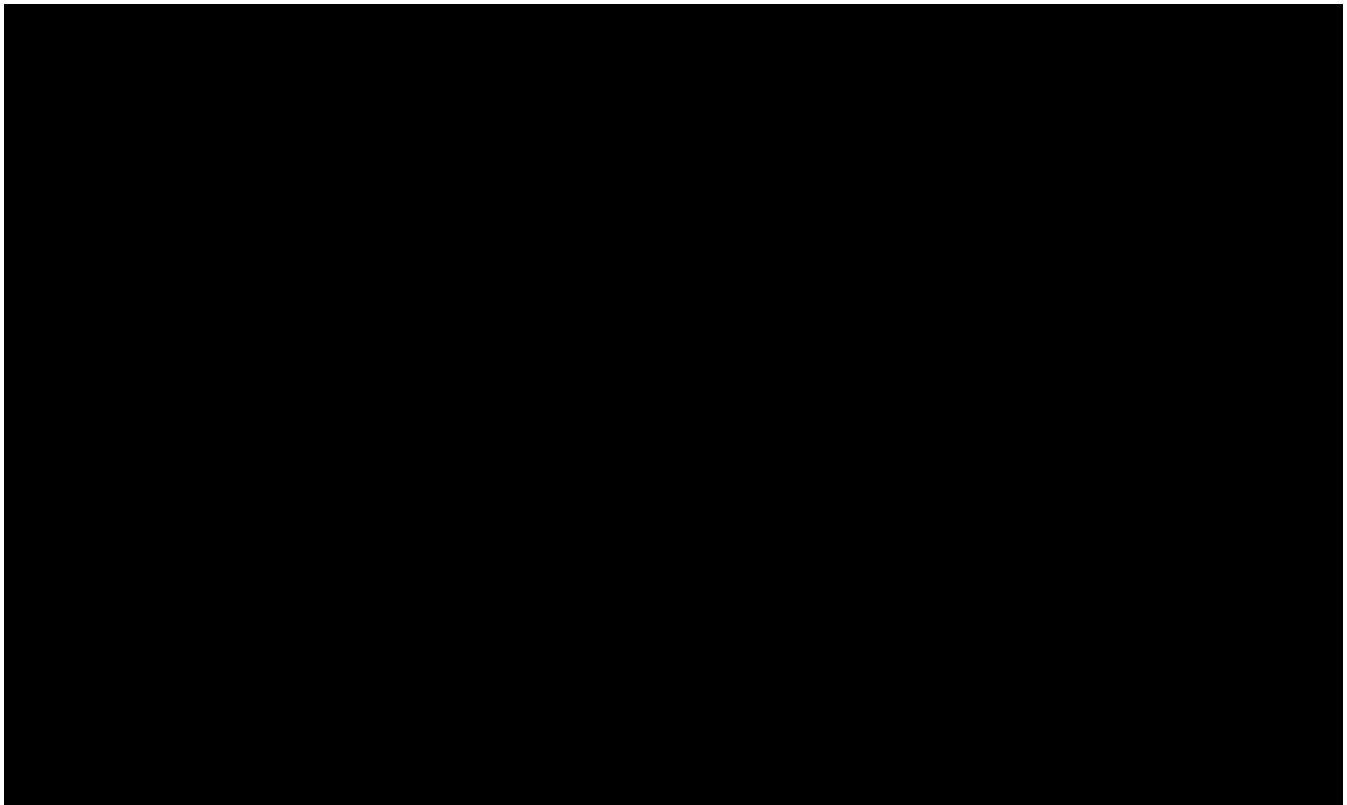


If your file has more than one column, choose the column you'd like to use.

A screenshot of a 'PREVIEW' screen titled 'Select Texts'. It says 'Select the columns with your texts. Multiple selected columns will be concatenated'. There are three checkboxes at the top: 'Discard first row' (checked), 'Advanced' (unchecked), and 'Use this column' which is checked for the first column. The table below has three columns: 'Text', 'Tag', and 'Markers'. Row 1 contains 'Text' in the first column, 'Tag' in the second, and 'Markers' in the third. Rows 2 through 8 contain text entries: 'I', 'So', 'Oops', 'What', 'Lol', 'Love it!', and 'Very good.' respectively. The 'Text' column has a 'Use this column' checkbox checked for each row. The 'Tag' and 'Markers' columns have 'Use this column' checkboxes unchecked for all rows.

