Artificial
Researcher

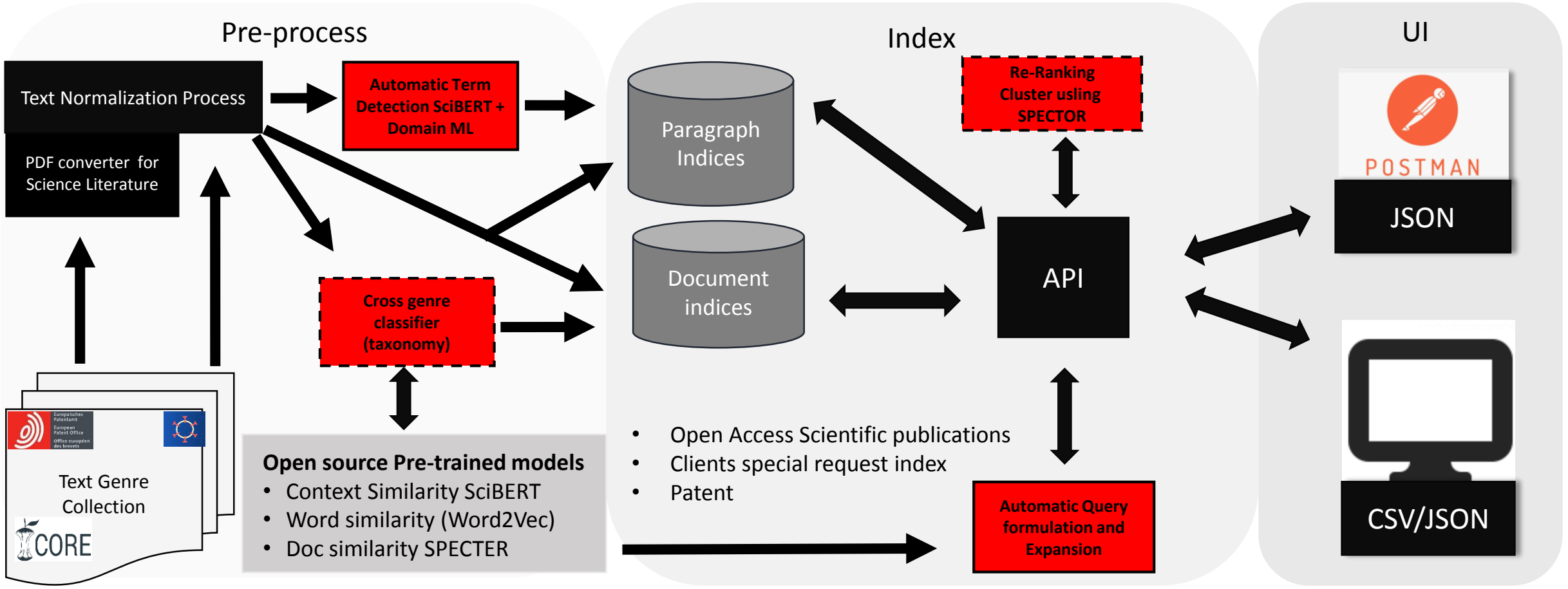
Outline

- Artificial Research Passage Retrieval Services
  - Technology & Usage
- Artificial Researcher Ontology Services
  - Technology & Usage
- Artificial Researcher NLP-toolkit Service
  - Release and rest API access

Artificial Researcher
Passage Retrieval Service

Artificial Researcher Passage Retrieval Services

Artificial Researcher



Open source	Software	Language	Open source container
GROBID Documentation	Solr, Lucene	python, Java, C++, GO, Perl	kubernetes

Automatic Query Formulation and Expansion

(12) **United States Design Patent** (10) Patent No.: US D500,000 S
Dyson et al. (45) Date of Patent: ** Dec. 21, 2004

(54) AUTOMOBILE BODY

(75) Inventors: **Andrew P Dyson**, West Bloomfield, MI (US); **Joseph S Dehner**, Bloomfield, MI (US); **David C McKinnon**, Bloomfield, MI (US); **Glenn W Abbott**, West Bloomfield, MI (US)

