

IBM Training

Student Exercises

IBM Watson Knowledge Studio
Hands-On

IBM Watson Technical
Enablement

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Exercises description

This lab guide is intended to provide you with hands-on experience in using Watson Knowledge Studio to build a machine learning annotator.

This course includes the following exercises:

- Exercise: Create a project. Create and edit a Type System
- Exercise: Upload training corpus
- Exercise: Create dictionary annotator
- Exercise: Dictionary pre-annotation
- Exercise: Alchemy API pre-annotation
- Exercise: Rule Annotator
- Exercise: Human annotation
- Exercise: Adjudication
- Exercise: Train and test machine learning (ML) Annotator
- Exercise: Pre-annotation with ML annotator

The exercises should be completed in the same order as listed before moving on to the next exercise.

Pre-requisites:

- a) Complete the Watson Knowledge Studio Foundations & Methodology course
- b) Open an IBM Cloud Account. You can open one here: <https://www.ibm.com/cloud/>
- c) Create a Watson Knowledge Studio Account. You can sign up for a 30 day free trial here: Login to your IBM Cloud environment -> <https://console.bluemix.net/>. 1) Enter IBM Cloud user id and password. 2) click on catalog; Type “Knowledge Studio” in the search text box. 3) press “Filter” button; and click on “Knowledge Studio” service. 4) Setup your service organization/space info; 5) select free WKS plan; and 6) click “Create”. 7) Click the “Launch” button on the WKS service. 8) You should see the WKS service in your IBM Cloud account.
- d) Install Chrome or Firefox to work with the Watson Knowledge Studio interface
- e) Download the files available for performing the labs.

Note: The illustrating screenshots provided in this lab guide could be slightly different from what you see in the WKS interface you are using because of updates to WKS since the lab guide was created.

Exercise 01: Create a Type System

Goals:

In this lab you will

- Create a project
- Import a type system
- Modify the type system by adding new entity and relation types

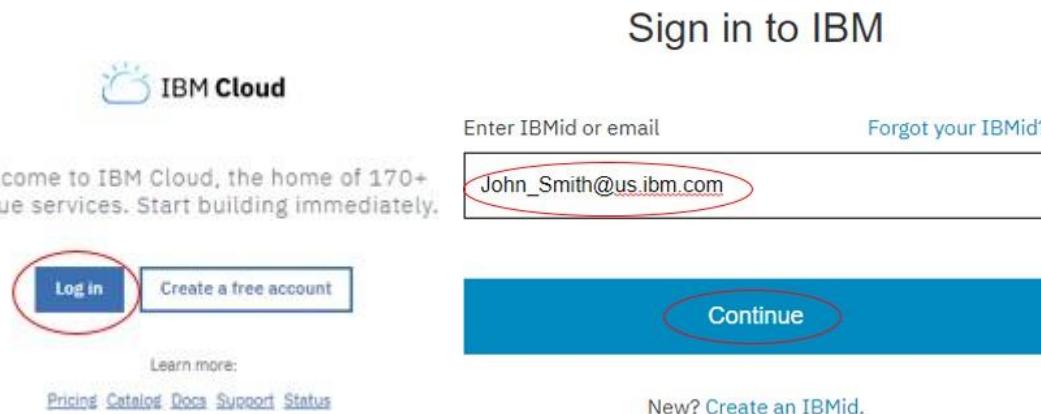
At the end of this lab, you should be able to use the WKS tool to create a type system

Exercise Instructions

Lesson 1.1 Create a project

Pre-requisites:

- For this step, you should be able to login to the WKS instance. If you do not have a WKS account, please refer to the “Pre-requisites” section above on the steps to sign up for access.
 - You should have privileges assigned within WKS to be able to create projects and complete the lab exercises.
1. Access the IBM Cloud -> <https://console.bluemix.net>. Then Login to your IBM Cloud account with your IBM user ID and password.



You will see your IBM Cloud dashboard.

2. Change the “Cloud Foundry Org” selection box to your Organization”.
3. Change the “Cloud Foundry Space” selection box to your dev space.
4. Create a Knowledge Studio service. Click on “Catalog” > in the filter textbox type “Knowledge Studio” > click on the “Knowledge Studio” services.

The screenshot shows the IBM Cloud Catalog interface. At the top, there is a navigation bar with links for IBM Cloud, Catalog, Docs, Support, and Manage. A search bar on the right contains the placeholder "Search for resource...". On the left, a sidebar lists categories: All Categories (2), Compute, Containers, Networking, Storage, AI (2), Analytics, and Databases. The main area is titled "Catalog" and features a search bar with the text "Knowledge Studio" highlighted by a red oval. Below the search bar, there are two service cards. The first card, "Knowledge Studio" (IBM), has its name highlighted by a red oval. It includes a brief description: "Teach Watson the language of your domain." The second card is for "Natural Language Understanding" (Lite • IBM) with a description: "Analyze text to extract meta-data from content such as concepts, entities, emotion, relations, sentiment and more." A "Filter" button is located at the bottom right of the search bar.

5. On the Knowledge Studio service create web page > provide a name for your Service name; e.g. Knowledge Studio-la > for the “Choose a region/location to deploy in:” select the “US South” > for the “Select a resource group” select the default. Make sure you have the Lite plan checked. Then click the “Create” button.

Service name: Knowledge Studio-la

Choose a region/location to deploy in: US South Select a resource group: default

Features

- Teach by Example

Empower domain subject matter experts to teach Watson the language of your industry or organization without requiring deep technical skills or coding.

- WKS is End-to-end

It's the only offering in the market that combines the powerful capabilities of annotation, training, and evaluation in a single collaboration-focused service.

- Engage your Experts

You won't need a single line of code. With a multi-user collaborative environment and a powerful user interface, SMEs can easily build custom models without any coding expertise, unlike competitive offerings.

- Use Everywhere

Apply what you've taught Watson in multiple applications by using models from Watson Knowledge Studio in Watson Discovery, Watson Natural Language Understanding and Watson Explorer.

Images

Images can be screen captures, slides, or videos. Click an image to view the details.



Pricing Plans

Monthly prices shown are for country or region: United States

PLAN	FEATURES	PRICING
✓ Lite	1 user 5 GB of storage included	Free

by Cost

Create

6. Click on the menu bar in the upper left > select Dashboard in the drop down menu. When your WKS service page displays > click on the “Launch tool” button.

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Watson /
Knowledge Studio-rn
 Location: US South Org: STSA Workshop PoT Space: Dev

Knowledge Studio
 Build custom models to teach
 Watson the language of your
 domain

Click "Launch" button
Launch

Developer resources:
 • Getting started tutorial

You will be dropped into the “Projects” page where you will be able to create projects. If you already have projects created, you should be able to see a listing of all your projects as master administrator.

Note: Once you have signed up for a IBM Cloud WKS 30-day trial instance, you will see the Watson Knowledge Studio service when you sign into: <https://console.bluemix.net/catalog/services/knowledge-studio?taxonomyNavigation=app-services> using your IBM id.

7. Click on “Create Workspace” button to create a new project.

IBM Watson Knowledge Studio

Workspaces

+ Create Workspace

Click “Create Workspace” button

Let's get started.

Create a workspace to start building your model.
[Learn more](#)

8. In the “Create Project” pop up window, enter the name of the new project as *NHTSA Advisor*. The “Description” field is optional. In the “Select a language” drop down field, choose “English”. You can use a dictionary based Tokenizer if you would like. For the purposes of this lab, use the “Default Tokenizer”.

Create Workspace

The screenshot shows the 'Create Workspace' interface. It includes fields for 'Workspace name' (Automobile Project v1_0), 'Language of documents' (English), 'Workspace description (optional)' (This project will create custom ML annotators for the automobile domain.), 'Component configuration (optional)' (Default tokenizer), and 'Project Manager Selection' (Select user name). A large red arrow points from the bottom right towards the 'Create' button. Step numbers 1 through 4 are overlaid on the interface:

- 1. Enter project name (circled around the workspace name field)
- 2. Enter project description (circled around the workspace description field)
- 3. Select "English" (circled around the language dropdown)
- 4. Keep "Default tokenizer" (circled around the component configuration field)

At the bottom right, there are 'Cancel' and 'Create' buttons, with a red arrow pointing down to the 'Create' button.

Note:

9. You will then be dropped to the project window where it is possible to create a Type System with entity and relation types.

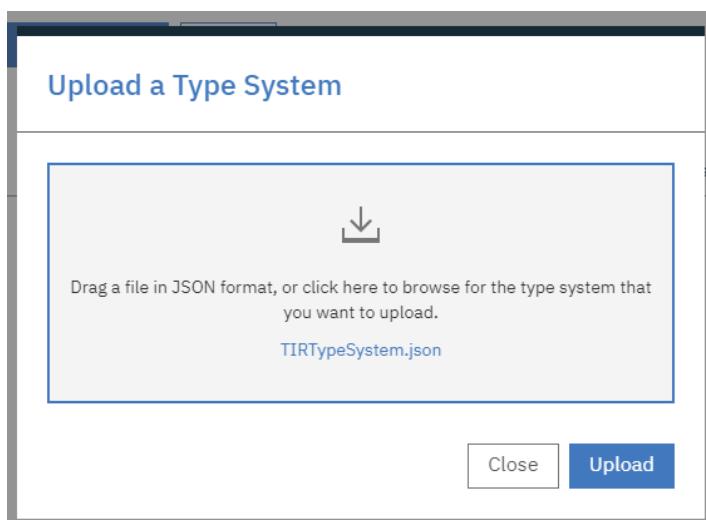
The screenshot shows the 'Type System' section of the IBM Watson Knowledge Studio. The top navigation bar includes 'IBM Watson Knowledge Studio', 'Type System', 'Documents', and 'Dictionaries'. Below the navigation, the URL is 'HOME / anurag1510_WKS / Type System'. The main area has tabs for 'Entity Types' (0), 'Mention Attributes', and 'Relation Types' (0). Buttons for '+ Add Entity Type', 'Import', and 'Import an existing type system.' are present. A link 'Create a type system.' is also visible. A search bar for 'Entity Type Name' and a 'Roles' section are at the bottom. A message 'No items found' is displayed.

Lesson 1.2 Import a TypeSystem

1. In Windows Explorer navigate to the “\Desktop\2018_10_11 ML PoT\Lab 1 – Develop WKS Annotators” folder.
2. From the Type System page on WKS, click on “Upload”

The screenshot shows the Entity Types page in the IBM Watson Knowledge Studio. The left sidebar has 'Entity Types' selected. The main area shows a table with columns for Entity Type Name, Roles, Subtypes, and Action. A red circle highlights the 'Upload' button, and a red arrow points to it from the text 'Click "Upload"'.

3. Navigate to the “Type System” folder. Drag and drop the TIRTypeSystem.json file from your explorer window to the “Upload a Type System” window
4. Once you drag and drop the file, click “Upload”



5. You should see the entity and relation types from the existing type system imported.

Entity Types

Entity Types (9)		Mention Classes	Mention Types			
		Add Entity Type	Upload	Download Types		
<input type="text"/> Enter text to filter entries X						
<input type="checkbox"/>	Entity Type Name ▾	Roles	Subtypes		Action	
<input type="checkbox"/>	ACCIDENT_OUTCOME	ACCIDENT_OUTCOME			Edit	Delete
<input type="checkbox"/>	INCIDENT	INCIDENT			Edit	Delete
<input type="checkbox"/>	MANUFACTURER	MANUFACTURER	VEHICLE		Edit	Delete
<input type="checkbox"/>	MODEL	MODEL	VEHICLE		Edit	Delete
<input type="checkbox"/>	MODEL_YEAR	MODEL_YEAR	VEHICLE		Edit	Delete
<input type="checkbox"/>	PART_OF_CAR	PART_OF_CAR			Edit	Delete
<input type="checkbox"/>	PERSON	PERSON			Edit	Delete
<input type="checkbox"/>	STRUCTURE	STRUCTURE			Edit	Delete
<input type="checkbox"/>	VEHICLE	VEHICLE			Edit	Delete

Lesson 1.3 Edit the Type System

1.3.1 Add new entity types

Edit the type system that has been imported. To add new entity types and relation types perform the following:

Entity types:

- CONDITION
 - a) On the “Entity Types” page -> click on “Add Entity”.
 - b) Add the entity type “CONDITION” and click “Save”. You will see a new entry for CONDITION.

Entity Types 9 Mention Classes Mention Types

Add Entity Type Delete Entity Types Upload Download Types

Entity Type Name Roles Subtypes Action

<input type="checkbox"/>	CONDITION	Select a role	+ Add	Enter a subtype	+ Add	Cancel	Save
CONDITION (This type)							

- c) Edit the entity type STRUCTURE and add a role “PART_OF_CAR”. Check the entity type and click on the “Edit” URL. In the “Select a role” drop down menu, pick “PART_OF_CAR”. Click “Save” button.

