

IBM Training

Student Exercises

**Lab-1: Develop Socioeconomic
Annotators for COVID-19**

Hands-On Lab

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Prerequisites

1. Make sure you have an IBM Cloud account before starting these labs.

Please make sure that you have already registered and currently have a working IBM Cloud account before starting these labs. If you do not have an IBM Cloud account, please inform the instructors right away.

2. Download all lab files to Desktop

- Go to the GitHub repository for this workshop:
https://github.com/bleonardb3/AI_POT_06-11-2020
- Click the down arrow on the **Clone or download button** and select **Download ZIP**. This will download all of the folders for this workshop as a zip file to your computer. You will use these folders with the instruction guides in order to complete each lab.
- Extract the downloaded zip file and save it on your Desktop.

Introduction

This lab will cover the development of socioeconomic annotators for COVID-19 in order to create a COVID-19 vulnerability index. IBM Watson Knowledge Studio will be used to develop the socioeconomic annotators.

Objectives

The goal of this lab is to familiarize the user with the Watson Knowledge Studio service. Watson Knowledge Studio lets you build a machine learning annotator by applying a type system, dictionary pre-annotator and human annotation on a training corpus of unstructured documents. Upon training and evaluation, the machine learning annotator can be saved and deployed to Watson Discovery for automated entity extraction. Watson Discovery is an enterprise AI search technology that leverages machine learning, including natural language processing, to retrieve specific answers to your questions and analyze trends and relationships buried in enterprise data; by integrating a machine learning annotator from Watson Knowledge Studio, Watson Discovery can be trained on the language of your domain. Both Watson Knowledge Studio and Watson Discovery can be deployed on any cloud or on-premises environment.

After completing this lab, you will be able to perform the following exercises:

1. Provision an instance of Watson Knowledge Studio
2. Provision an instance of Watson Discovery
3. Create a type system
4. Create a dictionary
5. Upload a corpus of documents
6. Perform manual annotation

7. Train and create a machine learning (ML) annotator
8. Save and deploy the ML annotator to Watson Discovery

Exercise 1: Create a Watson Knowledge Studio Instance

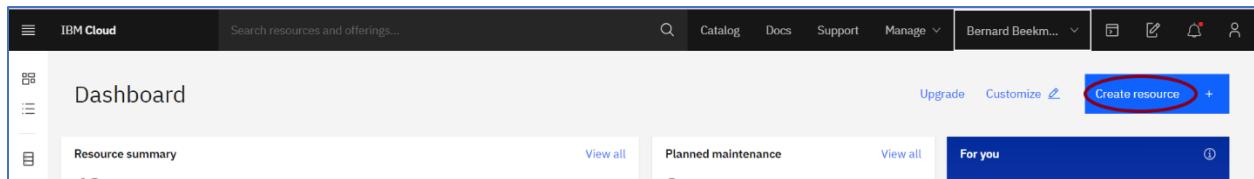
1. Log into your IBM Cloud account by typing **cloud.ibm.com** into the URL address bar of your Firefox or Chrome browser.
2. Enter your **IBMid** and click **Continue**.

The screenshot shows the 'Log in to IBM Cloud' page. At the top, there's a logo and a link to 'Create an account'. Below that, a text input field is labeled 'IBMid' with the value 'beekmanrb@us.ibm.com'. A red circle highlights this input field. Below it is a blue button labeled 'Continue' with a red circle around it. To the right of the 'Continue' button is a right-pointing arrow. At the bottom left, there's a checkbox for 'Remember ID' and a link 'Log in with SoftLayer ID'.

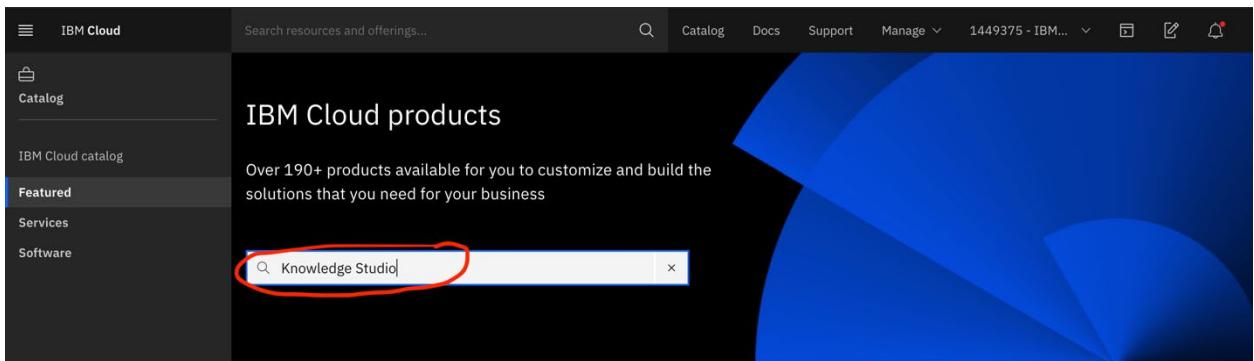
3. Enter your **Password** and click **Log in**.

The screenshot shows the same 'Log in to IBM Cloud' page after the user has entered their IBMID. Now, the password input field is highlighted with a red circle. It contains the value 'wsuser41000@gmail.com'. Below it is a blue 'Log in' button with a red circle around it. To the right of the 'Log in' button is a right-pointing arrow. The rest of the page remains the same, with the 'Forgot password?' link and other UI elements visible.

4. Click Create Resource.



5. Enter Knowledge Studio and click the <Enter> key.



6. Click on Knowledge Studio.

A screenshot of the search results for "Knowledge Studio". The results are titled "Search results for 'Knowledge Studio'" with "1 result". The single result is a card for "Knowledge Studio" by IBM, Services, AI. The card features a small icon, the service name in blue, and the subtitle "Teach Watson the language of your domain.". Below the card, it says "Lite • Free • IAM-enabled". The entire card area is circled in red.

7. Click on the Lite plan and click Create.

The screenshot shows the IBM Cloud Catalog interface for creating a Knowledge Studio instance. On the left, there's a sidebar with 'Create' and 'About' buttons. Below it, a dropdown menu shows 'Dallas' selected under 'Select a region'. A message says 'Select a pricing plan' with a note about tax and country/region. The main area displays three pricing plans: 'Lite', 'Standard', and 'Premium'. The 'Lite' plan is circled in red. It includes 1 user, 5 GB of storage included, up to 5 workspaces, 30 machine learning training sessions per month, and the ability to deploy models directly to Watson Natural Language Understanding and Watson Discovery services. It is labeled as 'Free'. The 'Standard' plan costs \$100.00 USD per user per month and \$50.00 USD per 10 GB storage per month. It includes 1 to 10 users, 10 GB to 100 GB of storage, up to 50 workspaces, 100 machine learning training sessions per month, and high availability and service level uptime guarantees. The 'Premium' plan costs \$10 to 100 users. On the right, a summary panel shows 'Knowledge Studio' with 'Region: Dallas', 'Plan: Lite', 'Service name: Knowledge Studio-2c', and 'Resource group: default'. A 'Summary' section indicates it's 'Free'. A 'Create' button is highlighted with a red circle. Other buttons include 'Add to estimate' and 'View terms'.

Exercise 2: Create a Watson Discovery Instance

1. Enter **Discovery** into the *Search resources and offerings* bar and click on **Discovery** under *Catalog Results*.

The screenshot shows the IBM Cloud Catalog interface. At the top, there's a search bar with 'Discovery' typed in. Below the search bar, there are two sections: 'Resource Results' and 'Catalog Results'. In the 'Resource Results' section, there are entries for 'Discovery-ew', 'Discovery-x2', and 'Watson-Discovery'. In the 'Catalog Results' section, there are entries for 'API Connect', 'Discovery' (which is circled in red), 'HashiCorp Consul', and 'Knowledge Studio'. The 'Discovery' entry in the catalog results is also circled in red. The top navigation bar includes 'IBM Cloud', 'Catalog', 'Docs', 'Support', 'Manage', and a user profile. A 'Details' and 'Actions...' button are visible on the right.