(73) Assignee: **DaimlerChrysler Corporation**, Auburn Hills, MI (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/201,094**

(22) Filed: **Mar. 10, 2004**

(51) LOC (7) Cl. 12-08
(52) U.S. Cl. D12/92
(58) Field of Search D12/90-92, 86; D21/424, 433; 296/185

(56) References Cited
U.S. PATENT DOCUMENTS

D408,328 S * 4/1999 Ayoub et al. D12/92
D465,436 S * 11/2002 Dehner et al. D12/92
D476,601 S * 7/2003 Stoddard et al. D12/92
D477,253 S * 7/2003 Minami et al. D12/92
D483,696 S * 12/2003 Howell et al. D12/92

* cited by examiner

Primary Examiner—Melody N. Brown
(74) *Attorney, Agent, or Firm*—Ralph E. Smith

(57) CLAIM

The ornamental design for an automobile body, as shown and described.

DESCRIPTION

FIG. 1 is a front perspective view of an automobile body showing our new design;
FIG. 2 is a side view thereof;
FIG. 3 is a rear perspective view thereof;
FIG. 4 is a front view thereof;
FIG. 5 is a rear view thereof;
FIG. 6 is a front perspective view of an automobile body showing a second embodiment of our new design;
FIG. 7 is a side view of FIG. 6;
FIG. 8 is a rear perspective view of FIG. 6;
FIG. 9 is a front view of FIG. 6; and,
FIG. 10 is a rear view of FIG. 6.

It will be understood that the dashed lines presented in the drawings are for illustration only, and do not form a part of the claimed design.

1 Claim, 8 Drawing Sheets

Example of automatic query generation

<QUERY>
(conured OR clutch OR connectability OR nmofs OR fclp OR dnsr OR slippage OR anda OR rotational OR acceleration OR backlash OR subordinate OR estimating OR ure OR brake OR torque OR stopped OR vehicle OR wheel OR command OR outputting OR estimate OR check OR psr OR driving OR pedal OR wheels OR shaft OR prohibiting OR determining
estimated OR prescribed OR stopping OR elapse
OR output OR controller OR rotating OR accelera
AND
("vehicle driving force control apparatus" OR "dr
OR "clutch connection command" OR "rear whe
path" OR "output rotational speed" OR "input ro
"detected parameter" OR "generation load torqu
"determination occurrence" OR "four-wheel driv
proceed" OR "wheel speed sensor" OR "output s
"backlash elimination" OR "drive mode switch" (
range" OR "transition time" OR "wheel speed" (
connection" OR "motor torque" OR "generator lo
"high rate" OR "electric motor" OR "throttle ope
force" OR "connected state" OR "previous equat
"prescribed rotational speed difference" OR "12
"disconnected state" OR "electric clutch" OR "fo
</QUERY>

Automatic query expansion terms

brake pedal:
vehicle operating pedal,
conventional hydraulic brake system
pedal devices
position brake actuating member
brake actuating member
hydraulically-assisted rack pinion steering gear
brake operating member
conventional braking system
pair pedals

