

Legal Meets Watson

—

Wolfgang Bosch
Business Development Executive
IBM Watson & AI Innovation



Legal

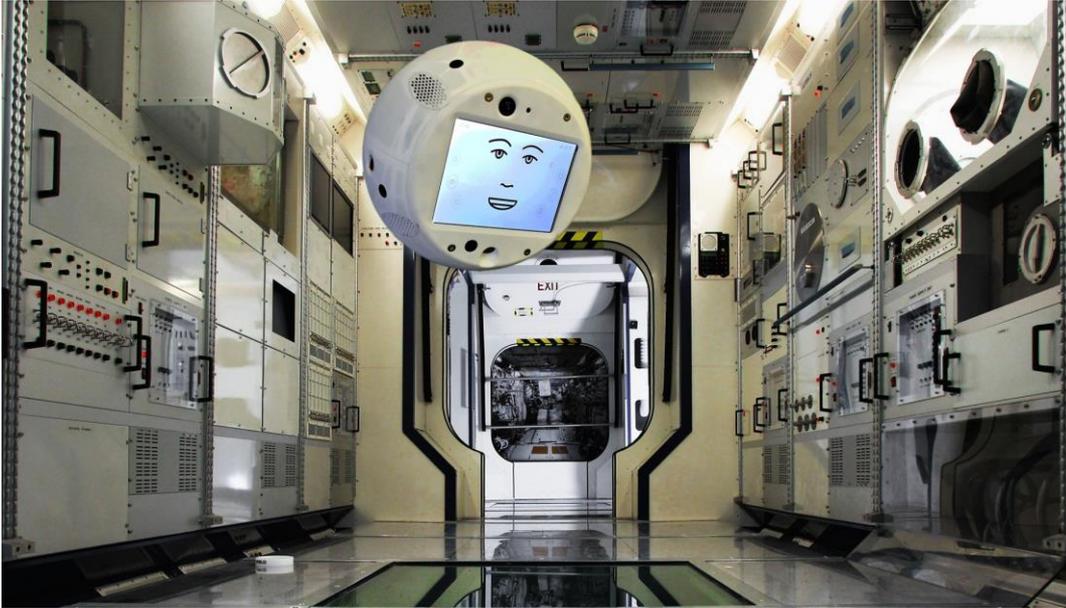
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Artificial Intelligence

- Perception
- Patterns
- Prediction
- Knowledge
- Reasoning
- Learning
- Robotics
- ...



Watson Hops On Board Human Space Flight!



<http://bit.ly/2sOHgez>

#IBM #Watson AI hops on board human space flight #ISS @AirbusSpace #Cloud

<http://bit.ly/2EMzl2V>

#AI technologies soon in the Space! #IBM #Watson will embark on the next space flight to the #ISS @AirbusSpace #Cloud

Airbus developed the CIMON astronaut assistance system for the DLR Space Administration

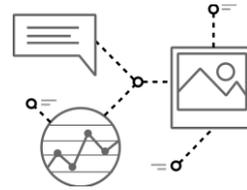
Thanks to IBM Watson AI technology, Alexander Gerst will get some unusual support: CIMON (Crew Interactive Mobile Companion) powered by Watson will be on board of the next mission to the International Space Station (ISS) to help the astronauts to perform experiments.

CIMON is a mobile and autonomous assistance system designed to aid astronauts with their everyday tasks on the ISS. This will be the first form of Artificial Intelligence (AI) on an ISS mission. CIMON is an experiment overseen by Space Administration at the German Aerospace Center (DLR) in cooperation with Airbus (Friedrichshafen /Bremen) as the prime contractor.

CIMON is a free flyer fueled with Watson AI, enhancing human expertise. AI-based technology is about constantly understanding, reasoning and learning, so CIMON is designed to assist and to create a feeling of talking to a crew mate.

