Using the Natural Language API to classify unstructured text

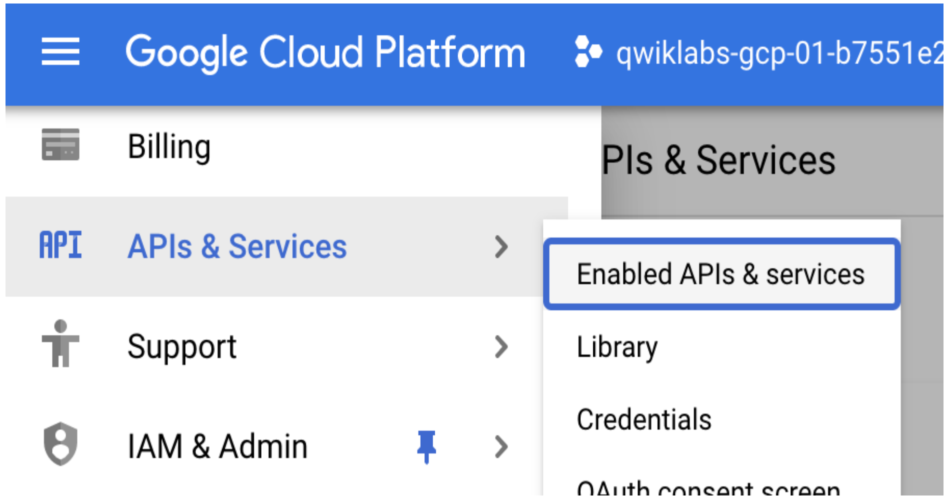
Objectives

What you'll learn
•Creating a Natural Language API request and calling the API with curl
•Using the NL API's text classification feature
•Using text classification to understand a dataset of news articles

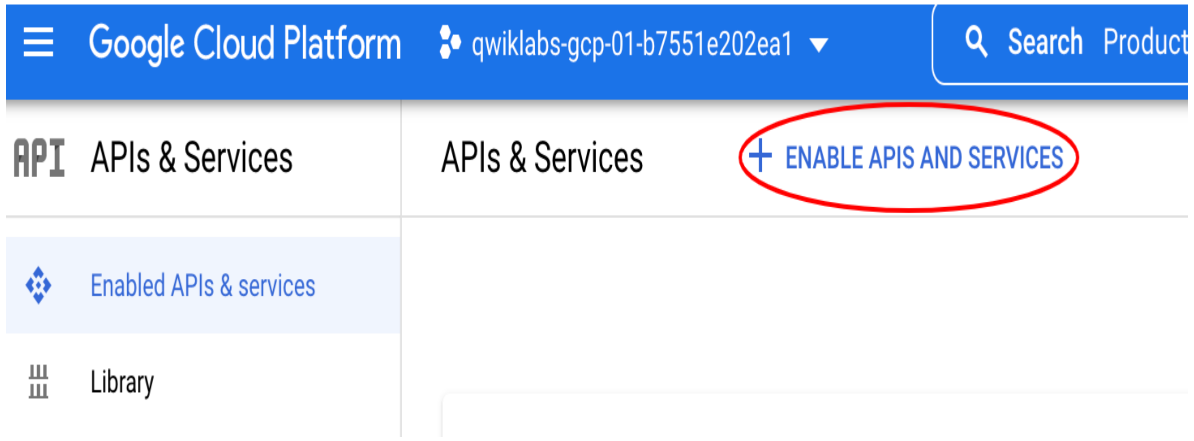
Setting (enable google cloud nlp Api)