accelerator pedal
case pedal device
pedal device

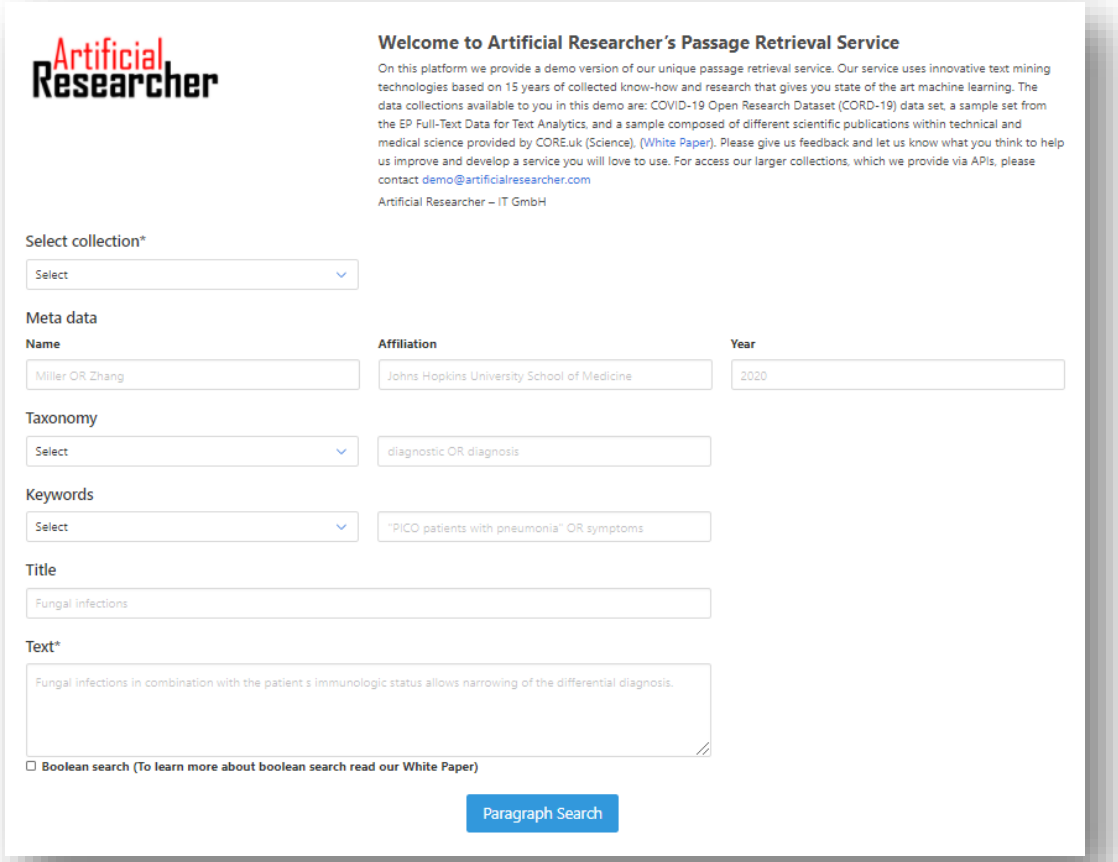
Claims (1)

1. The ornamental design for an automobile body, as shown and described.

Passage Retrieval Service

https://passageretrieval.artificialresearcher.com/

- Standard Index Collections
  - Open Access scientific articles
    - access to 204,582,649 – CORE.uk
  - Patents
    - EP full-text data for text analytics - European Patent Office
- Indexing domain-specific collections
  - e.g. COVID-19 Open Research Dataset (Wang et al 2019, Allen Institute for AI)