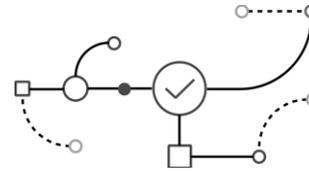
cog·ni·tive

/ˈkɑːɡnədɪv/



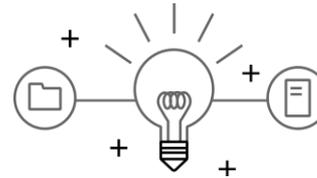
Understand

Like humans do



Reason

to extract ideas



Learn

From past results

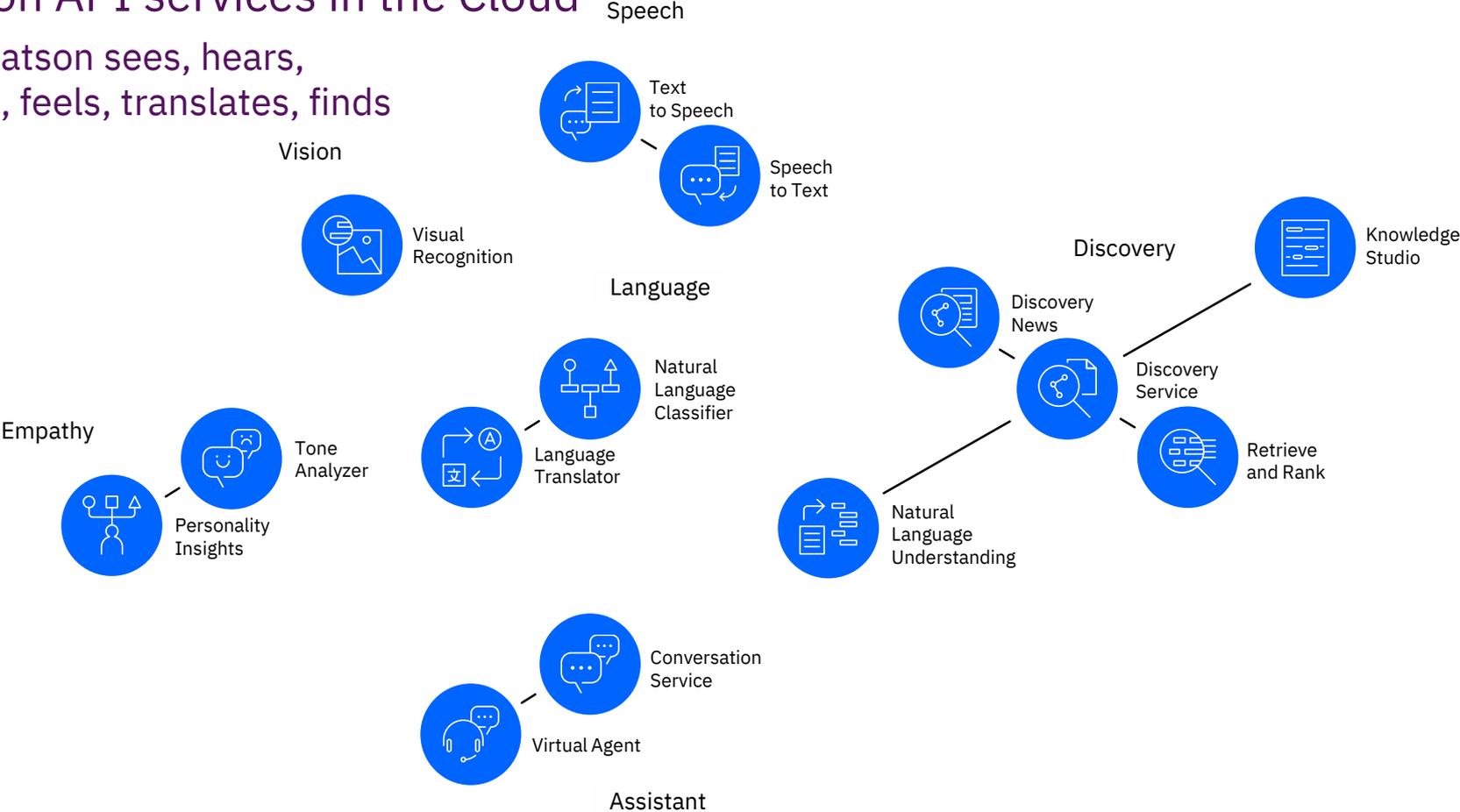


Interact

In a natural way

Watson API services in the Cloud

How Watson sees, hears, speaks, feels, translates, finds



Building the Ground Truth: Understanding begins with annotating

Simulate how we read and interpret content

Enables us to “understand” content by identifying and extracting the key:

- **Entities:** products, opinions, descriptions that appear in text
- **Concepts:** abstract ideas based on entities
- **Relationships:** relationships between and among and concepts

Improve upon humans by being faster, more consistent, and much more efficient

Wu Shu-chen, the former first wife, visited her husband Chen Shui-bian in detention in the morning.

She was accompanied by their son Chen Chih-chung and Lawrence Gao, a Democratic Progressive Party lawmaker.

How machines make sense of natural language

Requires transforming unstructured data to structured data and prepare it before it can be used for further analysis.

“This on-site investigation focused on the performance of the **Certified Advanced 208-Compliant air bag system** in a **2005 Ford Escape XLT 4x4** sport utility vehicle. This **two-vehicle crash** occurred in **July 2014** at **1539** hours in the state of Colorado.”

Annotator



Part of car	Certified Advanced 208-Compliant air bag system
Model year	2005
Manufacturer	Ford
Model	Escape XLT 4x4
Incident	Two-vehicle crash
Date of incident	July 2014
Time of incident	1539

Annotating - Illustrative Example

PERSON PEOPLE ORGANIZATION TIME EVENT_MEETING EVENT_CUSTODY

Wu Shu-chen, the former first wife, visited her husband Chen Shui-bian in detention in the morning.

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Annotating - Illustrative Example

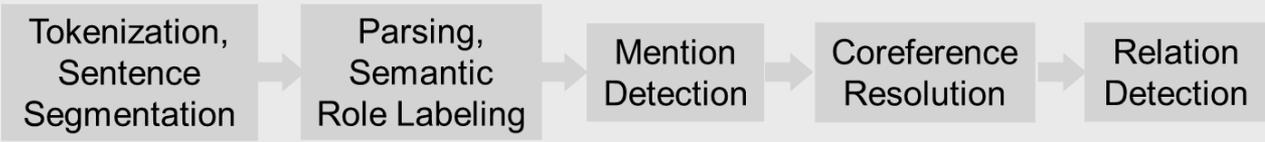
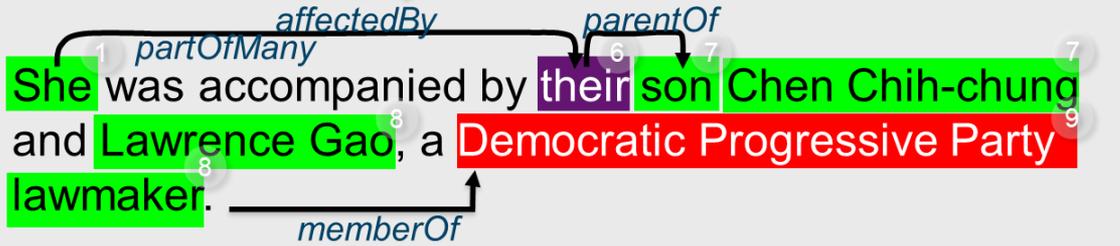
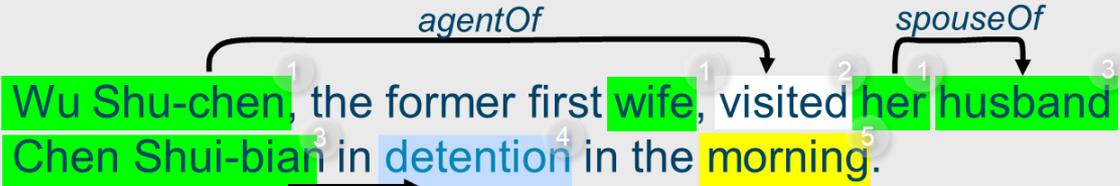


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Annotating - Illustrative Example



Since 2016 – Available to You on IBM Cloud



Marketplace



Watson

Stories

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Developers

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Use Cases

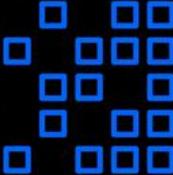
Get Started free

Watson Knowledge Studio

Teach Watson the language of your domain

Get started free

Why WKS



Are you an existing Marketplace customer looking to move to IBM Cloud? [Learn more here](#)

Ground Truth Editor: Mentions

The screenshot shows the IBM Watson Knowledge Studio interface. The main document area contains the following text with various words highlighted in different colors:

Business_iht.com_b6db04260e1e612b5241299b41b43

BRUSSELS: Despite concessions from the United States, the European Union is still pressing for assurances that Washington's "Buy America" policy will not discriminate against European companies.