Activate Google Cloud Shell
gcloud auth list
gcloud config list project

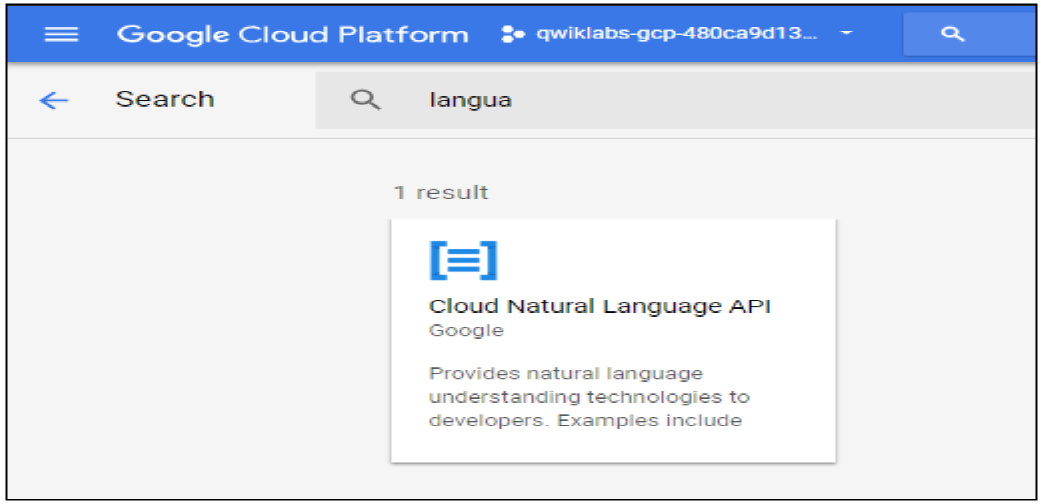
Task 1: Confirm that the Cloud Natural Language API is enabled



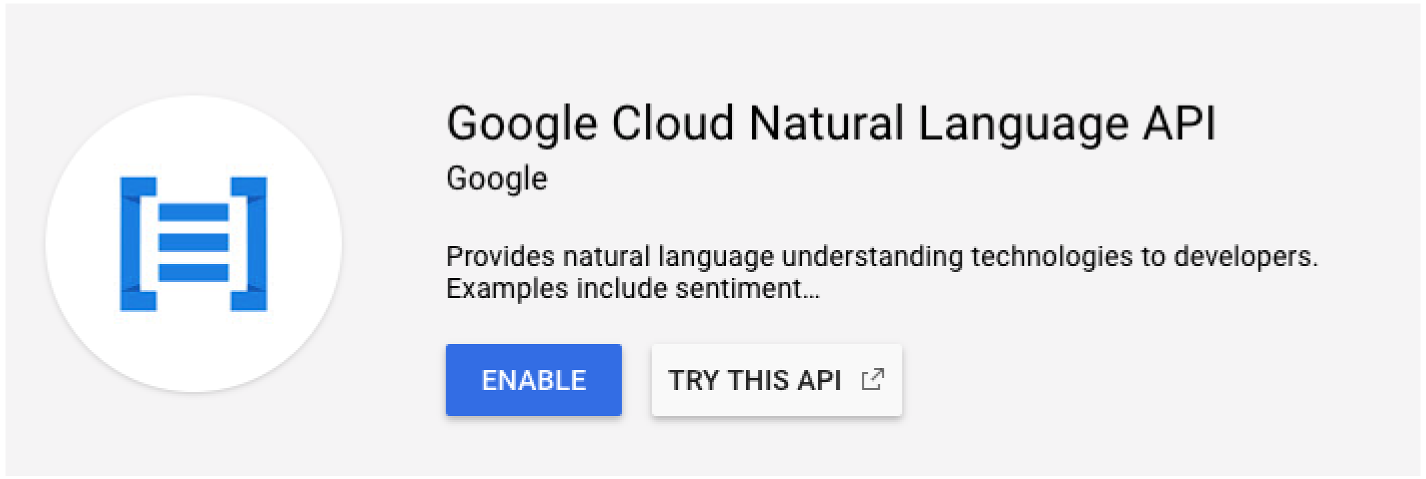
3.Click **+ ENABLE APIS AND SERVICES**.