4. Tag text to train your sentiment analyzer

Tag each piece of text as *Positive*, *Negative*, or *Neutral* to train your model based on sentiment. Once you tag a few, the model will begin making its own predictions. Correct them, if the model has tagged them wrong:



If you accidentally tag incorrectly, you can click '*PREV*' to return and correct it. And if a piece of text is irrelevant you can '*SKIP*' it.

5. Test your sentiment analyzer

Once you've trained your model with some examples, you'll need to name it. Then you can test it with new text to see how it's classified.

Test with your own text

Their customer service was terrible. I was on hold for 2 hours!

Results

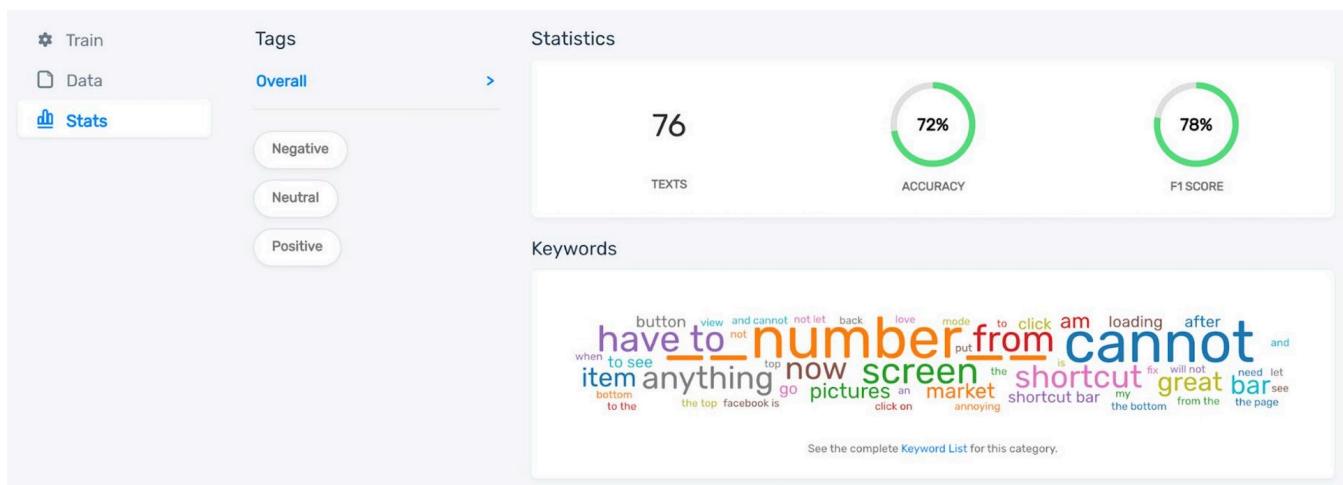
TAG	CONFIDENCE
Negative	99.9%

Classify Text

If it's still not performing accurately, click '*Build*' to continue training your model. The more you train your sentiment analyzer, the better it will perform.

MonkeyLearn shows a number of [sentiment analysis statistics](#) to help understand how well the model is working, and the word cloud helps visualize the most used words.

You'll see overall statistics or click through to see by *Negative*, *Positive*, and *Neutral*, individually.



6. Put your machine learning to work

Once your model is trained, you can upload huge amounts of data.

MonkeyLearn offers three ways to upload your data:

- [Batch Analysis](#): upload a CSV or Excel file with new text. MonkeyLearn will process the data and automatically provide your sentiment analysis results.
- [Integrations](#): MonkeyLearn offers simple integrations with apps you probably already use:

Integrations



Zapier

Direct Integration

Zapier makes it easy to automate tasks between web apps. With this integration you can connect MonkeyLearn and build workflows and processes to enrich text with more than 750 apps.