In comments that were coupled with a strong warning against any drift toward protectionist policies around the world, the European Trade Commissioner, Catherine Ashton, said she wants more clarity on how U.S. procurement rules will be applied.

Ashton said she remained unsure what would be "the technical impact of the wording" in the "Buy

On the right side, there is a legend table for mentions:

Entity		Mention	
Type	SubType	Role	
f	FACILITY	F	FOOD
g	GEOLOGIC...	X	GPE
w	LAW	I	LOCATION
k	MEASURE	m	MONEY
z	ORDINAL	x	ORGAN
o	ORGANIZA...	e	PEOPLE
b	PERCENT...	p	PERSON
-	PERSONPE...	-	PHONE
-	PLANT	O	PRODUCT

Ground Truth Editor: Coreference

IBM Watson Knowledge Studio

Ready

Alpha... 11pt 2

Mention

Relation

Coreference

Business_iht.com_b6db04260e1e612b5241299b41b43

BRUSSELS: Despite concessions from the United States, the European Union is still pressing for assurances that Washington's "Buy America" policy will not discriminate against European companies.

In comments that were coupled with a strong warning against any drift toward protectionist policies around the world, the European Trade Commissioner, Catherine Ashton, said she wants more clarity on how U.S. procurement rules will be applied.

#5	United States	16	×
#6	European	14	×
#7	Doha trade round	2	×
#8	member states	6	×
#9	Obama	3	×
#10	America	3	×
#11	European	3	×
#12	it	5	×

Ground Truth Editor: Relations

IBM Watson Knowledge Studio

Ready

Alpha... 11pt 2

Mention

Relation

Coreference

BRUSSELS: Despite concessions from the United

agentOf

States, the European Union is still pressing for

EVENT_...

assurances that Washington's "Buy America" policy

basedIn

will not discriminate against European companies.

ORGANIZA...

Relation		Attributes	
Type			
- affectedBy	- affiliatedWi...	- agentOf	- authorOf
- awardedBy	- awardedTo	- basedIn	- before
- bornAt	- bornOn	- bornAt	- bornOn
- capitalOf	- citizenOf	- capitalOf	- citizenOf
- clientOf	- colleague	- clientOf	- colleague
- competitor	- diedAt	- competitor	- diedAt
- diedOf	- diedOn	- diedOf	- diedOn

Watson Discovery Service extends functionality to allow for cognitive search and content analytics capabilities to be combined into new and existing applications.



Discovery News Service

News trending, alerts, event detection and search



Watson Discovery Service

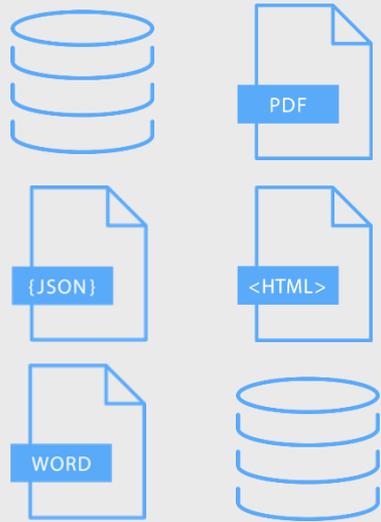
Rapidly build a cognitive search and content analytics engine



Watson Knowledge Studio

Train Watson to add domain customization

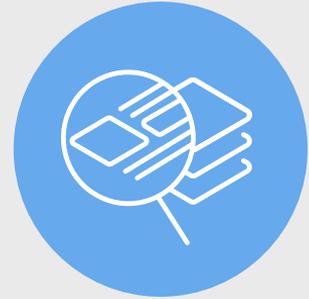
Many data scientists spend as much as **80 percent*** of their time on so-called “data janitor” work – collecting, cleaning and organizing data sets.



Analysis of unstructured data requires **advanced natural language processing** across the complete set of documents. **numerous barriers.**



Querying against indexes can require specialized and detailed knowledge and present a **significant learning curve** for new developers.



The Automated Data Pipeline



Structured



Unstructured



Sentiment



Entities



Concepts



Aggregation,
Time Slices,
and more

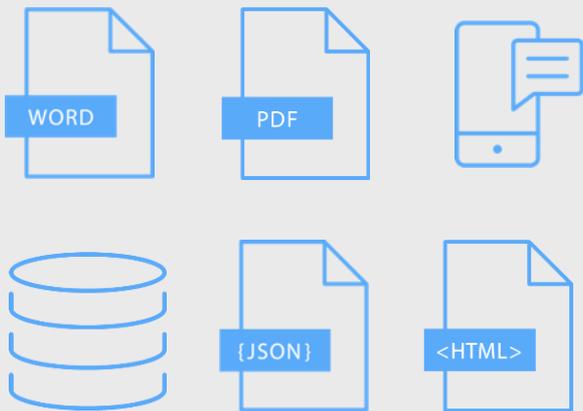
Ingest

Enrich

Query

With Watson Discovery, go from **data to insights rapidly** and with less effort

Documents/Data



??