4.Then, search for "language" in the search box. Click **Cloud Natural Language API**:


Google Cloud Platform
qwiklabs-gcp-480ca9d13...
Search
langua
1 result
Cloud Natural Language API
Google
Provides natural language understanding technologies to developers. Examples include

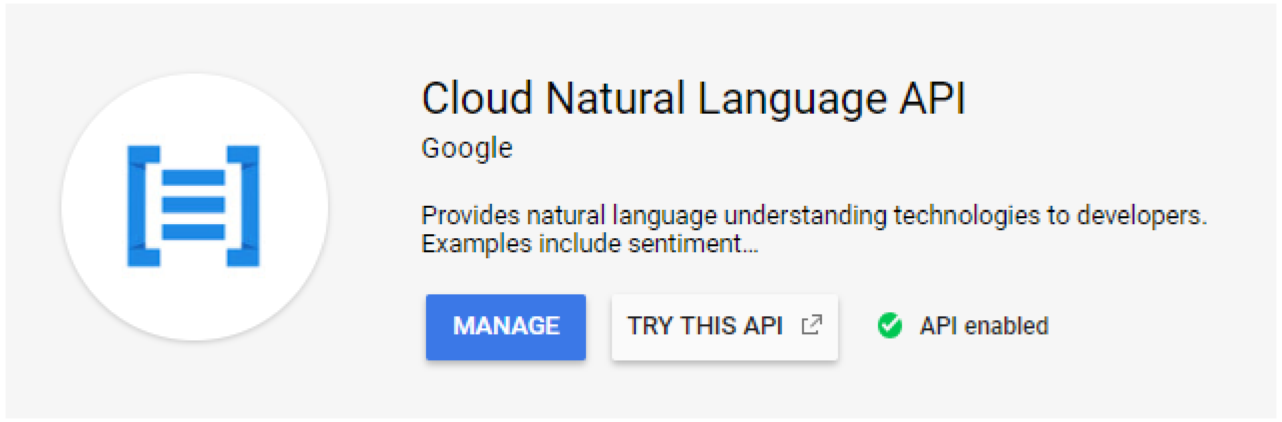
If the API is not enabled, you'll see the **ENABLE** button.
Click **ENABLE** to enable the Cloud Natural Language API



Google Cloud Natural Language API
Google

Provides natural language understanding technologies to developers. Examples include sentiment...

When the API is enabled, GCP displays API information as follows:



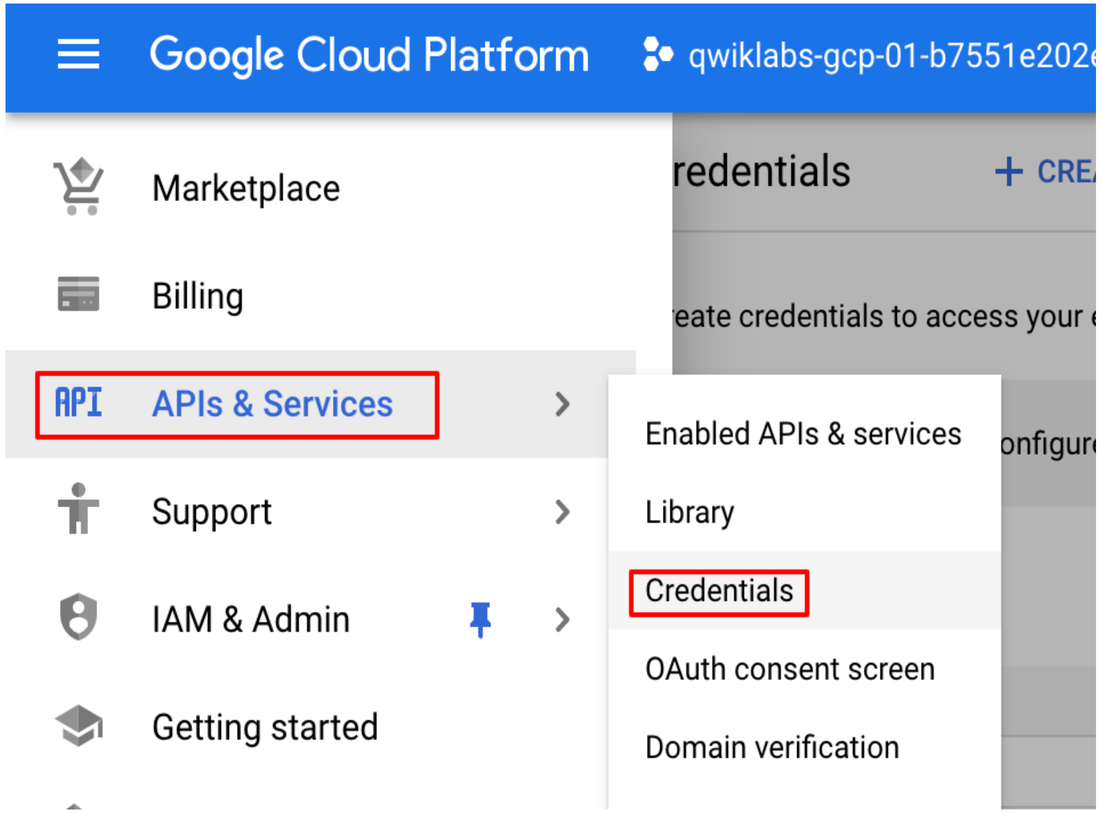
Cloud Natural Language API
Google

Provides natural language understanding technologies to developers. Examples include sentiment...

Create an API Key

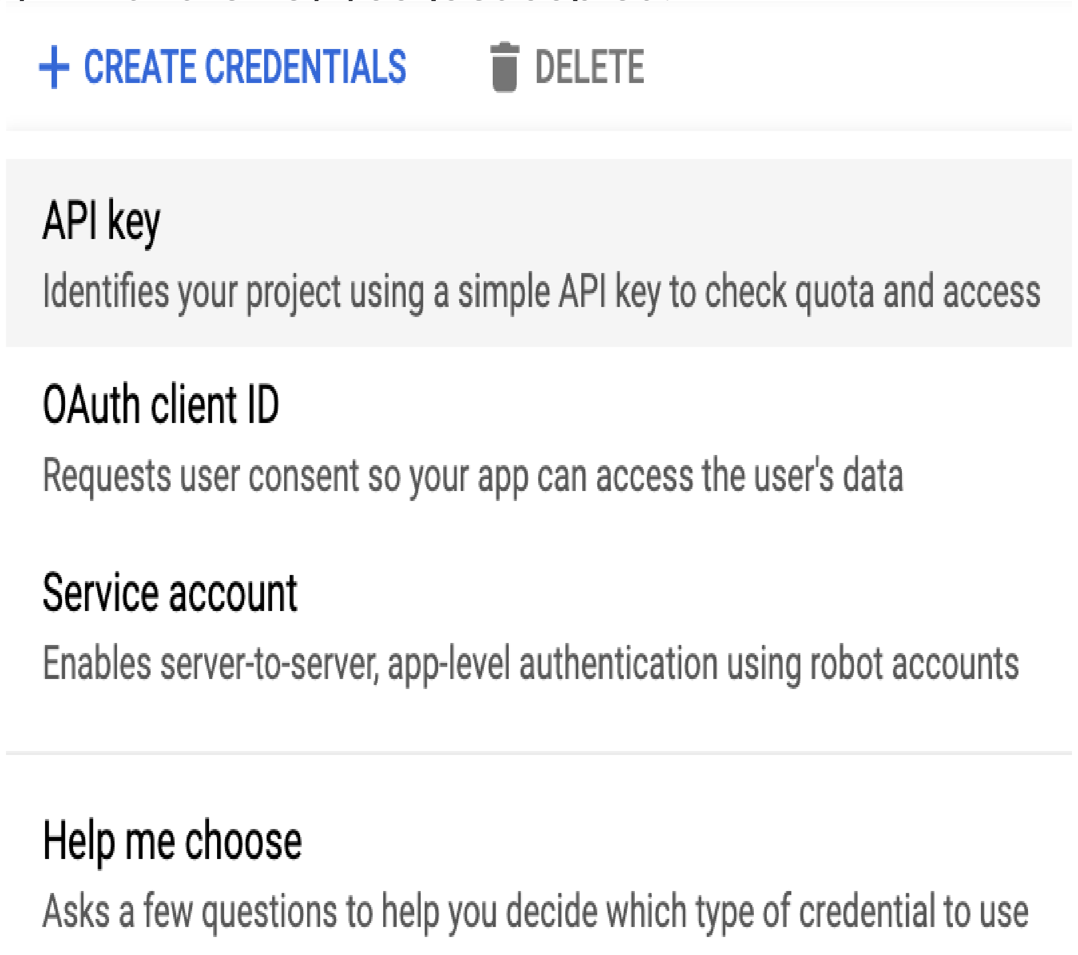
Since you're using curl to send a request to the Natural Language API, you need to generate an API key to pass in the request URL.

