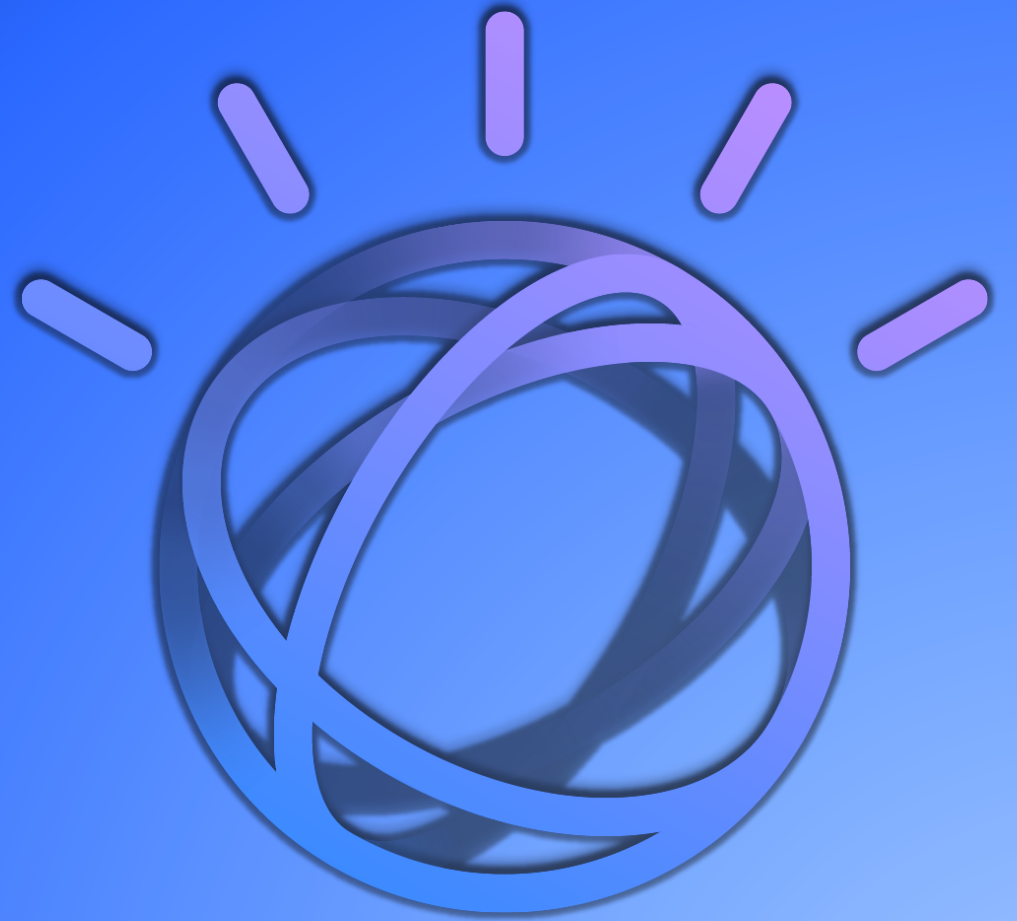


Watson de la A a la Z

3º Sesión

Josefina R. Casanova
IBM Innovation Lab Developer



Temario

1. Introducción

2. Tour de IBM Cloud

3. Personality Insights

1. Introducción

2. Demo

3. Hands-On

4. Natural Language Understanding

1. Introducción

2. Hands-On

1. Watson Knowledge Studio

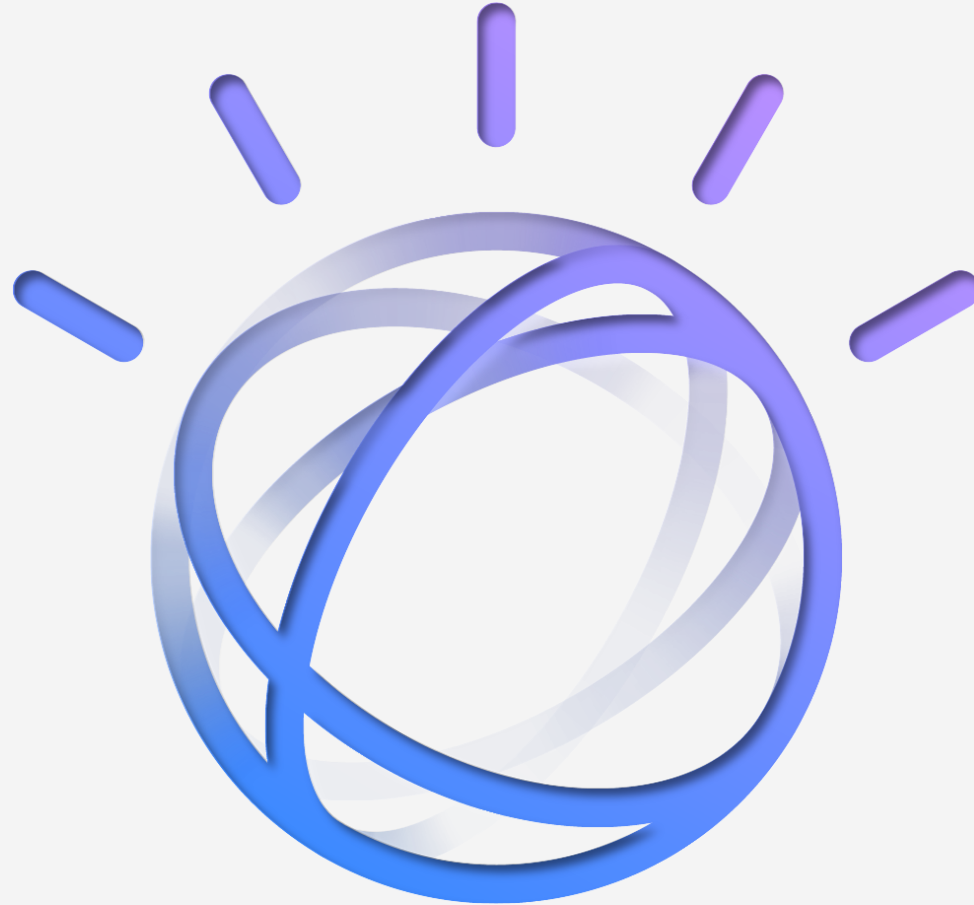
1. Introducción

2. Demo

3. Hands-On

2. Preguntas

Servicios Cognitivos: Watson



Servicios Cognitivos

Los servicios cognitivos son aquellos que son capaces de aprender y/o realizar tareas que asociaríamos como propias de un ser humano. Emplean alguna forma de **Inteligencia Artificial**.