2. Select the **Lite** plan and click **Create**.

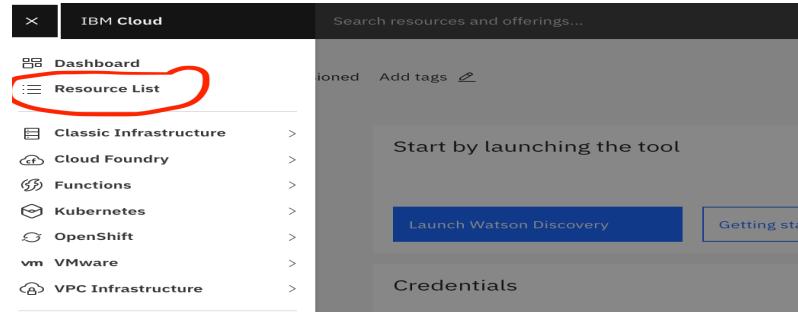
The screenshot shows the IBM Cloud Watson Discovery service page. On the left, there's a table comparing three plans: Lite, Advanced, and Premium. The 'Lite' plan is circled in red. The 'Advanced' plan details features like up to 50M docs and includes a 'Pricing based on document tiers' section. The 'Premium' plan adds features like usage and training data storage in an isolated environment. On the right, a summary panel shows the service is named 'Discovery', located in 'Dallas', and is currently 'Free'. A 'Create' button is highlighted with a red circle.

Although we will be using this Watson Discovery instance in Lab 2, we need to provision this instance in order to link it to the deployed machine learning annotator, which we will create by the end of this lab. The machine learning annotator will be used by Watson Discovery to perform entity extraction in Lab 2.

Exercise 3: Create a Type System

1. Select the Navigation Menu icon on the top left corner of the screen (the hamburger icon) and click **Resource List** on the drop down menu.

The screenshot shows the IBM Cloud Resource List interface. It displays a single instance named 'Discovery-x2' which is 'Provisioned'. The instance has 'Add tags' and 'Actions...' buttons. On the left, a sidebar shows 'Manage' sections for 'Getting started', 'Service credentials', 'Plan', and 'Connections'. The 'Plan' section for 'Lite' is shown on the right, with an 'Upgrade' button.



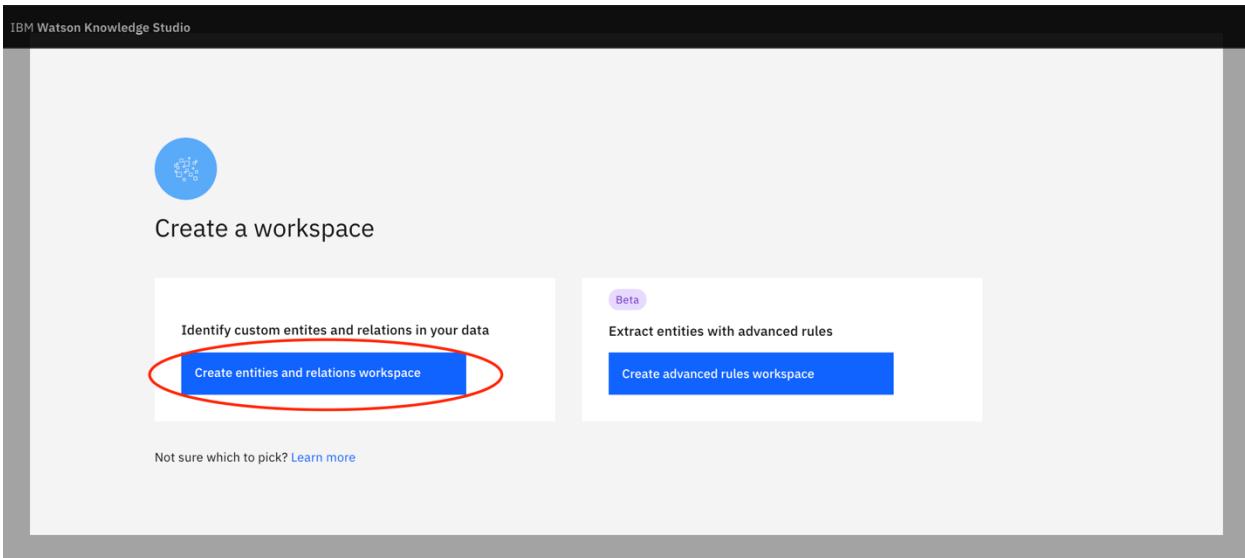
- Under Services, click on your Knowledge Studio instance (for a new IBM Cloud account, you should only see Knowledge Studio and Discovery listed here).

This screenshot shows the 'Resource list' page in the IBM Cloud interface. The left sidebar lists various service categories like Devices, VPC infrastructure, Clusters, Cloud Foundry apps, and Cloud Foundry services. Under 'Cloud Foundry services', there are 13 items listed, including AI-OpenScale, App ID-app, Compare-n-Comply, Continuous-Delivery, Db2-app, IBM Cognos Dashboard Embedded-ix, Knowledge Catalog-va, and Knowledge Studio-2c. The 'Knowledge Studio-2c' entry is circled in red.

- Click **Launch Knowledge Studio** to start your instance of Watson Knowledge Studio.

This screenshot shows the details page for the 'Knowledge Studio-2c' instance. It includes sections for 'Manage', 'Getting started', and 'Plan'. In the center, there is a 'Start by launching the tool' section with a prominent blue 'Launch Watson Knowledge Studio' button, which is circled in red. To the right, there is a 'Plan' section showing 'Lite' and an 'Upgrade' button.

- Select **Create entities and relations workspace**.



5. Type **COVID19-Vulnerability** for the Workspace name and click **Create**.

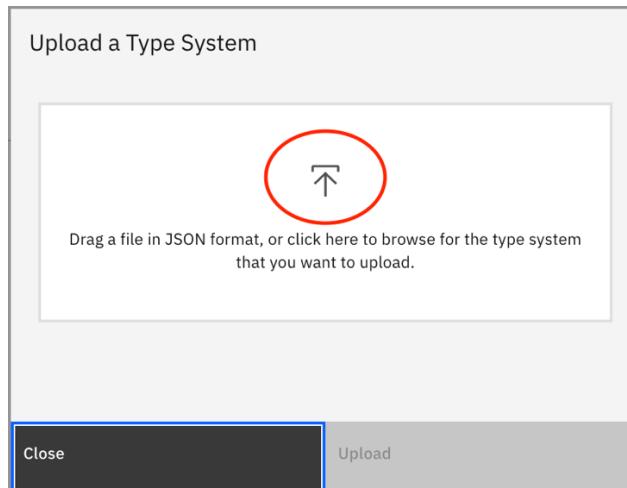
A screenshot of the "Create Workspace" dialog box. It has fields for "Workspace name" (containing "COVID19-Vulnerability") and "Language of documents" (set to "English"). There are also buttons for "+ Add Workspace Description" and "Advanced Options". At the bottom, there are "Cancel" and "Create" buttons, with "Create" being highlighted by a red oval.

Inside of this workspace, we will create a type system consisting of the custom entities of the COVID-19 vulnerability index, create a dictionary, perform manual annotation and upload a training corpus for the development of the entity recognition machine learning model.

6. Although we can manually enter the entity types for our type system, we will instead upload the type system file downloaded from the GitHub repository.
On the Entity Types screen, click **Upload**.