[Integrate](#)



Google Sheets

Direct Integration

Analyze and enrich text data within Google Sheets. Use text classifiers or extractors to enrich rows with corresponding topics, sentiment, keywords, and entities.

[Integrate](#)



RapidMiner

Direct Integration

RapidMiner makes data science teams more productive. With this integration you can easily use MonkeyLearn as part of your RapidMiner pipeline.

[Integrate](#)



Zendesk

Direct Integration

Automatically classify and enrich support tickets within Zendesk with MonkeyLearn.

[Integrate](#)

- [API: easy programming for quick plug-in analysis:](#)

Code Examples

Request Example

[Curl](#) [Python](#) [Ruby](#) [PHP](#) [Node.js](#) [Java](#)

```
1 curl --data '{"data": ["@Balgev @Zendesk @Zendesk is changing the game! @Balgev are you using any of their other offerings?"]}' \
2 -H "Authorization:Token" \
3 -H "Content-Type: application/json" \
4 -D - \
5 "https://api.monkeylearn.com/v3/classifiers/cl_gQm2zu2h/classify/"
```

But that's not all. MonkeyLearn allows you to get even more granular with your sentiment analysis insights.

Take Your Sentiment Analysis to the Next Level

You can uncover even more insights from your data when you connect multiple machine learning techniques to work in concert.

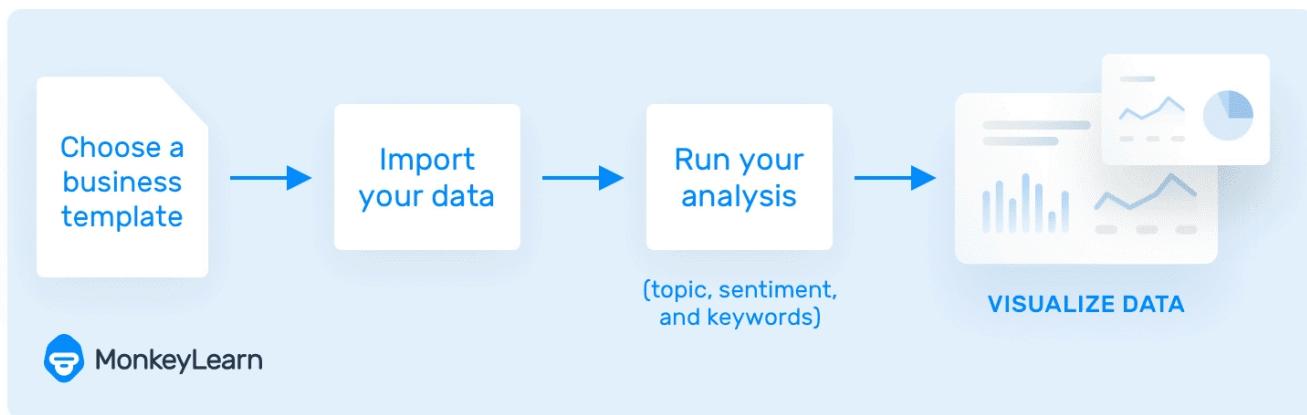
MonkeyLearn Studio allows you to do this automatically to get a deeper understanding of your data. There are many templates you can choose from, whether analyzing social media posts or customer reviews about your brand.

Each template consists of [text classification](#) models, which organize data into categories and sentiment so you can see which topics customers mention in a negative or positive way.

[Keyword extraction](#) is another useful machine learning tool that pulls the most important and most used words from a text and can be used to summarize a text or recognize main topics. After you've performed sentiment analysis, you could use keyword extraction to pull the most important keywords and phrases to dig even deeper into customer sentiments.

When you have your models trained and systems set up, MonkeyLearn allows you to connect all of these advanced machine learning techniques to work step-by-step in MonkeyLearn Studio.

How Does MonkeyLearn Studio Work?



1. Choose a template.

MonkeyLearn studio offers a variety of templates to choose from (or create your own), each template a different “chain” of machine learning models, with

each new model activated after the previous step. Use pre-trained analyzers or build your own, often in just a few minutes.