Questions

“What are the top terms mentioned by customers in support interactions”

“How do I setup a new connection for a customer with a locked accounts”

“How many times was my campaign mentioned over the last 30 days”

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Scaling Knowledge Ingestion

IBM Research - Zurich

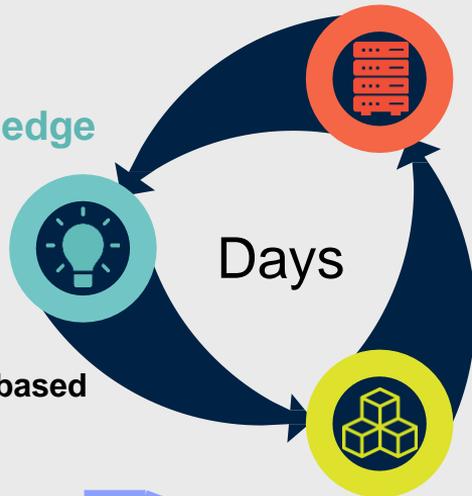


Knowledge Discovery Pipeline

Ingest structured and unstructured data to create massive knowledge spaces

- Complex documents
- Structured DBs
- Public and proprietary

Knowledge Space



Days

Inference

Get deep insights by ML/DL on the Knowledge Space

- Identify trends
- Discover gaps in the knowledge
- Explore “what if” scenarios
- Enrich knowledge space

- “How has the use of copper in alloys in the auto industry evolved in the last 20 years?”
- “What is the most likely use of a certain chemical by-product of an organic synthesis route next year? Which company is the most likely to want to buy it?”
- “How do I come up with the most relevant questions to ask a client for an insurance contract based on their answers so far?”

Enable contextual based search, based on meaning, not keywords

- Tables, Images, Formulas, Diagrams
- “What are all the properties of a chemical” -- “What is the cheapest health contract for non smokers younger than 25”

Deep Search

Knowledge Discovery Pipeline: Key APIs SaaS & On Premise

Corpus Conversion

- **PDF Smart annotator.** Any type of document. PDF is key here. Minimal and trivial annotation needed

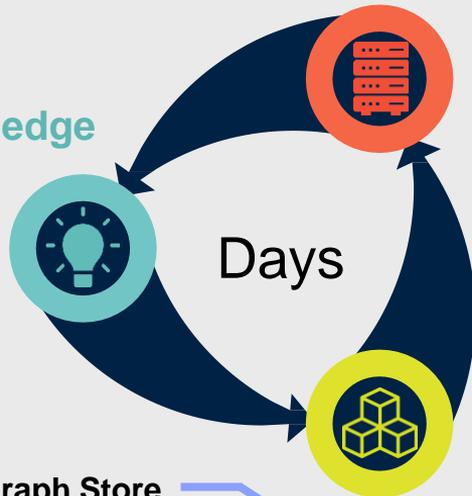
NLP: Facts extraction

- **Smart Reader:** non supervised extraction from text
- **Diagram Ingestion:** extracts data from diagrams, scientific plots, schematics
- **Tables and Forms extraction and semantic representation**

