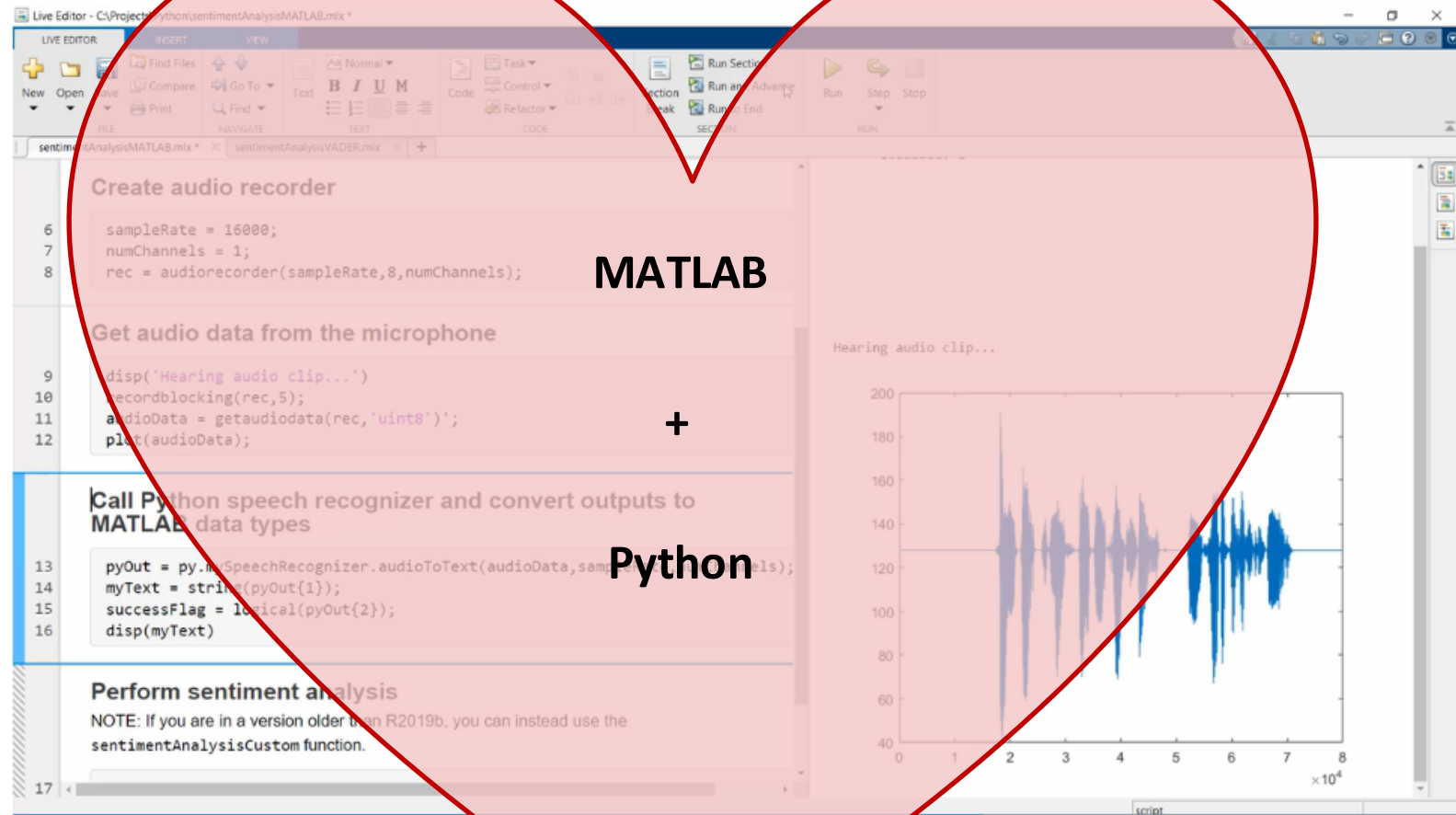




Usando MATLAB con Python

Usando MATLAB con Python



The screenshot displays the MATLAB Live Editor interface with a script for sentiment analysis. The script is divided into four sections: 'Create audio recorder', 'Get audio data from the microphone', 'Call Python speech recognizer and convert outputs to MATLAB data types', and 'Perform sentiment analysis'. A large red heart is overlaid on the code, with the word 'MATLAB' on the left side, a '+' sign in the middle, and the word 'Python' on the right side, indicating the integration of the two languages. The script includes MATLAB code for audio recording and Python code for speech recognition using the SpeechRecognizer class. A plot of the recorded audio data is visible on the right side of the editor.

```
6 sampleRate = 16000;
7 numChannels = 1;
8 rec = audiorecorder(sampleRate,8,numChannels);

9 disp('Hearing audio clip...')
10 recordblocking(rec,5);
11 audioData = getaudiodata(rec,'uint8');
12 plot(audioData);

13 pyOut = py.m('SpeechRecognizer',audioData,sampleRate,numChannels);
14 myText = string(pyOut{1});
15 successFlag = logical(pyOut{2});
16 disp(myText)

NOTE: If you are in a version older than R2019b, you can instead use the
sentimentAnalysisCustom function.
```

¡Aplicaciones sorprendentes son construidas usando MATLAB!