Algunas de estas tareas pueden ser:

- Comprensión del lenguaje, escrito y hablado (NLU, NLC, NLP)
- Reconocimiento y clasificación de imágenes (Visual Recognition)

Servicios Cognitivos

Pueden usarse para:

- Conversión de texto a audio, y viceversa (Watson Speech-To-Text y Text-To-Speech)
- Traducir texto o audio de un idioma a otro (Watson Language Translator)
- Identificar intenciones y emociones a partir del tono de voz (Watson Tone Analyzer)
- Análisis de Documentos (Watson Discovery)
- Diagnósticos médicos (Watson Health)
- Mantener conversaciones con personas (Watson Assistant)

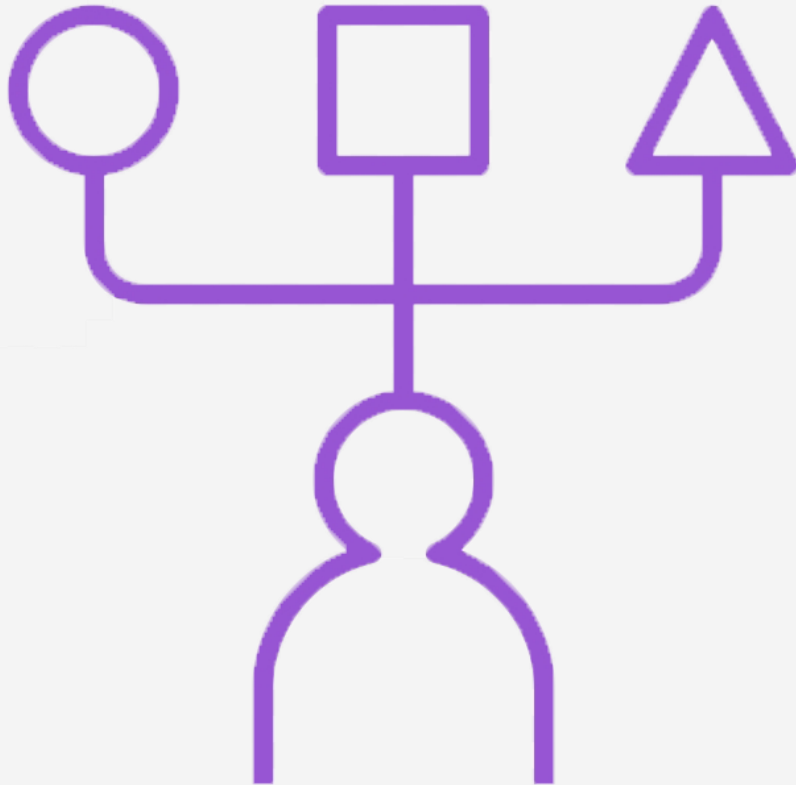


IBM Cloud

[¡Regístrate aquí!](#)

WATSON PERSONALITY INSIGHTS

¿Qué es Watson Personality Insights?



Personality Insights es un servicio capaz de realizar análisis lingüísticos extraer **características de personalidad** basadas en cómo escribe una persona.

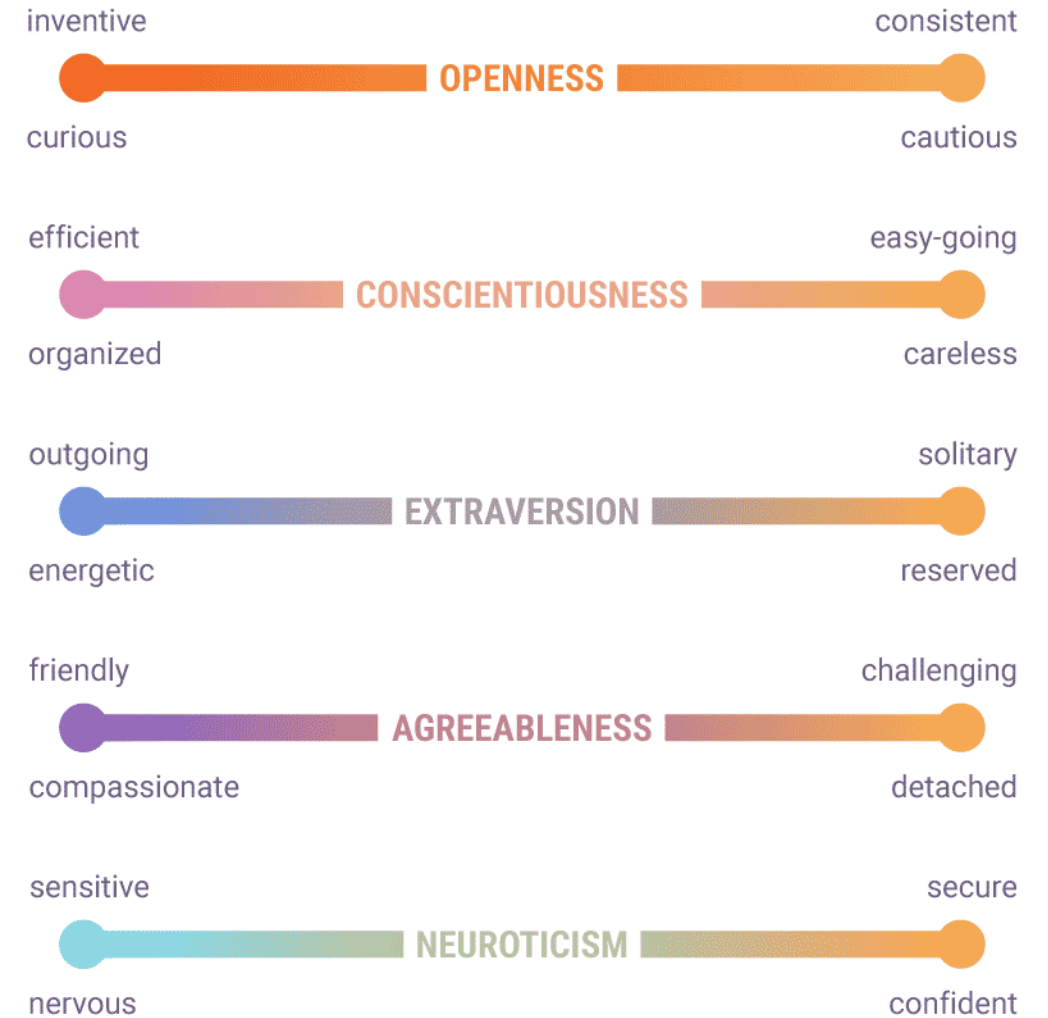
Puede extraer información de emails, blogs, tweets, posts en foros, o simple texto plano.