Knowledge Graph Store & Engine

- High performance in memory graph DB and query engine

Knowledge Space



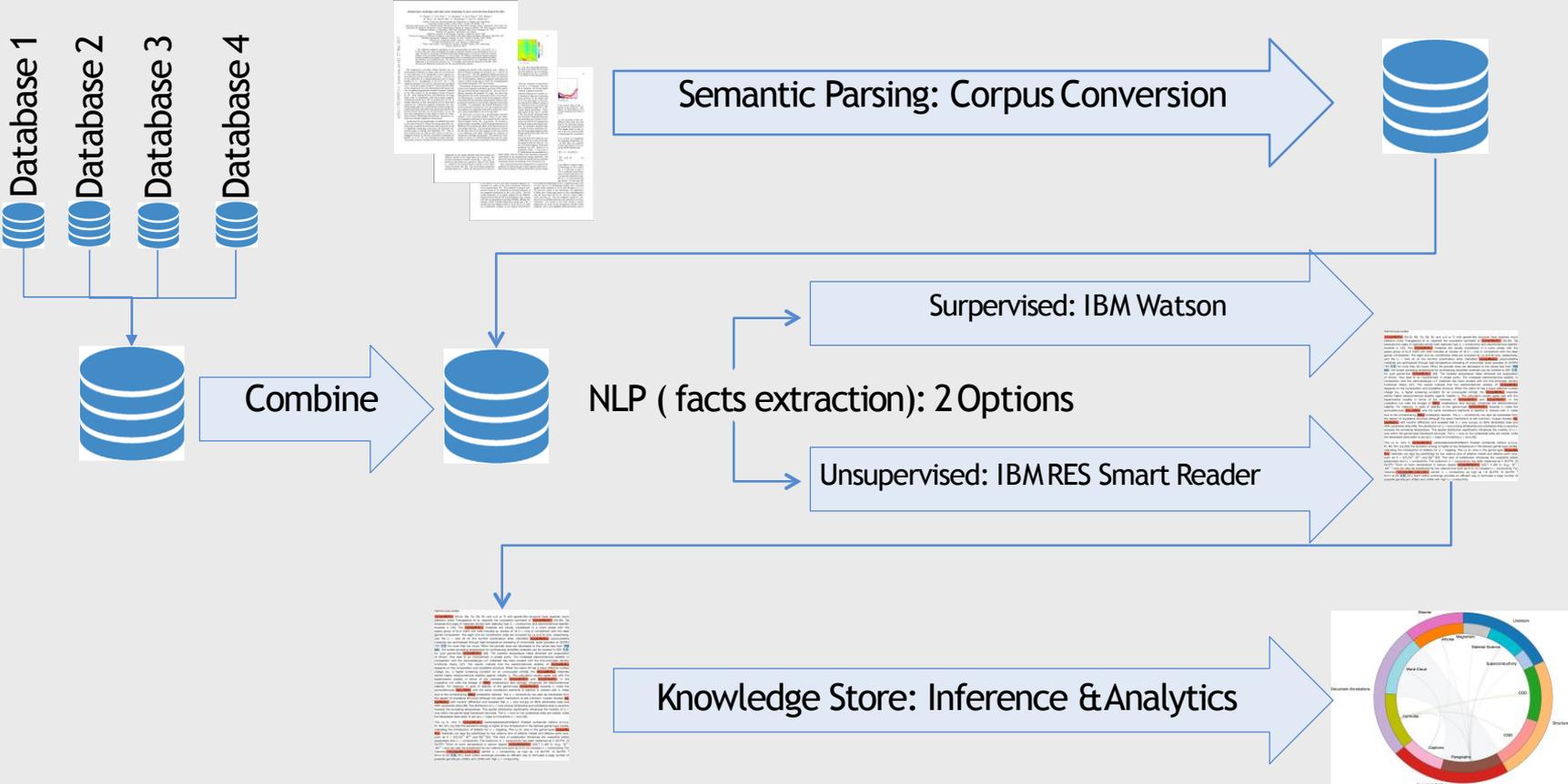
Days

Deep Search

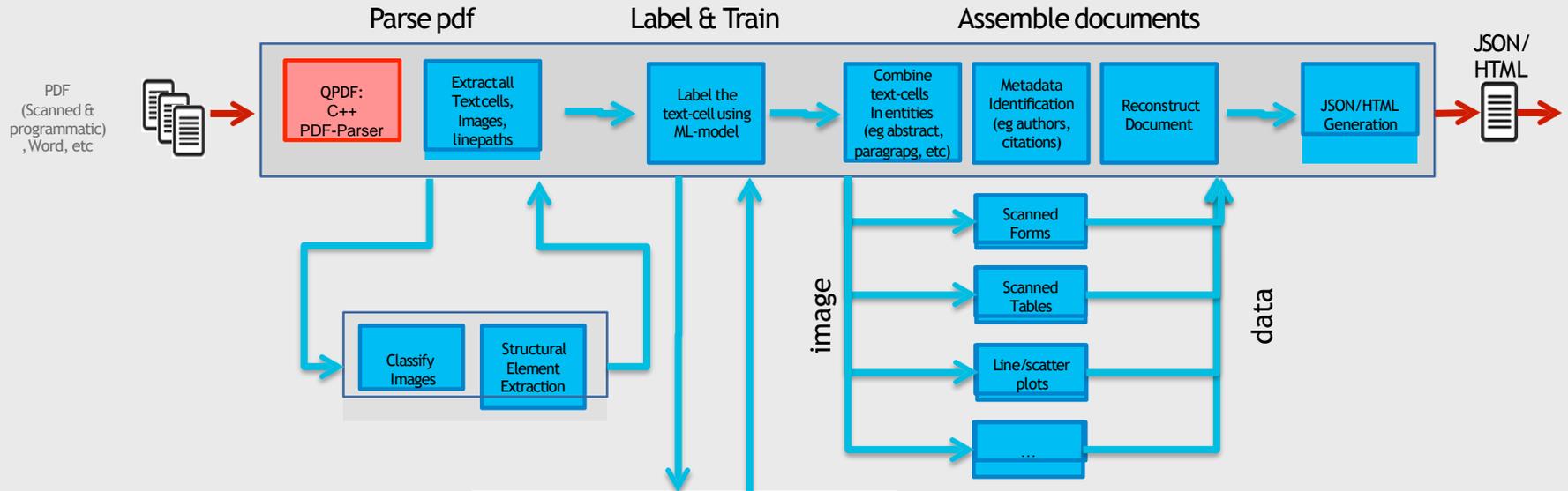
Analutos

- Low cost & scalable graph analytics and inference algorithms
 - Node importance (spectral centralities)
 - Graph simplification
 - Graph comparisons
 - Data uncertainty quantification
 - HPC Machine and Deep Learning
 - Autotuning for DL
 - Scalable non supervised text analytics: Word2vec, Node2vec

Knowledge Discovery Workflow Example



IBM Research: Corpus Conversion Service



Entities example

- Title (Red)
- Authors (Green)
- Affiliation (Violet)
- Subtitle (Pink)
- Abstract (Blue)
- Main-text (yellow)



- Open Source or Commercial SW
- IBM Research Solution

Smart annotator

9.4.143.71:5000/v1/gui/b78fe3e86f0785a01e66cb35442f1091250619bf/ENG_JAcupunctTuinaSci

586cf5cb8dbb4041d2b9148a 1 / 1

J. Acupunct. Tuina. Sci. 2014, 12 (4): 246-250
DOI: 10.1007/s1226-014-0782-4

CLINICAL STUDY

Clinical Observation on Comprehensive Treatment on Cutaneous Region for Low Back Pain

Zhao Feng, Liu Shu-tian

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2 Nanyang People's Hospital of Longgang District, Shenzhen City, Shenzhen 518211, China

CLC Number: R246.2 Document Code: A

Abstract
Objective: To observe the clinical effects of comprehensive treatment on cutaneous region for low back pain.
Methods: One hundred and twenty outpatients with low back pain who met the diagnostic criteria were randomly divided into a cutaneous region group or a medication group, 60 cases in each group. The cases in the cutaneous region group were treated by Nie-pinching up the skin of the lumbosacral region, cupping and acupuncture. Those in the medication group were treated by oral administration of Celecoxib capsule. The visual analogue scale (VAS) and Oswestry disability index (ODI) were used to assess the therapeutic effects.
Results: After treatment, the VAS scores of both groups were different from those before treatment, showing statistical significances (all $P < 0.01$). The D-value of VAS scores of both groups were different from those before treatment, showing statistical significances (all $P < 0.01$). The D-value of ODI scores in the cutaneous region group was significantly different from that in the medication group ($P < 0.01$). After treatment, the total effective rate was 91.7% in the cutaneous region group versus 76.7% in the medication group, there was a significant difference in comparing the clinical effect ($P < 0.01$).
Conclusion: Both comprehensive treatment on the cutaneous region and Celecoxib capsule can obviously relieve low back pain. But comprehensive treatment on the cutaneous region is better than Celecoxib capsule in the therapeutic effects.

