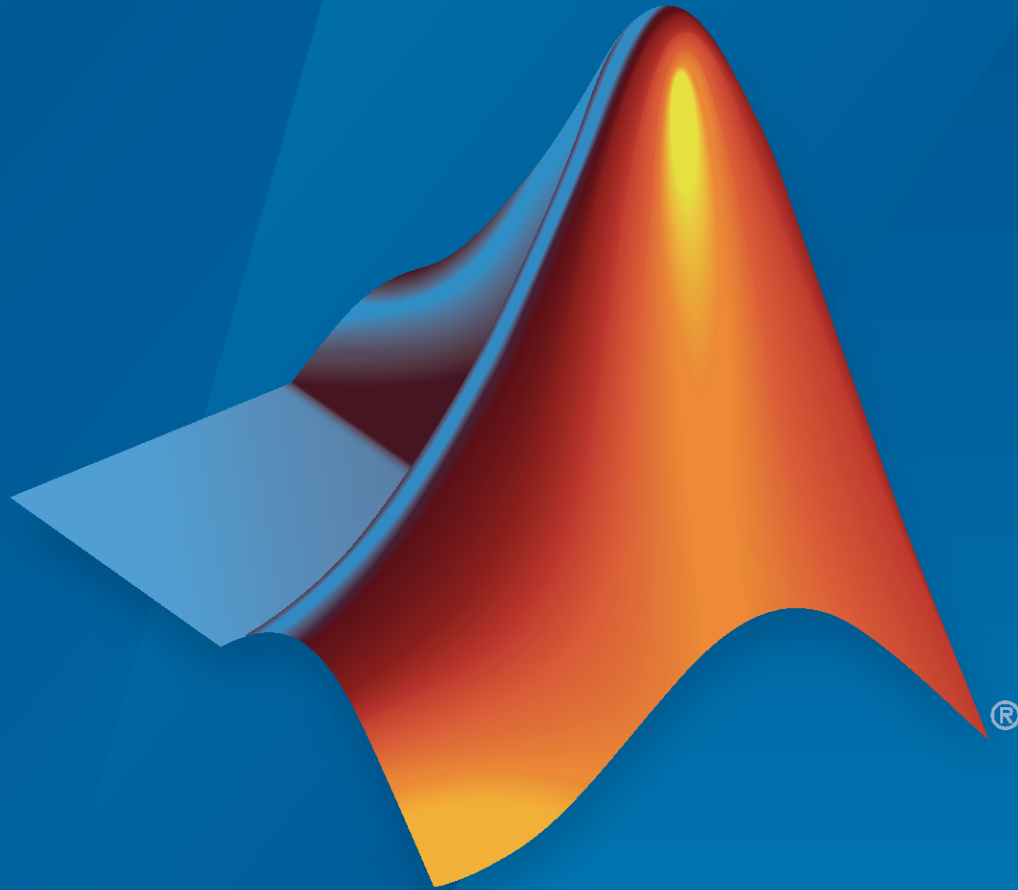


# Text Analytics Toolbox™

## Getting Started Guide



# MATLAB®

R2020a



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Phone: 508-647-7000



The MathWorks, Inc.  
1 Apple Hill Drive  
Natick, MA 01760-2098

*Text Analytics Toolbox™ Getting Started Guide*

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## Revision History

September 2017	Online Only	New for Version 1.0
March 2018	Online Only	Revised for Version 1.1 (Release 2018a)
September 2018	Online Only	Revised for Version 1.2 (Release 2018b)
March 2019	Online Only	Revised for Version 1.3 (Release 2019a)
September 2019	Online Only	Revised for Version 1.4 (Release 2019b)
March 2020	Online Only	Revised for Version 1.5 (Release 2020a)

## 1

### Getting Started

<b>Text Analytics Toolbox Product Description</b> .....	<b>1-2</b>
Key Features .....	<b>1-2</b>
<b>Create Simple Preprocessing Function</b> .....	<b>1-3</b>
<b>Import Text Data into MATLAB</b> .....	<b>1-6</b>
<b>Create Simple Preprocessing Function</b> .....	<b>1-7</b>
<b>Create Simple Preprocessing Function</b> .....	<b>1-10</b>



# Getting Started

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- “Text Analytics Toolbox Product Description” on page 1-2
- “Create Simple Preprocessing Function” on page 1-3
- “Import Text Data into MATLAB” on page 1-6
- “Create Simple Preprocessing Function” on page 1-7
- “Create Simple Preprocessing Function” on page 1-10

## **Text Analytics Toolbox Product Description**

### **Analyze and model text data**

Text Analytics Toolbox provides algorithms and visualizations for preprocessing, analyzing, and modeling text data. Models created with the toolbox can be used in applications such as sentiment analysis, predictive maintenance, and topic modeling.