Se recomiendan al menos 1200 palabras de texto de entrada al utilizar este servicio, pero con 100 ya son suficientes.

Big Five Personality Test (OCEAN)

Test de personalidad que clasifica a las personas en base a los siguientes parámetros:

- O** -> Apertura a la experiencia
- C** -> Conciencia
- E** -> Extraversión
- A** -> Amabilidad
- N** -> Neuroticismo

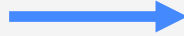


© Adioma

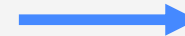
Personality Insights - Processo



**Input
(Text)**



**Personality
Insights**



```
{
  "word_count": 15223,
  "processed_language": "en",
  "personality": [
    {
      "trait_id": "big5_openness",
      "name": "Openness",
      "category": "personality",
      "percentile": 0.8011555009553,
      "raw_score": 0.77565404255038,
      "significant": true,
      "children": [
        {
          "trait_id": "facet_adventurousness",
          "name": "Adventurousness",
          "category": "personality",
          "percentile": 0.89755869047319,
          "raw_score": 0.54990704031219,
          "significant": true
        }
      ]
    }
  ]
},
```

**Output
(JSON)**

</Demo>

Personality Insights

Laboratorio I - Creación del Servicio

Requisito: [registrarse en IBM Cloud](#)

1. Acceder al [catálogo](#) de servicios
2. Buscar “Personality Insights”
3. Crear una instancia Lite del servicio

Personality Insights

Laboratorio I - Creación del Servicio

The screenshot shows the IBM Cloud catalog interface. On the left is a dark sidebar with navigation links: Catalog, IBM Cloud catalog, Featured, Services, Software, and Consulting. Below these are expandable sections for 'Category' (with 'AI / Machine Learning' selected) and 'Product'. The main content area has a top navigation bar with 'Search resources and offerings...', 'Catalog', 'Docs', 'Support', 'Manage', and 'IBM'. A search bar in the center contains the text 'personality insights'. Below the search bar, it says 'Search results for 'personality insights' 1 result'. A single result card is displayed, featuring a purple icon of three people, the title 'Personality Insights', the breadcrumb 'IBM • Services • AI / Machine Learning', a description 'The Watson Personality Insights derives insights from transactional and social media data to identify psychological traits.', and the tags 'Lite • Free • IAM-enabled'. On the right side of the main area, there are icons for a grid view and a zoomed-in view, and a vertical 'FEEDBACK' button.

IBM Cloud

Search resources and offerings...

Catalog Docs Support Manage IBM

Catalog

IBM Cloud catalog

Featured

Services

Software

Consulting

Category

AI / Machine Learning

Product

Search results for 'personality insights' 1 result

Personality Insights

IBM • Services • AI / Machine Learning

The Watson Personality Insights derives insights from transactional and social media data to identify psychological traits.

Lite • Free • IAM-enabled

FEEDBACK

Personality Insights


Laboratorio I - Creación del Servicio

IBM Cloud

Search resources and offerings...

Catalog Docs Support Manage IBM

Catalog / Services /

 **Personality Insights**
Author: IBM • Date of last update: 09/02/2020 • [Docs](#) • [API docs](#)

CreateAbout

Select a region

Select a region

Dallas

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or region: [United States](#)

Plan	Features	Pricing
Lite	1,000 API Calls per Month The Lite plan gets you started with 1,000 API calls per month at no cost. Lite plan services are deleted after 30 days of inactivity.	Free
Tiered	First 100 API calls each month are free	

Summary

Personality Insights Free
Region: Dallas
Plan: Lite
Service name: Personality Insights-rh
Resource group: Default

Create

Add to estimate

</Lab>

Personality Insights

Laboratorio II - Consulta API

- 1. Obtener las credenciales del servicio**
- 2. Consultar API Reference**
 1. <https://cloud.ibm.com/apidocs/personality-insights>
- 3. Descargar el código desde el repositorio (Opcional)**
 1. <https://github.com/IBMInnovationLabUY/Watson-DesafioIA/tree/master/Watson%20Personality%20Insights>
- 4. Colocar las credenciales en el código (apikey, url)**
- 5. Correr el programa y analizar las respuestas**

</Lab>

Personality Insights – Enlaces de Interés

- **Demo:**
 - <https://personality-insights-demo.ng.bluemix.net/>
- **Sample Application (NodeJS):**
 - <https://github.com/watson-developer-cloud/personality-insights-nodejs>
- **API Reference:**
 - <https://cloud.ibm.com/apidocs/personality-insights>

Personality Insights – Enlaces de Interés

- **Tutorial – Analizador de personalidad de personajes de cine:**
 - <https://towardsdatascience.com/visualizing-the-personality-profile-of-any-film-character-using-python-and-ibm-watson-78ad2fcee065>
- **Libro - Building Cognitive Applications with IBM Watson Services: Vol 7 - NLU**
 - <https://www.redbooks.ibm.com/redbooks/pdfs/sg248398.pdf>

WATSON NATURAL LANGUAGE UNDERSTANDING

¿Qué es Watson Natural Language Understanding (NLU)?



Natural Language Understanding (NLU) es un servicio compuesto por una colección de funciones de análisis de texto capaces de **derivar información semántica** de su contenido.

Nos permite obtener el significado del texto de entrada y extraer metadatos del contenido, como categorías, conceptos, emociones, entidades, palabras clave, metadatos, relaciones, roles semánticos y sentimiento.