Key Words
Cutaneous Region; Cupping Therapy; Acupuncture Therapy; Tuina; Massage; Pinching Manipulation; Low Back Pain

Low back pain (LBP) refers to pain in the low back, lumbosacral region and buttocks^[1]. To date, its etiology and pathogenesis are still unknown, which brings lots of difficulties for the treatment. The cutaneous region is a component part of the meridian system, and is the site on the body surface to reflect functional activities of the meridians, which is also where the meridian qi spreads^[2]. Stimulation to the cutaneous region is a therapeutic method in which the cutaneous region is used as the operation site to process different stimulation for producing the therapeutic effects^[3]. Stimulation to the cutaneous region is an external therapy for safe and effective treatment of low back pain. Under the circumstance of unknown pathogenesis, stimulation to the cutaneous region is a comparatively ideal option. We treated low back pain by stimulating the cutaneous region in comparison with the medication therapy, in order to explore the function of this therapy for low back pain. Now, the report is given as follows.

Author: Zhao Feng, master degree candidate, attending physician. E-mail: zhaofeng1977@163.com

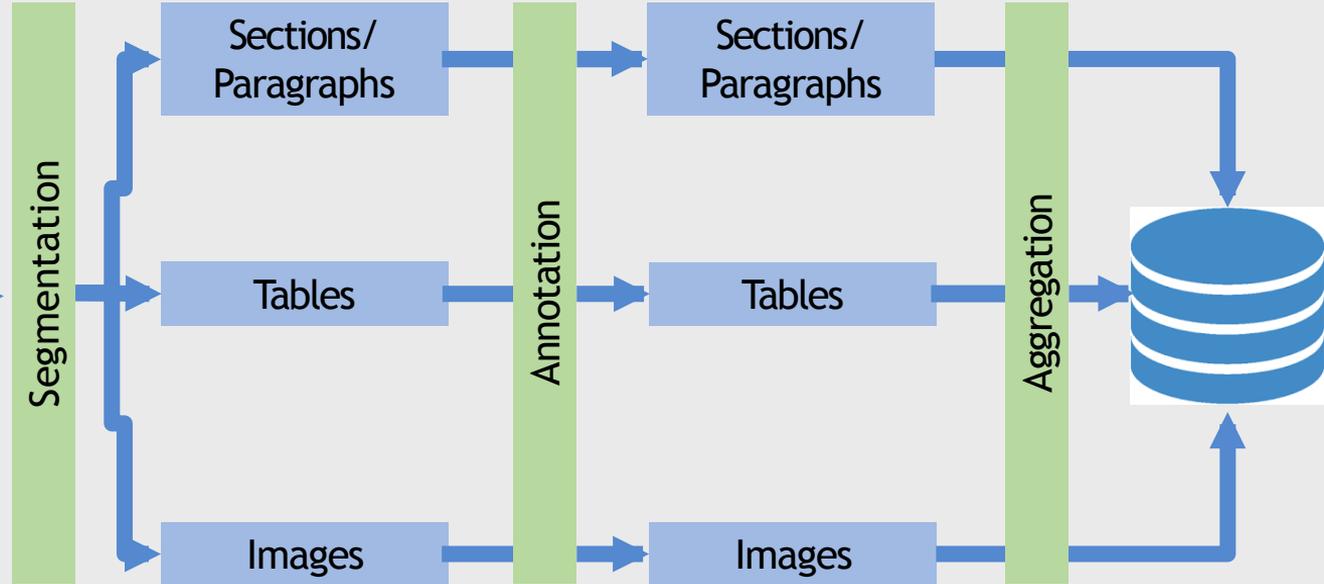
• 246 • | © Shanghai Research Institute of Acupuncture and Meridian and Springer-Verlag Berlin Heidelberg 2014

Abstract
Affiliation
Author
Caption
Citation
Enumeration
Formula
Main-text
None
Picture
Subtitle
Table
Title

Skip
Submit

Text-Annotation with SmartReader

Semantic documents
from Corpus
Conversion



- Use advanced regexes to skip a cold-start
- Use Word-embedding to enlarge the annotations

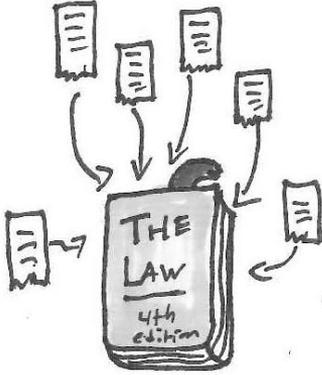
- Use distributed aggregation techniques to gather all annotations and keep track of the origin (provenance).

Contract Insights & Management with **Watson Compare & Comply**

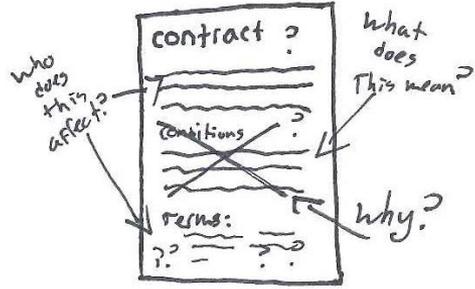
Watson



The Challenge:



Governing legal content is written by thousands of people to apply to a litany of situations in various industries.

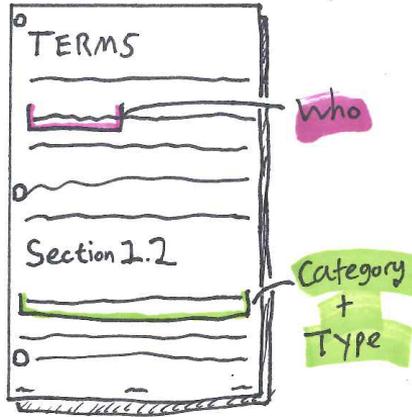


In order to understand this content, organizations employ professionals to **analyze every sentence** and make educated guesses on how the content affects their client.