PERSON PERSON

<input type="checkbox"/>	STRUCTURE	Select a r... + Add	Enter a subtype + Add	Cancel	Save
<div style="border: 1px solid #ccc; padding: 5px; width: fit-content;"> ACCIDENT_OUTCOME CONDITION INCIDENT MANUFACTURER MODEL MODEL_YEAR PART_OF_CAR PERSON </div>					
<input type="checkbox"/>	VEHICLE	Edit Delete			

d) The Entity Types tab should now look like this:

Entity Types

Entity Types 10		Mention Classes	Mention Types	
		Add Entity Type	Upload	Download Types
<input type="text"/> Enter text to filter entries ×				
<input type="checkbox"/>	Entity Type Name ▲	Roles	Subtypes	Action
<input type="checkbox"/>	ACCIDENT_OUTCOME	ACCIDENT_OUTCOME		Edit Delete
<input type="checkbox"/>	CONDITION	CONDITION		Edit Delete
<input type="checkbox"/>	INCIDENT	INCIDENT		Edit Delete
<input type="checkbox"/>	MANUFACTURER	MANUFACTURER		Edit Delete
		VEHICLE		
<input type="checkbox"/>	MODEL	MODEL		Edit Delete
		VEHICLE		
<input type="checkbox"/>	MODEL_YEAR	MODEL_YEAR		Edit Delete
		VEHICLE		
<input type="checkbox"/>	PART_OF_CAR	PART_OF_CAR		Edit Delete
<input type="checkbox"/>	PERSON	PERSON		Edit Delete
<input checked="" type="checkbox"/>	STRUCTURE	STRUCTURE		Edit Delete
		PART_OF_CAR		
<input type="checkbox"/>	VEHICLE	VEHICLE		Edit Delete

1.3.2 Add new relation types:

In this section you will add these two relation types:

- causedBy [(source) INCIDENT, (target) CONDITION]
- driveUnder [(source) VEHICLE, (target) CONDITION]

- a) Click on the “Relation Types” url on the left hand side menu
- b) Click on “Add Relation Type” button
- c) Type the relation type name as “causedBy”. Click in the first entity type textbox and type INCIDENT. Click in the second entity type and type CONDITION. Click the “Save” button.
- d) Similarly, add a relation type “driverUnder” and choose the first entity type as VEHICLE and the second entity type CONDITION

The screenshot shows a dialog box titled "Add Relation Type". At the top right is a search bar with the placeholder "Enter text to filter entries" and a close button. Below the title is a table with four columns: "Relation Type", "First Entity Type / Role", "Second Entity Type / Role", and "Action". The "Relation Type" column contains "driverUnder" and "causedBy". The "First Entity Type / Role" column contains "VEHICLE" and "INCIDENT". The "Second Entity Type / Role" column contains "CONDITION" and "CONDITION". The "Action" column contains "Cancel" and "Save" buttons, with "Save" being highlighted with a blue background and white text.

Relation Type	First Entity Type / Role	Second Entity Type / Role	Action
driverUnder	VEHICLE Delete Enter an entity type name	CONDITION Delete Enter an entity type name	Save
causedBy	INCIDENT	CONDITION	Edit Delete

- e) Once the relation types have been added, the Relation Types tab should look like this:

[Back to Workspaces](#)

Model Management ▾

Assets & Tools ▾

Documents

Entity Types

Relation Types

Pre-annotators

Document Annotation ▾

Settings

Help

Relation Types

Relation Types

33

Add Relation Type

Enter text to filter entries

Relation Type	First Entity Type / Role	Second Entity Type / Role	Action
causedBy	INCIDENT	CONDITION	Edit Delete
driveUnder	VEHICLE	CONDITION	Edit Delete
hasProperty	MODEL	MANUFACTURER, MODEL_YEAR	Edit Delete
hasProperty	MANUFACTURER	MODEL_YEAR	Edit Delete
hasProperty	VEHICLE	MODEL_YEAR, MANUFACTURER, MODEL	Edit Delete
impactPoint	INCIDENT	PERSON, PART_OF_CAR, MODEL_YEAR, VEHICLE, MODEL, MANUFACTURER, STRUCTURE	Edit Delete
locatedOn	PART_OF_CAR	MANUFACTURER, MODEL, VEHICLE, MODEL_YEAR	Edit Delete
occupantOf	PERSON	PART_OF_CAR, VEHICLE, STRUCTURE, MODEL, MANUFACTURER, MODEL_YEAR	Edit Delete
outcomeOf	ACCIDENT_OUTCOME	INCIDENT	Edit Delete
sufferedFrom	MODEL, VEHICLE, STRUCTURE, MODEL_YEAR, PERSON, MANUFACTURER, PART_OF_CAR	ACCIDENT_OUTCOME	Edit Delete

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Exercise 02: Upload documents

Goals:

In this lab you will:

- Upload documents to your project
- Create annotation sets

At the end of this lab, you should be able to upload documents to your project to train your machine learning MODEL

Exercise Instructions

Lesson 2.0 Upload Documents

1. For your project, click on the “Assets” expandable menu
2. Click on the “Documents” sub menu
3. Click on the “Upload Document Sets” for importing documents

The screenshot shows the IBM Watson Knowledge Studio interface. The top navigation bar includes 'IBM Watson Knowledge Studio', a user icon, and the email 'langelet@us.ibm.com'. On the left, there's a sidebar with 'Back to Workspaces', 'Assets' (which is expanded, showing 'Documents' circled in red), 'Entity Types', 'Relation Types', 'Dictionaries', 'Rule-based Model', 'Machine Learning Model', 'Settings', and 'Help'. The main content area has a title 'Documents' and three tabs: 'Document Sets (1)', 'Annotation Sets (0)', and 'Documents (All, 0)'. Below these tabs are two buttons: 'Create Annotation Sets' and 'Upload Document Sets' (which is also circled in red). A 'Download Document Sets' button is located on the right. The main table lists one item: 'Name' (All), 'Documents' (0), 'Last Modified' (-), and 'Action'. The entire screenshot is framed by a red border.

4. In the “Add Documents to the Corpus” window, drag and drop the ...\\Lab Material\\Lab1\\Documents\\NHTSA HA Docs\\NHTSA_HA_Docs.csv file with traffic INCIDENT report descriptions -> click the “Upload” button.

Add a Document Set

Drag files here, or click to browse for the files that you want to add.

For best performance, individual documents should not contain more than 2000 words. [Show details about the file formats](#)

NHTSA_HA_Docs.csv

[Close](#) [Upload](#)

- Using the “Rename” button > rename the set to “NHTSA HA Doc Set” > click “Save” button.

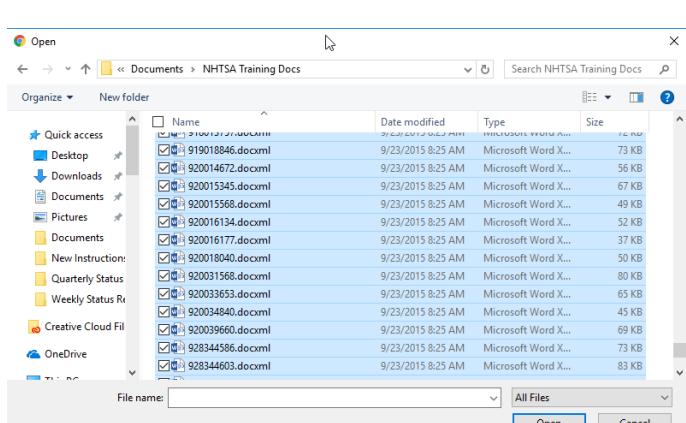
Document Sets (2) Annotation Sets (0) Documents (NHTSA_HA_Docs....)

Create Annotation Sets Upload Document Sets Download Document Sets

Name	Documents	Last Modified	Action
All	5	-	
NHTSA HA Doc Set	5	10/10/2018	Cancel Save

- Upload the NHTSA Training docs > click “Upload Document Sets” button > click

the Upload icon  to display Windows Explorer > select all files in the folder [...\\Training AI Systems Using WKS\\Labs\\Lab Material\\Documents\\NHTSA Training Docs](#) > click on the “Open” button > then click the “Upload” button.



The Windows Explorer window shows a list of Microsoft Word (.docml) files in the 'NHTSA Training Docs' folder. There are 425 items listed, all of which are selected (indicated by checked checkboxes). The columns show Name, Date modified, Type, and Size. The files were created on 9/23/2015 at 8:25 AM.

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

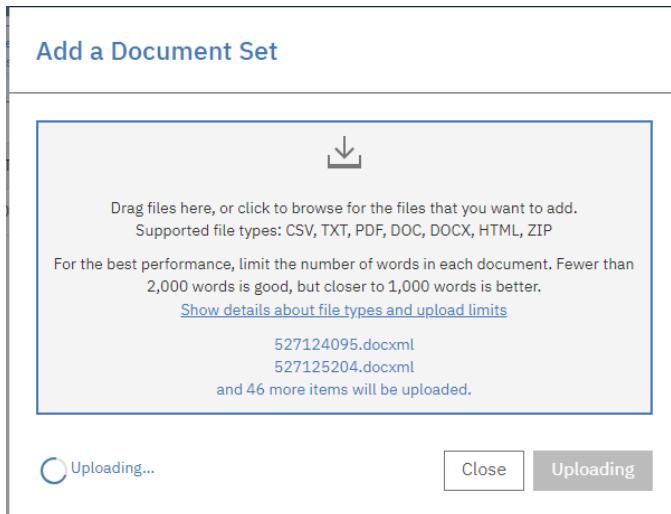
For the best performance, limit the number of words in each document. Fewer than 2,000 words is good, but closer to 1,000 words is better.

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

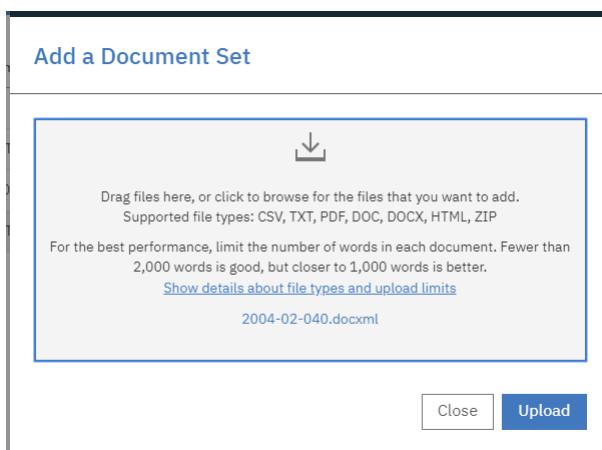
2004-02-001 Training Doc.docxml
2004-02-024.docxml
and 424 more items will be uploaded.

[Close](#) [Upload](#)

7. Click the “Rename” URL next to the training dataset; and rename it to “NHTSA Training Doc Set”.
8. Repeat steps 6 and 7 to import and rename the testing document sets:
 - NHTSA Testing Docs
 - Location – ...\\Training AI Systems Using WKS\\Labs\\Lab Material\\Documents\\NHTSA Testing Docs



9. Repeat steps 6 and 7 to import and rename the adjudication document sets:
 - NHTSA Adjudication Doc
 - Location – ...\\Training AI Systems Using WKS\\Labs\\Lab Material\\Documents\\NHTSA Adjudication Docs



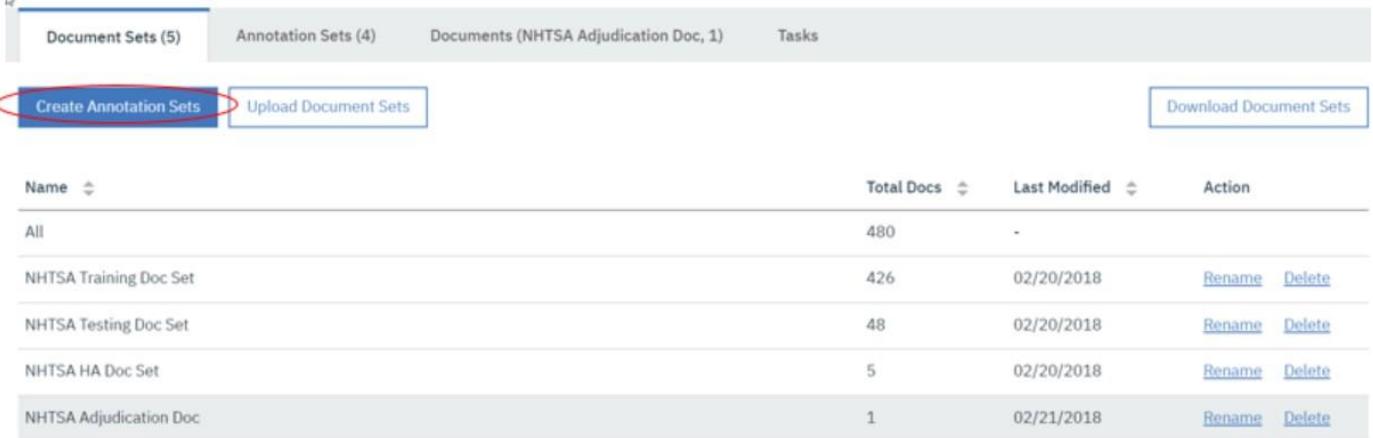
10. Your screen should now look like the image below.

Document Sets (5)		Annotation Sets (4)	Documents (NHTSA Adjudication Doc, 1)	Tasks
		Create Annotation Sets	Upload Document Sets	Download Document Sets
Name		Total Docs	Last Modified	Action
All		480	-	Rename Delete
NHTSA Training Doc Set		426	02/20/2018	Rename Delete
NHTSA Testing Doc Set		48	02/20/2018	Rename Delete
NHTSA HA Doc Set		5	02/20/2018	Rename Delete
NHTSA Adjudication Doc		1	02/21/2018	Rename Delete

Lesson 2.1 Create document sets

Once the documents have been uploaded, document sets need to be created so that they can be annotated by multiple human annotators.