Natural Language Understanding - Processo



Natural Language Understanding


Laboratorio I - Creación del Servicio

Requisito: [registrarse en IBM Cloud](#)

1. Acceder al [catálogo](#) de servicios
2. Buscar “Natural Language Understanding”
3. Crear una instancia Lite del servicio

Natural Language Understanding

Laboratorio I - Creación del Servicio

 Natural Language Understanding

Author: IBM • Date of last update: 04/24/2020 • [Docs](#) • [API docs](#)

Create

About

Select a region

Select a region

Dallas

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or region: United States

Plan	Features	Pricing
Lite	30,000 NLU Items Per Month 1 Custom Model Fixed API Rate Limit. See Standard plan for higher API Rate Limit NOTE: A NLU item is based on the number of data units enriched and the number of enrichment features applied. A data unit is 10,000 characters or less. For example: extracting Entities and Sentiment from 15,000 characters of text is (2 Data Units * 2 Enrichment Features) = 4 NLU Items. A custom model refers to an annotation model developed with Watson Knowledge Studio. The Lite plan gets you started with 30,000 NLU Items per month at no cost. This plan also enables use of one custom model published through Watson Knowledge Studio. Lite plan services are deleted after 30 days of inactivity.	Free
Standard	Unlimited NLU Items Per Month You will be charged per NLU Item & per Custom Model	Click to view tiers and pricing detail

Summary

Natural Language Understanding

Free

Region: Dallas

Plan: Lite

Service name: Natural Language Understanding-r0

Resource group: default

Create

Add to estimate

</Lab>

Natural Language Understanding

Laboratorio II - Consulta API

1. **Obtener las credenciales del servicio (apikey, url)**
2. **Consultar API Reference**
 1. <https://cloud.ibm.com/apidocs/natural-language-understanding>
3. **Descargar el código desde el repositorio (Opcional)**
 1. <https://github.com/IBMInnovationLabUY/Watson-DesafioIA/tree/master/Watson%20Natural%20Language%20Understanding>
4. **Colocar las credenciales en el código (apikey, url)**
5. **Correr el programa y analizar las respuestas**

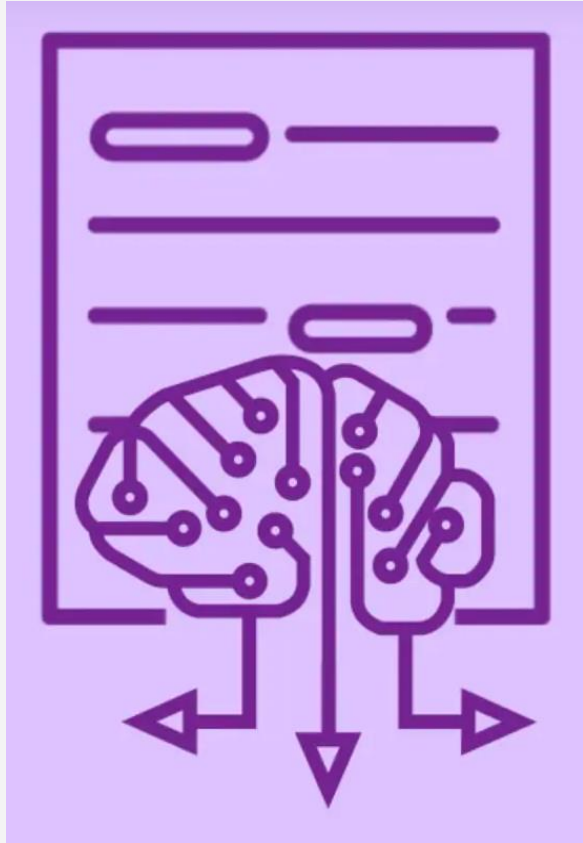
</Lab>

Natural Language Understanding – Enlaces de Interés

- **Sitio Oficial:**
 - <https://www.ibm.com/cloud/watson-natural-language-understanding>
- **API Referene:**
 - <https://cloud.ibm.com/apidocs/natural-language-understanding>
- **Tutorial – Getting Started with NLU:**
 - <https://cloud.ibm.com/docs/natural-language-understanding?topic=natural-language-understanding-getting-started>

WATSON KNOWLEDGE STUDIO

¿Qué es Watson Knowledge Studio (WKS)?



Watson Knowledge Studio (WKS) es una aplicación basada en la nube capaz de **aprender el idioma de un dominio** empleando modelos personalizados de machine learning para identificar entidades y relaciones exclusivas de su industria en texto no estructurado.

Estos modelos pueden ser creados y administrados sin la necesidad de emplear código, y pueden utilizarse en otros servicios de IBM como son Watson Discovery, Watson Natural Language Understanding y Watson Explorer.

Watson Knowledge Studio – Conceptos Generales

- **Entidad (Entity):**

- Representación de un objeto o concepto.
- Suelen denotarse utilizando sustantivos singulares
- Ejemplos:
 - Persona, Perro, Casa, Auto.

- **Relación (Relationship):**

- Vínculo existente entre dos entidades.
- Ejemplos:
 - DueñoDe (Persona puede ser dueña de Perro, Casa o Auto)
 - ManejadoPor (Auto puede ser manejado por Persona)

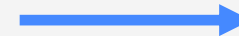
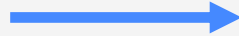
Watson Knowledge Studio – Conceptos Generales

- **Anotación (Annotation):**
 - Proceso mediante el cual se vinculan las Entidades y Relaciones con el contenido del texto.
- **Verdad Fundamental (Ground Truth):**
 - Información proporcionada por la observación directa en contraposición a la que puede ser inferida o asumida.

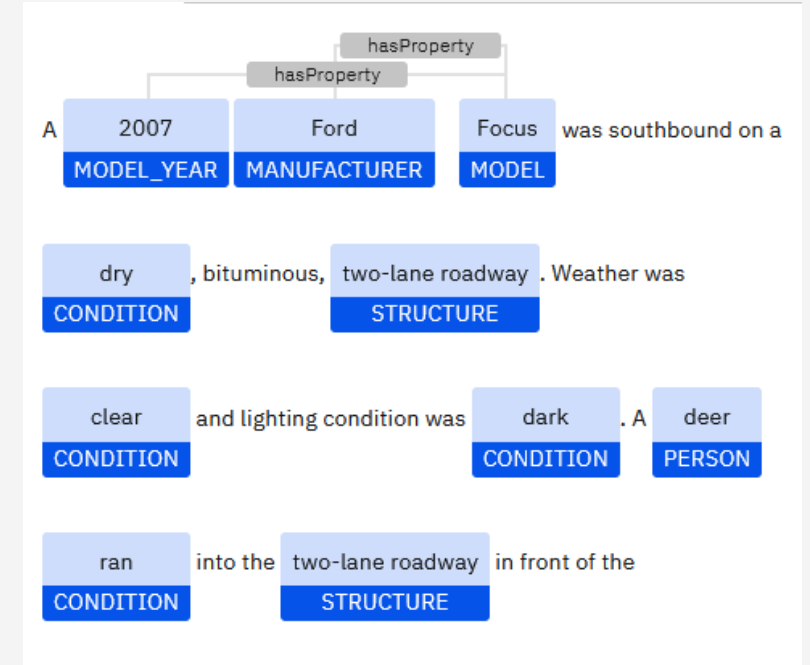
Watson Knowledge Studio - Proceso

A 2007 Ford Focus was southbound on a dry, bituminous, two-lane roadway. Weather was clear and lightning condition was dark. A deer ran into the two-lane roadway in front of the Ford.