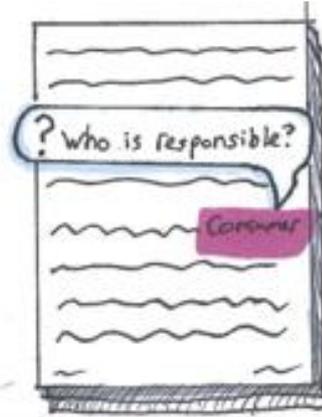


Many of these governing documents contain an enterprise's **most sensitive information** that must remain in their existing data centers

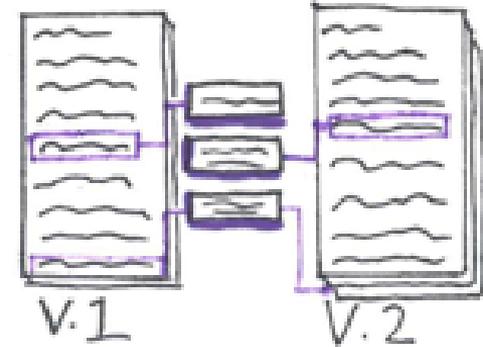
The Solution



A system to analyze the content of a governing document, making sense of the specifics of a document (who it pertains to, what kind of statements are within).



The ability to query the parsed semantic elements of a governing document, and locate relevant sections and passages.



The ability to compare a governing document to a corpus of documents, along with suggestions on how to adjust the document accordingly.

The Opportunity for Compare & Comply is **BIG**

\$34.3B US total labor spend on procurement professional role *(US Dept. of Labor)*

\$15.9B US total addressable market on legal software spend *(Mitratach)*

\$3B Current annual spend on legal software in the US *(Mitratach)*

13% Projected growth of in-house legal IT spend on cognitive compliance
(MD&I Sept 2016)

9.2% Average companies annual revenue spend for contract Management Costs
(IACCM)

50% Time in-house legal departments at mid-sized companies spend reviewing contracts *(CEB Compliance and Legal)*

Compare and Comply Common Use Patterns

Unlock Data to Facilitate Reviews

Quickly identify specific elements in a contract and pull out information for a business process.
Examples: Find all payment terms in a contract. Enable deep understanding of tables

Cause and Effect Analysis

Identify attributes within elements of a contract to help evaluation of or mitigation of implications/risks.
Example: Surface effect of terminating contract(s) with supplier

Expose Outliers to Find Risks

Compare multiple contracts and surface differences. Find anomalies or variations from standard terms to improve risk avoidance.
Example: Determine differences in payment terms in two similar contracts

Find Anomalies or Variations

Retrieve documents or elements within documents to answer a given question or perform analytics on corpus of documents.
Example: Locate previously agreed-to IP terms for a supplier to inform negotiations.

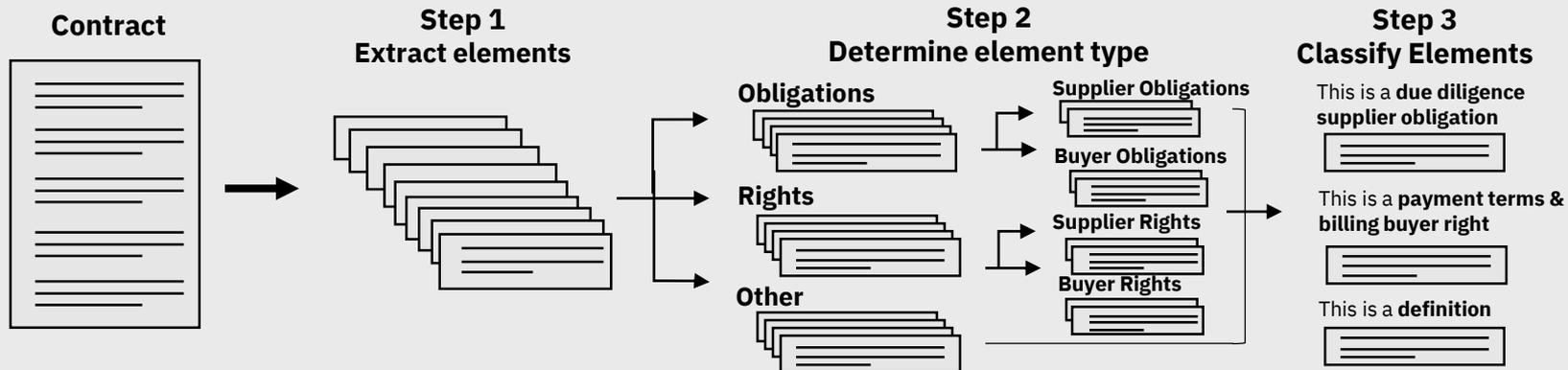
Insights on Corpus

Compare contract to invoice to mitigate revenue leakage or comply with account standards.
Example: Correct billings where invoices do not match contractual commitments.

Foundational Technology

Deliver market-leading semantic extraction of contracts with **Element Classification**.

Quickly identify the responsible parties, types of actions required and categories covered in your contracts



Begin with programmatic PDF Document	Convert PDF to HTML	Tag HTML Elements with appropriate metadata labels	Output JSON to query and identify relevant information
--------------------------------------	---------------------	--	--

Element Classification Labelling Terms Overview

Doc	A long-form natural language document, in this case a contract
Element	A single piece from a Doc, in this case limited to a single sentence
Element Nature	What type of action the sentence requires
Element Party	Who is the effected subject of the element
Element Category	What the sentence is talking about (subject of a sentence)

“TYPE”

Labelled sentence example

Exclusion - Supplier	4
Obligation - Buyer	12
Obligation - Supplier	121
<i>Describes specific terms the Supplier is required to fulfill.</i>	
Right - Buyer	28
Right - Supplier	5

additions to tax and the amount of interest thereon imposed with respect to Supplier's failure to invoice Buyer for the correct amount of tax.

5.0 Payments & Acceptance

Terms for payment will be specified in the relevant SOW and/or WA. Payment of invoices will not be deemed acceptance of Deliverables and/or Services, but rather such Deliverables and/or Services, at its option, either reject Deliverables and/or Services that do not comply with the acceptance or completion criteria as specified in the relevant SOW and/or WA. Supplier, upon Buyer's written instruction, to repair or replace such Deliverables or re-perform such Services in a timely manner.