The screenshot shows the MonkeyLearn Templates page. At the top, there are navigation links for 'Projects' and 'Templates'. Below this, a search bar is followed by a section titled 'Templates' containing eight cards. Each card features a small image, a title, and a subtitle. The cards are arranged in two rows of four. The titles and subtitles are:

- Zendesk Retail Classifier Analysis
- Intercom Customer Support Analysis
- Twitter Customer Support Analysis
- Front Mail Analysis
- Marketing Campaign Survey
- Client Feedback Sentiment Analysis
- Front Mail Sentiment Analysis
- Intercom Customer Support Analysis

At the bottom of this section is a button labeled 'Show 8 More'. Below this, there is a section titled 'Popular from our Blog' with three cards:

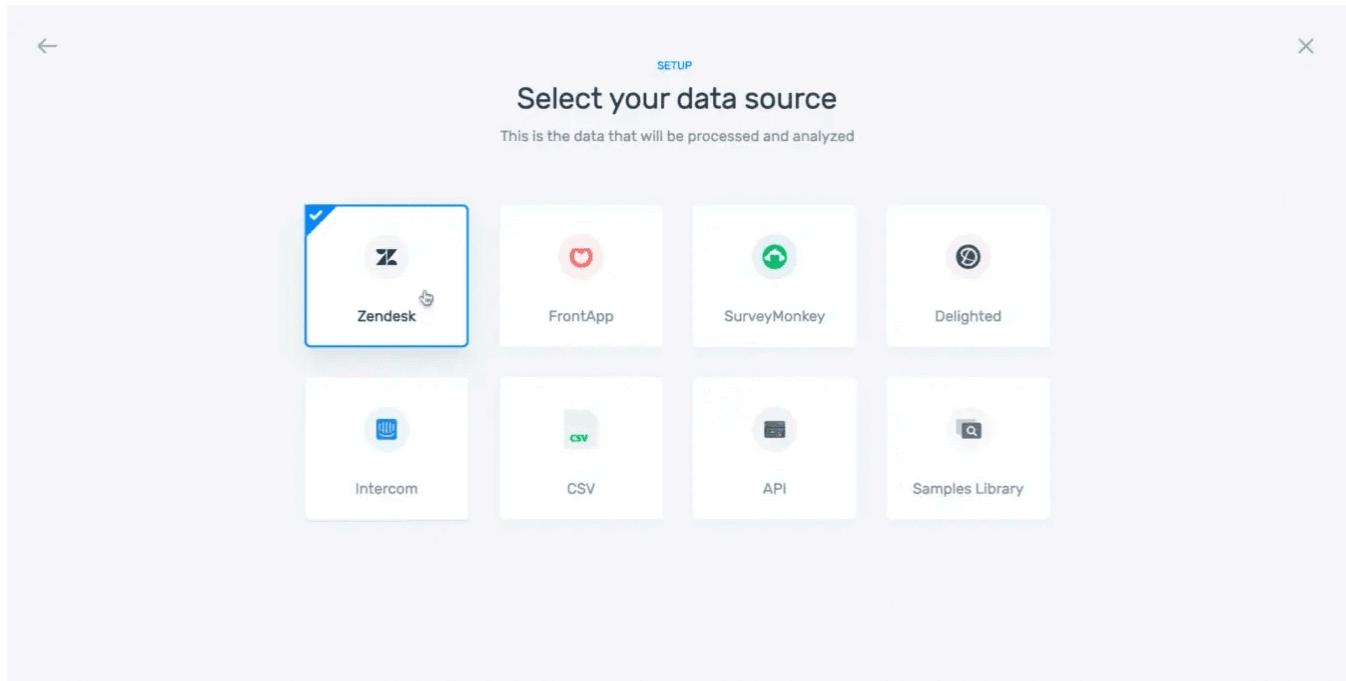
- MACHINE LEARNING: An introduction to Support Vector Machines (SVM)
- MACHINE LEARNING: Monitor your Segment events through Datadog
- MACHINE LEARNING: Monitor events

There are nearly endless configurations of how a template could work, but they all follow a similar workflow:

1. Opinion Unit Extractor (to make data more manageable)
2. Classification Models (like a sentiment analyzer to categorize data)
3. Text Extraction Model (like, a keyword extractor to pull the most used words)
4. Visualization (see below).