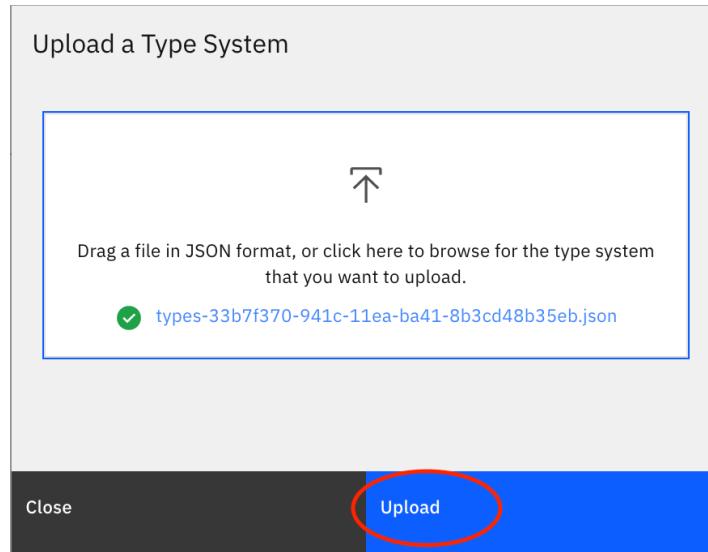
The screenshot shows the Entity Types section of the IBM Watson Knowledge Studio interface. On the left, there's a sidebar with categories like Assets, Documents, Entity Types (which is selected and highlighted in grey), Relation Types, Dictionaries, Rule-based Model, Machine Learning Model, Settings, and Help. The main area has tabs for Entity Types (0), Mention Classes, and Mention Types. Below these are buttons for 'Add Entity Type', 'Upload' (which is circled in red), and 'Create a type system.'. There are also filters for Entity Type Name, Roles, Subtypes, and an Action column. A search bar at the top right says 'Enter text to filter'. At the bottom, it says 'No items'.

- Click on the upload icon and select the **types-33b7f370-941c-11ea-ba41-8b3cd48b35eb.json**.



This is a screenshot of a file explorer window. The left sidebar shows 'Favorites' with options like Recents, Desktop, Downloads, Documents, Applications, Creative Cloud, iCloud, and Locations (Docker, Remote Disc, Network). The main area lists files under 'Name' with columns for 'Date Modified', 'Size', and 'Kind'. A file named 'types-33b7f370-941c-11ea-ba41-8b3cd48b35eb.json' is highlighted with a red circle. The file is a 'JSON Document' from today at 1:23 AM, 12 KB in size.

- Click on **Upload**.



You should now see 20 entity types on your screen. These entity types directly pertain to social vulnerability to COVID-19 and will be used to annotate a corpus of social media posts from citizens living in New York City, Washington DC, Los Angeles, Seattle and Chicago – 5 cities that are among the most populous in the U.S. and most affected by the COVID-19 pandemic.

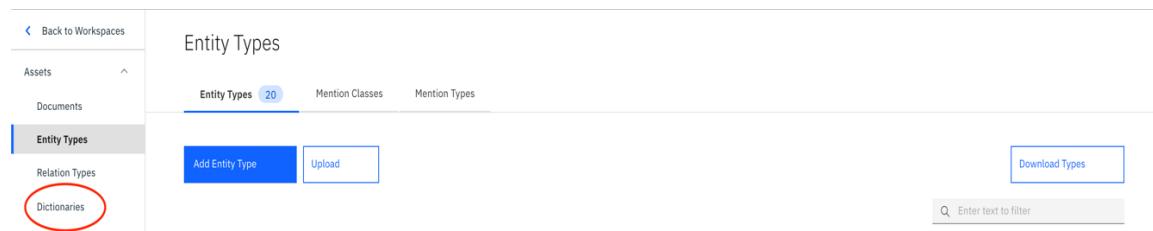
Entity Type Name	Roles	Subtypes	Action
No_Health_Insurance	No_Health_Insurance		Edit Delete
Medically_Insured	Medically_Insured		Edit Delete
No_Vehicle	No_Vehicle		Edit Delete
Car_Owner	Car_Owner		Edit Delete
Mobile_Home_Owner	Mobile_Home_Owner		Edit Delete
Crowded_Living	Crowded_Living		Edit Delete
Apartment_Renter	Apartment_Renter		Edit Delete
Home_Owner	Home_Owner		Edit Delete
ESL_Speaker	ESL_Speaker		Edit Delete
Minority	Minority		Edit Delete

Exercise 4: Create a Dictionary

To help with manual annotation (which we will tackle in the next exercise), we will create a dictionary for each of the entity types in our type system. Each dictionary will contain a list of terms and key phrases pertaining to each entity type.

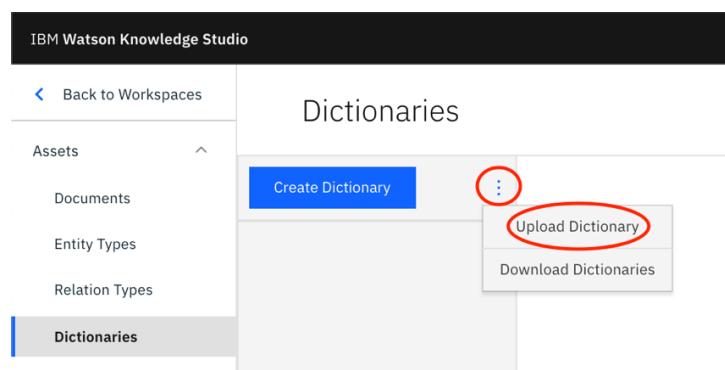
Although we can manually create a dictionary for each entity type, we will instead upload dictionary files for all 20 entity types in this exercise.

1. Under Assets, click **Dictionaries**.



The screenshot shows the 'Entity Types' page. The left sidebar has 'Assets' and 'Entity Types' selected. Under 'Entity Types', 'Relation Types' and 'Dictionaries' are listed, with 'Dictionaries' circled in red. The main area shows 'Entity Types 20', 'Add Entity Type', 'Upload', and 'Download Types' buttons. A search bar at the bottom right says 'Enter text to filter'.

2. On the Dictionaries page, we can upload the zip file containing dictionaries for all of our entity types. Click on the **vertical dots icon** and select **Upload Dictionary**.



The screenshot shows the 'Dictionaries' page. The left sidebar has 'Assets' and 'Dictionaries' selected. The main area has 'Create Dictionary', a vertical dots icon, 'Upload Dictionary' (circled in red), and 'Download Dictionaries' options.

3. Click on the **Upload icon** and select the **COVID19_dictionary_1589757211592.zip** file.

Upload Dictionaries

Drag a file here, or click to browse for the file that you want to upload.

You can upload a dictionary CSV file to create a read-only dictionary. The CSV file must be under 16MB. You can also upload a ZIP file that contains dictionaries downloaded from another workspace. The type system and dictionary ZIP file must originate from the same workspace. Upload the type system that was downloaded from the other workspace in JSON format before you upload the dictionary file. Dictionaries that you reuse from another workspace can be edited.

Close **Upload**

Favorites	Name	Date Modified	Size	Kind
Recents	▶ COVID19_dictionary_1589757211592	Today at 7:13 PM	--	Folder
Desktop	COVID19_dictionary_1589757211592.zip	Today at 7:13 PM	7 KB	ZIP archive

4. Click on **Upload**.

Upload Dictionaries

Drag a file here, or click to browse for the file that you want to upload.

You can upload a dictionary CSV file to create a read-only dictionary. The CSV file must be under 16MB. You can also upload a ZIP file that contains dictionaries downloaded from another workspace. The type system and dictionary ZIP file must originate from the same workspace. Upload the type system that was downloaded from the other workspace in JSON format before you upload the dictionary file. Dictionaries that you reuse from another workspace can be edited.

✓ COVID19_dictionary_1589757211592.zip

Close **Upload**

You should now be able to see dictionaries for each entity type. We will use these dictionaries to pre-annotate a sample set of the social media posts prior to manual annotation.