1. Open the documents page for your project
2. Click the “Create Annotation Sets” button to create annotation sets



The screenshot shows a user interface for managing document sets. At the top, there are tabs: 'Document Sets (5)', 'Annotation Sets (4)', 'Documents (NHTSA Adjudication Doc, 1)', and 'Tasks'. Below the tabs, there are two buttons: 'Create Annotation Sets' (which is circled in red) and 'Upload Document Sets'. To the right of these buttons is a 'Download Document Sets' link. The main area displays a table of document sets. The columns are 'Name', 'Total Docs', 'Last Modified', and 'Action'. The rows show the following data:

Name	Total Docs	Last Modified	Action
All	480	-	Rename Delete
NHTSA Training Doc Set	426	02/20/2018	Rename Delete
NHTSA Testing Doc Set	48	02/20/2018	Rename Delete
NHTSA HA Doc Set	5	02/20/2018	Rename Delete
NHTSA Adjudication Doc	1	02/21/2018	Rename Delete

3. When the “Create Annotation Sets” dialog displays > perform these sets to create an annotation set:
 - a. Select the “NHTSA HA Doc Set”;
 - b. set the overlap as 60%
 - c. select the annotator as yourself;
 - d. name the “Set name” to “NHTSA_HA_DocSet1_Username”
 - e. click “Add another set and human annotator”
 - f. select the annotator as yourself
 - g. set the “Set name” to “NHTSA_HA_DocSet2_Username”
 - h. click the “Generate” button

Create Annotation Sets

Base set NHTSA HA Doc Set 1. Select "NHTSA HA Doc Set"

Overlap 60 % of 5 documents 2. Set Overlap to "60%"

New Sets 3. Select user name

Annotator Lee Angelelli 4. Name document set

Set name NHTSA_HA_DocSet1_LeeA 5. Select user name

Annotator Lee Angelelli 6. Name document set

Set name NHTSA_HA_DocSet2_LeeA 7. Press "Generate"

Cancel Generate

4. You will see “NHTSA_HA_DocSet1_Username” and “NHTSA_HA_DocSet2_Username” each containing 4 documents.
5. Repeat the same process steps to create two annotation sets for the “NHTSA Adjudication Doc”. Since there’s one document in the “NHTSA Adjudication Doc” set, please set **Overlap to 100%**. Name the Adjudication document sets as “Adjudication_DocSet1_Username” and “Adjudication_DocSet2_Username”.

Create Annotation Sets

Base set NHTSA Adjudication Doc 1. Select "NHTSA HA Doc Set"

Overlap 100 % of 1 documents 2. Set Overlap to "100%"

New Sets 3. Select user name

Annotator Lee Angelelli 4. Name document set

Set name Adjudication_DocSet1_LA 5. Select user name

Annotator Lee Angelelli 6. Name document set

Set name Adjudication_DocSet2_LA 7. Press "Generate"

Cancel Generate

6. After you have create the annotation sets, your screen should look like the screen shot below.

Documents

Document Sets (5)	Annotation Sets (4)	Documents (NHTSA Adjudicatio...		
Create Annotation Sets		To begin annotating documents, create a task on the Annotation Tasks page.		
Name	Documents	Annotator	Last Modified	Action
NHTSA_HA_DocSet1_LA	4	Lee Angelelli	10/10/2018	Rename Delete
NHTSA_HA_DocSet2_LA	4	Lee Angelelli	10/10/2018	Rename Delete
Adjudication_DocSet1_LA	1	Lee Angelelli	10/10/2018	Rename Delete
Adjudication_DocSet2_LA	1	Lee Angelelli	10/10/2018	Rename Delete

Exercise 03: Create Dictionary

Goals:

In this lab you will:

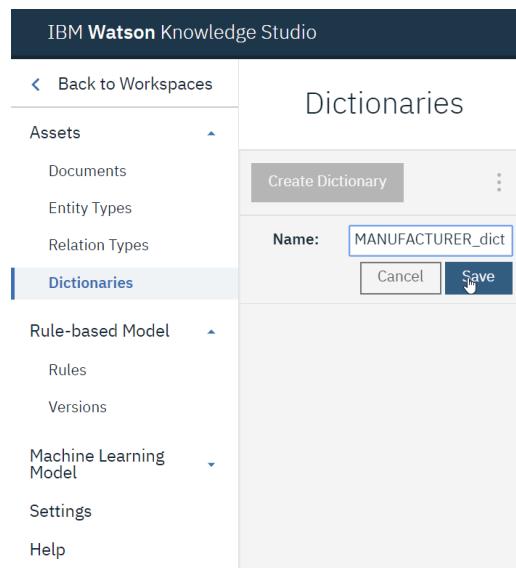
- Create a dictionary
- Create a dictionary annotator

At the end of this lab, you should be able to create dictionaries and dictionary annotator

Exercise Instructions

Lesson 3.0 Create a dictionary of MANUFACTURERS

1. For your project, click on “Assets” to expand the drop menu
2. Click on the “Dictionaries” URL in the left menu then click the “Create Dictionary” to create an empty dictionary
3. Click the “Create Dictionary” button – create a new dictionary. Enter the name of the dictionary as MANUFACTURER_dict in the Name. Click ‘Save.’



4. You should see a dictionary created. Click on the “Manufacturer_dict” dictionary; select “MANUFACTURER” for the entity type; and click the “Upload” button.

The screenshot shows the 'Create Dictionary' interface. On the left, there's a sidebar with a 'Create Dictionary' button and a list of existing dictionaries. One dictionary, 'MANUFACTURERS_dict', is highlighted with a red oval. Below it, a callout box says '1. Click the MANUFACTURERS_dict.' On the right, the main panel shows the 'MANUFACTURERS_dict' details. It includes a language selection ('Language: English | 0 entries'), an entity type dropdown ('Entity type: MANUFACTURER' with a red oval), a rule class dropdown ('Rule class: None'), and a search bar ('Enter text to filter entries'). Below these are buttons for 'Add Entry' and 'Upload' (also with a red oval). A callout box points to the 'Upload' button with the instruction '3. Click the "Upload" button'. A tooltip for the 'Upload' button says 'Upload a CSV file that contains dictionary entries.' At the bottom, there are filters for 'Lemma' and 'Surface Forms' and columns for 'Part of Speech' and 'Action'.

Note: You see an empty dictionary being created. It is possible to add entries manually. However, since we already have a list of MANUFACTURERS, we will import directly from a csv file that has the MANUFACTURERS dictionary entries (lemma, parts of speech and surface forms).

5. In the “Upload Dictionary Entries” popup dialog, click the “upload icon” > select the MANUFACTURER.csv in the folder “...\\Training AI Systems Using WKS\\Labs\\Lab Material\\Dictionaries\\” > click “Open” > click ‘Upload’.

Upload Dictionary Entries

The screenshot shows the 'Upload Dictionary Entries' dialog. It features a large input field with a downward arrow icon. Below it, text says 'Drag a file here, or click to browse for the file that you want to upload. You can upload any CSV file that contains dictionary terms. Maximum file size: 1MB'. A file list shows 'manufacturers.csv' (with a red oval) and other files 'models.csv' and 'vehicles.csv'. A checkbox labeled 'Name' is checked. At the bottom are 'Close' and 'Upload' buttons (the latter with a red oval). A callout box points to the 'Upload' button with the instruction '4. Click on "Upload"'. Another callout box points to the 'manufacturers.csv' file with the instruction '3. Drag & drop the "manufacturers.csv" file'.

Note: You will now see the dictionary and all the entries. Further you could make additional entries if necessary by clicking on the “Add Entry” button.

[←](#) Manage Dictionaries

The screenshot shows the 'Manage Dictionaries' interface. On the left, there's a sidebar with a 'Create Dictionary' button. The main area has a header 'MANUFACTURERS_dict' with a '52' badge and a three-dot menu. To the right is a search bar 'Enter text to filter entries'. Below the header, there are dropdowns for 'Entity type: MANUFACTURER' and 'Rule class: None'. At the bottom are buttons for 'Add Entry', 'Upload', and 'Download'. The central part is a table with columns: Lemma, Surface Forms, Part of Speech, and Action (Edit, Delete). The table lists entries like Volvo, Volkswagen, Toyota, Tesla, Suzuki, and Subaru, all categorized as Nouns.

<input type="checkbox"/> Lemma ▲	Surface Forms	Part of Speech ▲	Action
<input type="checkbox"/> Volvo	Volvo	Noun	Edit Delete
<input type="checkbox"/> Volkswagen	Volkswagen	Noun	Edit Delete
<input type="checkbox"/> Toyota	Toyota	Noun	Edit Delete
<input type="checkbox"/> Tesla	Tesla	Noun	Edit Delete
<input type="checkbox"/> Suzuki	Suzuki	Noun	Edit Delete
<input type="checkbox"/> Subaru	Subaru	Noun	Edit Delete

6. Similarly perform steps 3-4 to add two more dictionaries

- MODEL_dict, for MODELS. Use the models.csv file.
- VEHICLE_dict, for VEHICLE. Use the vehicles.csv file.

Your screen should look like the screen shot below.

This screenshot shows the 'Manage Dictionaries' interface with three dictionaries listed: 'MANUFACTURERS_dict' (52 entries), 'MODELS_dict' (408 entries), and 'VECHICLES' (61 entries). The 'VECHICLES' table is expanded, showing a list of car brands with their surface forms and part of speech (all are Nouns) along with edit and delete links.

<input type="checkbox"/> Lemma ▲	Surface Forms	Part of Speech ▲	Action
<input type="checkbox"/> Volvo	Volvo	Noun	Edit Delete
<input type="checkbox"/> Volkswagen	Volkswagen	Noun	Edit Delete
<input type="checkbox"/> Toyota	Toyota	Noun	Edit Delete
<input type="checkbox"/> Tesla	Tesla	Noun	Edit Delete
<input type="checkbox"/> Suzuki	Suzuki	Noun	Edit Delete
<input type="checkbox"/> Subaru	Subaru	Noun	Edit Delete
<input type="checkbox"/> Smart	Smart	Noun	Edit Delete
<input type="checkbox"/> Scion	Scion	Noun	Edit Delete
<input type="checkbox"/> Saturn	Saturn	Noun	Edit Delete

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Lesson 3.1 Create a dictionary annotator

1. Click “Machine Learning Model” to expand sub menus on the left hand side > click Pre-annotation to open the Pre-Annotator main screen > click on the “Apply this Pre- annotator” button.

The screenshot shows the IBM Watson Studio interface. On the left, there is a navigation sidebar with the following menu items:

- Back to Workspaces
- Assets
 - Documents
 - Entity Types
 - Relation Types
 - Dictionaries
- Rule-based Model
 - Rules
 - Versions
- Machine Learning Model
 - Pre-annotation
- Annotation Tasks
- Performance
- Versions
- Settings
- Help

The "Machine Learning Model" and "Pre-annotation" items are circled in red. The "Pre-annotation" item is highlighted with a blue background.

The main content area is titled "Pre-annotation". It has two tabs: "Dictionaries" (selected) and "Natural Language Understanding". A descriptive text box states: "A dictionary annotator creates an annotation for each mention in the text that matches a term in a dictionary. Dictionaries must be mapped to a type or class in order to apply an annotation." Below this is a large blue button labeled "Apply This Pre-annotator", which is also circled in red.

Below the main content is a section titled "Dictionary Mapping" with the sub-instruction: "Manage dictionaries from the [Dictionaries](#) page." A table lists three dictionaries:

Dictionary Name	Entity Type
MANUFACTURER_dict	MANUFACTURER
MODEL_dict	MODEL
VEHICLE_dict	VEHICLE

2. Check the document sets “NHTSA_HA_DocSet1_Username” and “NHTSA_HA_DocSet2_Username” and click Run

Run Annotator

[Close](#)

[Run](#)

Documents

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

- NHTSA Training Doc Set
- NHTSA Testing Doc Set
- NHTSA HA Doc Set
- [NHTSA_HA_DocSet1_LeeA](#)
- [NHTSA_HA_DocSet2_LeeA](#)



Success: Dictionary annotator application complete.

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Exercise 04: Create a human annotation task

Goals:

In this lab you will:

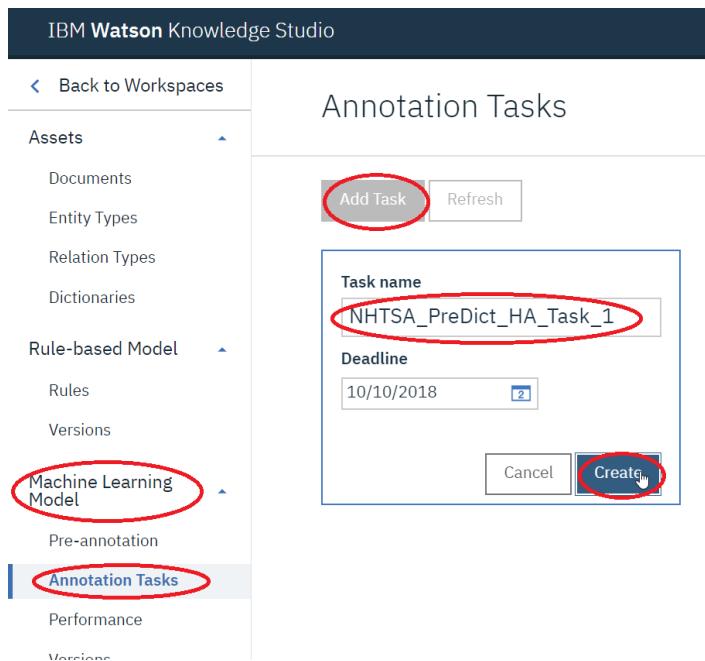
- Create a human annotation task

At the end of this lab, you should be able to create a human annotation task and see the dictionary annotator results.