**Input
(Plain
Text)**

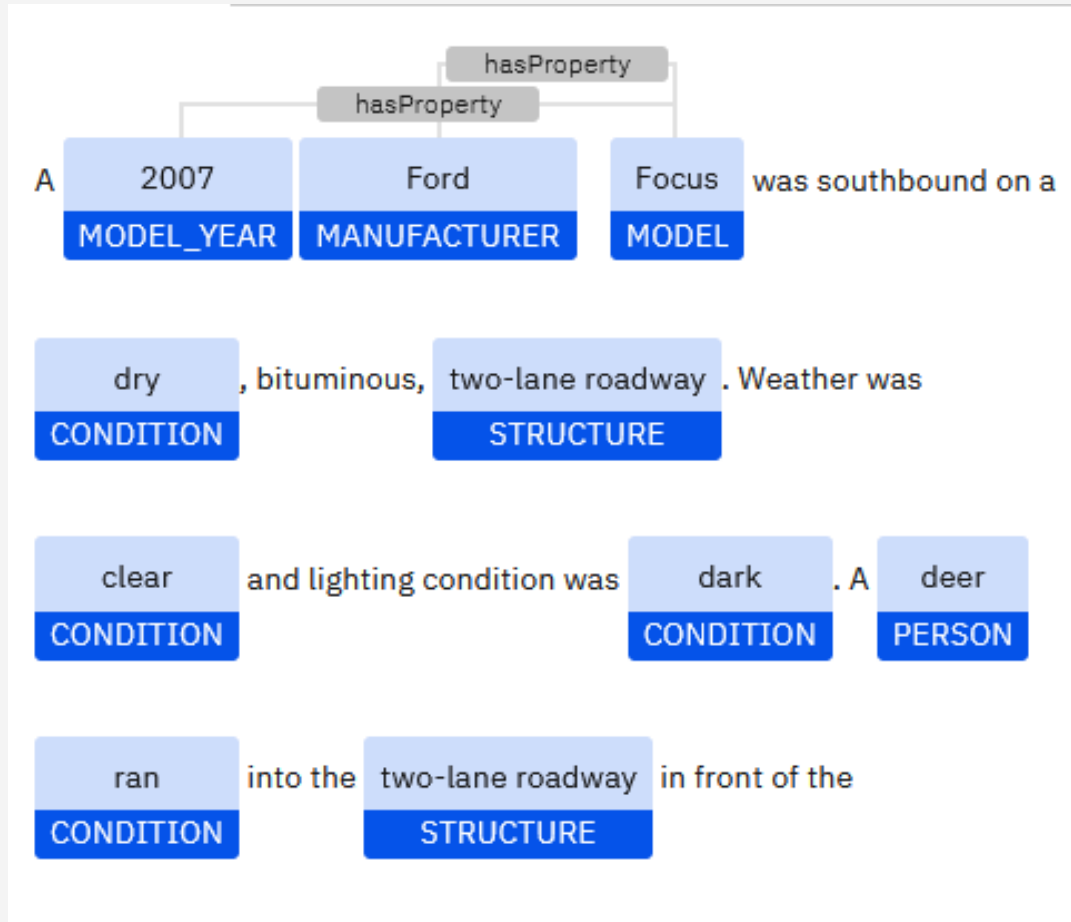


**Watson
Knowledge
Studio**



**Output
(Analyzed
Text)**

Watson Knowledge Studio - Proceso



• Entidades:

- Model_Year (2007)
- Manufacturer (Ford)
- Model (Focus)
- Condition (dark, **ran**, clear)
- Person (**deer**)

• Relaciones:

- hasProperty

</Demo>

Watson Knowledge Studio


Laboratorio I - Creación del Servicio

Requisito: [registrarse en IBM Cloud](#)

1. Acceder al [catálogo](#) de servicios
2. Buscar “Watson Knowledge Studio”
3. Crear una instancia Lite del servicio

Watson Knowledge Studio

Laboratorio I - Creación del Servicio

 Knowledge Studio

Author: IBM • Date of last update: 04/24/2020 • [Docs](#)

Create

About

Pricing plans

Displayed prices do not include tax. Monthly prices shown are for country or region: [United States](#)

Plan	Features	Pricing
Lite	1 user 5 GB of storage included Up to 5 workspaces 30 machine learning training sessions per month Deploy models directly to Watson Natural Language Understanding and Watson Discovery services	Free
Standard	1 to 10 users 10 GB to 100 GB of storage Up to 50 workspaces 100 machine learning training sessions per month Deploy models directly to Watson Natural Language Understanding and Watson Discovery services High availability and service level uptime guarantee Export models for use with Watson Explorer	\$100.00 USD/per user per month \$50.00 USD/per 10 GB storage per month
Premium	10 to 100 users 100 GB to 500 GB of storage Up to 100 workspaces Unlimited machine learning training sessions Deploy models directly to Watson Natural Language Understanding and Watson Discovery Export models for use with Watson Explorer	

Summary

Knowledge Studio

Plan: Lite

Free

Sign up to create

</Lab>

Watson Knowledge Studio

Laboratorio II

Requisitos:

- [Registrarse en IBM Cloud](#)
- [Descargar los archivos necesarios](#)

Watson Knowledge Studio

Laboratorio II

Contexto del ejercicio:

Se desea crear un modelo de lenguaje utilizando Watson Knowledge Studio para el análisis de reseñas de talleres mecánicos para autos.

Este modelo será luego exportado a Natural Language Understanding y consumido desde una aplicación (para este taller, se utilizará NodeJS).