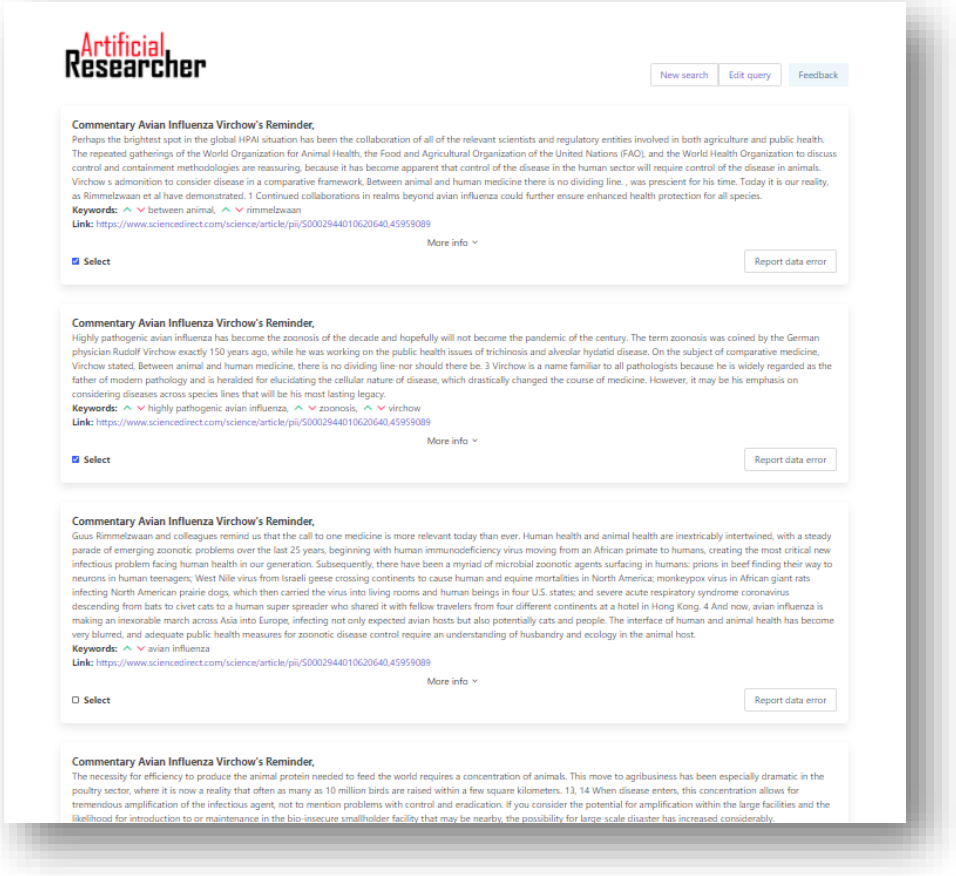


Passage Retrieval Service

- Direct access to
  - Relevant paragraphs
  - Abstracts
  - Bibliographic information (author, year, affiliation)
  - Links to full text documents

- Possibility to select and download paragraphs including all bibliographic data, ***including the identified technical terms***, subject classification terms, scientific classifications