Mondragon University

Mondragon University Students Build Practical Engineering Skills Through Project-Based Learning



Carnegie Wave Energy

Carnegie Wave Energy Designs and Builds the World's First Operating Wave Farm



MIT CSAIL

MIT CSAIL Researchers Develop Video Processing Algorithms to Magnify Minute Movements and Changes in Color

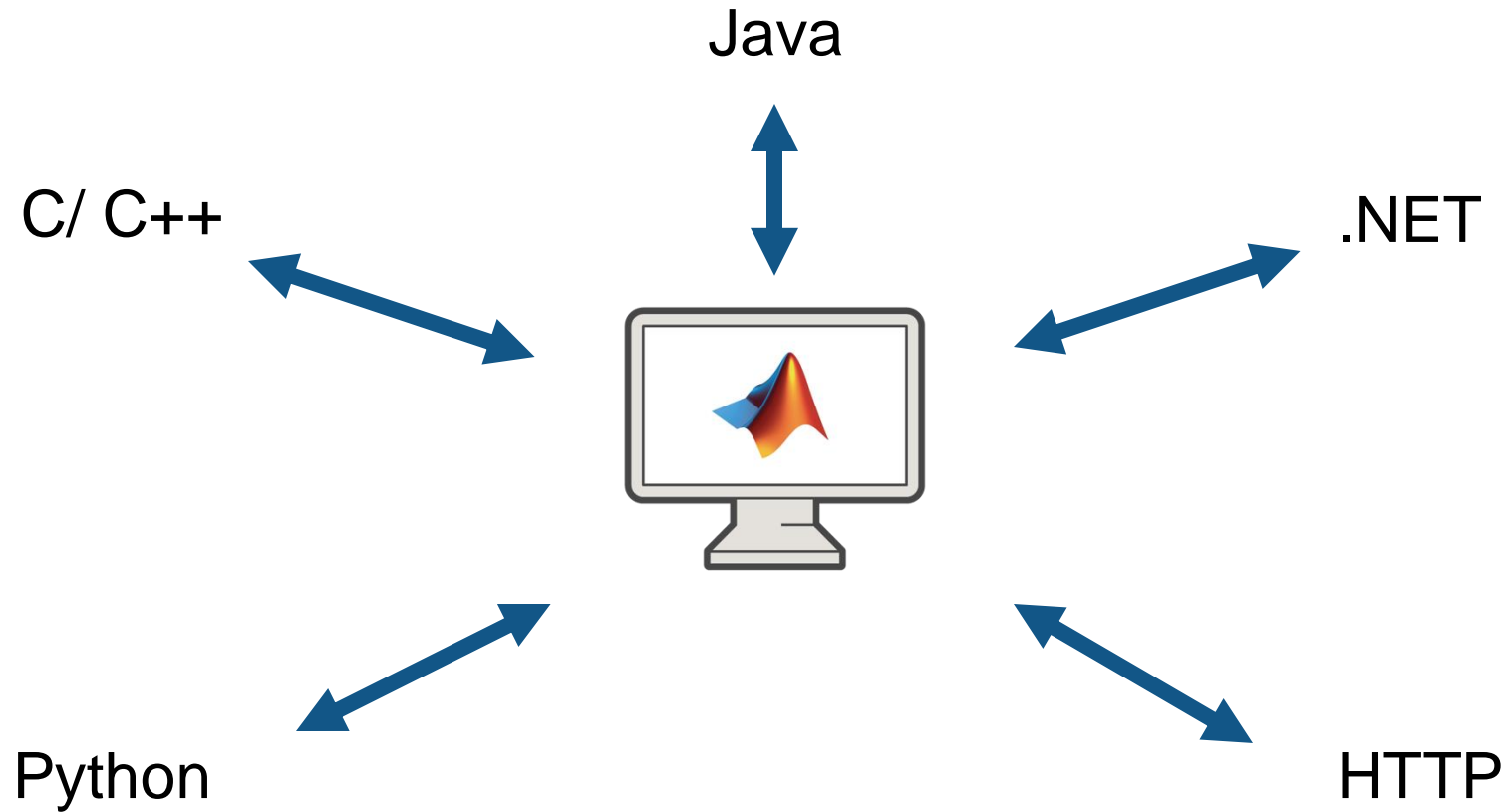


Mondi

Mondi Implements Statistics-Based Health Monitoring and Predictive Maintenance for Manufacturing Processes with Machine Learning