Dictionaries

Unemployed
Language: English | 9 entries

Entity type: None Rule class: None

Lemma	Surface Forms	Part of Speech	Action
to file for unemployment	to file for unemployment	Verb	Edit Delete
no job	no job	Noun	Edit Delete
weekly claims	weekly claims	Noun	Edit Delete
got laid off	got laid off, Got laid off	Verb	Edit Delete
unemployment office	unemployment office	Noun	Edit Delete
filed for unemployment	filed for unemployment, Filed for unemployment	Verb	Edit Delete
file for unemployment	file for unemployment, file for Unemployment	Verb	Edit Delete
unemployment	unemployment	Noun	Edit Delete
unemployment claim	unemployment claim	Noun	Edit Delete

Add Entry Upload Download Enter text to filter

In order to save these dictionaries as a pre-annotator, we need to remember to match each dictionary with its corresponding entity type. For example, the Unemployed dictionary, which currently has an entity type of None needs to be matched to the Unemployed entity type.

Entity type: **None**

To fix this, we will have to update the Entity type for each dictionary. For the Unemployed dictionary:

- Click the drop-down menu under Entity type and select **Unemployed**.

Dictionaries

Create Dictionary	⋮	
Unemployed 9	⋮	
No_Health_Insura... 5	⋮	
Hourly_Wage_Emp... 9	⋮	
Medically_Insured 6	⋮	
Full_Time_Employ... 4	⋮	
Senior_Citizen 7	⋮	
Minor 4	⋮	
Disabled 3	⋮	

Unemployed
Language: English | 9 entries

Entity type:

Select an entity type

- High_School_Student
- No_High_School_Diploma
- University_Student
- Minor
- Senior_Citizen
- Full_Time_Employment
- Hourly_Wage_Employment
- Unemployed**

Rule cl Non

Repeat the same process for each dictionary until all 20 dictionaries are matched to their corresponding entity type (none of the dictionaries should have an Entity type of None).

Exercise 5: Upload a corpus of documents

In this exercise, we will upload a corpus of social media posts to which we will apply a dictionary pre-annotator and perform manual annotation. This is a small set of social media posts containing first-hand narratives from citizens living in New York City, Washington D.C., Los Angeles, Seattle and Chicago.

- Under Assets, select **Documents**.

IBM Watson Knowledge Studio

Back to Workspaces

Assets

- Documents**
- Entity Types
- Relation Types
- Dictionaries**
- Rule-based Model
- Machine Learning Model

Dictionaries

Create Dictionary	⋮	
Unemployed 9	⋮	
No_Health_Insura... 5	⋮	
Hourly_Wage_Emp... 9	⋮	
Medically_Insured 6	⋮	

Unemployed
Language: English | 9 entries

Entity type:

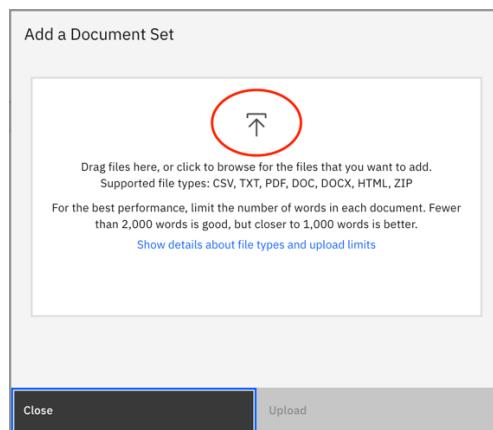
None

Add Entry | Upload

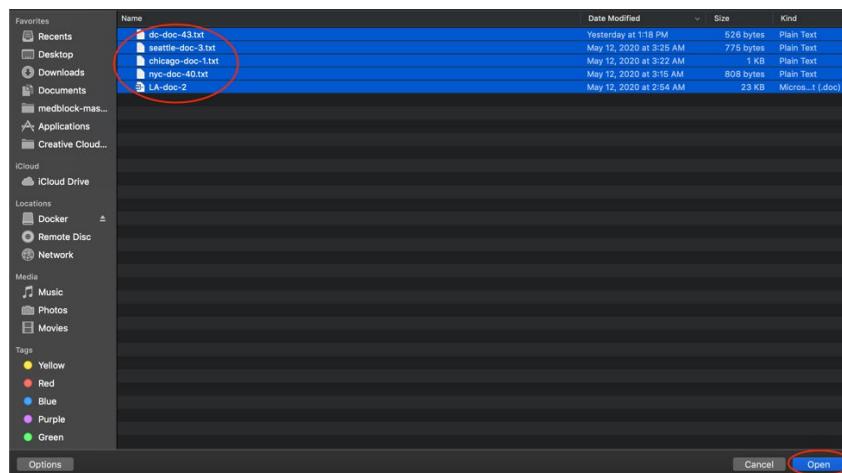
- Click **Upload Document Sets**.

The screenshot shows the 'Documents' section of the IBM Watson Knowledge Studio. On the left, there's a sidebar with 'Assets' expanded, showing 'Documents' selected. Below it are 'Entity Types', 'Relation Types', 'Dictionaries', and 'Rule-based Model'. The main area has tabs for 'Document Sets (1)' and 'Documents (All, 0)'. A red circle highlights the 'Upload Document Sets' button, which is part of a larger callout box with the text 'Add documents to the corpus'.

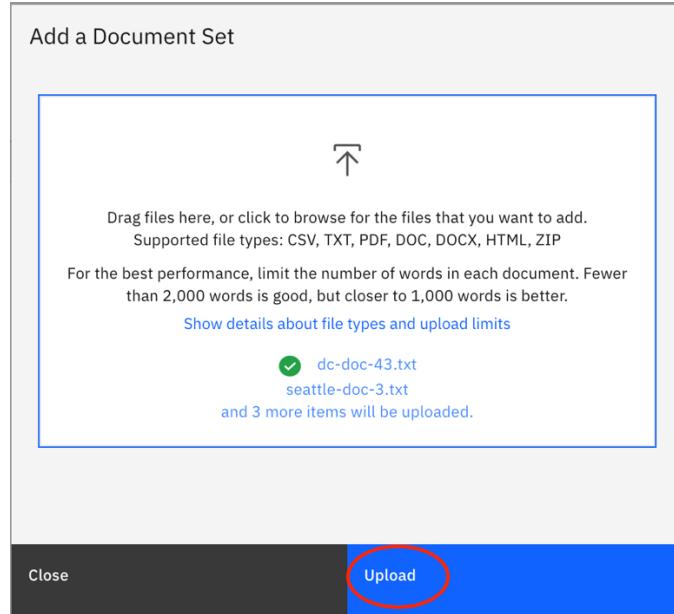
3. Click on the **Upload icon** and double-click on the **SampleDocs** folder.



4. Shift select all 5 documents in the folder and click **Open**.



5. Click **Upload**.



You should now be able to see a set of five documents named dc-doc-43.txt_set to which we will apply a dictionary pre-annotator as well as manually annotate in the next exercise.

Name	Documents	Last Modified	Action
All	5	-	Rename Delete
dc-doc-43.txt_set	5	05/17/2020	Rename Delete

Exercise 6: Perform Manual Annotation

In order to create an entity recognition model, we will need to teach Watson about our custom entity types by manually annotating a sample corpus of documents.

We will start by pre-annotating the document set with our dictionaries. This will allow Watson to quickly annotate our documents using the terms defined in each entity type dictionary.

1. Under Machine Learning Model, click **Pre-annotation**.

The screenshot shows the 'Documents' section of the IBM Watson Knowledge Studio. The left sidebar has a 'Pre-annotation' option highlighted with a red circle. Other options like 'Entity Types', 'Relation Types', 'Dictionaries', 'Rule-based Model', 'Machine Learning Model', 'Annotations', 'Performance', and 'Versions' are also listed.

2. Click Run Pre-annotators.

You can run pre-annotators on document sets. Click **Run Pre-annotators** to start the pre-annotation wizard. If the pre-annotator you want to run is not available, open the menu and make the necessary changes to enable the pre-annotator.