- *The sample collections on the showcase page are updated every 4th day*



Request via Postman

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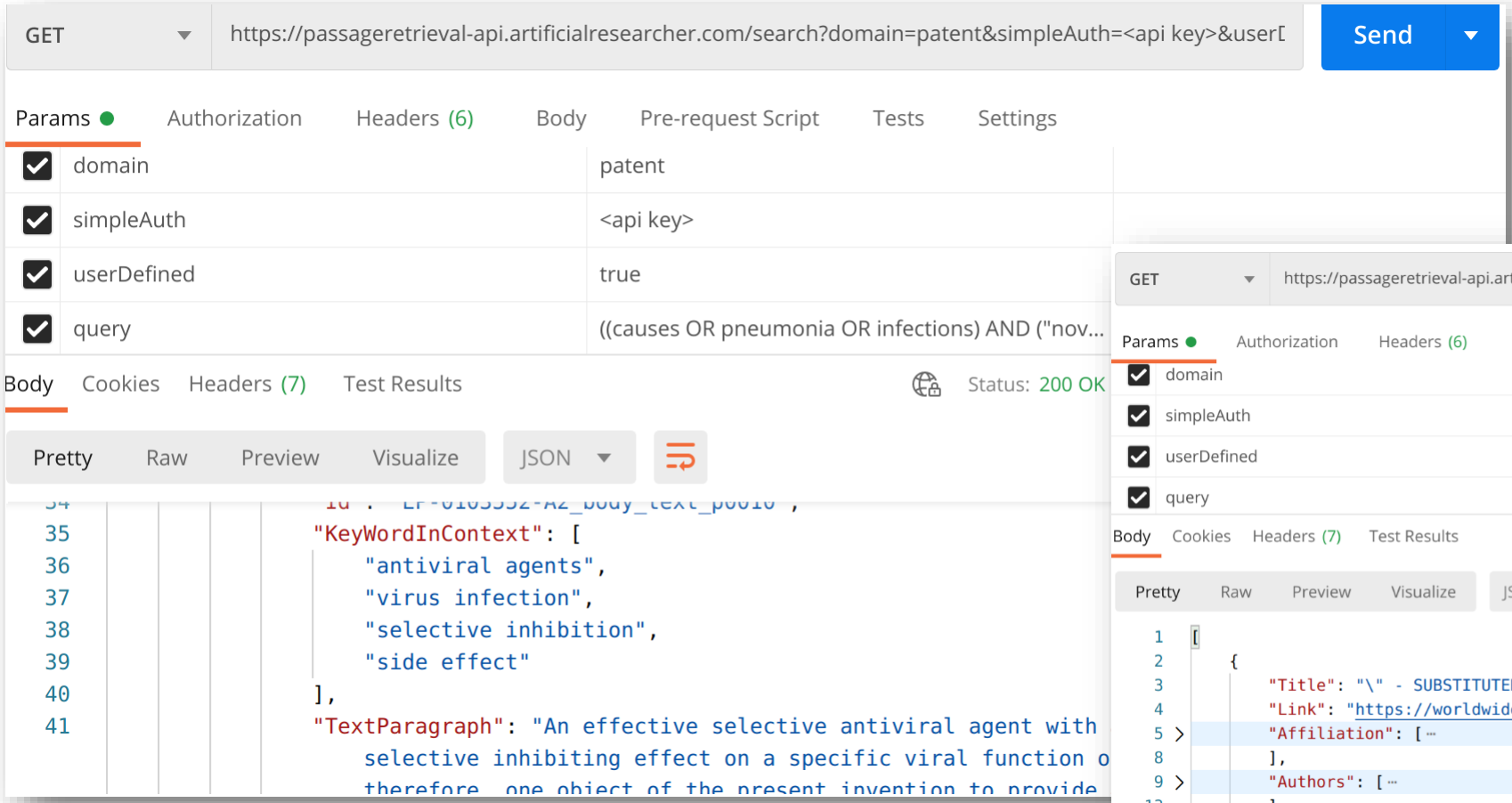
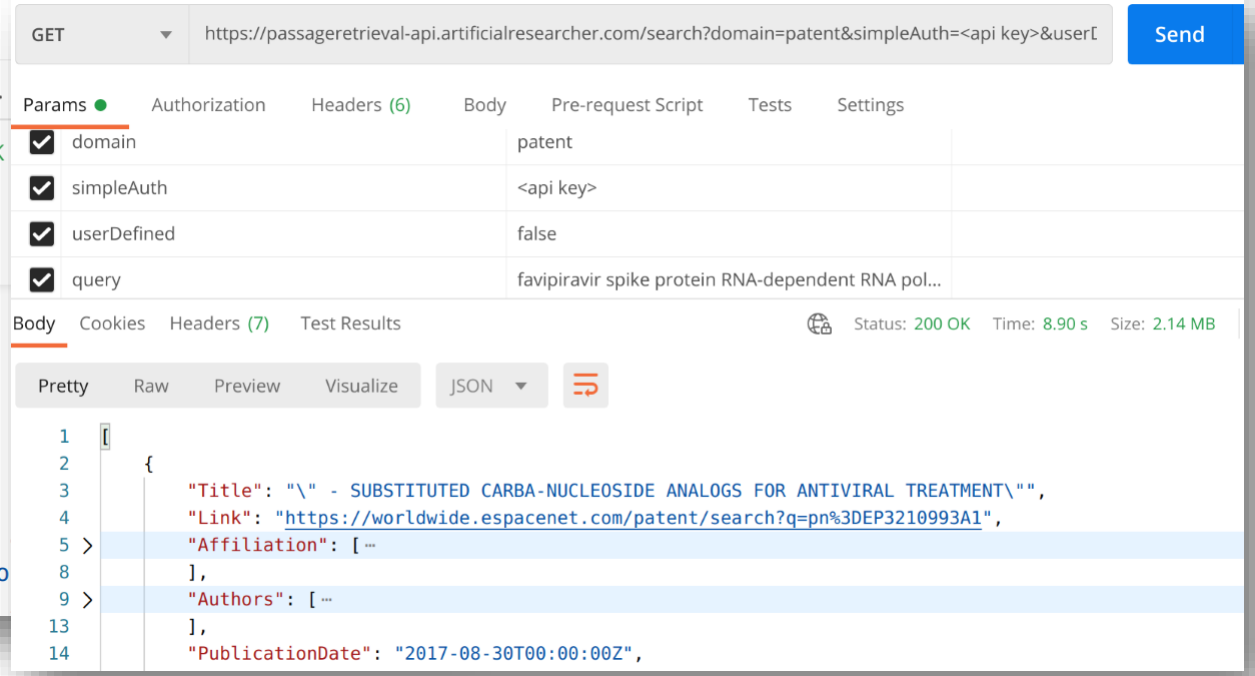
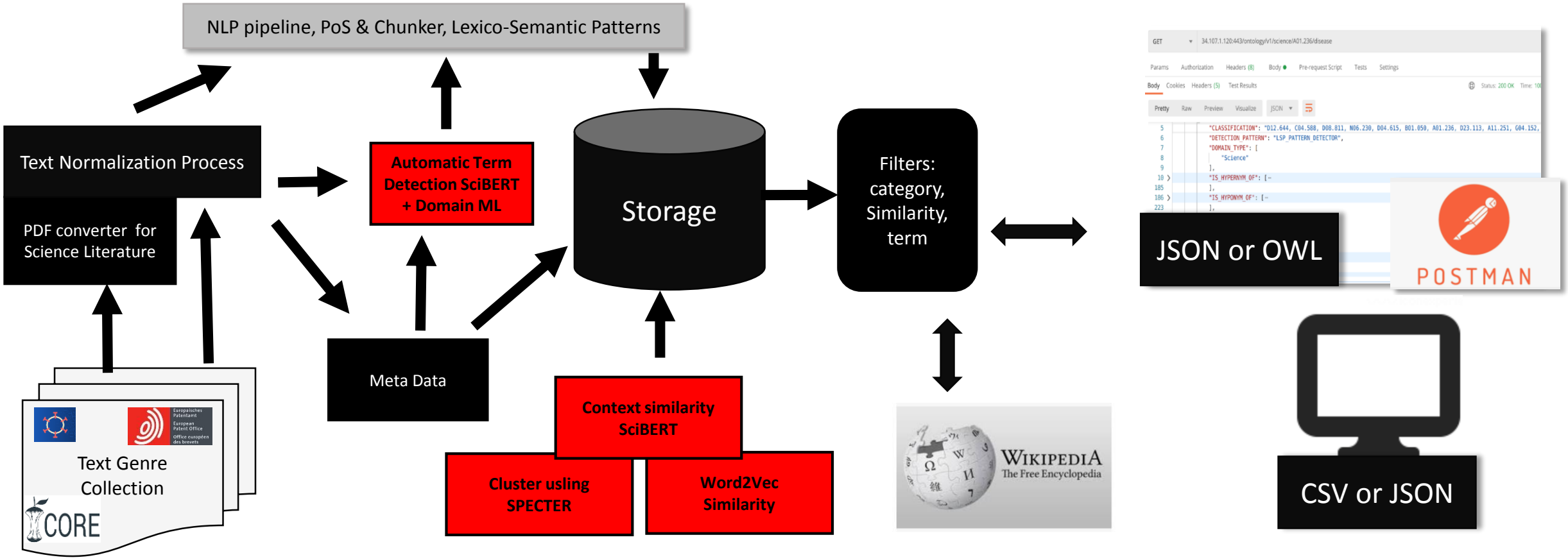