Exercise Instructions

Lesson 4.0 Create a human annotation task

1. For your project, click on the “Machine Learning Model” URL > click on the “Annotation Tasks” URL > click on the “Add Task” button to add a new task.
2. Enter the title “NHTSA_Predict_HA_Task_1” > accept the default deadline > click the “Create” button.



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3. Check the document sets “NHTSA_HA_DocSet1_xxx” and “NHTSA_HA_DocSet2_xxx” and click on “Create Task” button on the top right corner

Add Annotation Sets to the Task

Annotation Set Name	Annotator Name	Task Name
<input checked="" type="checkbox"/> NHTSA_HA_DocSet1_LeeA	Lee Angelelli	
<input checked="" type="checkbox"/> NHTSA_HA_DocSet2_LeeA	Lee Angelelli	

4. Repeat the same steps to create a task called “NHTSA_HA_Adjudication_Task_2”. Click on the “Add Task” button to add a new task. Enter the title “NHTSA_HA_Adjudication_Task_2”. Accept the default deadline date. Click the “Create” button.

Task name

Deadline

5. Check the document sets “NHTSA_Adjudicate_Doc_xxx1” and “NHTSA_Adjudicate_Doc_xxx2” and click on “Create Task” button on the top right corner

Add Annotation Sets to the Task

Annotation Set Name	Annotator Name	Task Name
<input type="checkbox"/> NHTSA_HA_DocSet1_LA	Lee Angelelli	NHTSA_Predict_HA_Task_1
<input type="checkbox"/> NHTSA_HA_DocSet2_LA	Lee Angelelli	NHTSA_Predict_HA_Task_1
<input checked="" type="checkbox"/> Adjudication_DocSet1_LA	Lee Angelelli	
<input checked="" type="checkbox"/> Adjudication_DocSet2_LA	Lee Angelelli	

6. Your screen should look like the screen shot below.

Annotation Tasks

The screenshot shows a user interface for managing annotation tasks. At the top, there are two buttons: "Add Task" (blue) and "Refresh" (white). Below these are two task cards. The first card is for "NHTSA_PreDict_HA_Task_1" with a deadline of 10/10/2018. The second card is for "NHTSA_HA_Adjudication" with a deadline of 10/10/2018. Each card displays a progress bar at 0% completion.

7. Click on the “NHTSA_PreDict_HA_Task_1”.

Documents

The screenshot shows a user interface for managing documents. At the top, there are four tabs: "Document Sets (4)", "Annotation Sets (2)", "Documents (All, 479)" (selected), and "Tasks". Below these are two buttons: "Add Task" (blue) and "Refresh" (white). A single document card is visible, representing "NHTSA_PreDict_HA_Task_1" with a deadline of 02/21/2018. This document card is highlighted with a blue border, indicating it is selected.

8. Click on “Annotate” button for the “NHTSA_HA_DocSet2_LeeA” doc set.

NHTSA_PreDict_HA_Task_1

Deadline: 02/21/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted. When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth. Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts
Apply Type System Updates			

Annotation Set Name	Annotator Name	Status	Action
NHTSA_HA_DocSet2_LeeA	Lee Angelelli	IN PROGRESS	
NHTSA_HA_DocSet1_LeeA	Lee Angelelli	IN PROGRESS	

9. Click on any of the documents; e.g. “CA08012”. You should see the MANUFACTURER, MODEL, and VEHICLE already annotated.

Showing 1-4 of 4

Document Name	Status	Last Modified
CA08012	Ready	2018-02-21 14:47:16 -0500
CA08013	Ready	2018-02-21 14:47:16 -0500
DS08008	Ready	2018-02-21 14:47:16 -0500
IN08015	Ready	2018-02-21 14:47:16 -0500



Back to Task | Open document list

 Mention
 Relation


CA08012

- 1 This on-site investigative effort focused on the side impact inflatable occupant protection system in a 2007 **Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver.
- 2 The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.
- 3 In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.
- 4 The **Hyundai** was involved in an intersection crash with a 2005 **Ford Explorer** that resulted in left side damage to the **Sonata**.
- 5 A 2004 **Ford Focus** subsequently struck the **Explorer** as the **vehicle** came to rest.

 Entity | Mention

Type	Subtype	Role
o	ACCIDENT_OUTCOME	
-	CONDITION	
i	INCIDENT	
m	MANUFACTURER	
y	MODEL	
f	MODEL_YEAR	
p	PART_OF_CAR	
s	PERSON	
H	STRUCTURE	
v	VEHICLE	

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Exercise 05: Human Annotation

Goals:

In this lab you will:

- Annotate mentions, co-references and relations for the documents in the document set assigned to you

Use the Annotation_Guidelines document provided as a reference to annotate the documents. At the end of this lab, you should know how to annotate documents for training a machine learning MODEL.

Exercise Instructions

Login to the WKS instance. Click on the project you have created. You will annotate documents that are assigned to you in this project.

Note:

In order to be able to adjudicate documents, there must be some differences in the overlapping documents so that conflicts can be resolved. So you may want to purposely annotate the overlapping documents slightly differently just to be able to go through the process of adjudicating.

Lesson 5.0 Annotate Mentions

1. Click on the WKS working Project <short login name>. Click on the “Machine Learning Model” > click on “Annotation Tasks” > click on the “NHTSA_PreDict_HA_Task_1” annotation task.

[Back to Workspaces](#)

Annotation Tasks

[Add Task](#) [Refresh](#)

NHTSA_PreDict_HA_Task_1

Deadline: 10/10/2018

Progress 0%

Machine Learning Model

Annotation Tasks

- On the Human Annotation page and you will see a list of tasks. You will see the document sets assigned for you to annotate. In this case, since you are the only one working on the project, you will see two document sets both assigned to you. Click on the “Annotate” button next to the “NHTSA_HA_DocSet2_LA” task to begin annotation.

[NHTSA_PreDict_HA_Task_1](#)

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

[Edit Annotation Sets](#) [Refresh](#) [Calculate Inter-Annotator Agreement](#) [Check Overlapping Documents for Conflicts](#)

[Apply Type System Updates](#)

Annotation Set Name	Annotator Name	Status	Action
NHTSA_HA_DocSet2_LA	Lee Angelelli	IN PROGRESS	Annotate
NHTSA_HA_DocSet1_LA	Lee Angelelli	IN PROGRESS	Annotate

- You will see the documents that have been assigned to you. Click on one of the “CA08012” document to begin the annotation task.

Select Document

[Close](#)

Annotation Set: NHTSA_HA_DocSet2_LA
Annotator: langelel@us.ibm.com
Task: NHTSA_PreDict_HA_Task_1

[Submit All Documents](#)

Showing 1-4 of 4

Document Name	Status	Last Modified	Actions
CA08012	Ready	Oct 10, 2018 11:03:08 AM	Open
CA08013	Ready	Oct 10, 2018 11:03:08 AM	Open
IN08010	Ready	Oct 10, 2018 11:03:08 AM	Open
IN08015	Ready	Oct 10, 2018 11:03:08 AM	Open

CA08012

- ¹ This on-site investigative effort focused on the side impact inflatable occupant protection system in a 2007 **Hyundai** **Sonata** and the injury sources of the restrained 31-year-old female driver.
- ² The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.
- ³ In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.
- ⁴ The **Hyundai** was involved in an intersection crash with a 2005 **Ford** **Explorer** that resulted in left side damage to the **Sonata**.
- ⁵ A 2004 **Ford** **Focus** subsequently struck the **Explorer** as the **vehicle** came to rest.

Entity		Mention
Type	Subtype	Role
o	ACCIDENT_OUTCOME	
-	CONDITION	
i	INCIDENT	
f	MANUFACTURER	
m	MODEL	
y	MODEL_YEAR	
j	PART_OF_CAR	
p	PERSON	
s	STRUCTURE	
H	VEHICLE	

There are 3 sections on the left for annotating mentions, relations and co-reference. The default section that comes up is ‘Mentions’. For annotating mentions, click the word or phrase that you would like to annotate and choose the entity type (which is color coded) on the right.

Note: A dictionary annotator should have already labeled mentions of MANUFACTURER and MODEL.

4. Click on the text 2007 to highlight the text > click the entity type “MODEL_YEAR” on the right-hand side. Repeat the steps for 2005 and 2004.
5. Click on the text phrase “inflatable occupant protection system” to create a box around the phrase > click on “PART_OF_CAR” > then click on the ‘Save’ button at the top.

A View Details Replace Concordance Attribute View In Progress Save Entity

CA08012

1 This on-site investigative effort focused on the side impact **inflatable occupant protection system** in a **2007 Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver.

2 The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.

3 In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.

4 The **Hyundai** was involved in an intersection crash with a **2005 Ford Explorer** that resulted in left side damage to the **Sonata**.

5 A **2004 Ford Focus** subsequently struck the **Explorer** as the **vehicle** came to rest.

6 As a result of the crash, the **Hyundai**'s left seat back mounted side impact air bag and the left side curtain air bag deployed.

7 The driver of the **Hyundai** sustained minor injuries during crash and was transported to a hospital where she was treated and released.

6. To annotate a role for a mention, click on the text “Ford”, go to the ‘Role’ tab on the right. You will see the list of roles that are applicable to the entity type that has been chosen for the mention. Select “VEHICLE”.

A View Details Concordance Attribute View In Progress Save Entity

CA08012

1 This on-site investigative effort focused on the side impact **inflatable occupant protection system** in a **2007 Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver.

2 The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.

3 In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.

4 The **Hyundai** was involved in an intersection crash with a **2005 Ford Explorer** that resulted in left side damage to the **Sonata**.

5 A **2004 Ford Focus** subsequently struck the **Explorer** as the **vehicle** came to rest.

6 As a result of the crash, the **Hyundai**'s left seat back mounted side impact air bag and the left side curtain air bag deployed.

7 The driver of the **Hyundai** sustained minor injuries during crash and was transported to a hospital where she was treated and released.

Lesson 5.1 Annotate co-references

Note: Co-references should be annotated only after mention annotations have been completed.

1. Coreferences are mentions that refer to the same thing given within the scope of the document. To annotate coreferences, go to the coreference page by clicking coreferences on the left.
2. Single click on all mentions of “Hyundai”. To create a coreference of Hyundai > double click on one of the Hyundai terms. You will see a coreference appear in the upper right. You will see the number key on the right with co-referenced mentions having the same number.

Notice that all the Hyundai mentions are marked with #1. This means that they belong to the same entity.

The screenshot shows the annotation interface with the following components:

- Mention Panel:** On the left, there are three buttons: "Mention" (selected), "Relation", and "Coreference".
- Document ID:** CA08012
- Status Bar:** In Progress, Save
- Text Content:** A numbered list of 7 statements describing a car accident involving a 2007 Hyundai Sonata and a Ford Explorer.
- Coreference Chains:** A table showing the coreference chain for the word "Hyundai".
- Single Mention List:** A table listing all the vehicle mentions found in the text.

Coreference Chains		
ID	Text	Size
#1	Hyundai	6

Single Mention List
Sonata
Ford
Explorer
Sonata
Ford
Focus
Explorer
vehicle
2007
2005

Lesson 5.2 Annotate relations

1. To annotate relations, click the relations icon on the left > the relations view should be displayed.

This on-site investigative effort focused on the side impact **PART_OF_CAR** inflatable occupant protection system in a 2007 Hyundai Sonata and the injury sources of the restrained 31-year-old female driver.

The **MANUF...** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.

Note: To create a relation > choose the mention which belongs to the first entity type and then the mention that belongs to the second entity type in a relation. The WKS system will display/filter only the relations that can exist between the two relations.

2. Click on the phrase “inflatable occupant protection system” [PART_OF_CAR] > create a link to “Hyundai”.[MANUFACTURER] > and select the relation {locatedOn}. Click on “Hyundai”.[MANUFACTURER] and create a link to “2007”[MODEL_YEAR] and select the {hasProperty} relation.

This on-site investigative effort focused on the side impact **PART_OF_CAR** inflatable occupant protection system in a 2007 Hyundai Sonata and the injury sources of the restrained 31-year-old female driver.

Lesson 5.3 Save and submit your annotations

- Once you have completed annotating mentions, co-references and relations on all the documents, mark each document as 'Complete' and save. Click the "Back to Task" icon at the top left.



- You should see the document marked to complete.

Select Document

[Close](#)

Annotation Set: NHTSA_HA_DocSet2_LA

Annotator: langelel@us.ibm.com

Task: NHTSA_PreDict_HA_Task_1

[Submit All Documents](#)

Showing 1-4 of 4

Document Name	Status	Last Modified	Actions
CA08013	Ready	Oct 10, 2018 11:03:08 AM	Open
IN08010	Ready	Oct 10, 2018 11:03:08 AM	Open
IN08015	Ready	Oct 10, 2018 11:03:08 AM	Open
CA08012	Completed	Oct 10, 2018 1:50:43 PM	Open

Note: In a real WKS project you will annotated all the documents in a document set and marked them as complete, the document set status changes to "Submitted" from "In Progress". Once submitted, human annotators cannot edit the annotations. It is now up to the Project Manager to review the annotations, adjudicate, and accept or reject the annotations. If accepted, they are promoted to ground truth.

- For the purposes of this lab > click the "Submit All Documents" button to submit all documents in the HA task > click OK to confirm > click "Close" button.

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4. You should be on the “NHTSA_PreDict_HA_Task_1” view. Click the “Annotate” button next to the “NHTSA_HA_DocSet1_LA” task > click the “Submit All Documents” button to submit all documents in the HA task > click OK to confirm > click “Close” button.