Watson Knowledge Studio

Laboratorio II

1. Crear una instancia de Natural Language Understanding (Lite)



2. Crear una instancia de Watson Knowledge Studio (Lite)



3. Acceder a Knowledge Studio

1. Definir Entidades y Relaciones
2. Subir Documentos
3. Anotar Documentos
4. Generar y Entrenar un modelo de Machine Learning
5. Exportar el modelo al servicio de Natural Language Understanding

Watson Knowledge Studio Laboratorio II

Acceder a Knowledge Studio:

[Resource list](#) /

Knowledge Studio-9k ✓ Active [Add tags](#) [✎](#)

[Details](#)

[Actions...](#) [▼](#)

Manage

Getting started

Plan

Start by launching the tool

[Launch Watson Knowledge Studio](#)

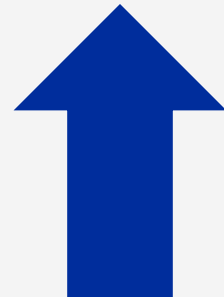
[Getting started tutorial](#) [↗](#)

Plan

Lite

[Upgrade](#)

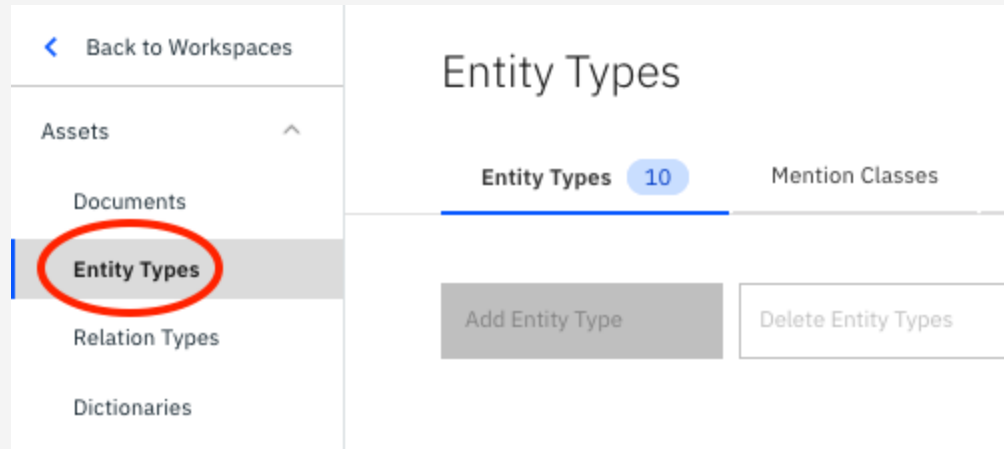
FEEDBACK



Watson Knowledge Studio

Laboratorio II

Definir Entidades:



Roles	Subtypes	Action
Select a r... ▼	Enter a subtype	Cancel Save
Repair (This type)	Transmission	🗑
	Tires	🗑
	Electrical	🗑
	Body	🗑
	Engine	🗑
	Brakes	🗑
	Glass	🗑
	Maintenance	🗑

Watson Knowledge Studio

Laboratorio II

Definir Relaciones:

- repairedBy (Vehicle, Mechanic)
- ownedBy (Vehicle, Driver)
- damagedBy (Vehicle, Mechanic)
- belongsTo(Vehicle, Customer)
- partOf (Vehicle, Repair)
- workDone (Vehicle, Repair)
- needRepairType (Vehicle, Repair)
- worksWith (Mechanic, Mechanic)

Watson Knowledge Studio

Laboratorio II

Definir Relaciones:

[Back to Workspaces](#)

Assets ^

Documents

Entity Types

Relation Types

Dictionaries

Rule-based Model v

Machine Learning Model v

Settings

Help

Relation Types

Relation Types 7

Add Relation Type

Q Enter text to filter

Relation Type	First Entity Type / Role	Second Entity Type / Role	Action	
<input type="text" value="Enter a relatio..."/>	<input type="text" value="Enter an entity type name"/>	<input type="text" value="Enter an entity type name"/>	Cancel	Save
repairedBy	Vehicle	Mechanic	Edit	Delete
belongsTo	Vehicle	Customer	Edit	Delete
partOf	Vehicle	Repair	Edit	Delete

Watson Knowledge Studio

Laboratorio II

Subir documentos:

IBM Watson Knowledge Studio

< Back to Workspaces

Assets ^

Documents

Entity Types

Relation Types

Dictionaries

Rule-based Model v

Machine Learning Model v

Documents

Document Sets (24) Documents (All, 4943)


Upload Document Sets To begin annotating documents, go to [Annotations](#) page. [Download Document Sets](#)

Name	Documents	Last Modified	Action
All	4943	-	
sample_review.txt_set	1	04/14/2020	Rename Delete
sample_review1.txt_set	8	04/14/2020	Rename Delete

Watson Knowledge Studio Laboratorio II

Subir documentos:


Add a Document Set



Drag files here, or click to browse for the files that you want to add.
Supported file types: CSV, TXT, PDF, DOC, DOCX, HTML, ZIP


For the best performance, limit the number of words in each document. Fewer than 2,000 words is good, but closer to 1,000 words is better.

[Show details about file types and upload limits](#)

 [corpus-e6e25540-9c54-11ea-b92e-afac3e68cacf.zip](#)

☒ Upload corpus documents and include ground truth (upload the original workspace's type system first)

☐ Upload documents in UIMA CAS XMI format

 Uploading...