Artificial Researcher Ontology Services

Artificial Researcher Ontology Service

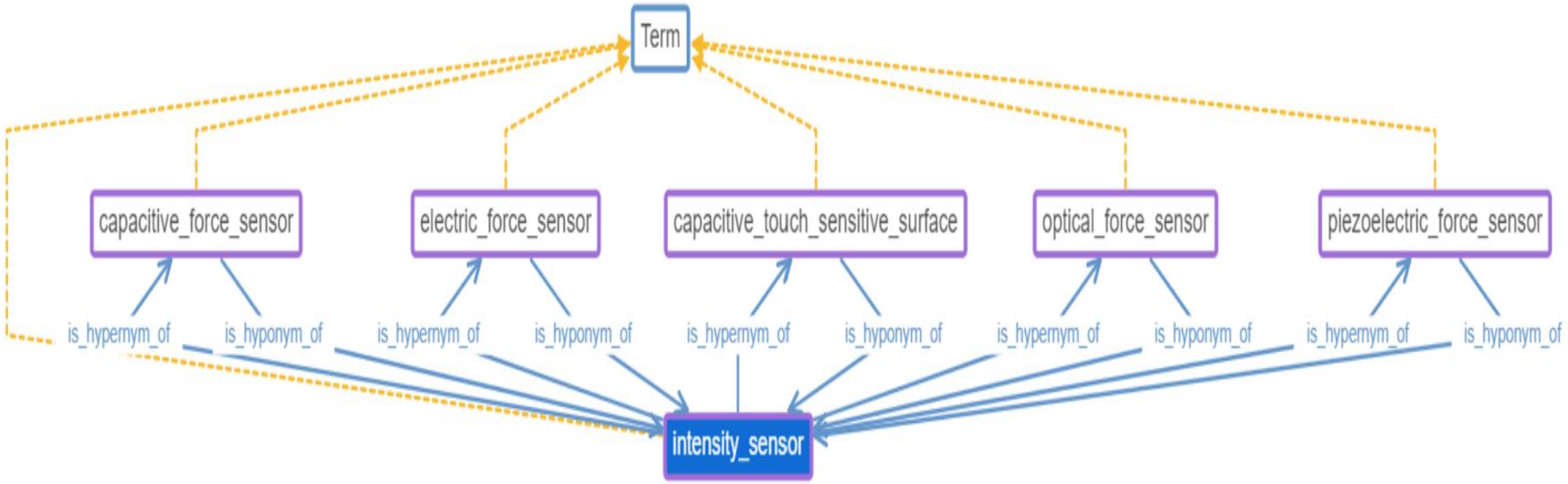
Artificial Researcher



Open source	Software	Language	Open source container
GROBID Documentation	kibana	python	
AI2	elastic	GO	
		Java	
		Perl	
		C++	
			kubernetes