1.To create an API key, in your Console, click **Navigation menu** > **APIs & services** > **Credentials**:



2.Then click **+ CREATE CREDENTIALS**:
3.In the drop down menu, select **API key**:
4.Next, copy the key you just generated.
AIzaSyDTp1uRl-91hXcVEiHzvbuXeTkezNSYRrM
 Then click **CLOSE**.
Now that you have an API key, save it to an environment variable to avoid having to insert the value of your API key in each request.
5.In Cloud Shell run the following. Be sure to replace <your_api_key> with the key you just copied.

```
export API_KEY=<YOUR_API_KEY>
```



API key
Identifies your project using a simple API key to check quota and access

OAuth client ID
Requests user consent so your app can access the user's data

Service account
Enables server-to-server, app-level authentication using robot accounts

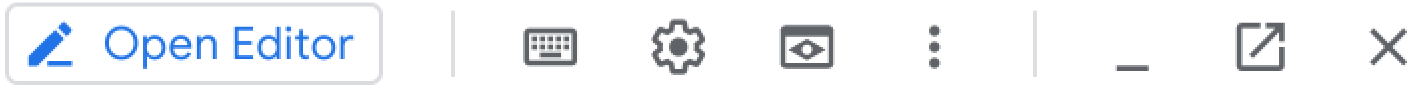
Help me choose
Asks a few questions to help you decide which type of credential to use

Task 3: Classify a news article

Using the Natural Language API's classifyText method, you can sort text data into categories with a single API call. This method returns a list of content categories that apply to a text document. These categories range in specificity, from broad categories like /Computers & Electronics to highly specific categories such as /Computers & Electronics/Programming/Java (Programming Language). A full list of 700+ possible categories can be found here. We'll start by classifying a single article, and then we'll see how we can use this method to make sense of a large news corpus. To start, let's take this headline and description from a New York Times article in the food section:

A Smoky Lobster Salad With a Tapa Twist. This spin on the Spanish pulpo a la gallega skips the octopus, but keeps the sea salt, olive oil, pimentón and boiled potatoes.