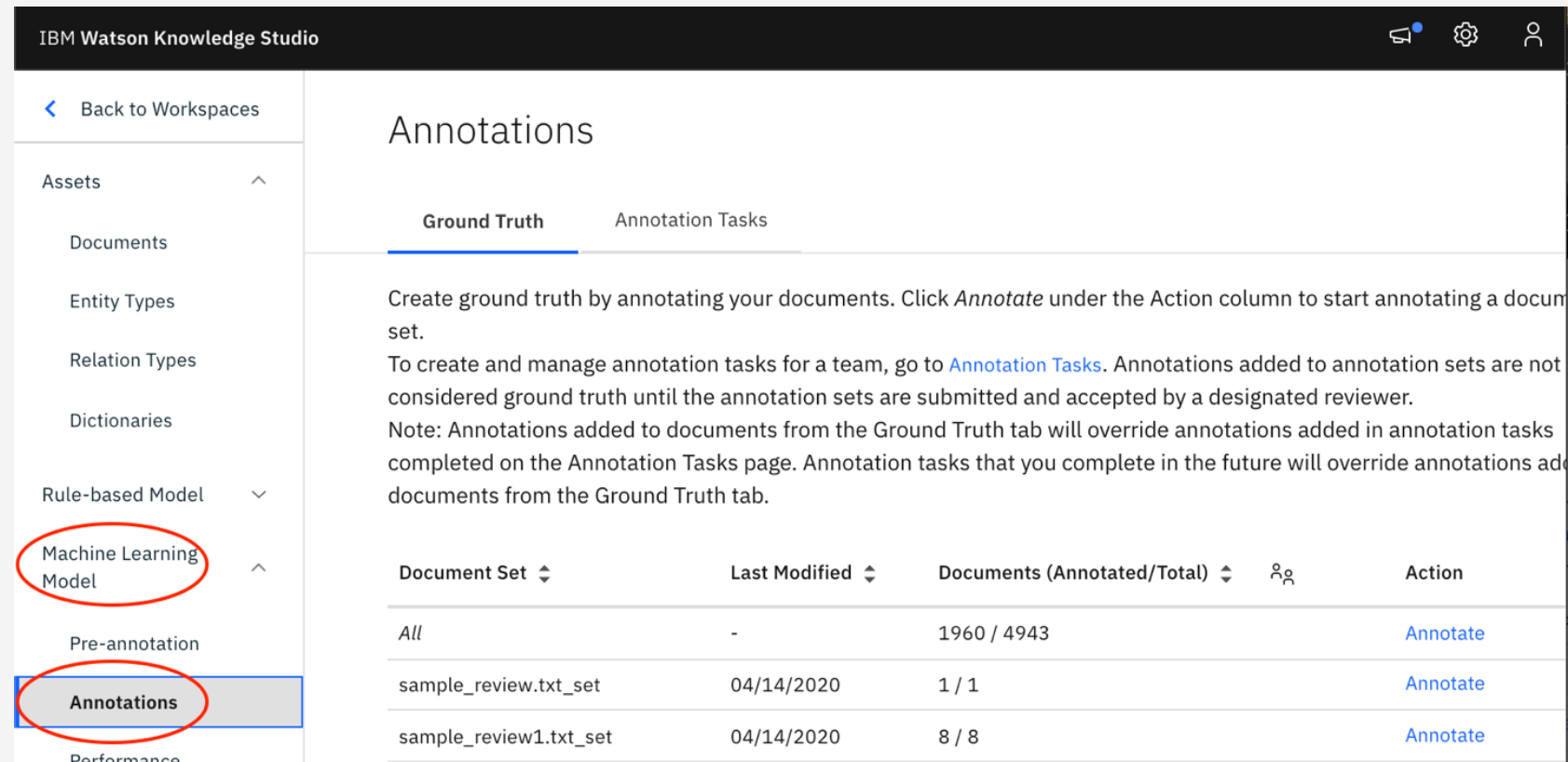
Close

Uploading

Watson Knowledge Studio

Laboratorio II

Anotar Documentos:



IBM Watson Knowledge Studio

Annotations

Ground Truth | Annotation Tasks

Create ground truth by annotating your documents. Click *Annotate* under the Action column to start annotating a document set.

To create and manage annotation tasks for a team, go to [Annotation Tasks](#). Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted by a designated reviewer.

Note: Annotations added to documents from the Ground Truth tab will override annotations added in annotation tasks completed on the Annotation Tasks page. Annotation tasks that you complete in the future will override annotations added to documents from the Ground Truth tab.

Document Set	Last Modified	Documents (Annotated/Total)		Action
All	-	1960 / 4943		Annotate
sample_review.txt_set	04/14/2020	1 / 1		Annotate
sample_review1.txt_set	04/14/2020	8 / 8		Annotate

Watson Knowledge Studio


Laboratorio II


Anotar Documentos:


Document Set ▾	Last Modified ▾	Documents (Annotated/Total) ▾	👤	Action
<i>All</i>	-	1960 / 4943		Annotate
sample_review.txt_set	04/14/2020	1 / 1		Annotate

Watson Knowledge Studio Laboratorio II

Anotar Documentos:


Mention


Relation


Coreference

View Details 🔍 Replace ↶ Concordance 📄 Attribute View 📄 Save 💾

review_18.txt

1 i had a nail in my tire and they did a great job.


2 i was able to get an appointment and they got me in and out within an hour


Entity	
Type	Subtype
-	Customer
-	Driver
-	Location
-	Manufacturer
-	Mechanic
-	Repair
-	Vehicle


Watson Knowledge Studio

Laboratorio II

Anotar Documentos:

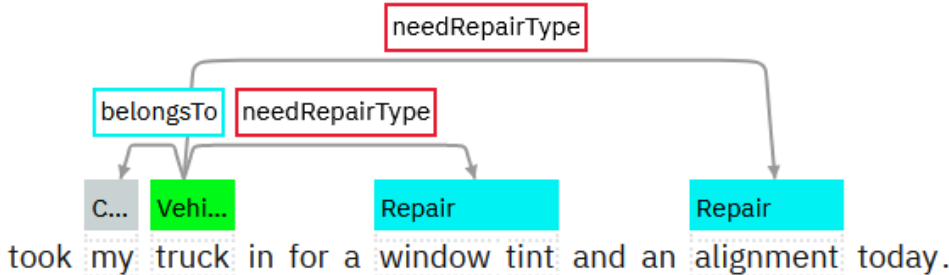

Mention


Relation


Coreference

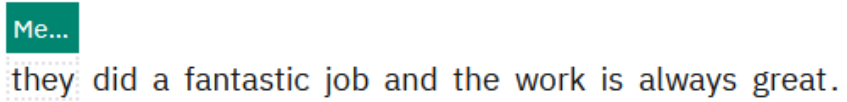
review_14.txt

1




```
graph TD; C[C...] -- belongsTo --> V[Vehi...]; V -- needRepairType --> R1[Repair]; V -- needRepairType --> R2[Repair];
```

2



```
graph LR; Me[Me...] --- they[they];
```

Save 

Relation Type

- belongsTo
- damagedBy
- needRepairType
- partOf
- repairedBy
- workDone
- worksWith

Watson Knowledge Studio

Laboratorio II

Anotar Documentos:


Ground Truth

Annotation Tasks

Create ground truth by annotating your documents. Click *Annotate* under the Action column to start annotating a document set.