Select Document

[Close](#)

Annotation Set: NHTSA_HA_DocSet2_LA

Annotator: langelel@us.ibm.com

Task: NHTSA_PreDict_HA_Task_1

[Submit All Documents](#)

Showing 1-4 of 4

Document Name	Status	Last Modified	Actions
CA08013	Completed	Oct 10, 2018 11:03:08 AM	Open
IN08010	Completed	Oct 10, 2018 11:03:08 AM	Open
IN08015	Completed	Oct 10, 2018 11:03:08 AM	Open
CA08012	Completed	Oct 10, 2018 1:50:43 PM	Open

5. To submit documents as ground truth > click on the checkbox to check the HA tasks “” and “” then click the “Accept” button.

[←](#) | [NHTSA_PreDict_HA_Task_1](#)

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.

When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.

Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts	Apply Type System Update
Accept	Reject			
Annotation Set Name	Announcer Name	Status		
<input checked="" type="checkbox"/> NHTSA_HA_DocSet2_LA	Lee Angelelli	SUBMITTED		
<input checked="" type="checkbox"/> NHTSA_HA_DocSet1_LA	Lee Angelelli	SUBMITTED		

Note:

The HA tasks will appear in conflict. In order to be able to adjudicate documents, there must be some differences in the overlapping documents so that conflicts can be resolved. Once the conflicts have been resolved through adjudication > you will be able to submit them as ground truth.

To speed up this lab we will use the “NHTSA Adjudication Example.” Please follow these steps to prepare the “2004-02-040.docxml” document in the Annotation set “NHTSA Adjudication Doc”.

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Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted. When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth. Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

[Edit Annotation Sets](#) [Refresh](#) [Calculate Inter-Annotator Agreement](#) [Check Overlapping Documents for Conflicts](#) [Apply Type System Updates](#)

Annotation Set Name	Annotator Name	Status	Action
NHTSA_HA_DocSet2_LA	Lee Angelelli	IN CONFLICT	View
NHTSA_HA_DocSet1_LA	Lee Angelelli	IN CONFLICT	View

6. Click on the “Annotation Tasks” on the left-hand side > click on the “NHTSA_HA_Adjudication_Task_2” HA task.

Annotation Tasks

[Add Task](#) [Refresh](#)

NHTSA_PreDict_HA_... ::

Deadline: 10/10/2018

Progress 100%

NHTSA_HA_Adjudica... ::

Deadline: 10/10/2018

Progress 0%

7. Click on the “Annotate” button next to the “Adjudication_DocSet1_LA” document set name.

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

[Edit Annotation Sets](#) [Refresh](#) [Calculate Inter-Annotator Agreement](#) [Check Overlapping Documents for Conflicts](#) [Apply Type System Updates](#)

Annotation Set Name	Annotator Name	Status	Action
Adjudication_DocSet1_LA	Lee Angelelli	IN PROGRESS	Annotate
Adjudication_DocSet2_LA	Lee Angelelli	IN PROGRESS	Annotate

8. Click on the “Open” link next to the document “2004-02-040.docxml”. Click on “Mentions” menu item on the left. Then delete these mentions circled in red.
 - Sentence 1 – “Vehicle 2” and “2-lane”.
 - Sentence 6 – “damage” and “vehicle 2”.

2004-02-040.docxml

- 1 **Vehicle 1** and **Vehicle 2** were both traveling south on a **2-lane** divided **roadway**.
- 2 **Vehicle 2** was approaching an intersection with functioning **traffic signals** and was preparing to stop.
- 3 **Vehicle 1** was approaching the same intersection behind **V2**.
- 4 The **front** of **V1** contacted the **back** of **V2**.
- 5 The **roadway** was **level and dry**, with **no adverse weather conditions**.
- 6 **Vehicle 1** was **towed** due to **damage**, and **vehicle 2** was **not towed**.
- 7 No **occupants** were transported to a medical facility.

Note: if you see this Confirmation dialog box about mention has been added to a coreference... -> click the “Ok” button.

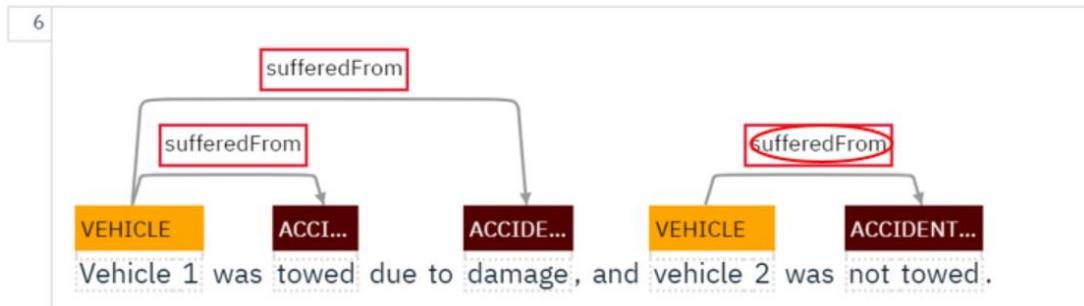
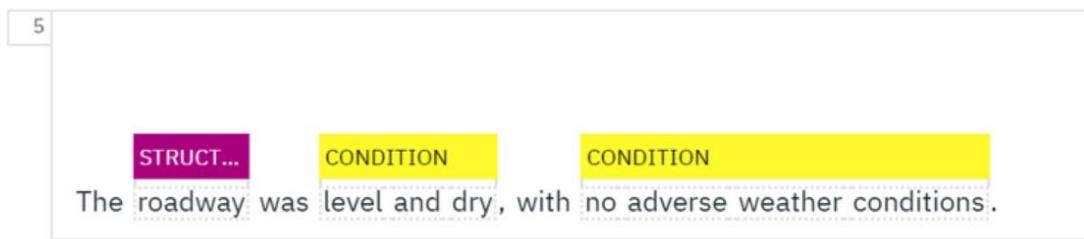
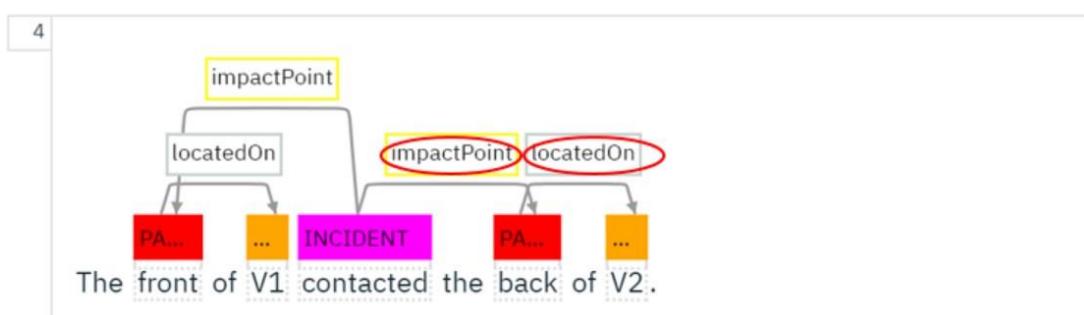
Confirmation

This mention has been added to a coreference chain and it has relations. It will be removed from the coreference chain and all relations will be removed. Do you really want to continue this operation?

Cancel

OK

9. Click on the “Relations” menu item on the left pane. Then delete these relations circled in red. Click on the relation > then click the ‘x’ to delete the relation.
 - Sentence 4 – delete “impactPoint” and “locatedOn”
 - Sentence 6 – delete “sufferedFrom”



10. Click on the “Coreference” menu item on the left pane. Then delete the

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coreference circled in red.

- Sentence 1 – “Vehicle #1”

2004-02-040.docxml

- 1 Vehicle 1 and Vehicle 2 were both traveling south on a 2-lane divided roadway.
#1
#2
- 2 Vehicle 2 was approaching an intersection with functioning traffic signals and was preparing to stop.
#2
- 3 Vehicle 1 was approaching the same intersection behind V2.
#1
#2
- 4 The front of V1 contacted the back of V2.
#1
#2
- 5 The roadway was level and dry, with no adverse weather conditions.
- 6 Vehicle 1 was towed due to damage, and vehicle 2 was not towed.
#1
- 7 No occupants were transported to a medical facility.

11. Select “Completed” and press “Save”.
- 12 Click the “<- Back to Task” icon. You should see this screen below with the document “2004-040.docxml” marked as “Completed”

NHTSA HA Adjudication Example

Annotation Set		
NHTSA_Adjudicate_Doc_LA1		
Document Name	Status	Last Modified
2004-02-040.docxml	Completed	2018-02-21 19:42:35 -0500

13. In the “NHTSA_HA_Adjudication_Task_2” screen > click the “Annotate” button next to the HA task “Adjudication_DocSet2_LA” > then click the “Submit All Documents” button > click Ok on the confirmation dialog > click Close button > click the “<- Back To Task” link in the upper left.

Select Document

[Close](#)

Annotation Set: Adjudication_DocSet2_LA
Annotator: langelel@us.ibm.com
Task: NHTSA_HA_Adjudication_Task_2

[Submit All Documents](#)

Showing 1-1 of 1

Document Name	Status	Last Modified	Actions
2004-02-040.docxml	Ready	Oct 10, 2018 9:25:17 AM	Open

14. You should now see all documents marked “Complete”.

[←](#) | NHTSA_HA_Adjudication_Task_2

Deadline: 10/10/2018

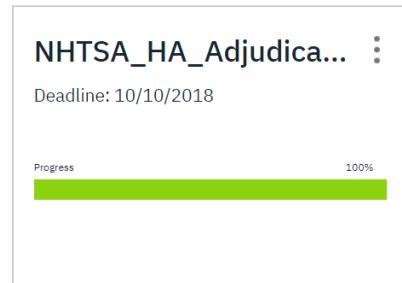
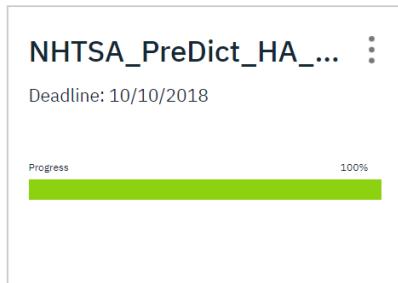
Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts	Apply Type System Updates
Accept	Reject			
Annotation Set Name	Annotator Name	Status	Action	
<input type="checkbox"/> Adjudication_DocSet2_LA	Lee Angelelli	SUBMITTED	View	
<input type="checkbox"/> Adjudication_DocSet1_LA	Lee Angelelli	SUBMITTED	View	

15. Click the “<-“ link at the top left of the webpage. You should see the task “NHTSA_HA_Adjudication_Task_2” marked 100% complete.

Annotation Tasks

[Add Task](#) [Refresh](#)



Exercise 06: Adjudication

Goals:

In this lab you will:

- Adjudicate the overlapping documents among human annotators
- Promote annotated documents to ground truth

At the end of this lab, you should know how to interpret the Inter-Annotator agreement, adjudicate and create ground truth.

Lesson 6.1 Adjudicate and build Machine Learning Model

Once the documents have been submitted, the annotation process manager needs to promote the documents to ground truth if the annotations are acceptable. To do so, the first step is to review the IAA score to see if the F measure, precision and recall are acceptable.

6.1.1 Annotate documents for <login>_WKS

1. if you have not already done as part of lab 5, go to the project <login>_WKS where <login> is your IBM login and annotate the documents from both document sets that have been assigned to you.

6.1.2 Analyzing inter-annotator agreement (IAA) Scores

1. Click on “Machine Learning Model” to expand drop down menu; click “Annotation Tasks” link; double click the ““NHTSA_HA_Adjudication_Task_2”. Now you should see this ““NHTSA_HA_Adjudication_Task_2” task screen.
2. Click on the checkboxes next to “” and “” > click on the “Calculate Inter-Annnotator Agreement” button.

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted. When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth. Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

<input type="button" value="Edit Annotation Sets"/>	<input type="button" value="Refresh"/>	<input type="button" value="Calculate Inter-Annotator Agreement"/>	<input type="button" value="Check Overlapping Documents for Conflicts"/>	<input type="button" value="Apply Type System Updates"/>
<input type="button" value="Accept"/>	<input type="button" value="Reject"/>			
Annotation Set Name	Annotator Name	Status	Action	
<input checked="" type="checkbox"/> Adjudication_DocSet2_LA	Lee Angelelli	SUBMITTED	<input type="button" value="View"/>	
<input checked="" type="checkbox"/> Adjudication_DocSet1_LA	Lee Angelelli	SUBMITTED	<input type="button" value="View"/>	

3. The system by default will show you the “Mention” IAA scores. Take some time to review the scores. Also, change the “Pair” value to view by “Document”. In this case there’s only one document.

Review IAA for NHTSA HA Adjudication Example

Mention	Pair	
Values in the "All" column are Fleiss kappa scores. The range is below 1, and values can be negative. Values in the other columns are F1 scores. The range can be from 0 to 1. The closer a value is to 1, the higher the agreement rate is (1 means perfect agreement).		
<hr/>		
Summary		
All	0.84	langelel@us.ibm.com & langelel@us.ibm.com
<hr/>		
Overall Statistics		
All	0.9	
<hr/>		
Entity Type		
ACCIDENT_OUTCOME	0.85	langelel@us.ibm.com & langelel@us.ibm.com
CONDITION	1	1
INCIDENT	1	1
MANUFACTURER	N/A	N/A
MODEL	N/A	N/A
MODEL_YEAR	N/A	N/A
PART_OF_CAR	1	1
PERSON	1	1
STRUCTURE	0.71	0.86
VEHICLE	0.82	0.88
<hr/>		

4. Next view the IAA scores for “Coreferences”. Change the “Mention” value to “Coreference” and “Document” back to “Pair”. In this case there’s only one coreference type “VECHILE”.