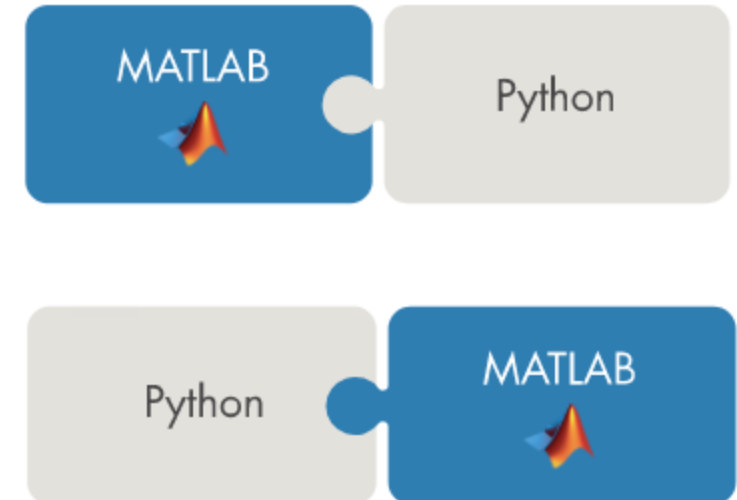
https://www.mathworks.com/company/user_stories.html

MATLAB Provee una integración flexible con múltiples lenguajes



Usando MATLAB con Python

- Presentación del ejemplo
- Llamando librerías de Python desde MATLAB
- Llamando MATLAB desde Python
 - vía MATLAB Engine API
 - vía MATLAB Runtime (MATLAB Compiler SDK)
 - vía MATLAB Production Server
- Información Adicional
 - Manejo de Datos
 - Deep learning
 - Troubleshooting
- Fuentes



Ejemplo: Análisis de Opiniones



~~"That teddie
was terrible!"~~



Archivos del ejemplo:

<https://github.com/mathworks/matlab-with-python>

Ejemplo: Análisis de Opiniones



Speech



Audio



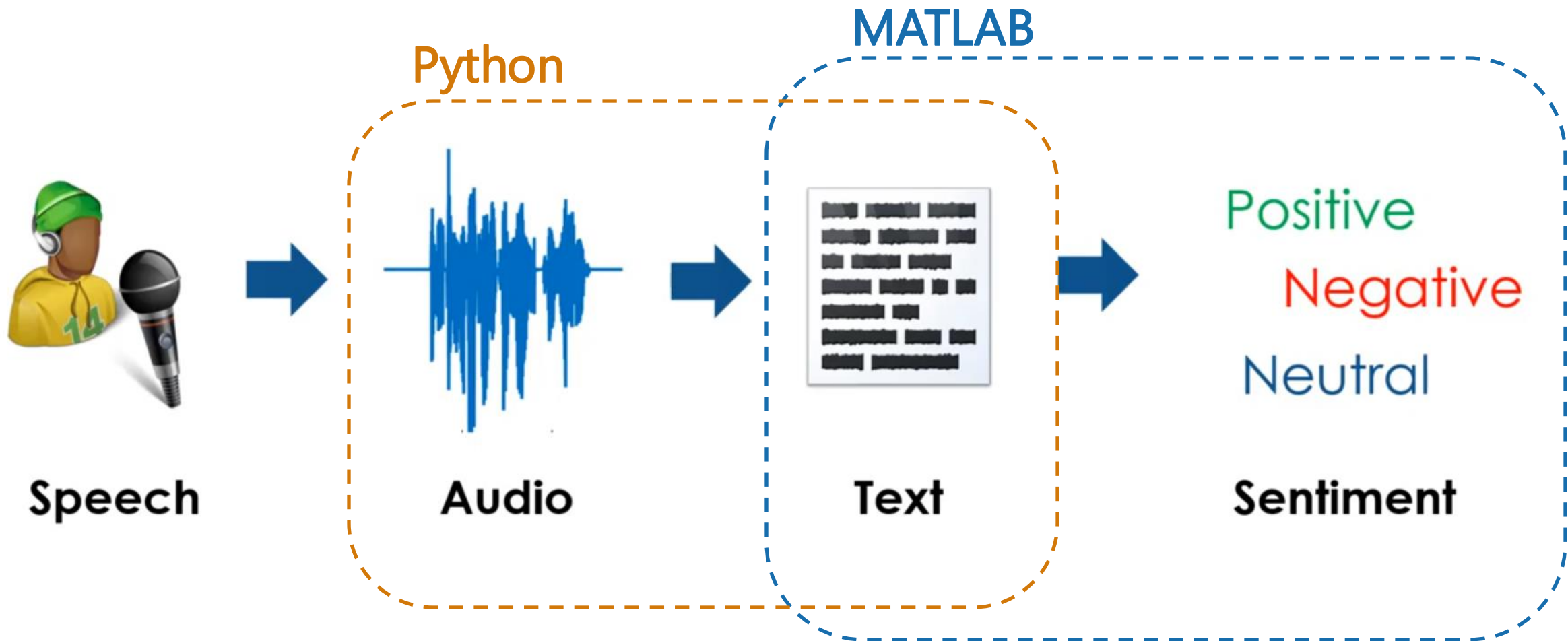
Text



Positive
Negative
Neutral

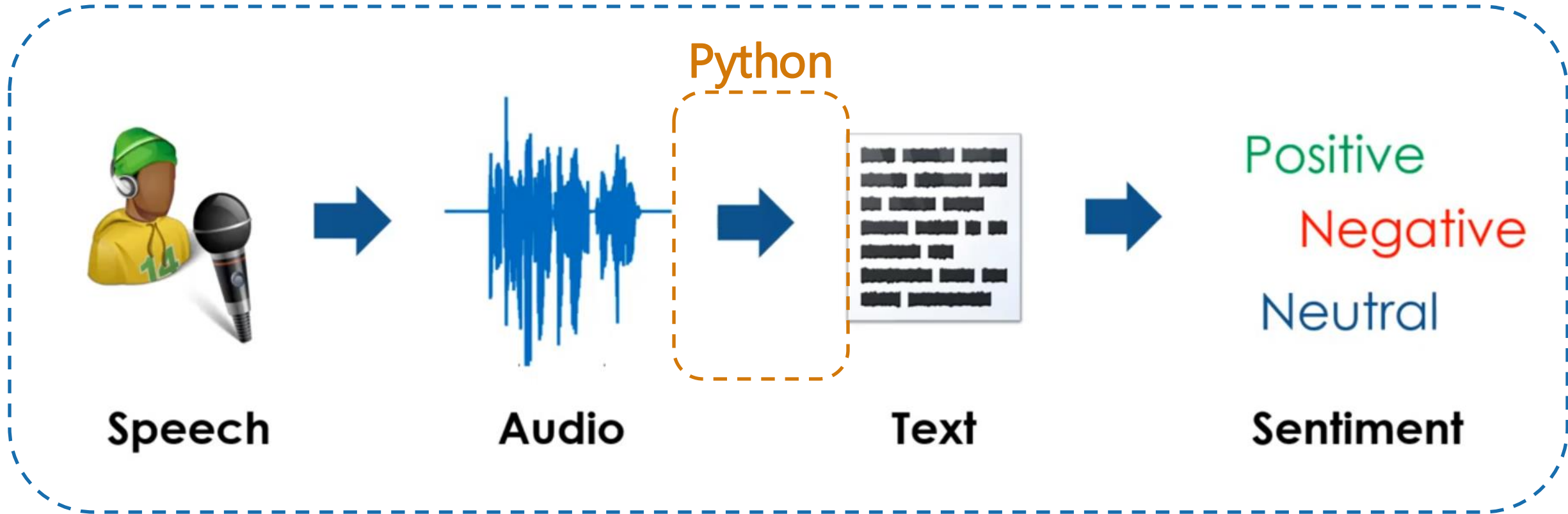
Sentiment

Ejemplo: Análisis de Opiniones



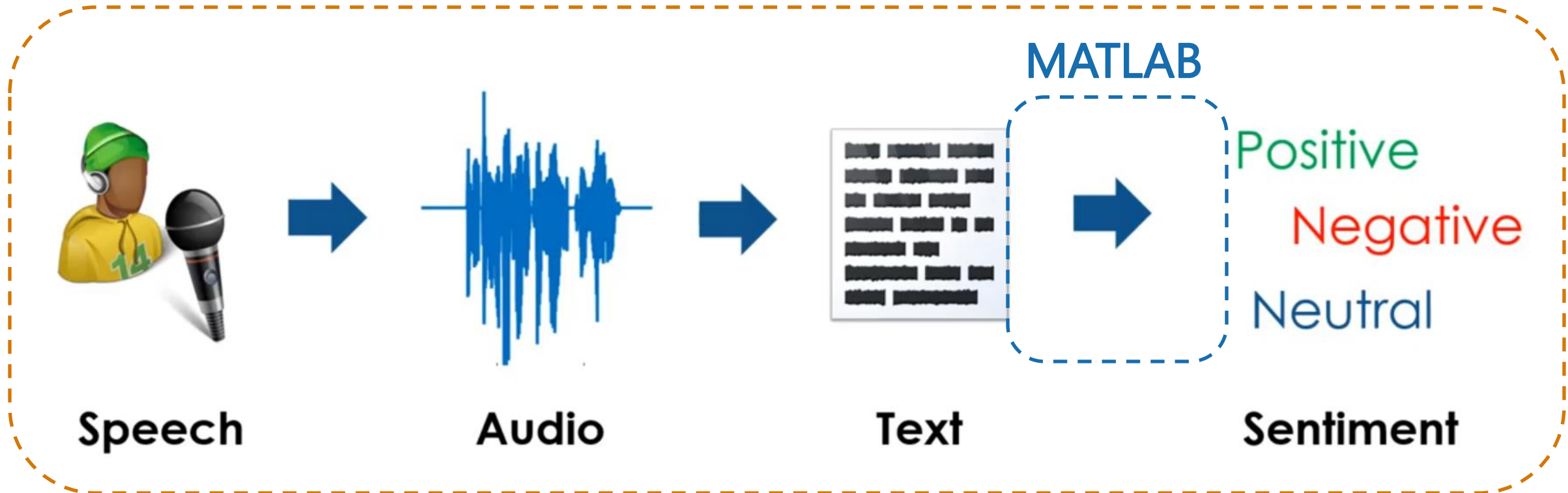
Ejemplo: Análisis de Opiniones, Llamando Python desde MATLAB