Text Analytics Toolbox includes tools for processing raw text from sources such as equipment logs, news feeds, surveys, operator reports, and social media. You can extract text from popular file formats, preprocess raw text, extract individual words, convert text into numerical representations, and build statistical models.

Using machine learning techniques such as LSA, LDA, and word embeddings, you can find clusters and create features from high-dimensional text datasets. Features created with Text Analytics Toolbox can be combined with features from other data sources to build machine learning models that take advantage of textual, numeric, and other types of data.

### **Key Features**

- Text preprocessing and normalization
- Machine learning algorithms, including latent Dirichlet allocation (LDA) and latent semantic analysis (LSA)
- Word-embedding training, and pretrained model import from word2vec, FastText, and GloVe
- Word cloud and text scatter plots
- Document import from PDF and Microsoft® Word files
- TF-IDF and word frequency statistics



- 3 Erase punctuation using `erasePunctuation`.
- 4 Remove a list of stop words (such as "and", "of", and "the") using `removeStopWords`.
- 5 Remove words with 2 or fewer characters using `removeShortWords`.
- 6 Remove words with 15 or more characters using `removeLongWords`.

To use the function, simply input your text data into `preprocessTextData`.

```
textData = [  
    "A large tree is downed and blocking traffic outside Apple Hill."  
    "There is lots of damage to many car windshields in the parking lot."];  
documents = preprocessTextData(textData)  
  
documents =  
    2x1 tokenizedDocument:  
  
    8 tokens: large tree down block traffic outside apple hill  
    7 tokens: lot damage many car windshield parking lot
```

## Preprocessing Function

```
function documents = preprocessTextData(textData)  
  
% Tokenize the text.  
documents = tokenizedDocument(textData);  
  
% Lemmatize the words. To improve lemmatization, first use  
% addPartOfSpeechDetails.  
documents = addPartOfSpeechDetails(documents);  
documents = normalizeWords(documents, 'Style', 'Lemma');  
  
% Erase punctuation.  
documents = erasePunctuation(documents);  
  
% Remove a list of stop words.  
documents = removeStopWords(documents);  
  
% Remove words with 2 or fewer characters, and words with 15 or more  
% characters.  
documents = removeShortWords(documents, 2);  
documents = removeLongWords(documents, 15);  
  
end
```

For an example showing a more detailed workflow, see “Prepare Text Data for Analysis”.

For next steps in text analytics, you can try creating a classification model or analyze the data using topic models. For examples, see “Create Simple Text Model for Classification” and “Analyze Text Data Using Topic Models”.

## See Also

`bagOfWords` | `encode` | `tokenizedDocument`



## **Related Examples**

- [“Analyze Text Data Using Topic Models”](#)
- [“Analyze Text Data Using Multiword Phrases”](#)
- [“Analyze Text Data Containing Emojis”](#)
- [“Train a Sentiment Classifier”](#)
- [“Classify Text Data Using Deep Learning”](#)
- [“Generate Text Using Deep Learning” \(Deep Learning Toolbox\)](#)

## Import Text Data into MATLAB

Use the following functions to import text data into MATLAB®. Usually, the easiest way to import text data into MATLAB is to use the `extractFileText` function. For example, to import text from a text file, use:

```
str = extractFileText('sonnets.txt');
```

This table outlines which function to use for different file types. For more information, see “Extract Text Data from Files”.

Source	Function	Example
Text, Microsoft Word, PDF, and HTML files	<code>extractFileText</code>	<pre>str = extractFileText('sonnets .txt');</pre>
CSV and Microsoft Excel® files	<code>readtable</code>	<pre>tbl = readtable('weatherReport s.csv','TextType','string');</pre>
HTML code	<code>extractHTMLText</code>	<pre>str = extractHTMLText('&lt;html&gt;&lt; body&gt;&lt;h1&gt;THE SONNETS&lt;/ h1&gt;&lt;p&gt;by William Shakespeare&lt;/p&gt;&lt;/body&gt;&lt;/ html&gt;');</pre>
PDF forms	<code>readPDFFormData</code>	<pre>data = readPDFFormData('weather ReportForm1.pdf');</pre>