Review IAA for NHTSA HA Adjudication Example

Coreference	▼	Pair	▼
-------------	---	------	---

All values are F1 scores. The range can be from 0 to 1.

The closer a value is to 1, the higher the agreement rate is (1 means perfect agreement).

Summary	langelel@us.ibm.com & langelel@us.ibm.com
Overall Statistics	0.88
Coreference	◆ langelel@us.ibm.com & langelel@us.ibm.com
ACCIDENT_OUTCOME	N/A
CONDITION	N/A
INCIDENT	N/A
MANUFACTURER	N/A
MODEL	N/A
MODEL_YEAR	N/A
PART_OF_CAR	N/A
PERSON	N/A
STRUCTURE	N/A
VEHICLE	0.88

5. Next view the IAA scores for “Relation”. Change the “Coreference” value to “Relation” and view by “Pair”. Please take time to review the scores for the different relation type.

Relation	▼	Pair	▼
----------	---	------	---

All values are F1 scores. The range can be from 0 to 1.

The closer a value is to 1, the higher the agreement rate is (1 means perfect agreement).

Summary	langelel@us.ibm.com & langelel@us.ibm.com
Overall Statistics	0.83
Relation Type	langelel@us.ibm.com & langelel@us.ibm.com
causedBy	N/A
driverUnder	N/A
hasProperty	N/A
impactPoint	1
locatedOn	1
occupantOf	N/A
outcomeOf	N/A
sufferedFrom	0.5

6. Click on the link “<- Back to NHTSA_HA_Adjudication_Task_2 Task”. Now you should be viewing the main “NHTSA HA Adjudication Example” task screen.

6.1.3 Adjudicate and promote to ground truth

6. Select the two Annotation Sets: “Adjudicate_DocSet1_xxx” and “Adjudicate_DocSet2_xx”. Then click Accept button. Click “Ok” button on the Confirmation dialog box “Are you sure that you want to accept the selected annotation sets?”

NHTSA HA Adjudication Example

Deadline: 02/21/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts
Apply Type System Updates			
Accept	Reject		
Annotation Set Name	Annotator Name	Status	Action
<input checked="" type="checkbox"/> NHTSA_Adjudicate_Doc_LA1	Lee Angelelli	SUBMITTED	View
<input checked="" type="checkbox"/> NHTSA_Adjudicate_Doc_LA2	Lee Angelelli	SUBMITTED	View

7. Once approve is clicked, the documents that do not overlap are automatically promoted to ground truth. The documents that do overlap need to be adjudicated.
8. To adjudicate conflicts, click on “Check overlapping documents for conflict” button.

[←](#) | [NHTSA_HA_Adjudication_Task_2](#)

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts	Apply Type System Updates
Annotation Set Name	Annotator Name	Status	Action	
Adjudication_DocSet2_LA	Lee Angelelli	IN CONFLICT	View	
Adjudication_DocSet1_LA	Lee Angelelli	IN CONFLICT	View	

9. The system shows “2004-02-040.docxml” is in conflict. Click the “Check for Conflicts” button. Select the two documents in conflict; click the “Check for Conflicts” button.

Select the two sets of human annotation conflicts that you want to resolve.

- Adjudication_DocSet2_LA (langelel@us.ibm.com)
- Adjudication_DocSet1_LA (langelel@us.ibm.com)
- Current Ground Truth

Cancel

Check for Conflicts

10. Now you should see the Mentions conflicts screen. The conflicts are in sentence 1 and 6. The human annotators name shows the mentions in conflict. Please perform these actions:

- Sentence 1 – accept the “Vehicle 2” and “2-lane” mentions.
- Sentence 6 – accept the “damage” and “vehicle” mentions.

The screenshot shows the 'Attribute View' interface for document '2004-02-040.docx'. The left sidebar lists 'Conflicts' (8 remaining) and categories like 'Mention conflicts' (4), 'Relation conflicts' (2), and 'Coreference chain conflicts' (2). The main area displays three sentences with annotations:

- Sentence 1:** 'Lee Angelelli' annotated 'Vehicle 1' and 'Vehicle 2' as 'VEHICLE'. 'Lee An...' annotated '2-lane' and 'roadway' as 'STRUCTURE'. The text: 'Vehicle 1 and Vehicle 2 were both traveling south on a 2-lane divided roadway.' Buttons: 'Reject (4)' and 'Accept (4)'.
- Sentence 2:** 'LEE ANGELELLI' annotated 'Vehicle 2' as 'VEHICLE'. The text: 'Vehicle 2 was approaching an intersection with functioning traffic signals and was preparing to stop.'
- Sentence 6:** 'Lee Angelelli' annotated 'Vehicle 1' as 'VEHICLE'. 'Lee Angelelli' annotated 'damage' as 'ACCIO...' and 'vehicle 2' as 'VEHICLE'. The text: 'Vehicle 1 was towed due to damage, and vehicle 2 was not towed.'

A legend on the right defines entity types: ACCIDENT_OUTCOME, CONDITION, INCIDENT, MANUFACTURER, MODEL, MODEL_YEAR, PART_OF_CAR, PERSON, STRUCTURE, and VEHICLE. A color key indicates entity subtypes: ACCIDENT_OUTCOME (red), CONDITION (blue), INCIDENT (green), MANUFACTURER (orange), MODEL (purple), MODEL_YEAR (pink), PART_OF_CAR (yellow), PERSON (teal), STRUCTURE (light blue), and VEHICLE (dark blue).

11. Now you should see the mentions in conflict = 0. Click on the “Coreference

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chain conflicts". There should be two of them. #2 Vehicle and #3 Vehicle seem to be in conflict. Please click on #2 and #3; then press "Merge" button. Click the Ok button for the Confirmation dialog box "The selected coreference chains will be merged as resolved coreference chains. Do you really want to merge all selected coreference chains?"

The screenshot shows a document titled "2004-02-040.docxml" with 4 remaining conflicts. The conflicts are categorized as follows:

- Conflicts:** 4 remaining
- Human Annotators:** Lee Angelelli
- Unresolved:** Resolved
- Mention conflicts:** 0
- Relation conflicts:** 2
- Coreference chain conflicts:** 2

The main pane displays the following sentences with coreference annotations:

- #1 Vehicle 1 and Vehicle 2 were both traveling south on a 2-lane divided roadway.
- #2 Vehicle 2 was approaching an intersection with functioning traffic signals and was preparing to stop.
- #1 Vehicle 1 was approaching the same intersection behind V2.
- The front of V1 contacted the back of V2.
- The roadway was level and dry, with no adverse weather conditions.
- #1 Vehicle 1 was towed due to damage, and vehicle 2 was not towed.
- No occupants were transported to a medical facility.

At the top right, there are buttons for Discard, Save, and Promote to Ground Truth. On the far right, there is a sidebar for Lee Angelelli with options to Merge Chains, Reject Chain, or Accept Chain. A list of coreference chains is also shown:

- #1 Vehicle 1 (4)
- #2 Vehicle 2 (3)
- #3 Vehicle 2 (5)

12. Now you should see zero "Coreference chain conflicts"

13. Click on the Relation conflicts. There should be two conflicts. In sentence 6 – select the two relations in conflict and click the "Accept" button.

Conflicts 2 remaining

Human Annotators Lee Angelelli

Unresolved Resolved

Mention conflicts 0

Relation conflicts 2

Coreference chain conflicts 0

STRUCTURE CONDITION CONDITION

The front of V1 contacted the back of V2.

causedBy
driverUnder
hasProperty
impactPoint
locatedOn
occupantOf
outcomeOf
sufferedFrom

STRUCTURE CONDITION CONDITION

The roadway was level and dry, with no adverse weather conditions.

6

Lee Angelelli sufferedFrom

Lee Angelelli sufferedFrom

Reject (2) Accept (2)

Vehicle 1 was towed due to damage, and vehicle 2 was not towed.

Select all annotations

14. Now you should see zero conflicts. Click the “Promote to Ground Truth” > click the back button in the upper left. Adjudication process is complete.

Documents

Document Sets (5) Annotation Sets (4) Documents (All, 480) Tasks

Go Back to Task List

NHTSA HA Adjudication Example

Deadline: 02/21/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets Refresh Calculate Inter-Annotator Agreement Check Overlapping Documents for Conflicts Apply Type System Updates

Annotation Set Name	Annotator Name	Status	Action
NHTSA_Adjudicate_Doc_LA1	Lee Angelelli	COMPLETED	<button>View</button>
NHTSA_Adjudicate_Doc_LA2	Lee Angelelli	COMPLETED	<button>View</button>

Lesson 6.2 Create a Machine Learning Annotator

The steps to follow to build a ML annotator is documented in the user guide. It can be accessed from:

http://www.ibm.com/watson/developercloud/doc/wks/wks_tutorials.shtml

Note: You can obtain more NHTSA traffic INCIDENT reports from: <http://www-nass.nhtsa.dot.gov/nass/sci/SearchForm.aspx>

Training the machine-learning annotator

This section will walk through the process of training and testing a customized machine learning annotator. In IBM Watson™ Knowledge Studio, the creation of the machine-learning annotator component involves training the machine-learning annotator and evaluating how well the annotator performed when annotating test data and blind data.

Creating a machine-learning annotator component

When you create a machine-learning annotator component, you select the document sets that you want to use to train the annotator component and specify the percentage of documents that are to be used as training data, test data, and blind data.

6.3 Create the Training/Testing Annotation Sets and HA Tasks

1. Click on the “Assets” link to expand the menu in the left pane. Click “Documents” link menu item > click the “Create Annotation Sets” button.
2. In the Base set drop down > select the “NHTSA Training Docs”. Leave Overlap to 100%. Select a Human annotator. Name the Set name to “NHTSA Training Annotation Set”; click the “Generate” button.

3. Click “Create Annotation Sets” button. Select the “NHTSA Testing Doc Set”. Leave Overlap to 100%. Select a Human annotator. Name the Set name to “NHTSA Testing Annotation Set”; click the “Generate” button.
4. Your screen should look like this screen shot.

Name	Documents	Annotator	Last Modified	Action
NHTSA_HA_DocSet1_LA	4	Lee Angelelli	10/10/2018	Rename
NHTSA_HA_DocSet2_LA	4	Lee Angelelli	10/10/2018	Rename
Adjudication_DocSet1_LA	1	Lee Angelelli	10/10/2018	Rename
Adjudication_DocSet2_LA	1	Lee Angelelli	10/10/2018	Rename
NHTSA Training Annotation Set	426	Lee Angelelli	10/10/2018	Rename Delete
NHTSA Testing Doc Set	48	Lee Angelelli	10/10/2018	Rename Delete

Now you need to create two Human annotation tasks: 1) for training and 2) for testing.

5. Click the “Machine Learning Model” to expand the menu > click “Annotation Tasks” link > click the “Add Task” button. Give the task the name “NHTSA GT Training Set” > click the “Create” button > select the “NHTSA Training Annotation Set” document set > click the “Create Task” button.

Add Annotation Sets to the Task

[Cancel](#) [Create Task](#)

Annotation Set Name	Annotator Name	Task Name
<input type="checkbox"/> NHTSA_HA_DocSet1_LeeA	Lee Angelelli	NHTSA_PreDict_HA_Task_1
<input type="checkbox"/> NHTSA_HA_DocSet2_LeeA	Lee Angelelli	NHTSA_PreDict_HA_Task_1
<input type="checkbox"/> NHTSA_Adjudicate_Doc_LA1	Lee Angelelli	NHTSA HA Adjudication Example
<input type="checkbox"/> NHTSA_Adjudicate_Doc_LA2	Lee Angelelli	NHTSA HA Adjudication Example
<input checked="" type="checkbox"/> NHTSA Training Annotation Set	Lee Angelelli	
<input type="checkbox"/> NHTSA Testing Annotation Set	Lee Angelelli	

6. Perform the same steps to create the Testing HA task. Click “Add Task” button. Give the task the name “NHTSA GT Testing Set” > click the “Create” button > select the “NHTSA Testing Annotation Set” document set. Click the “Create Task” button.

Note; these training and testing documents have already been pre-annotated. Using the steps learned above – view the annotations and “Submit all Documents” as complete.

7. Click the “NHTSA GT Training Set” > click the “Annotate” button > click the “Submit All Documents” button > click OK on the confirmation dialog > click the Close button > click the “<- Back to Task” icon.

[←](#) | NHTSA GT Training Set

Deadline: 10/10/2018

Annotations added to annotation sets are not considered ground truth until the annotation sets are submitted and accepted.
When an annotation set is accepted, documents that are annotated in only one annotation set immediately become ground truth.
Documents that are annotated in two or more annotation sets become overlapping documents that will become ground truth after conflicts are resolved.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts	Apply Type System Updates
Accept	Reject			
Annotation Set Name	Annotator Name	Status	Action	
<input type="checkbox"/> NHTSA Training Annotation Set	Lee Angelelli	SUBMITTED	View	

8. Now you will need to accept the training document set as ground truth. Click the checkbox next to the “NHTSA Training Annotation Set” > click the “Accept” button > click OK button > click “<-“ back icon in top left.