MATLAB



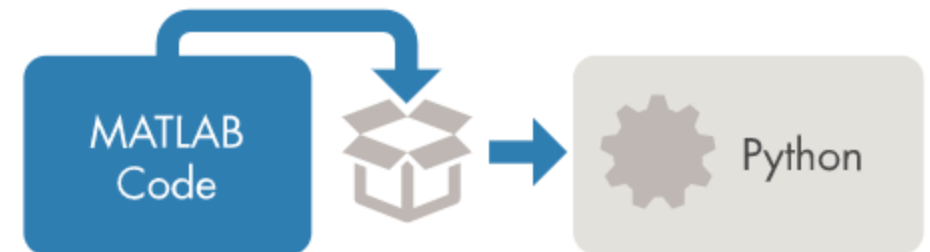
Ejemplo: Análisis de Opiniones : Llamando MATLAB desde Python

Python



Usando MATLAB con Python

- Llamando librerías escritas en Python desde MATLAB
 - MATLAB
- Llamando MATLAB desde Python
 - MATLAB
- Empacando programas de MATLAB para despliegue escalable con Python
 - MATLAB Compiler SDK
 - MATLAB Production Server



MATLAB convierte tipos de Python

```
>> x = 9.0;
>> a = py.math.sqrt(x);
>> class(a)
    'double'
```



MATLAB Type	Example	Python Type	Example
Scalar double	9.0	Float	9.0
Char	'A'	Str	'A'
Cell array	{'apple',2,1}	Tuple	['apple',2,1]
1-by-n double	[1.0, 2.0, 3.0]	array.array('d')	[1.0, 2.0, 3.0]
m-by-n matrix	[1.0, 2.0 3.0, 4.0]	memoryview object	

Note las diferencias de syntaxis cuando se llama Python desde MATLAB

Python

```
>>> import math  
>>> math.sqrt(42)
```



MATLAB

```
>> py.math.sqrt(42)
```

```
>>> print('hello', 'world', sep=', ')
```



```
>> py.print('hello', 'world', ...  
           pyargs('sep', ', '))
```

Note las diferencias de sintaxis cuando se llama MATLAB desde Python

MATLAB

```
>> [s, idx] = sort(x)
```

```
>> foo(x)
```

```
>> C = A + B
```



Python

```
>>> s = eng.sort(x, nargout=2)
```

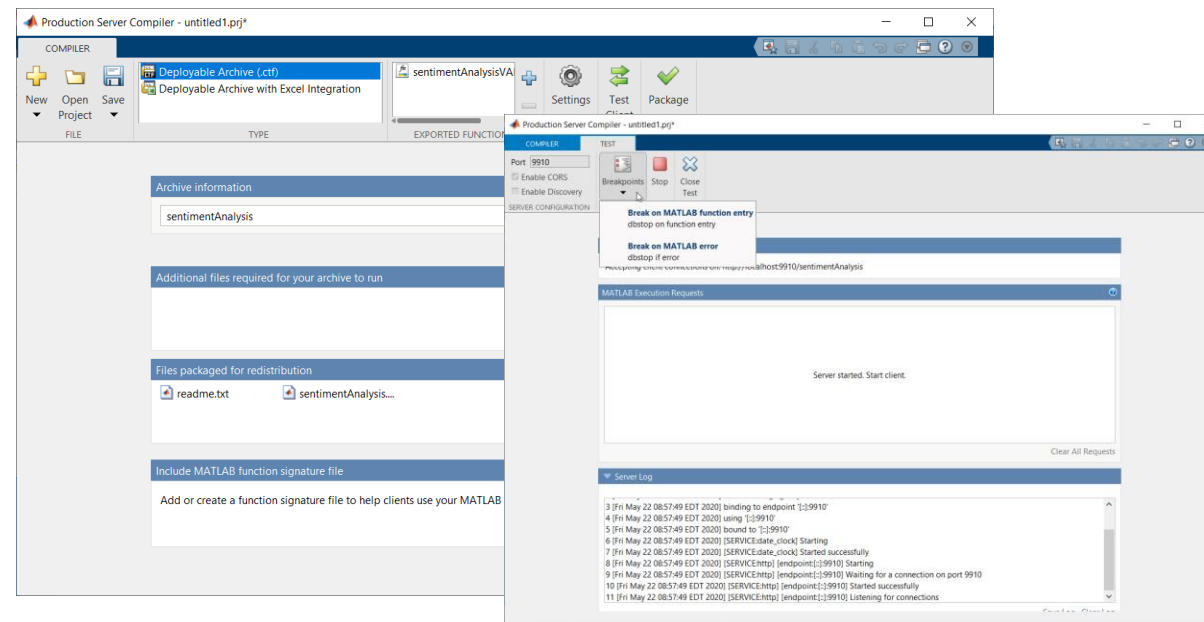
```
>>> eng.foo(x, nargout=0)
```



```
>>> C = eng.plus(A, B)
```