Click **Order Settings** to change the execution order of pre-annotators. [Learn more](#)

Order	Pre-annotator	Status	⋮
1	Rule-based Model	Not available	⋮
2	Dictionaries	Available	⋮
3	Machine Learning Model	Not available	⋮
4	Natural Language Understanding	Not available	⋮

You should be able to see that Dictionaries is available as a pre-annotator. If you do not see any available pre-annotators in the table, please revisit Exercise 4, step 5 to match each dictionary with its corresponding entity type.

3. Under Select pre-annotators, click the **checkbox** next to Dictionaries and click **Next**.

Run Pre-annotators

Select pre-annotators

Select the pre-annotators that you want to use.

Pre-annotator
<input checked="" type="checkbox"/> Dictionaries

Close Next

4. Under Select document sets, click the **checkbox** next to dc-doc-43.txt_set and click **Run**.

Run Pre-annotators

Select document sets

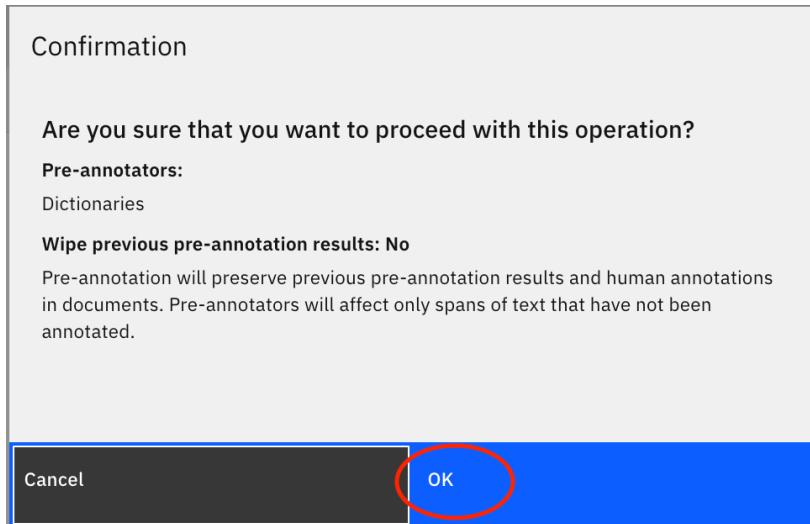
Check if you want to remove previous pre-annotation results from documents before running the pre-annotators. If not checked, all previous annotations are preserved.
 * Annotations made by humans outside of the pre-annotation process remain even if you check the wipe option.

Wipe previous pre-annotation results

Select the document sets or annotation sets that you want to pre-annotate.

Document set	Documents	Pre-annotated documents	Human annotated documents
<input checked="" type="checkbox"/> dc-doc-43.txt_set	5	0	0

5. Click OK.



After a few seconds, pre-annotation will be complete and you will see the following success message:

IBM Watson Knowledge Studio

Pre-annotation

You can run pre-annotators on document sets. Click Run Pre-annotators to start the pre-annotation wizard. If the pre-annotator you want to run is not available, open the menu and make the necessary changes to enable the pre-annotator.

Click Order Settings to change the execution order of pre-annotators. [Learn more](#)

Success: May 17, 2020 10:30:59 PM
Pre-annotation complete.

6. Under Machine Learning Model, click Annotations.

Machine Learning Model

Pre-annotation

Annotations (highlighted with a red circle)

1 Rule-based Model	Not available
2 Dictionaries	Available
3 Machine Learning Model	Not available
4 Natural Language Understanding	Not available

On the Annotations screen, you will see that Watson used the dictionary pre-annotator to annotate 3 of the 5 documents. We will now manually annotate all 5 documents. When annotating each document, we will highlight any mention of the custom entity types in each social media post.

7. Click the second **Annotate** link on the dc-doc-43.txt_set row.

Document Set	Last Modified	Documents (Annotated/Total)	Action
All	-	3 / 5	Annotate
dc-doc-43.txt_set	05/17/2020	3 / 5	Annotate

8. On the Select Document screen, click the first **Open** link (on the dc-doc-43.txt row).

Document Name	Status	Last Modified	Actions
dc-doc-43.txt		May 17, 2020 10:30:48 PM	Open

9. To annotate the dc-doc-43.txt, we will skim through the post and find any mention of the custom entity types. We see that this post mentions one entity type in particular – **University_Student**. The following sentences can be highlighted with this entity type: “**UDC incoming student**,” “**I will be in the speech program at UDC**” and “**off campus student housing**.”

To highlight a sentence with an entity type, click on the first word of the sentence and then the last word before clicking on the corresponding entity type on the right, which in this post is only University_Student.

Manually annotate the above sentences with the **University_Student** entity type so that you get the following annotated post:

The screenshot shows the annotation interface for the file 'dc-doc-43.txt'. On the left, the document content is displayed with several annotations highlighted in red. The right side features a detailed legend for entity types, organized into three columns: Entity, Subtype, and Role. The Entity column lists categories like Apartment_Renter, Cat_Owner, Crowded_Living, Disabled, ESL_Speaker, Full_Time_Employment, High_School_Student, Home_Owner, Hourly_Wage_Employment, Medically_Insured, Minor, Minority, Mobile_Home_Owner, No_Health_Insurance, No_High_School_Diploma, No_Vehicle, Senior_Citizen, Single_Parent, Unemployed, and University_Student. The Subtype and Role columns provide more specific details for each entity type.

10. Click **Save** and click **Open document list** to return to the list of documents.

This screenshot shows the same annotation interface as above, but with the 'Save' button and the 'Open document list' link both circled in red. This indicates the steps required to save the annotations and return to the main document list.

11. Click the **Open** link on the seattle-doc-3.txt row.

This screenshot shows a 'Select Document' dialog box. It displays a list of documents under the heading 'Document Set: dc-doc-43.txt_set'. The list includes 'seattle-doc-3.txt', 'chicago-doc-1.txt', 'nyc-doc-40.txt', 'LA-doc-2.doc', and 'dc-doc-43.txt'. Each row shows the document name, status (last modified date), and an 'Actions' column with an 'Open' link. The 'Open' link for the 'seattle-doc-3.txt' row is circled in red.

12. Annotate the seattle-doc-3.txt and compare your result with the annotated post below. Don't forget to **Save** your annotation and click **Open document list** when you're done annotating this post.

Annotations for seattle-doc-3.txt:

- { "title": "Etiquette Question - Sheltering in Place, Apartments & Music", "text": "Just getting a read of general feelings on this.
- Given that many of us are staying at home/working from home during the pandemic, there's a lot more opportunity for grating on each other unintentionally.
- I live in an apartment complex** with fairly thin walls.
- At what point, in your personal opinion, is it reasonable to start playing music, watch action movies, or other entertainment activities that involve a degree of noise?
- Personally I don't turn on music my neighbors may hear before 9:00am (**I start work early each morning**), but is this a good rule of thumb?
- Too early?
- Curious to hear folks' thoughts.
- ", "subreddit": "Seattle", "created": "2020-04-25T01:45:48.000Z" }

13. Click the **Open** link on the chicago-doc-1.txt row.

Document Name	Status	Last Modified	Actions
chicago-doc-1.txt		May 17, 2020 10:30:48 PM	Open

14. Annotate the chicago-doc-1.txt post and compare your result with the annotated post below. Don't forget to **Save** your annotation and click **Open document list** when you're done annotating this post.