### See Also

[extractFileText](#) | [extractHTMLText](#) | [readPDFFormData](#) | [readtable](#)

### More About

- “Create Simple Preprocessing Function” on page 1-3
- “Create Simple Preprocessing Function” on page 1-7
- “Create Simple Preprocessing Function” on page 1-10
- “Visualize Text Data Using Word Clouds”
- “Text Analytics Glossary”

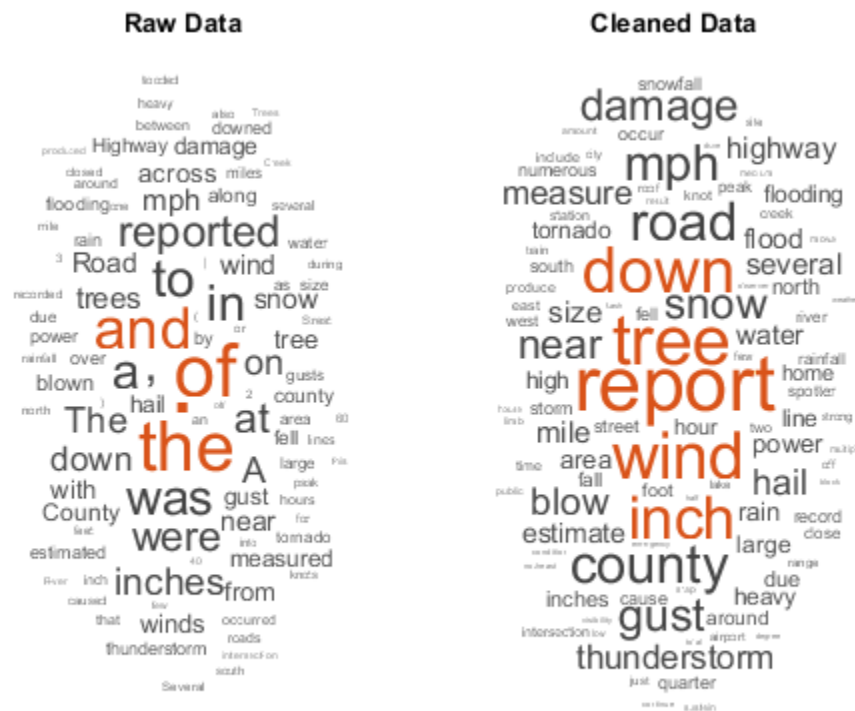
## Create Simple Preprocessing Function

This example shows how to create a function which cleans and preprocesses text data for analysis.

Text data can be large and can contain lots of noise which negatively affects statistical analysis. For example, text data can contain the following:

- Variations in case, for example "new" and "New"
- Variations in word forms, for example "walk" and "walking"
- Words which add noise, for example "stop words" such as "the" and "of"
- Punctuation and special characters
- HTML and XML tags

These word clouds illustrate word frequency analysis applied to some raw text data from weather reports, and a preprocessed version of the same text data.



It can be useful to create a preprocessing function, so you can prepare different collections of text data in the same way. For example, when training a model, you can use a function so that you can preprocess new data using the same steps as the training data.

The function `preprocessTextData`, listed at the end of the example, performs the following steps:

- 1 Tokenize the text using `tokenizedDocument`.
- 2 Lemmatize the words using `normalizeWords`.

- 3 Erase punctuation using `erasePunctuation`.
- 4 Remove a list of stop words (such as "and", "of", and "the") using `removeStopWords`.
- 5 Remove words with 2 or fewer characters using `removeShortWords`.
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To use the function, simply input your text data into `preprocessTextData`.

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documents = normalizeWords(documents, 'Style', 'lemma');  
  
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end
```

For an example showing a more detailed workflow, see “Prepare Text Data for Analysis”.

For next steps in text analytics, you can try creating a classification model or analyze the data using topic models. For examples, see “Create Simple Text Model for Classification” and “Analyze Text Data Using Topic Models”.

### See Also

`addPartOfSpeechDetails` | `erasePunctuation` | `normalizeWords` | `removeLongWords` | `removeShortWords` | `removeStopWords` | `tokenizedDocument`

## **More About**

- “Create Simple Preprocessing Function” on page 1-3
- “Import Text Data into MATLAB” on page 1-6
- “Create Simple Preprocessing Function” on page 1-10
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### See Also

`bagOfWords` | `erasePunctuation` | `fitlda` | `removeStopWords` | `tokenizedDocument` | `wordcloud`

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