2. Import your data.

Upload a file or set up one of the many easy-to-use integrations.



3. Run the analysis.

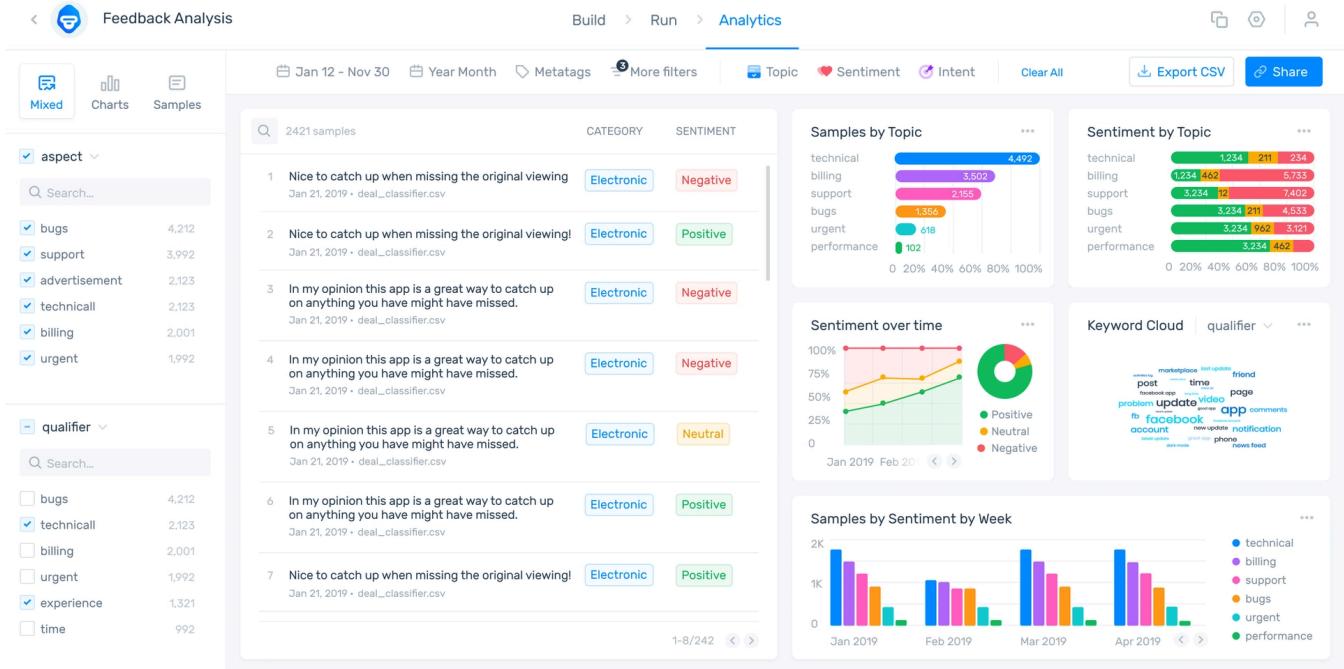
Once you've uploaded your data, your deep learning analysis will begin working automatically.

A screenshot of the MonkeyLearn Studio interface showing the 'Run' tab. On the left, there's a sidebar with 'Workflow Test Model' and buttons for 'Demo', 'Batch', 'API', and 'Integrations'. The main area has a 'Test with your own content' section containing the text: 'The specs of the laptop are: Refurbished Dell Black 14'' E6420 with Intel Core i5 Processor, 6GB Memory, 320GB Hard Drive and Windows 10 Home.' Below this is a 'Run' button. To the right is a 'Results' section with a JSON toggle switch. It shows 'DATA EXTRACTION' results: 'The specs of the laptop are: Refurbished Dell Black 14'' E6420 with Intel Core i5 Processor, 6GB Memory, 320GB Hard Drive and Windows 10 Home.'. Under 'KEYWORDS', it lists: 'Dell, 14'', Intel Core i5, 6GB, Ram, machine, not boot'. Below that is a table with columns: CATEGORY, SUBCATEGORY, SENTIMENT, and INTENT. The categories listed are Electronics, Laptop, Positive, Opinion, and Desktop.