Annotations for chicago-doc-1.txt:

- { "title": "Are **landlords** really allowed to enter occupied **apartments** to film new virtual tours?
- ", "text": "As the questions asks, are **landlords** actually allowed to do this?
- I had my alderman refer me to **tenant** rights but haven't heard anything back.
- Speaking with a lawyer they said they recording a virtual tour is a nice compromise and didn't seem aware that in person showing if occupied **units** is actually prohibited.
- \n\nTo add insult to injury, they are posting these videos publicly on YouTube with the **unit** numbers along with the name of the **apartment**, so on top of potentially getting sick we are being forced to publish our private property online for anyone to see.
- \n\nPrior to knowing the very public way they were distributing these videos we offered to record one only to be told the format would have to be perfect or we'd have to keep recording until we got it correct.
- \n\nsee a lot of posts about how Chicago is a very **tenant** friendly city, but I don't see it right now.
- ", "subreddit": "chicago", "created": "2020-04-24T07:42:46.000Z" }

15. Click the **Open** link on the nyc-doc-40.txt row.

Select Document

Document Set: dc-doc-43.txt_set

Showing 1-5 of 5

Document Name	Status	Last Modified	Actions
nyc-doc-40.txt		May 17, 2020 10:30:48 PM	Open

16. Annotate the nyc-doc-40.txt post and compare your result with the annotated post below.
Don't forget to **Save** your annotation and click **Open document list** when you're done
annotating this post.

Back to Annotations [Open document list](#)

[View Details](#) [Replace](#) [Concordance](#) [Attribute View](#)

Mention

nyc-doc-40.txt

1. {"text": "I know most of the world is **laid off** right now and apparently most of NYC but i can't get through to **unemployment** at all!!! I've been calling for hours i don't understand why they couldn't complete my claim online."}

2. Is there a center i can go to in person?

3. I'd rather wait in line then to call back to back to back to get some automated system that hangs up on me or actually get through to the menu, enter all my info and have it hang up on me AGAIN after i'm supposed to be transfers to a rep.

4. I have to pay my **rent** and my partner is also **laid off**.

5. He got approved but his benefits aren't going to come for 2-3 weeks it says .. and i can't even get through to get mine approved.

6. ANY advice seriously I'm spinning out here", "author_fullname": "t2_4qqx83ci", "title": "**Unemployment**"}

Save

Type	Subtype	Role
Apartment_Renter		
Car_Owner		
Crowded_Living		
Disabled		
ESL_Speaker		
Full_Time_Employment		
High_School_Student		
Home_Owner		
Hourly_Wage_Employment		
Medically_Insured		
Minor		
Minority		
Mobile_Home_Owner		
No_Health_Insurance		
No_High_School_Diploma		
No_Vehicle		
Senior_Citizen		
Single_Parent		
Unemployed		
University_Student		

17. Click the **Open** link on the LA-doc-2.doc row.

Select Document

Document Set: dc-doc-43.txt_set

Showing 1-5 of 5

Document Name	Status	Last Modified	Actions
LA-doc-2.doc		May 17, 2020 10:30:48 PM	Open

18. Annotate the LA-doc-2.doc post and compare your result with the annotated post below.
Don't forget to **Save** your annotation and click **Open document list** when you're done
annotating this post.

The screenshot shows the annotation interface for a document named 'LA-doc-2.doc'. The document content is as follows:

```

1 {
2   "title": "Isolated outdoors spot?
3   "
4   "text": "It's my wife's birthday this weekend and was wondering if anyone knew of any places within and around the city that are isolated where you could drive and park your car to enjoy outdoors for a picnic or something?
5   I don't want to endanger anyone or break any county rules but was just hoping to get us outside of the house for a couple hours to make it at least a little memorable.
6   ",
7   " subreddit": "LosAngeles",
8   "created": "2020-04-22T02:49:34.000Z"
9 }

```

The interface includes a toolbar with 'Back to Annotations', 'Open document list', 'View Details', 'Replace', 'Concordance', 'Attribute View', and a 'Save' button. To the right is a sidebar with a list of entity types:

- Alphabetic Order
- Entity Mention
- Type Subtype Role
- Apartment_Renter
- Car_Owner
- Crowded_Living
- Disabled
- ESL_Speaker
- Full_Time_Employment
- High_School_Student
- Home_Owner
- Hourly_Wage_Employment
- Medically_Insured
- Minor
- Minority
- Mobile_Home_Owner
- No_Health_Insurance
- No_High_School_Diploma
- No_Vehicle
- Senior_Citizen
- Single_Parent
- Unemployed
- University_Student

All 5 documents have now been manually annotated. However, we will need a much larger set of documents in order to train and create a machine learning model. In the next exercise, we will upload the complete corpus of documents and create an entity recognition model.

19. Click **Annotations** to return to the Annotations screen.

The screenshot shows the Annotations workspace. The left sidebar has sections for Assets, Documents, Entity Types, Relation Types, Dictionaries, Rule-based Model, Machine Learning Model, Pre-annotation, and Annotations. The 'Annotations' section is circled in red. The main area displays a table titled 'Select Document' with the following data:

Document Name	Status	Last Modified
dc-doc-43.txt	<small>100% Annotated</small>	May 18, 2020 12:02:21 AM
seattle-doc-3.txt	<small>100% Annotated</small>	May 18, 2020 12:33:04 AM
chicago-doc-1.txt	<small>100% Annotated</small>	May 18, 2020 12:40:47 AM
nyc-doc-40.txt	<small>100% Annotated</small>	May 18, 2020 12:47:26 AM
LA-doc-2.doc	<small>100% Annotated</small>	May 18, 2020 1:01:13 AM

Exercise 7: Train and create a machine learning (ML) annotator

As stated above, we will require a much larger set of documents in order to create a machine learning annotator. Although we can provide a folder with all of the social media posts extracted for each of the 5 cities and instruct you annotate each post one by one, we have already done all of the hard work for you and have prepared a zip file containing the entire corpus of documents called Lab1-WKS.zip. Let's upload this zip file to our workspace.

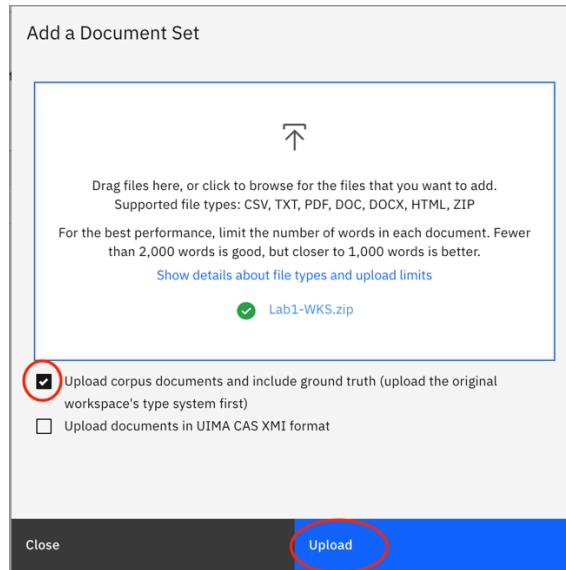
- Under Assets, click **Documents**.

- On the Documents screen, click **Upload Document Sets**.

- Click on the **Upload icon** and select the **Lab1-WKS.zip** file and click **Open**.

	Lab1-WKS.zip	Today at 1:26 AM	5.4 MB	ZIP archive
	SampleDocs.zip	Yesterday at 9:06 PM	10 KB	ZIP archive
▶	SampleDocs	Yesterday at 7:59 PM	--	Folder
▶	nyc-docs	Yesterday at 7:55 PM	--	Folder
▶	LA-docs	Yesterday at 7:53 PM	--	Folder
▶	COVID19_dictionary_1589757211592	Yesterday at 7:13 PM	--	Folder
▶	COVID19_dictionary_1589757211592.zip	Yesterday at 7:13 PM	7 KB	ZIP archive
	Dictionaries.zip	Yesterday at 6:58 PM	19 KB	ZIP archive
▶	Dictionaries	Yesterday at 6:57 PM	--	Folder

4. Click the box next to **Upload corpus documents and include ground truth (upload the original workspace's type system first)** and click **Upload**.