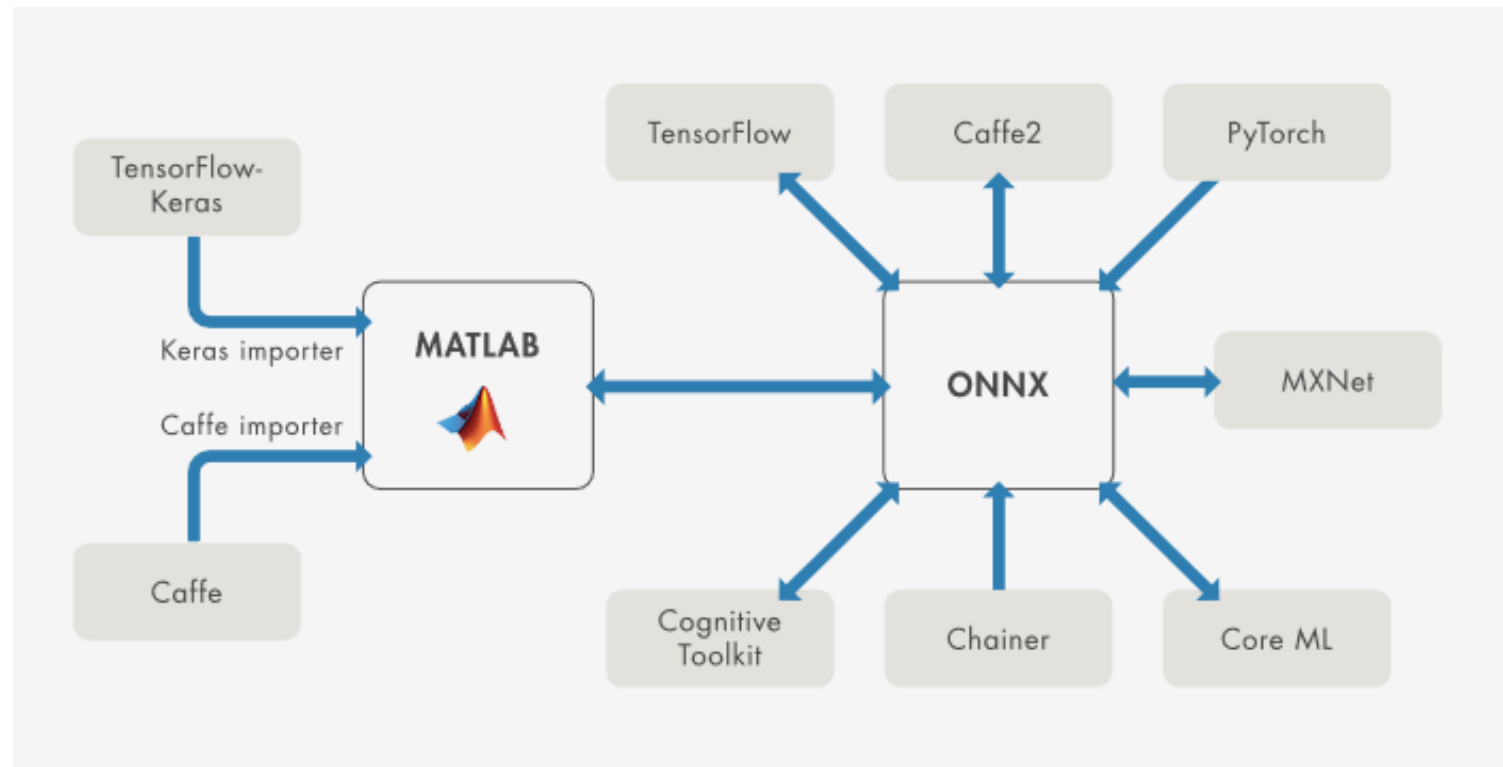
MATLAB Production Server administra simultáneamente múltiples versiones de MATLAB Runtime