Category: Payment Terms & Billing

Type: Obligation - Supplier

Unless otherwise provided by local law without the possibility of contractual waiver or limitation, Supplier will submit invoices, corrected invoices, or other such claims for reimbursement, to Buyer within (1) year from the date of acceptance of Deliverables or the satisfactory completion of Services. Exceptions must be specifically authorized by Buyer.

ibm.biz/cnc-demo

Type and Category Labels

Nature Label	When it is used	Simply put
Definition	The purpose of the element is to add clarity for a term/ relationship/etc. Action is not required to fulfill this element	“X means Y”
Obligation	The party in the element is required to fulfill the terms of the element	“You must do this”
Right	The party in the element is guaranteed to receive the terms of the element	“You will get/may do this”
Exclusion	The party in the element will not fulfill the specific terms laid out in the element	“You/we will not do this”
Disclaimer	The party in the element is not obligated to fulfill the specific terms in the element, but is not barred from doing so	“We don’t have to do this”

Identifiable Contract Party Labels

- Supplier
- Buyer
- End User
- None

Identifiable Contract Category Labels

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> • Amendments • Confidentiality • Definitions • Deliverables • Dispute Resolution • Force Majeure | <ul style="list-style-type: none"> • Indemnification • Insurance • Intellectual Property • Liability • Miscellaneous • Payment Terms & Billing | <ul style="list-style-type: none"> • Pricing & Taxes • Responsibilities • Term & Termination • Warranties |
|---|--|---|

Watson Element Classification Demo

Watson

Watson Discovery Element Classification

topics such as buyer entitlements, or definitions or terms.

EXPERIMENTAL

View All Services

Analyze contracts for key clauses.
Select a sample contract to see how Compare and Comply; Parse works

Non-Technical Services Agreement | Statement of Work

Original Contract	Output Document	Output JSON
Nature & Party		
Definition - None	19 <i>An element that adds clarity to a term or relationship.</i>	This Base Agreement (" Base Agreement ") between Company A (" Buyer ") and Company B (" Supplier "), establishes the basis for a multinational procurement relationship under which Supplier will provide Buyer the Deliverables and/or Services described in SOW's and/or WAs issued under this Base Agreement. This Base Agreement is effective from 10/23/2017 (" Effective Date ") and will remain in effect until terminated.
Disclaimer - Buyer	4	Li Definitions
Disclaimer - Supplier	4	" Affiliates " means entities that control, are controlled by, or are under common control with, a party to this Agreement.
Exclusion - Buyer	5	" Agreement " means this Base Agreement and any relevant Statements of Work (" SOW "), Work Authorizations (" WA "), and other attachments or appendices specifically referenced in this Agreement.
Exclusion - Supplier	4	" Customer " means Buyer's Customer.
Obligation - Buyer	12	" Deliverables " means items that Supplier prepares for or provides to Buyer or Customer as described in a SOW and/or WA.
Obligation - Supplier	121	" Developed Works " means all work product developed in the performance of this Agreement as described in a SOW and/or WA.
Right - Buyer	28	" Electronic Self-Help " means a process where Supplier electronically disables, removes, or otherwise prevents the use of its software product without the Buyer's or Customer's cooperation or consent. Electronic Self-Help could be done through electronic or other means (for example: remotely through "back doors" or hidden entrances in the software or through hidden shut-down commands in the software that can be activated by phone or in other ways).
Right - Supplier	5	" Participation Agreement " or " PA " means an agreement signed by one or more Affiliates which incorporates by reference the terms and conditions in this Base Agreement, any relevant SOW, and other attachments or appendices specifically referenced in the PA.
Category		
Amendments	1	" Personal Data " means any information that may identify an individual.
Asset Use	4	" Personnel " means individuals who are (i) employees of Buyer or Supplier, (ii) agents appointed by Buyer or Supplier, (iii) independent contractors engaged by Buyer or Supplier or (iv) provided to Buyer or Supplier by a Subcontractor. For clarity, any agent appointed by Supplier or independent contractor engaged by Supplier is also a Subcontractor.
Assignments	2	" Prices " means the agreed upon payment and currency for Deliverables and Services, exclusive of Taxes but including all applicable fees and

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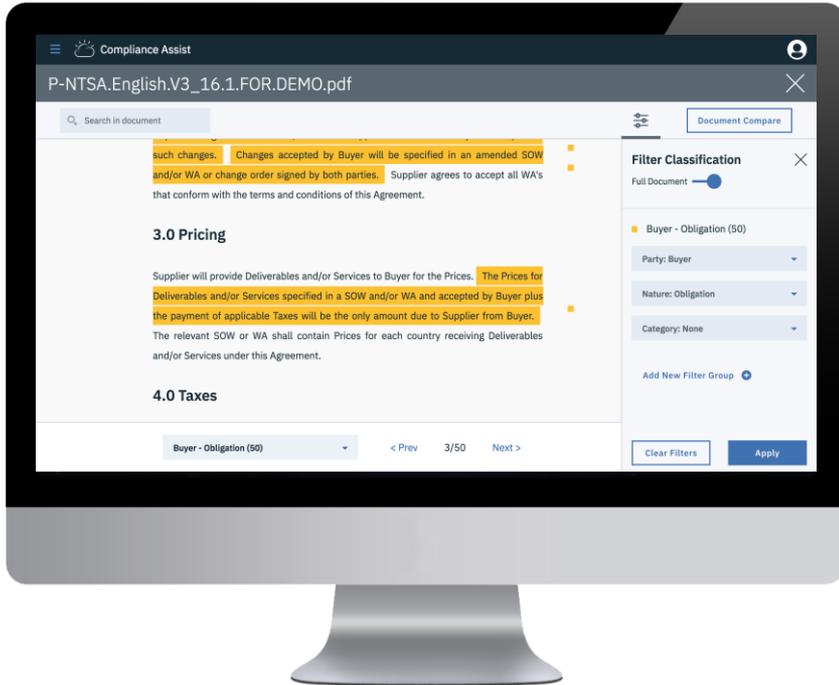
Pre-loaded documents

- Non-technical service agreement
- Statement of Work

Views

- Original document
- Annotation output example
- JSON output

Watson Compliance Assist Demo



- Document-level filters (contract value, supplier/buyer)
- Single contract view
- Visual Element Classification tagging for sentence / clause
- Filtering by element classifications
- Similar document recommendations for comparison
- Search for document by name

IBM