You should now see several new document sets on the Documents screen including an Import document set consisting of 368 posts that were just now added to the workspace. We will be using these newly uploaded documents to train and create a ML annotator.

Name	Documents	Last Modified	Action
All	373	-	Rename Delete
LA-doc-6.doc_set	32	05/12/2020	Rename Delete
nyc-doc-1.txt_set	96	05/12/2020	Rename Delete
chicago-doc-1.txt_set	36	05/12/2020	Rename Delete
seattle-doc-1.txt_set	113	05/12/2020	Rename Delete
dc-doc-1.txt_set	91	05/13/2020	Rename Delete
dc-doc-43.txt_set	5	05/18/2020	Rename Delete
Import	368	05/18/2020	Rename Delete

5. Under Machine Learning Model, click on **Performance**.

The screenshot shows the 'IBM Watson Knowledge Studio' interface. On the left, there is a navigation sidebar under 'Assets' with the following options: Back to Workspaces, Documents (highlighted), Entity Types, Relation Types, Dictionaries, Rule-based Model, Machine Learning Model (expanded), Pre-annotation, Annotations, Performance (circled in red), Versions, Settings, and Help. The main content area is titled 'Documents' and shows 'Document Sets (8)' and 'Documents (All, 373)'. A button labeled 'Upload Document Sets' is present. Below it is a list of document sets: All, LA-doc-6.doc_set, nyc-doc-1.txt_set, chicago-doc-1.txt_set, seattle-doc-1.txt_set, dc-doc-1.txt_set, dc-doc-43.txt_set, and Import.

6. On the Performance screen, click on **Train and evaluate**.

The screenshot shows the 'Performance' screen in IBM Watson Knowledge Studio. The left sidebar shows 'Assets' with 'Performance' selected (highlighted). The main content area is titled 'Performance' and displays information for a 'COVID19-Vulnerability' model. It shows the language of documents as English and indicates 0 Training Set, 0 Test Set, and 0 Blind Set. There are buttons for 'Training Set' and 'Test Set' with links to 'View Ground Truth' and 'View Decoding Results'. On the right, there are sections for 'Last trained on:' and 'Last evaluated on:'. At the bottom, there is a section for 'Document set evaluation' with a 'Model over time' chart, a 'View Log' button, and performance metrics for 'Mention' (Precision: --, Recall: --).

7. On the Select Training/Test/Blind Sets screen, choose **Import**, change the **Training Set** percentage to 85%, **Test Set** to 10% and **Blind Set** to 5%. Click **Train & Evaluate**.

← | Training / Test / Blind Sets

Select Training/ Test/ Blind Sets

Document Set	Task Status
<input type="checkbox"/> All	
<input type="checkbox"/> LA-doc-6.doc_set	
<input type="checkbox"/> nyc-doc-1.txt_set	
<input type="checkbox"/> chicago-doc-1.txt_set	
<input type="checkbox"/> seattle-doc-1.txt_set	
<input type="checkbox"/> dc-doc-1.txt_set	
<input type="checkbox"/> dc-doc-43.txt_set	
<input checked="" type="checkbox"/> Import	

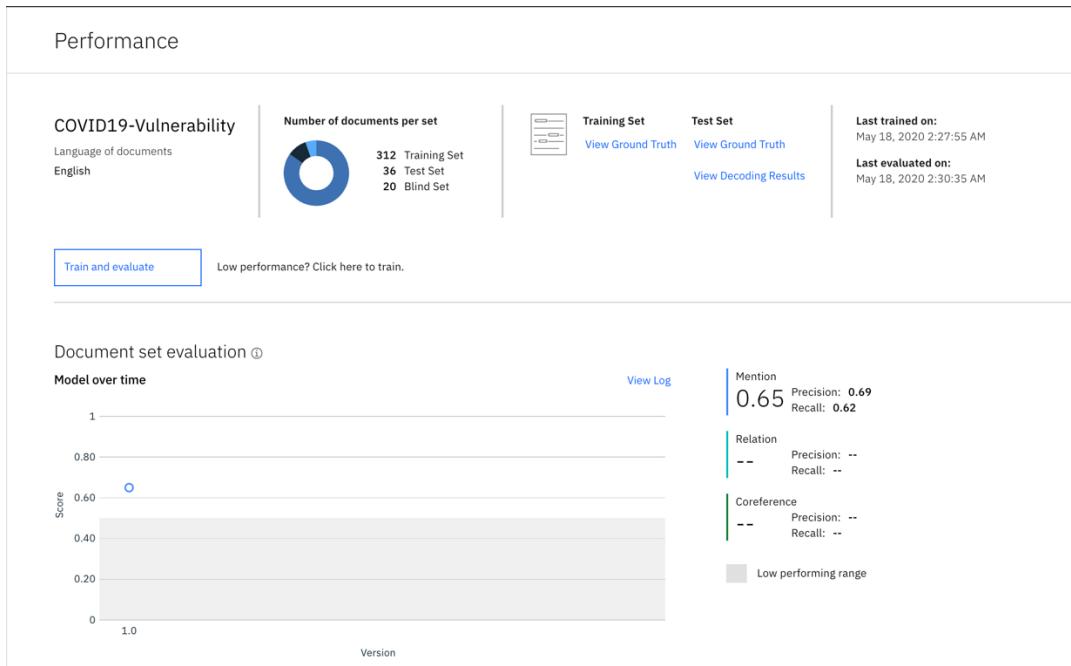
Create new sets by splitting the selected document sets

Ratio
Enter the percentage of documents to include in each set.

85	Training Set (70% Recommended)
10	Test Set (23% Recommended)
5	Blind Set (7% Recommended)

This will start the process of training and evaluating a machine learning annotator, which should take approximately 14 minutes to complete. You will see a progress message on the top right corner of the screen detailing the current phase – training or evaluation – and the amount of time elapsed.

Once the model is created, you should see the following on your Performance screen:

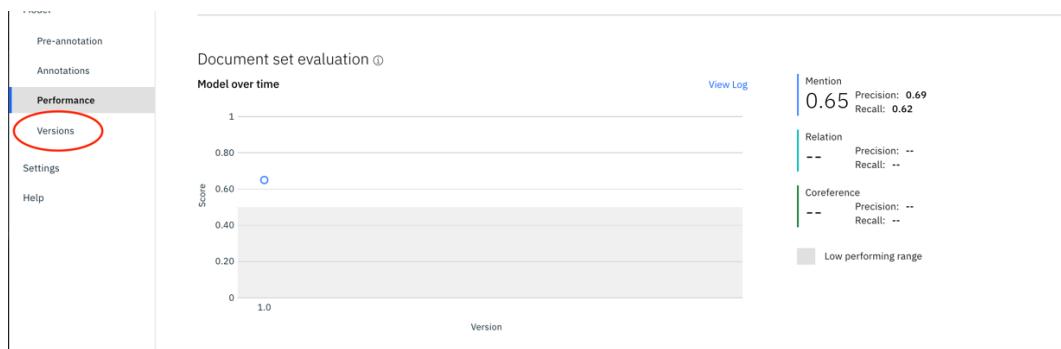


Exercise 8: Save and Deploy the ML Annotator to Discovery

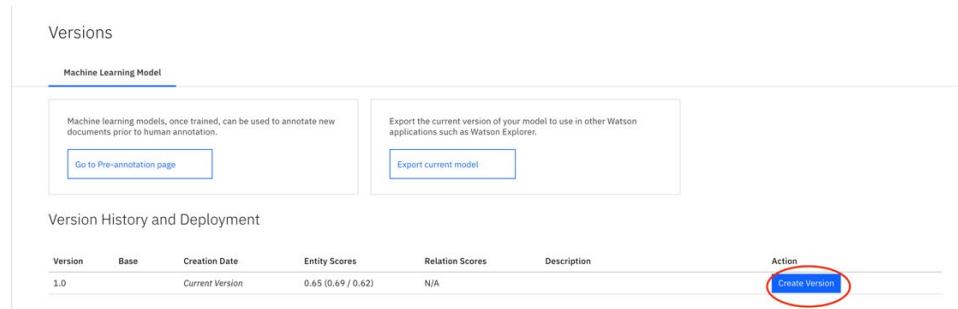
Now that we have a machine learning annotator, we can use it to automatically perform entity extraction inside of Watson Discovery. The automated entity extraction of social media posts for all 5 cities will get us closer to determining the social vulnerability index of each city.