4. Visualize your data.

MonkeyLearn Studio is an all-in-one text analysis and [data visualization](#) tool that brings the entirety of your data together into a striking and easy-to-follow

view. The below is a sample MonkeyLearn Studio dashboard showing an in-depth analysis of reviews of the application, Zoom.



See how the reviews are separated into classification categories (Usability, Reliability, etc.), then are broken into sentiment by category. Notice how categories and sentiments change over time and text from the actual reviews is listed by date.

There is also a breakdown of [intent classification](#), an analysis that reads text to output the purpose or objective of the text. In this case, of course, the highest intent is for *Opinion*, as these are reviews of software.

With other use cases, like reading email responses, intent classification can automatically group emails into categories, like *Interested, Not Interested, Autoresponder, Email Bounce*, etc., and then route them to the proper employee or simply discard them.

Data visualization tools can pull all of your data together and simplify it, so you can get a broad view or dig into the minute details. Find patterns, relationships, and insights that wouldn't otherwise be clear in a simple spreadsheet or standalone chart or graph. Furthermore, unlike other business intelligence

software, MonkeyLearn Studio allows you to perform and tweak your analyses right in the dashboard.

The Takeaway

Sentiment analysis offers undeniable analytical results, whether from regular documents, business reports, social media monitoring, customer support tickets, and more. And deep learning allows you to put more powerful algorithms and more tools to work on your data.

When employed with user-friendly and in-depth visualization tools, like MonkeyLearn Studio, you can create captivating data stories to prove your brand's worth and help push your business forward. MonkeyLearn Studio is the only all-in-one text analysis solution that can take you from model training to text analysis, and on to full-blown data visualization in just a few steps.

[MonkeyLearn](#) is a SaaS platform with dozens of deep learning tools to help you get the most from your data.

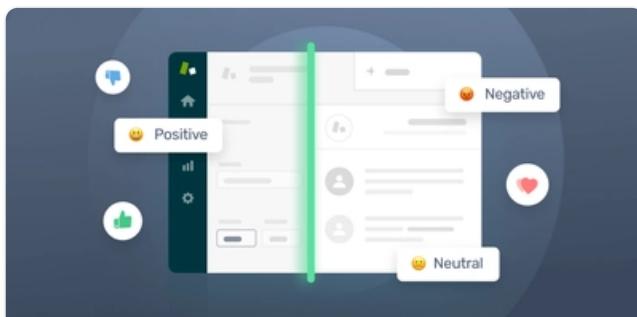
Try some of MonkeyLearn's text analysis tools for free to see how it works:

- [Keyword Extractor](#)
- [Sentiment Analyzer](#)
- [Survey Feedback Classifier](#)
- [Intent and Email Classifier](#)

Or [request a demo](#) to see what MonkeyLearn Studio can do to get the most out of your text data.

August 29th, 2020

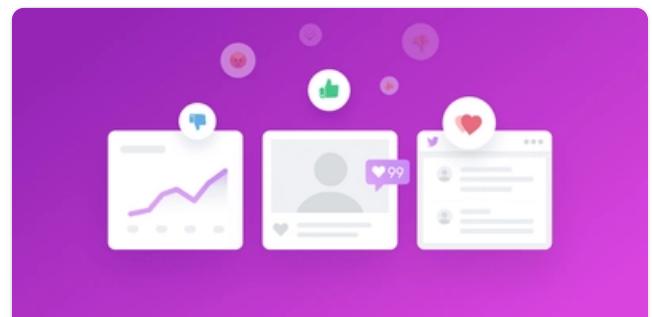
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