- RESTful API:
 - <https://www.mathworks.com/help/mps/restful-api-and-json.html>
- Cliente Python:
 - <https://www.mathworks.com/help/mps/python/create-a-matlab-production-server-python-client.html>



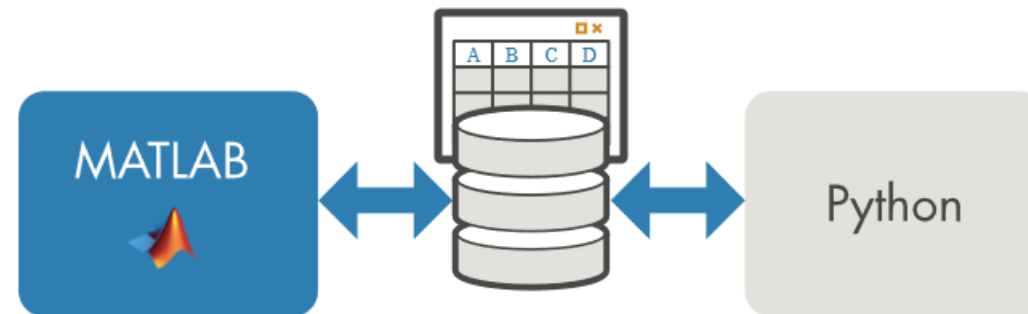
Usando MATLAB con Python para Deep Learning

- Importar y exportar redes directamente usando ONNX y Tensorflow-Keras:
- <https://www.mathworks.com/solutions/deep-learning/models.html>



Uso de Apache Parquet para almacenar y transferir datos tabulares entre MATLAB and Python

- Trabajando con archivos Parquet:
- <https://www.mathworks.com/help/matlab/parquet-files.html>
- Librería de MATLAB para Apache Arrow en GitHub:
- <https://github.com/apache/arrow/tree/master/matlab>



Troubleshooting

- Opciones sofisticadas para el manejo de excepciones
- Ver la documentación
- Contactar a Soporte Técnico!
- MATLAB Answers, community

Troubleshooting

Limitations to Python Support

Python features not supported in MATLAB.

Undefined variable "py" or function "py.command"

Troubleshooting failures loading Python.

Unsupported MATLAB Types

MATLAB types that are not supported in Python.

Using Python Data in MATLAB

Python types that do not have compatible MATLAB types.

Troubleshooting Multidimensional Array Argument Errors

Error might be caused by input array with more than one non-singleton dimension.

Limitations to Indexing into Python Objects

Indexing features not supported in MATLAB.

Handle Python Exceptions

MATLAB catches exceptions thrown by Python and converts them into a `matlab.exception.PyException` object.

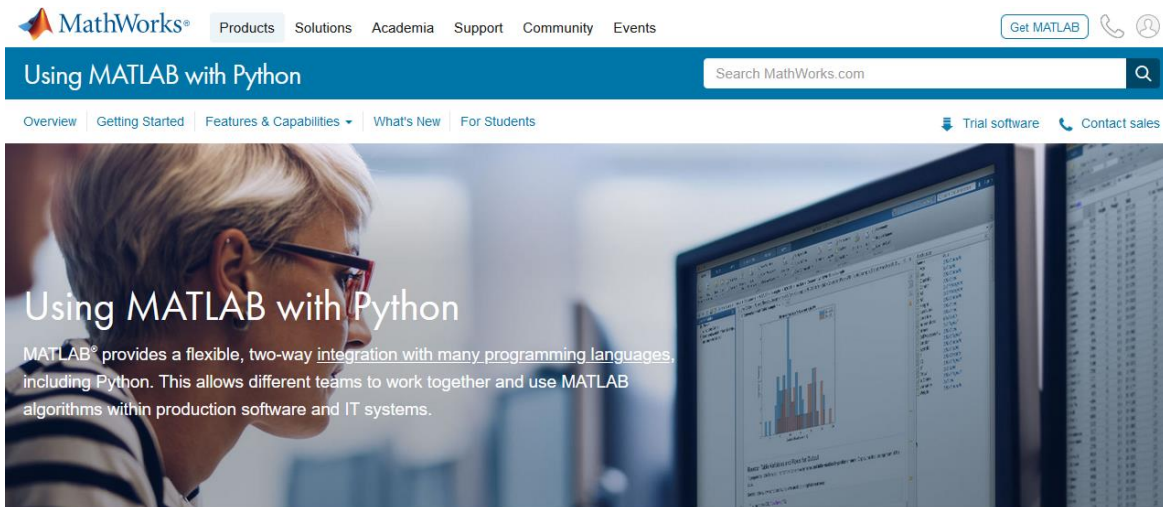
Troubleshooting Error Messages

Tips to determine if an error originates in Python or MATLAB code.