Let's save this machine learning model and deploy it to the Discovery instance that we created at the beginning of this lab.

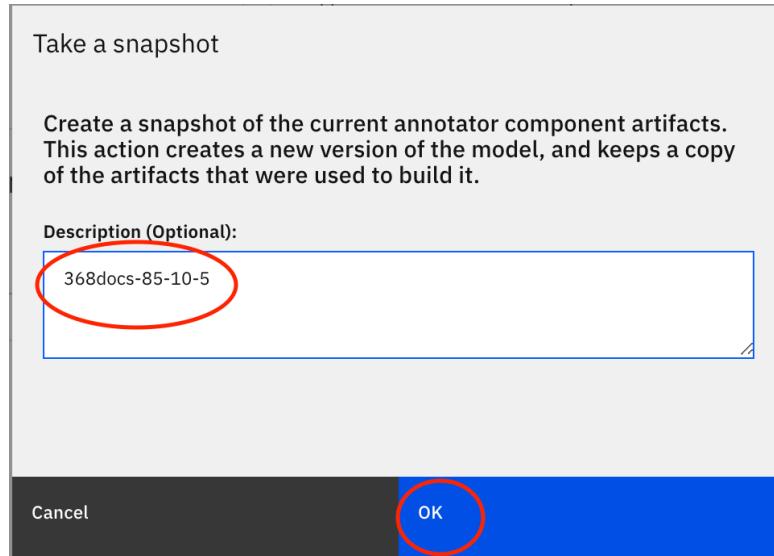
1. Under Machine Learning Model, click on **Versions**.



2. On the Versions page, click **Create Version**.



3. Type **368docs-85-10-5** (to distinguish this as an entity model using 368 docs with an 85-10-5 split) under Description and click **OK**.

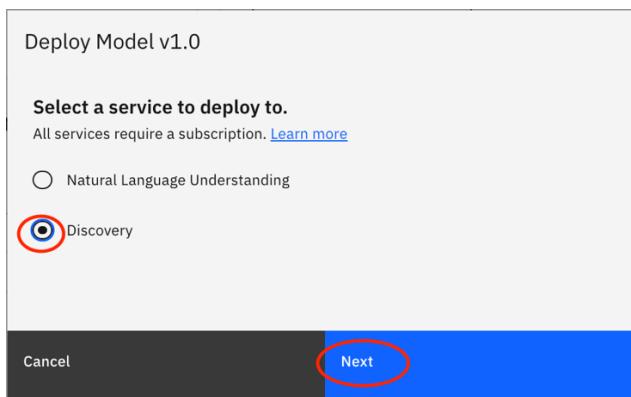


4. In the Version 1.0 row, click **Deploy**.

Version History and Deployment

Version	Base	Creation Date	Entity Scores	Relation Scores	Description	Action
1.1		Current Version	0.65 (0.69 / 0.62)	N/A		Create Version
1.0		05/18/2020	0.65 (0.69 / 0.62)	N/A	368docs-85-10-5	Promote Delete Deploy

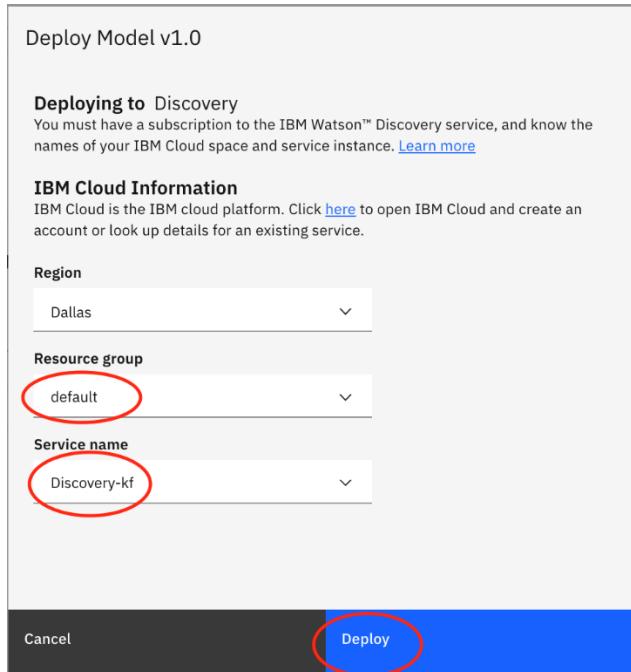
5. Select **Discovery** and click **Next**.



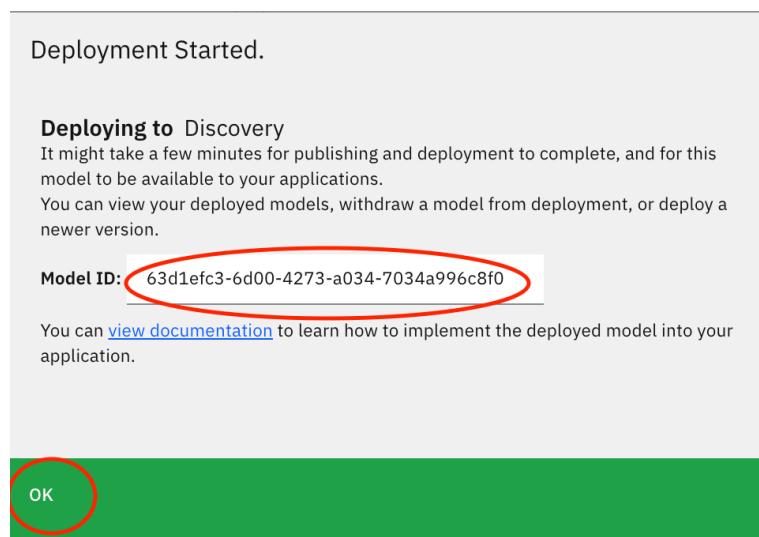
6. In order to deploy this model to your Discovery instance, you will need to select the resource group containing your instance as well as the Service name of the instance that you created.

If this is your first time working with the Watson APIs on the IBM Cloud, you should only have one instance of Discovery currently provisioned.

Select **default** from the drop-down menu under **Resource group** and the **name of the Discovery instance** under **Service name**.



7. Copy the **Model ID** displayed on the screen to use in the next lab and click **OK**.



8. Underneath Deployed Models, you should now see the Model ID number for your newly deployed model. This deployed model will be used to perform entity extraction within Watson Discovery in Lab 2.

The screenshot shows the Watson Studio interface. At the top, there's a navigation bar with icons for Home, Projects, Data, Machine Learning, and Watson Studio. Below that, a sidebar has 'Machine Learning' selected. The main content area has a 'Machine Learning Model' tab active. Under this tab, there are two boxes: one for 'Go to Pre-annotation page' and another for 'Export current model'. Below this is a table titled 'Version History and Deployment' with the following data:

Version	Base	Creation Date	Entity Scores	Relation Scores	Description	Action
1.1	Current Version		0.65 (0.69 / 0.62)	N/A		Create Version
1.0		05/18/2020	0.65 (0.69 / 0.62)	N/A	368docs-85-10-5	Promote Delete Deploy
▼ Deployed Models (1)						
Model ID: 63d1efc3-6d00-4273-a034-7034a996c8f0				Service ID: 03b54347-0aad-4da9-b59a-e1f2df1070cc		Undeploy Status

You have completed Lab 1!