Edit Annotation Sets	Refresh	Calculate Inter-Annotator Agreement	Check Overlapping Documents for Conflicts	Apply Typ
Accept	Reject			
Annotation Set Name	Annotator Name	Status	Action	
<input checked="" type="checkbox"/> NHTSA Training Annotation Set	Lee Angelelli	SUBMITTED	View	

9. Click the “NHTSA GT Testing Set” > > click the “Annotate” button > click

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- the “Submit All Documents” button > click OK on the confirmation dialog > click the Close button > click the “<- Back to Task” icon.
10. Now you will need to accept the training document set as ground truth. Click the checkbox next to the “NHTSA Testing Doc Set” > click the “Accept” button > click OK button > click “<-“ back icon in top left.
 11. Your screen should look similar to this screen shot.

Annotation Tasks

Add Task
Refresh

NHTSA_PreDict_HA_... ⋮

Deadline: 10/10/2018

Progress 100%

NHTSA_HA_Adjudica... ⋮

Deadline: 10/10/2018

Progress 100%

NHTSA GT Training Set ⋮

Deadline: 10/10/2018

Progress 100%

NHTSA GT Testing Set ⋮

Deadline: 10/10/2018

Progress 100%

6.4 Create a machine-learning annotator component

In this lesson, you will learn how to create a machine learning annotator in Knowledge Studio.

About this task

When you create a machine-learning annotator, you select the document sets that you want to use to train it. You also specify the percentage of documents that are to be used as training data, test data, and blind data. Only documents that became ground truth through approval or adjudication can be used to train the machine learning annotator.

Procedure

1. Log in to Knowledge Studio as the administrator > click on the “NHTSA Advisor” project.
2. Click on the “Machine Learning Model” to expand the menu > click on

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“Performance” link > click on the “Train and Evaluate” button. From the **Model Management > Performance** sidebar, click **Train and evaluate**” button.

The screenshot shows the 'Performance' section of the Model Management interface. The sidebar on the left has several sections: Assets (Documents, Entity Types, Relation Types, Dictionaries), Rule-based Model, Machine Learning Model (circled in red), Pre-annotation, Annotation Tasks, Performance (circled in red), Versions, Settings, and Help. The main content area is titled 'Performance' and shows 'NHTSA Advisor' with 'Language of documents: English'. It features a donut chart for 'Number of documents per set' with three segments: Training Set (0), Test Set (0), and Blind Set (0). A prominent blue button labeled 'Train and evaluate' is circled in red, with a tooltip message: 'You have not trained the machine learning model.' Below this are sections for 'Document set evaluation' and 'Model over time'.

3. Click the checkbox next to the document set “**NHTSA Training Annotation Set**” for creating a machine-learning annotator.
4. In the section “Create new sets by splitting the selected document sets” specify these ratios > then click the Train button.:
 - 100 -> Training Set (70% Recommended)
 - 0 -> Test Set (23% Recommended)
 - 0 -> Blind Set (7% Recommended)

Note: Very IMPORTANT: click **Train** first.

Note: Training might take more than ten minutes, or even hours, depending on the number of human annotations and the total number of words across documents

← | Training / Test / Blind Sets

Select Training/ Test/ Blind Sets

Train

Train & Evaluate

⚠ Some tasks aren't completed yet. Machine learning uses current ground truth. The ground truth can change when a task completes.

Document Set	Task Status
<input type="checkbox"/> All	
<input type="checkbox"/> NHTSA HA Doc Set	
<input type="checkbox"/> NHTSA Training Docs	
<input type="checkbox"/> NHTSA Testing Docs	
<input type="checkbox"/> NHTSA Adjudication Docs	
<input type="checkbox"/> NHTSA_HA_DocSet1_LA	IN CONFLICT
<input type="checkbox"/> NHTSA_HA_DocSet2_LA	IN CONFLICT
<input type="checkbox"/> Adjudication_DocSet1_LA	COMPLETED
<input type="checkbox"/> Adjudication_DocSet2_LA	COMPLETED
<input checked="" type="checkbox"/> NHTSA Training Annotation Set	COMPLETED
<input type="checkbox"/> NHTSA Testing Doc Set	COMPLETED

Create new sets by splitting the selected document sets

Ratio

Enter the percentage of documents to include in each set.

100

Training Set (70% Recommended)

0

Test Set (23% Recommended)

0

Blind Set (7% Recommended)

- Once the training is done > click the “Train and evaluate” button > click the “Edit Settings” button.

← | Training / Test / Blind Sets

Last trained on: Oct 10, 2018 4:19:47 PM

Last evaluated on:

Train

Evaluate

Train & Evaluate

Edit Settings

Set Name	Number of Documents	Action
Training Set	426	View Ground Truth
Test Set	0	View Ground Truth View Decoding Results
Blind Set	0	

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- Click the checkbox for the document set “NHTSA Testing Doc Set” > click the checkbox for the “Add documents in the selected sets to:” > click the checkbox for “Test Set” > click the “Evaluate” button.

Note: Very IMPORTANT: click Test button. This process should take 4 mins.

← Training / Test / Blind Sets

Last trained on: Oct 10, 2018 4:19:47 PM
Last evaluated on:

[Train](#)

[Evaluate](#)

[Train & Evaluate](#)

[Go Back to View Mode](#)

Some tasks aren't completed yet. Machine learning uses current ground truth. The ground truth can change when a task completes.

Document Set	Task Status
<input type="checkbox"/> All	
<input type="checkbox"/> NHTSA HA Doc Set	
<input type="checkbox"/> NHTSA Training Docs	
<input type="checkbox"/> NHTSA Testing Docs	
<input type="checkbox"/> NHTSA Adjudication Docs	
<input type="checkbox"/> NHTSA_HA_DocSet1_LA	IN CONFLICT
<input type="checkbox"/> NHTSA_HA_DocSet2_LA	IN CONFLICT
<input type="checkbox"/> Adjudication_DocSet1_LA	COMPLETED
<input type="checkbox"/> Adjudication_DocSet2_LA	COMPLETED
<input type="checkbox"/> NHTSA Training Annotation Set	COMPLETED
<input checked="" type="checkbox"/> NHTSA Testing Doc Set	COMPLETED

Create new sets by splitting the selected docu...

Ratio

Enter the percentage of documents to include in each set.

100

Training Set (70% Recommended)

0

Test Set (23% Recommended)

0

Blind Set (7% Recommended)

Add documents in the selected sets to:

Set Name	Number of Documents
<input type="checkbox"/> Training Set	426
<input checked="" type="checkbox"/> Test Set	
<input type="checkbox"/> Blind Set	

- After the machine-learning annotator is trained, you can export it or you can view detailed information about its performance by clicking the **Detailed Statistics** links that are located above each of the graphs.
- To view the Training / Test / Blind Sets page, click the **Train and evaluate** button.
- To see the documents that human annotators worked on, click **View Ground Truth**.
- To see the annotations that the trained machine-learning annotator created on that same set of documents, click **View Decoding Results**.
- To view details about the precision, recall, and F1 scores for the machine-

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- learning annotator, select the Performance page.
12. Click the **Detailed Statistics** links above each of the graphs. On these Statistics pages, you can view the scores for mentions, relations, and coreference chains by using the radio buttons.
- You can analyze performance by viewing a summary of statistics for entity types, relation types, and coreference chains. You can also analyze statistics that are presented in a confusion matrix by selecting **Confusion Matrix** from the menu that defaults to **Summary**. The *confusion matrix* helps you compare the annotations that were added by the machine-learning annotator to the annotations in the ground truth.

IBM Watson Knowledge Studio

[Back to Workspaces](#)

Assets

- Documents
- Entity Types
- Relation Types
- Dictionaries

Rule-based Model

Machine Learning Model

- Pre-annotation
- Annotation Tasks
- Performance**
- Versions

Settings

Help

NHTSA Advisor

Language of documents
English

Number of documents per set



Set	Count
Training Set	426
Test Set	48
Blind Set	0

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

Test Set [View Ground Truth](#)

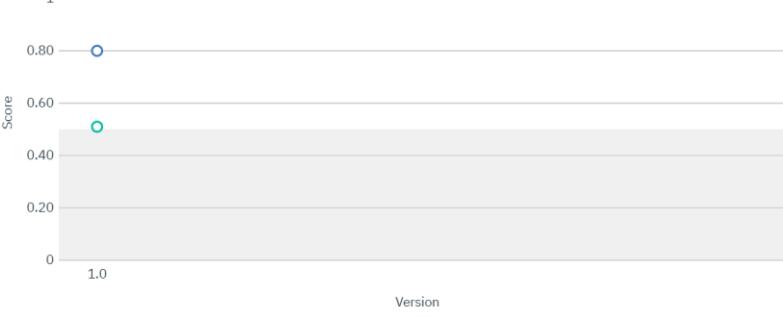
Last trained on: Oct 10, 2018 4:19:47 PM

Last evaluated on: Oct 10, 2018 7:10:33 PM

Train and evaluate Low performance? Click here to train.

Document set evaluation [View Log](#)

Model over time



Version	Score
1.0	~0.80
1.0	~0.45

Mention **0.80** Precision: 0.82 Recall: 0.78

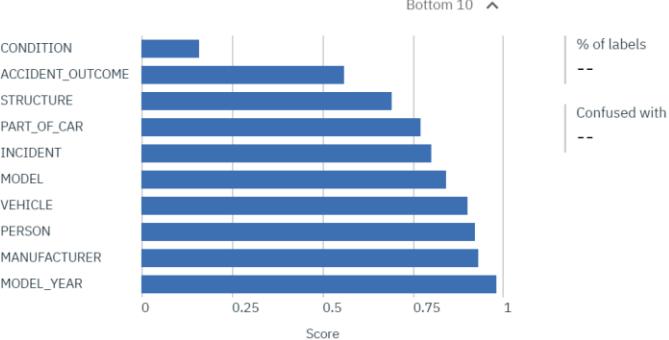
Relation **0.51** Precision: 0.47 Recall: 0.57

Coreference Precision: -- Recall: --

Low performing range

Current version insights

Mention breakdown [Detailed Statistics](#)



Entity	Score
CONDITION	~0.25
ACCIDENT_OUTCOME	~0.55
STRUCTURE	~0.65
PART_OF_CAR	~0.70
INCIDENT	~0.75
MODEL	~0.78
VEHICLE	~0.80
PERSON	~0.82
MANUFACTURER	~0.85
MODEL_YEAR	~0.95

Bottom 10

% of labels

Confused with

Ways to Improve

- Entities get confused with other entities when there are mixed examples. Ensure examples are consistent.
- Label more examples of low performing types.
- Add more documents with new examples.

[Cookie Preferences](#)

13. From the sidebar, select “Machine Learning Model” > click the “**Versions**” link > click the “Take Snapshot” button > enter a description; e.g. “version 1.0 of the NHTSA model.” > click Ok.

Note: on the Versions page, you can take a snapshot of the annotator and the resources that were used to create it (except for dictionaries and annotation tasks). For example, you might want to take a snapshot before you retrain the model. If the statistics are poorer the next time you train it,

you can promote the older version and delete the version that returned poorer results.

Version History and Deployment								
Version	Base	Creation Date	F1 score (Precision / Recall)	Entity Types	Relation Types	Description	Action	Status
1.0						version 1.0 of the NHTSA model.	Take Snapshot	N/A

14. Now your model can be deployed to other Watson services (like Discovery) or Watson software products (like Watson Explorer).

Versions

Version History and Deployment								
Version	Base	Creation Date	F1 score (Precision / Recall)	Entity Types	Relation Types	Description	Action	Status
1.1		Current Version	0.80 (0.82 / 0.78)	0.51 (0.47 / 0.57)			Take Snapshot	N/A
1.0		10/10/2018	0.80 (0.82 / 0.78)	0.51 (0.47 / 0.57)	version 1.0 of the NHTSA model.		Promote Delete Deploy	N/A

Exercise 07: Rule Annotator (optional)

Goals:

In this lab you will:

- Create a rule based annotator to pre-annotate documents

At the end of this lab, you should know how to create a rule based annotator using the Rules editor within WKS and use it to pre-annotate documents

Lesson 7.1 Use rules editor to create new rule

Watson Knowledge Studio version 2.0 includes a new rules editor that can be used to build a rule based annotator. This annotator can be used to pre-annotate documents that are used for training the machine learning MODEL. The rule-based annotator can also be independently deployed to Watson Explorer or Watson Discovery services

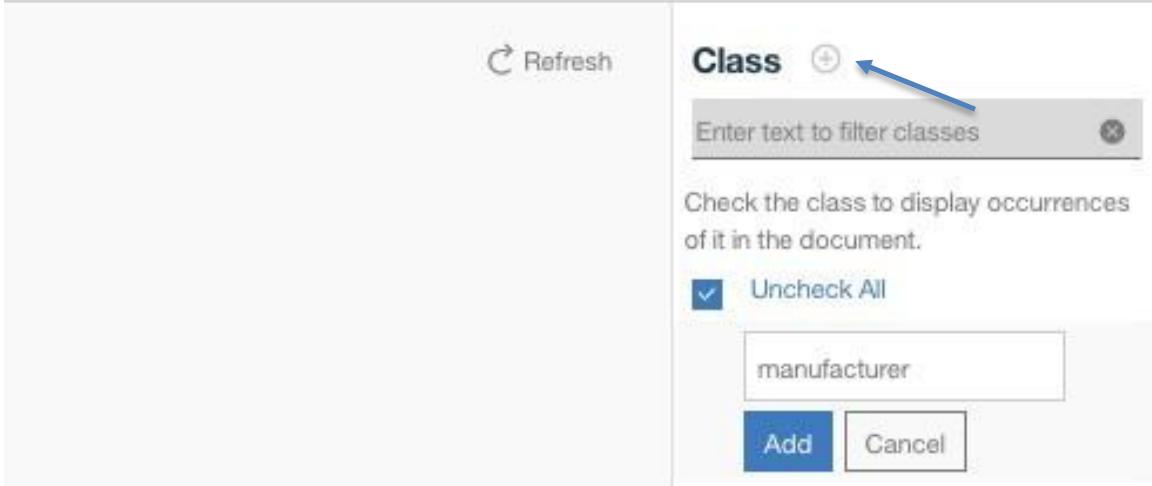
NOTE: Applying a rule based annotator for pre-annotations on documents that are already annotated will erase the existing annotations (human annotated and any other pre-annotations). You can apply only one pre-annotator. Any pre- annotator that is applied after annotating documents will erase existing annotations.