To create and manage annotation tasks for a team, go to [Annotation Tasks](#). Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted by a designated reviewer.

Note: Annotations added to documents from the Ground Truth tab will override annotations added in annotation tasks completed on the Annotation Tasks page. Annotation tasks that you complete in the future will override annotations added to documents from the Ground Truth tab.

Document Set	Last Modified	Documents (Annotated/Total)		Action
All	-	85 / 85		Annotate
review_1.txt_set	05/26/2020	85 / 85		Annotate

Watson Knowledge Studio Laboratorio II

Anotar Documentos:


Ground Truth

Annotation Tasks

Create ground truth by annotating your documents. Click *Annotate* under the Action column to start annotating a document set.

To create and manage annotation tasks for a team, go to [Annotation Tasks](#). Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted by a designated reviewer.

Note: Annotations added to documents from the Ground Truth tab will override annotations added in annotation tasks completed on the Annotation Tasks page. Annotation tasks that you complete in the future will override annotations added to documents from the Ground Truth tab.

Document Set	Last Modified	Documents (Annotated/Total)		Action
All	-	85 / 85		Annotate
review_1.txt_set	05/26/2020	85 / 85		Annotate

Watson Knowledge Studio Laboratorio II

Generar Modelo de Machine Learning:

[Back to Workspaces](#)

Documents

Entity Types

Relation Types

Dictionaries

Rule-based Model

Machine Learning Model


Pre-annotation

Annotations

Performance

Performance

DESAFIOIA_ORT
Language of documents
English

Number of documents per set


0	Training Set
0	Test Set
0	Blind Set

Training Set
[View Ground Truth](#)
Test Set
[View Ground Truth](#)
[View Decoding Results](#)

Last trained on:

Last evaluated on:

[Train and evaluate](#)

You have not trained the machine learning model. Click here to train and evaluate it.

Watson Knowledge Studio

Laboratorio II

Generar un Modelo de Machine Learning:

[Back to Workspaces](#)

Training / Test / Blind Sets

Select Training/ Test/ Blind Sets

Train

Train & Evaluate

Document Set	Task Status
<input checked="" type="checkbox"/> All	
<input type="checkbox"/> review_1.txt_set	

Create new sets by splitting the selected document sets

Ratio

Enter the percentage of documents to include in each set.

70	Training Set (70% Recommended)
23	Test Set (23% Recommended)
7	Blind Set (7% Recommended)

Watson Knowledge Studio

Laboratorio II

Desplegar el Modelo:

Model

Pre-annotation

Annotations

Performance

Versions

Settings

Help

Machine learning models, once trained, can be used to annotate new documents prior to human annotation.
[Go to Pre-annotation page](#)

Export the current version of your model to use in other Watson applications such as Watson Explorer.
[Export current model](#)

Version History and Deployment

Version	Base	Creation Date	Entity Scores	Relation Scores	Description	Action
1.3		<i>Current Version</i>	0.93 (0.99 / 0.87)	N/A		Create Version
1.2		04/28/2020	0.93 (0.99 / 0.87)	N/A		Promote Delete Deploy

► Deployed Models (1)

Watson Knowledge Studio

Laboratorio II

Desplegar el Modelo:

Deploy Model v1.0

Select a service to deploy to.
All services require a subscription. [Learn more](#)

☒ Natural Language Understanding

☐ Discovery

Cancel Next

Deployment Started.

Deploying to Natural Language Understanding
It might take a few minutes for publishing and deployment to complete, and for this model to be available to your applications.
You can view your deployed models, withdraw a model from deployment, or deploy a newer version.

Model ID: 92c7efbf-2e46-4b64-8b9a-47633958b7cb

You can [view documentation](#) to learn how to implement the deployed model into your application.

OK

Watson Knowledge Studio Laboratorio II

Desplegar el Modelo:

[Resource list](#) / **Natural Language Understanding-DesafioIA** ✓ Active [Add tags](#) [Details](#) [Actions...](#)

Manage
Getting started
Service credentials
Plan
Connections

Start by viewing the tutorial

[Getting started tutorial](#) [API reference](#)

Plan

Lite

Upgrade

Credentials

[Download](#) [Show credentials](#)

API key:
.....

URL:
https://api.us-south.natural-language-understanding.watson.cloud.ibm.com/instances/cc9781b6-
< >

Watson Knowledge Studio

Laboratorio II

Probar Modelo desde Código:

```
{
  "text": "<input_text>",
  "features": {
    "entities": {
      "model": "<model_id>"
    },
    "keywords": {
      "emotion": true,
      "sentiment": true
    },
    "emotion": {
      "sentiment": true
    },
    "categories": {
      "sentiment": true
    },
    "relations": {
      "model": "<model_id>"
    },
    "sentiment": {}
  }
}
```



```
/**
 * Detección de categorías
 * @param {*} url
 */
async function analyze_NLU(analyzeParams) {
  naturalLanguageUnderstanding.analyze(analyzeParams)
    .then(analysisResults => {
      console.log(JSON.stringify(analysisResults, null, 2));
    })
    .catch(err => {
      console.log('error:', err);
    });
}
```

</Lab>

Watson Knowledge Studio – Enlaces de Interés

- **Sitio Oficial:**

- <https://www.ibm.com/cloud/watson-knowledge-studio>

- **Demo:**

- <https://www.ibm.com/demos/live/watson-knowledge-studio/self-service/home>

- **API Reference:**

- <https://cloud.ibm.com/apidocs/natural-language-understanding>

Watson Knowledge Studio – Enlaces de Interés

- **Artículos - Métricas de Machine Learning:**
 - https://fayrix.com/machine-learning-metrics_es
 - <https://sitiobigdata.com/2019/01/19/machine-learning-metrica-clasificacion-parte-3/>
- **Documentación – Modelos Custom de WKS en NLU:**
 - <https://cloud.ibm.com/docs/natural-language-understanding?topic=natural-language-understanding-customizing>

Watson Knowledge Studio – Enlaces de Interés

- **Tutorial – Build a Recommendation engine with WKS + NLU:**
 - <https://developer.ibm.com/tutorials/build-a-recommendation-engine-with-watson-natural-language-understanding/>
- **Tutorial – Getting Started with WKS:**
 - https://cloud.ibm.com/docs/watson-knowledge-studio?topic=watson-knowledge-studio-wks_tutintro

¿Preguntas?



¡¡Muchas gracias!!



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