1.In your Cloud Shell environment, create a request.json file with the code below. You can either create the file using one of your preferred command line editors (nano, vim, emacs) or use the Cloud Shell code editor:



2.Create a new file named request.json and add the following:

```
{
  "document":{
    "type":"PLAIN_TEXT",
    "content":"A Smoky Lobster Salad With a Tapa Twist. This spin on the Spanish pulpo a la gallega skips the octopus, but keeps the sea salt, olive oil, pimentón and boiled potatoes."
  }
}
```

3.Now, you can send this text to the Natural Language API's classifyText method with the following curl command:

```
curl "https://language.googleapis.com/v1/documents:classifyText?key=${API_KEY}" \
  -s -X POST -H "Content-Type: application/json" --data-binary @request.json
```

Look at the response:

Output (do not copy)

```
{ categories: [ { name: '/Food & Drink/Cooking & Recipes', confidence: 0.85 }, { name: '/Food & Drink/Food/Meat & Seafood', confidence: 0.63 } ] }
```

The API returned 2 categories for this text:

- /Food & Drink/Cooking & Recipes
- /Food & Drink/Food/Meat & Seafood

The text doesn't explicitly mention that this is a recipe or even that it includes seafood, but the API is able to categorize it. Classifying a single article is cool, but to really see the power of this feature, let's classify lots of text data

Classifying a large text dataset

To see how the classifyText method can help us understand a dataset with lots of text, you'll use this public dataset of BBC news articles. The dataset consists of 2,225 articles in five topic areas (business, entertainment, politics, sports, tech) from 2004 - 2005. A subset of these articles are in a public Google Cloud Storage bucket. Each of the articles is in a .txt file.

To examine the data and send it to the Natural Language API, you'll write a Python script to read each text file from Cloud Storage, send it to the classifyText endpoint, and store the results in a BigQuery table. BigQuery is Google Cloud's big data warehouse tool - it lets you easily store and analyze large data sets.

1.To see the type of text you'll be working with, run the following command to view one article (gsutil provides a command line interface for Cloud Storage):

```
gsutil cat gs://cloud-training-demos-text/bbc_dataset/entertainment/001.txt
```

Next you'll create a BigQuery table for your data.

Creating a BigQuery table for our categorized text data

Before sending the text to the Natural Language API, you need a place to store the text and category for each article.
1.Navigate to the BigQuery under Big Data in the Console Menu. Click **Done** for the welcome notice when launching BigQuery.
2. **Create dataset**.
3.For **Dataset ID**, type news_classification_dataset
4.Click **Create dataset**.
5.Click on the **View actions** icon next to your dataset name and click **Create table**. Use the following settings for the new table:
•Create table from: **Empty table**
•Name your table **article_data**
•Click **Add Field** and add the following 3 fields: **article_text** with type **STRING**, **category** with type **STRING**, and **confidence** with type **FLOAT**.
6.Click **CREATE TABLE**.

The table is empty right now. In the next step you'll read the articles from Cloud Storage, send them to the Natural Language API for classification, and store the result in BigQuery.

Classifying news data and storing the result in BigQuery

Before writing a script to send the news data to the Natural Language API, you need to create a service account. This will be used to authenticate to the Natural Language API and BigQuery from a Python script.
1.First, back in Cloud Shell, export the name of your Cloud project as an environment variable.
Replace <your_project_name> with the **GCP Project ID** found in the **CONNECTION DETAILS** section of the lab.

```
export PROJECT=<your_project_name>
```

Then run the following commands from Cloud Shell to create a service account:

```
gcloud iam service-accounts create my-account --display-name my-account
gcloud projects add-iam-policy-binding $PROJECT --member=serviceAccount:my-account@$PROJECT.iam.gserviceaccount.com --role=roles/bigquery.admin
gcloud iam service-accounts keys create key.json --iam-account=my-account@$PROJECT.iam.gserviceaccount.com
export GOOGLE_APPLICATION_CREDENTIALS=key.json
```

Now you're ready to send the text data to the Natural Language API!
To do that, write a Python script using the Python module for Google Cloud. You can accomplish the same thing from any language, there are many different cloud client libraries.