7.1.1 Use your project NHTSA Advisor

Login to Watson Knowledge. Click on the project NHTSA Advisor

7.1.2 Create a rule using rules editor

1. From the Document Annotation drop down on the left side click the Dictionaries tab.
2. Create a new class MANUFACTURER by clicking the '+' sign on the right panel



The screenshot shows the 'Annotator Component' interface. At the top, there are tabs for 'Rules', 'Human Annotation', and 'Annotator Component'. On the right, there are icons for user, settings, and email (subuseth@yahoo.com). Below the tabs, there's a 'Refresh' button and a 'Class' filter dialog. The dialog has an input field 'Enter text to filter classes' with a placeholder 'Enter text to filter classes' and a clear button 'X'. Below it is a note: 'Check the class to display occurrences of it in the document.' There's a checked checkbox 'manufacturer' with an 'Uncheck All' button. At the bottom are 'Add' and 'Cancel' buttons.

3. Similarly, create two new classes MODEL and MODELYear using the same procedure described in step 2.
4. Click the ‘+’ next to “**Documents**” in order to add a sample text that can be used to create the rule. Enter the **Title** as “SampleText” and enter the following passage in the **Text** field:

“This on-site investigative effort focused on the side impact inflatable occupant protection system in a 2007 Hyundai Sonata and the injury sources of the restrained 31-year-old female driver. The Hyundai was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions. In addition to the side impact air bags, the Hyundai was equipped with a Certified Advanced 208-Compliant frontal air bag system. The Hyundai was involved in an intersection crash with a 2005 Ford Explorer that resulted in left side damage to the Sonata. A 2004 Ford Focus subsequently struck the Explorer as the VEHICLE came to rest. As a result of the crash, the Hyundai’s left seat back mounted side impact air bag and the left side curtain air bag deployed. The driver of the Hyundai sustained minor injuries during crash and was transported to a hospital where she was

treated and released."

Click "Add"

This on-site investigative effort focused on the side impact inflatable occupant protection system in a 2007 Hyundai Sonata and the injury sources of the restrained 31-year-old female driver. The Hyundai was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions. In addition to the side impact air bags, the Hyundai was equipped with a Certified Advanced 208-Compliant frontal air bag system. The Hyundai was involved in an intersection crash with a 2005 Ford Explorer that resulted in left side damage to the Sonata. A 2004 Ford Focus subsequently struck the Explorer as the vehicle came to rest. As a result of the crash, the Hyundai's left seat back mounted side impact air bag and the left side curtain air bag deployed. The driver of the Hyundai sustained minor injuries during crash and was transported to a hospital where she was treated and released.

939 / 5000 characters

Add Cancel

5. Go to the **Dictionaries** section on the left and select MANUFACTURER_dict.
6. Click on "**MANUFACTURER**". From the 'Class' drop down, choose '**MANUFACTURER**' > click Save.
7. Similarly, choose the class '**MODEL**' from the **Class** drop down for the **MODEL** dictionary.

Lemma	Surface Forms
zephyr	zephyr
z4	z4
yaris	yaris
x-type	x-type
xterra	xterra
xc90	xc90
xb	xb
x5	x5
w-series	w-series
windstar	windstar

Class

Enter text to filter classes

Check the class to display occurrence of it in the document.

Uncheck All

Manufacturer

Model

ModelYear

8. Go to the "**Rules**" Section and notice that the SampleText is already highlighted with the MANUFACTURER and MODEL both being done by the dictionary.

Rules

Enter text to filter rules ×

No rules are defined. First, select the document text that depicts the rule pattern, and then click the plus sign to add the rule.

Edit **Close**

SampleText

This on-site investigative effort focused on the side impact inflatable occupant protection system in a 2007 **Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver .

The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.

In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.

The **Hyundai** was involved in an intersection crash with a 2005 **Ford Explorer** that resulted in left side damage to the **Sonata**. A 2004 **Ford Focus** subsequently struck the **Explorer** as the VEHICLE came to rest.

As a result of the crash, the **Hyundai**'s left seat back mounted side impact air bag and the left side curtain air bag deployed. The driver of the **Hyundai** sustained minor injuries during crash and was transported to a hospital where she was treated and released.

Class

Enter text to filter classes ×

Check the class to display occurrences of it in the document.

- Uncheck All
- Manufacturer** 🔍 :
- Model** 🔍 :
- ModelYear** 🔍 :

9. Add a rule > click the Rule + > Highlight the text **2007 Hyundai Sonata** in the first sentence and click the '+' sign next to Rules to create a new rule.

Rules

Enter text to filter rules ×

No rules are defined. First, select the document text that depicts the rule pattern, and then click the plus sign to add the rule.

Edit **Close**

SampleText

This on-site investigative effort focused on the side impact inflatable occupant protection system in a **2007** **Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver .

10. You will see the following:

Rules

Enter text to filter rules

Rule name:
Rule_0

Save **Cancel**

Create a rule

[Open Properties](#)

Each cell represents a token in the text that you highlighted from the document. Click a cell to add a class annotation.



Click a word or annotation to adjust the conditions by which it participates in the rule pattern.



- 11.** Click on the tick mark on 2007 and make sure that the repeat setting is set to “**Required (Exactly 1)**”

Create a rule

Each cell represents a token in the text that you highlighted from the document. Click a cell to add a class annotation.



Click a word or annotation to adjust the conditions by which it participates in the rule pattern.



- Repeat Setting
- Required (Exactly 1) **Selected**
- Repeating 1 or more times
- Repeating 0 or more times
- Occurring 0 or 1 time
- Advanced: Exactly 1

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12. Click the “Text” icon on 2007 and make sure you select the “Character Type: Numeric” condition. This ensures that the token that should be annotated is actually a number. Similarly make sure that the length of the token is exactly 4. The conditions for 2007 should look like this:

HOME / ProjRule / Rules

Create a rule

Each cell represents a token in the text that you highlighted from the doc

Click a word or annotation to adjust the conditions by which it participate

2007 Hyundai Sonata

Feature Setting
Text : 2007
Length : 4
Part of Speech : numeral
Character Type : Numeric

13. Click on the tick mark icon above MANUFACTURER. Make sure “Required (Exactly 1)” is selected:

HOME / ProjRule / Rules

The screenshot shows the 'ProjRule' section of the IBM Project Rule interface. On the left, there's a sidebar with 'Rules' selected. The main area has a title 'Rules' with a plus sign, a search bar 'Enter text to filter rules', and a 'Rule name:' field containing 'Rule_0'. Below these are 'Save' and 'Cancel' buttons. To the right, a large panel titled 'Create a rule' displays a diagram of tokens: 'manufacturer' (yellow box), 'model' (red box), and '2007' (white box). Lines connect 'manufacturer' to 'model' and 'model' to '2007'. A legend below the diagram defines symbols: a checkmark and a slash for 'Repeat Setting', a checkmark for 'Required (Exactly 1)', a plus sign for 'Repeating 1 or more times', a asterisk for 'Repeating 0 or more times', a question mark for 'Occurring 0 or 1 time', and a pencil icon for 'Advanced: Exactly 1'.

14. Keep the Text setting for MANUFACTURER as follows:-

Rules +

Enter text to filter rules ×

Rule name:
Rule_0

Save Cancel

Create a rule

Each cell represents a token in the text that you highlighted from the document. Click a cell to add a class

Click a word or annotation to adjust the conditions by which it participates in the rule pattern.

```

graph LR
    M[Manufacturer] --- Model[Model]
    2007[2007] --- M
    subgraph Annotations [Annotations]
        FS[Feature Setting]
        T[Text : Hyundai]
        L[Length : 7]
        RM[Rule Match : Manufacturer]
    end
    
```

15. For MODEL, keep the **Repeats** setting as “**Occuring 0 or 1 time**” and the **Text** setting to “**Rule Match: MODEL**”
16. Click the rectangular box above 2007 and choose the class as **MODELYear** from the **Class** drop down.

Rules +

Enter text to filter rules ×

Rule name:
Rule_0

Save Cancel

Create a rule

Each cell represents a token in the text that you highlighted from the document. Click a cell to add a class

Click a word or annotation to adjust the conditions by which it participates in the rule pattern.

```

graph LR
    M[Manufacturer] --- Model[Model]
    2007[2007] --- M
    Hyundai[Hyundai] --- Model
    subgraph Annotations [Annotations]
        FS[Feature Setting]
        T[Text : Sonata]
        L[Length : 6]
        RM[Rule Match : Model]
    end
    
```

17. Change the name of the rule to **Rule_MODELYear** and click **Save**.

The screenshot shows the 'Create a rule' interface. On the left, a sidebar displays the rule configuration with the name 'Rule_MODELYear'. On the right, the main area shows a dependency graph where '2007' is connected to 'Manufacturer' and 'Model', which are further connected to 'Feature Setting', 'Text : Hyundai', 'Length : 7', and 'Rule Match : Manufacturer'. A button 'Open Properties' is visible in the top right corner.

18. Notice now that the remaining MODELYears automatically get annotated.

The screenshot shows the 'SampleText' panel with the following text:
This on-site investigative effort focused on the side impact
inflatable occupant protection system in a 2007 Hyundai Sonata
and the injury sources of the restrained 31-year-old female driver
. .
The Hyundai was equipped with seat back mounted side impact
air bags for the front seat positions and curtain air bags for the
four outboard positions.
In addition to the side impact air bags, the Hyundai was
equipped with a Certified Advanced 208-Compliant frontal air bag
system.
The Hyundai was involved in an intersection crash with a 2005
Ford Explorer that resulted in left side damage to the Sonata.
A 2004 Ford Focus subsequently struck the Explorer as the
VEHICLE came to rest.
As a result of the crash, the Hyundai's left seat back mounted
side impact air bag and the left side curtain air bag deployed.
The driver of the Hyundai sustained minor injuries during crash
and was transported to a hospital where she was treated and
released.

The 'Class' panel on the right lists the annotated classes: Manufacturer, Model, and ModelYear, with ModelYear being the selected class.

i. Create a rule annotator

1. From the sidebar, select **Model Management > Versions** and click the **Rule-based model type mapping** tab.
2. You will be prompted to map the entity types defined in the type system to classes defined in the rules editor. Map them as follows:

The screenshot shows the IBM Watson Studio interface. On the left, there's a sidebar with 'Back to Workspaces', 'Model Management' (selected), 'Performance', 'Versions' (selected), 'Assets & Tools', 'Document Annotation', 'Settings', and 'Help'. The main area is titled 'Versions' and has tabs for 'Machine Learning', 'Rule-based', and 'Rule-based model type mapping' (which is selected). A sub-section titled 'Map entity types from your type system to one or more classes in your rule annotator. You must map at least one class before you can run the annotator.' includes a 'Learn more' link and a search bar 'Enter text to filter entries'. Below this is a table with columns 'Entity Type Name', 'Class Name', and 'Actions'. The table lists entities like CONDITION, INCIDENT, STRUCTURE, MODEL_YEAR, VEHICLE, MANUFACTURER, ACCIDENT_OUTCOME, PART_OF_CAR, PERSON, and MODEL, each with an 'Edit' link in the Actions column.

Entity Type Name	Class Name	Actions
CONDITION		Edit
INCIDENT		Edit
STRUCTURE		Edit
MODEL_YEAR	ModelYear	Edit
VEHICLE		Edit
MANUFACTURER	Manufacturer	Edit
ACCIDENT_OUTCOME		Edit
PART_OF_CAR		Edit
PERSON		Edit
MODEL	Model	Edit

ii. Pre-annotate documents using rule annotator

1. To run the rule-based model select the **Rule-based** tab and click **Run this model**.

The screenshot shows the 'Rule-based' annotation interface. At the top, there are buttons for 'View Details', 'Replace', 'Concordance', and 'Attribute View'. On the right, there are buttons for 'Ready', 'Save', and 'Close'. The main area displays a document with annotations. Annotations include:
1. This on-site investigative effort focused on the side impact inflatable occupant protection system in a **2007 Hyundai Sonata** and the injury sources of the restrained 31-year-old female driver.
2. The **Hyundai** was equipped with seat back mounted side impact air bags for the front seat positions and curtain air bags for the four outboard positions.
3. In addition to the side impact air bags, the **Hyundai** was equipped with a Certified Advanced 208-Compliant frontal air bag system.
4. The **Hyundai** was involved in an intersection crash with a **2005 Ford Explorer** that resulted in left side damage to the **Sonata**.
5. A **2004 Ford Focus** subsequently struck the **Explorer** as the vehicle came to rest.
6. As a result of the crash, the **Hyundai**'s left seat back mounted side impact air bag and the left side curtain air bag deployed.
7. The driver of the **Hyundai** sustained minor injuries during crash and was transported to a hospital where she was treated and released.

On the right, there's a sidebar with 'Alpha...', 'Entity', 'Type', 'Manufacturer', 'Model', and 'ModelYear'. It also shows 'Subtype' and 'Mentix'.

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