<https://www.mathworks.com/help/matlab/getting-started-with-python.html>

<https://www.mathworks.com/help/matlab/matlab-engine-for-python.html>

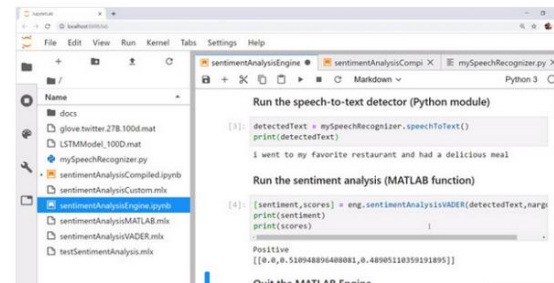
Fuentes



Calling MATLAB from Python

The MATLAB Engine API for Python allows you to call MATLAB as a computational engine from Python.

The API lets you execute MATLAB commands from within your Python environment without starting a desktop session of MATLAB. Learn more about the MATLAB Engine API for Python.



<https://www.mathworks.com/products/matlab/matlab-and-python.html>

- [Cheatsheet](#)
- [Example on GitHub](#)
- [Blog post](#)
- Videos
 - [Calling Python from MATLAB](#)
 - [Calling MATLAB from Python](#)
 - [Using MATLAB with Python + Q&A \(YouTube live stream recording\)](#)
- Documentation
 - [Calling Python from MATLAB](#)
 - Calling MATLAB from Python via:
 - [MATLAB Engine API](#)
 - [MATLAB Compiler SDK](#)
 - [MATLAB Production Server](#)
 - Data management:
 - [Data type conversions](#)
 - [Working with Parquet files](#)
 - [MATLAB library for Apache Arrow on GitHub](#)
 - [Deep Learning \(TensorFlow, PyTorch, etc\)](#)

Tips de Configuración

- Use `pyenv` para actualizar la configuración (`pyversion` antes de R2019b)
- Asegure que todo el Código está en el path
- Revise la configuración de ambiente, depende de como se configuró Python
- Vea la [documentación](#) para troubleshooting, en MATLAB Answers
- Llame a soporte técnico

```
pyenv
```

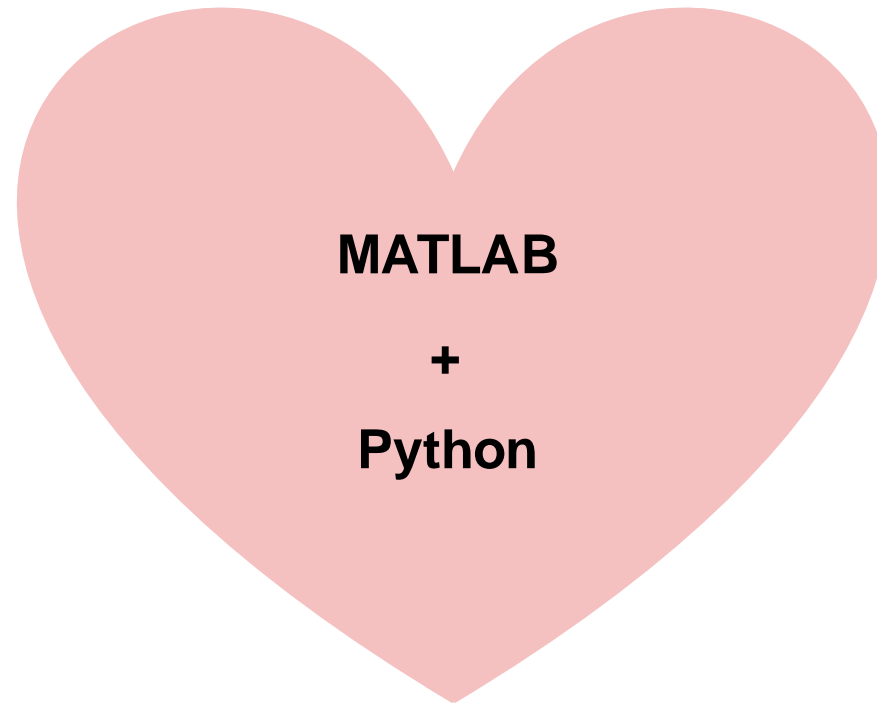
```
ans =
```

```
PythonEnvironment with properties:
```

```
    Version: "3.6"  
    Executable: "C:\Python36\WPY-3670\python-3.6.7.amd64\python.EXE"  
    Library: "C:\Python36\WPY-3670\python-3.6.7.amd64\python36.dll"  
    Home: "C:\Python36\WPY-3670\python-3.6.7.amd64"  
    Status: Loaded  
    ExecutionMode: OutOfProcess  
    ProcessID: "13980"  
    ProcessName: "MATLABPyHost"
```

```
pyenv("Version",3.7)
```

Usando MATLAB con Python



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 @HeatherGorr

 @heather.codes



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