3.Create a file called classify-text.py and copy the following into it. Replace YOUR_PROJECT with your **GCP Project ID** (**NOTE:** Please leave the single quotes around the Project ID value in place).

```
from google.cloud import storage, language_v1, bigquery
# Set up our GCS, NL, and BigQuery clients
storage_client = storage.Client()
nl_client = language_v1.LanguageServiceClient()
# TODO: replace YOUR_PROJECT with your project id below
bq_client = bigquery.Client(project='YOUR_PROJECT')
dataset_ref = bq_client.dataset('news_classification_dataset')
dataset = bigquery.Dataset(dataset_ref)
table_ref = dataset.table('article_data') # Update this if you used a different table name
table = bq_client.get_table(table_ref)
# Send article text to the NL API's classifyText method
def classify_text(article):
        response = nl_client.classify_text(
                document=language_v1.types.Document(
                        content=article,
                        type_='PLAIN_TEXT'
                )
        )
        return response
rows_for_bq = []
files = storage_client.bucket('cloud-training-demos-text').list_blobs()
print("Got article files from GCS, sending them to the NL API (this will take ~2 minutes)...")
```

```
# Send files to the NL API and save the result to send to BigQuery
for file in files:
        if file.name.endswith('txt'):
                article_text = file.download_as_bytes()
                nl_response = classify_text(article_text)
                if len(nl_response.categories) > 0:
                        rows_for_bq.append((str(article_text),
str(nl_response.categories[0].name), nl_response.categories[0].confidence))
print("Writing NL API article data to BigQuery...")
# Write article text + category data to BQ
errors = bq_client.insert_rows(table, rows_for_bq)
assert errors == []
```

Now you're ready to start classifying articles and importing them to BigQuery.
4.Run the following script:
python3 classify-text.py
The script takes about two minutes to complete, so while it's running let's discuss what's happening.
Note: If you get an error while executing python3 classify-text.py, it might be the case the cloud shell get disconnected. In order to fix that, please export your environment variables by running the below commands then re-run the python3 classify-text.py command. export PROJECT= (GCP PROJECT ID) export GOOGLE_APPLICATION_CREDENTIALS=key.json

We're using the google-cloud Python client library to access Cloud Storage, the Natural Language API, and BigQuery. First, a client is created for each service; then references are created to the BigQuery table. files is a reference to each of the BBC dataset files in the public bucket. We iterate through these files, download the articles as strings, and send each one to the Natural Language API in our classify_text function. For all articles where the Natural Language API returns a category, the article and its category data are saved to a rows_for_bq list. When classifying each article is done, the data is inserted into BigQuery using insert_rows().

Note: The Natural Language API can return more than one category for a document, but for this lab you're only storing the first category returned to keep things simple.

When the script has finished running, it's time to verify that the article data was saved to BigQuery

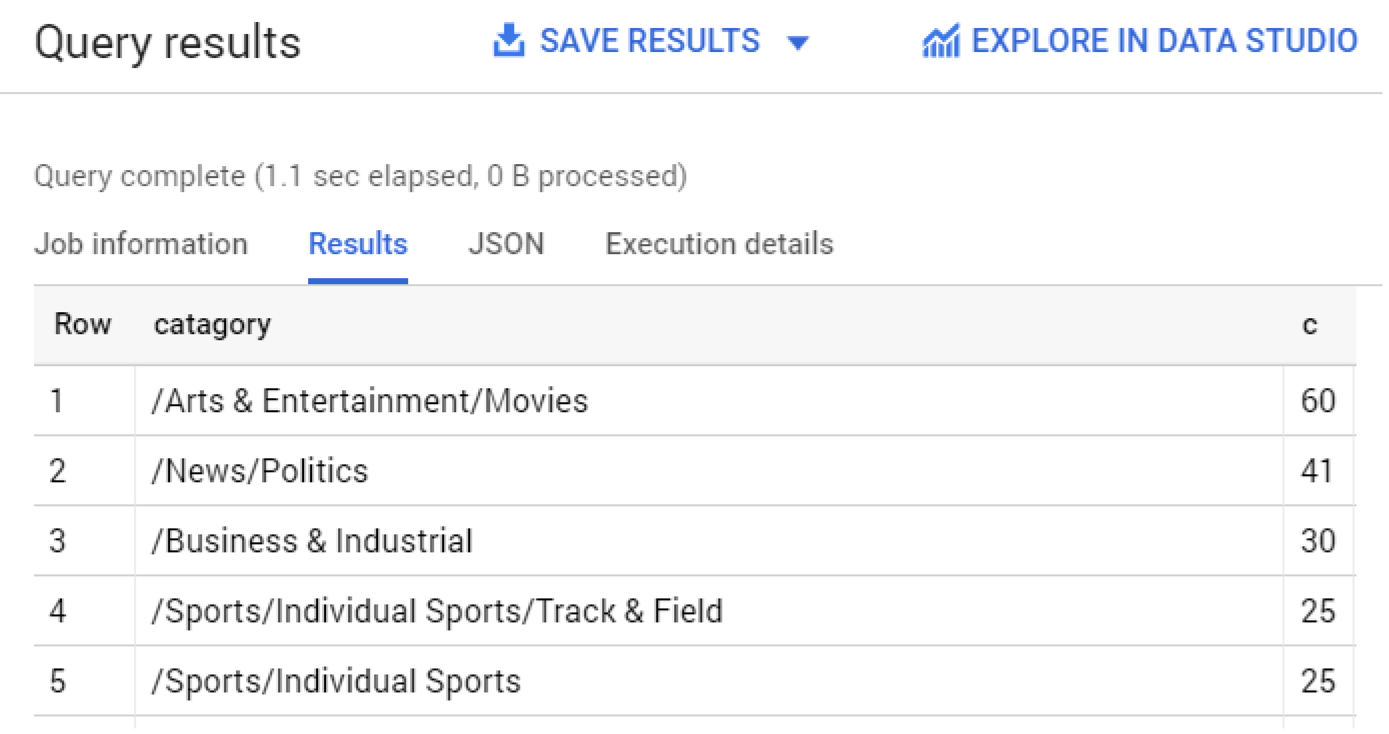
5.In BigQuery, navigate to the article_data table in the BigQuery tab and click **QUERY** > **In new tab**:
6. Edit the results in the **Unsaved query** box, adding an asterisk between SELECT and FROM:

```
SELECT * FROM `news_classification_dataset.article_data`
```

7.Now click **RUN**.
You will see your data when the query completes. Scroll to the right to see the category column.
The category column has the name of the first category the Natural Language API returned for the article, and confidence is a value between 0 and 1 indicating how confident the API is that it categorized the article correctly.
You'll learn how to perform more complex queries on the data in the next step.

task 7: Analyzing categorized news data in BigQuery
First, see which categories were most common in the dataset.
1.In the BigQuery console, click **COMPOSE NEW QUERY**.
2.Enter the following query:

```
SELECT
  category,
  COUNT(*) c
FROM
  `news_classification_dataset.article_data`
GROUP BY
  category
ORDER BY
  c DESC
```



Query complete (1.1 sec elapsed, 0 B processed)

Row	catagory	c
1	/Arts & Entertainment/Movies	60
2	/News/Politics	41
3	/Business & Industrial	30
4	/Sports/Individual Sports/Track & Field	25
5	/Sports/Individual Sports	25

4.If you wanted to find the article returned for a more obscure category like /Arts & Entertainment/Music & Audio/Classical Music, you could run the following query:

```
SELECT * FROM `news_classification_dataset.article_data`
WHERE category = "/Arts & Entertainment/Music & Audio/Classical Music“
```

5.To get only the articles where the Natural language API returned a confidence score greater than 90%, run the following query:

```
SELECT
  article_text,
  category
FROM `news_classification_dataset.article_data`
WHERE cast(confidence as float64) > 0.9
```