Relation Extraction Graph

Narrow terms



Broad term

Added Meta data to RE Graph

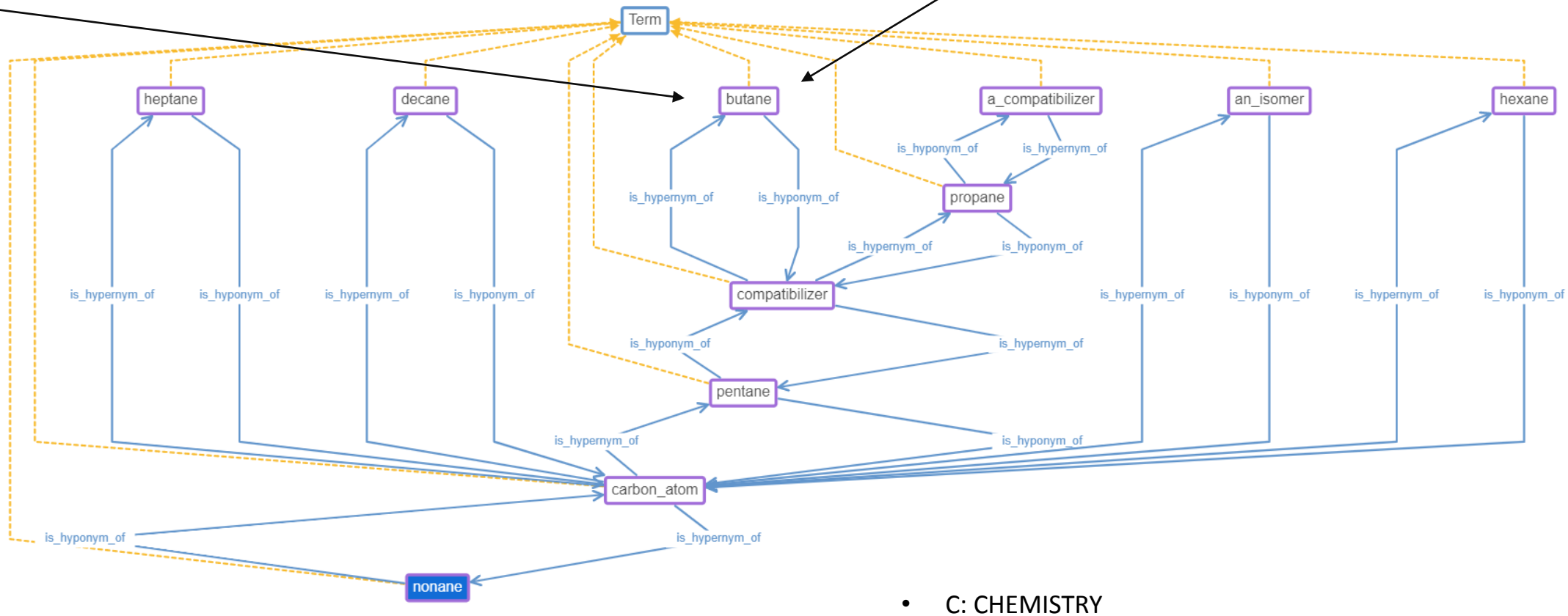
Artificial Researcher

Wikipedia

Butane

Names	
Preferred IUPAC name	Butane[3]
Systematic IUPAC name	Tetracarbane (never recommended[3])
Other names	Butyl hydride,[1] Quartane,[2] Refrigerant 3-11-0
Identifiers	
CAS Number	106-97-8 ✓
3D model (JSmol)	Interactive image
Beilstein Reference	969129
ChEBI	CHEBI:37808 ✓
ChEMBL	ChEMBL134702 ✓
ChemSpider	7555 ✓
ECHA InfoCard	100.003.136
EC Number	203-448-7
E number	E943a (glazing agents, ...)
Gmelin Reference	1148
KEGG	D03186 ✓
MeSH	butane
PubChem CID	7843
RTECS number	EJ4200000
UNII	6LV4FOR43R ✓
UN number	1011
CompTox Dashboard (EPA)	DTXSID7024665 ✓
InChI	[show]
SMILES	[show]
Properties	
Chemical formula	C_4H_{10}
Molar mass	58.124 g·mol^{-1}
Appearance	Colorless gas
Odor	Gasoline-like or natural gas-like[1]
Density	2.48 kg/m^3 (at 15 °C (59 °F))
Melting point	−140 to −134 °C; −220 to −209 °F; 133 to 139 K
Boiling point	−1 to 1 °C; 30 to 34 °F; 272 to 274 K
Solubility in water	61 mg L^{-1} (at 20 °C (68 °F))
log *P*	2.745
Vapor pressure	~170 kPa at 283 K [4]
Henry's law constant (k_H)	11 nmol Pa^{-1} kg^{-1}
Conjugate acid	Butanium
Magnetic susceptibility (χ)	-57.4·10^{-6} cm^3/mol
Thermochemistry	
Heat capacity (*C*)	98.49 J K^{-1} mol^{-1}
Std enthalpy of formation ($\Delta_f H^\circ_{298}$)	−126.3–−124.9 kJ mol^{-1}
Std enthalpy of combustion ($\Delta_c H^\circ_{298}$)	−2.8781–−2.8769 MJ mol^{-1}
Hazards[5]	

Label: organic compound



- C: CHEMISTRY
  - C07: ORGANIC CHEMISTRY
    - C07F7/08; C07F7/10; C07F7/28
  - C08: ORGANIC MACROMOLECULAR COMPOUNDS
    - C08F4/58

Combining NLP & Distributional Semantics

Embedding identifies similarities between different words

- Underwear **similar to** underpants , undergarment, panties, underclothes
- Strength **similar to** strengths, strength, toughness, stronger, sfrength

Technical semantic relations are a mixture of single words and phrases

- *synthetic fibers* **synonym to** *polyester fibers*
- *thrips* **hypernym to** *bulb fly larvae*

$$JoinedSimilarity = \sum_{\substack{i,j=1,n \\ i \neq j \\ i<j}}^{N} \frac{\cos\left(\overrightarrow{w_i}, \overrightarrow{w_j}\right)}{N}$$

- w_i, w_j represent each word vector pair cosine similarity of a MWT
- N is the number of words for a MWT (Andersson et al 2017)

Joined Similarity

Syntagmatic

- Does “Network lan” and “communication link” have (hyponymy) relation? Yes

Paradigmatic

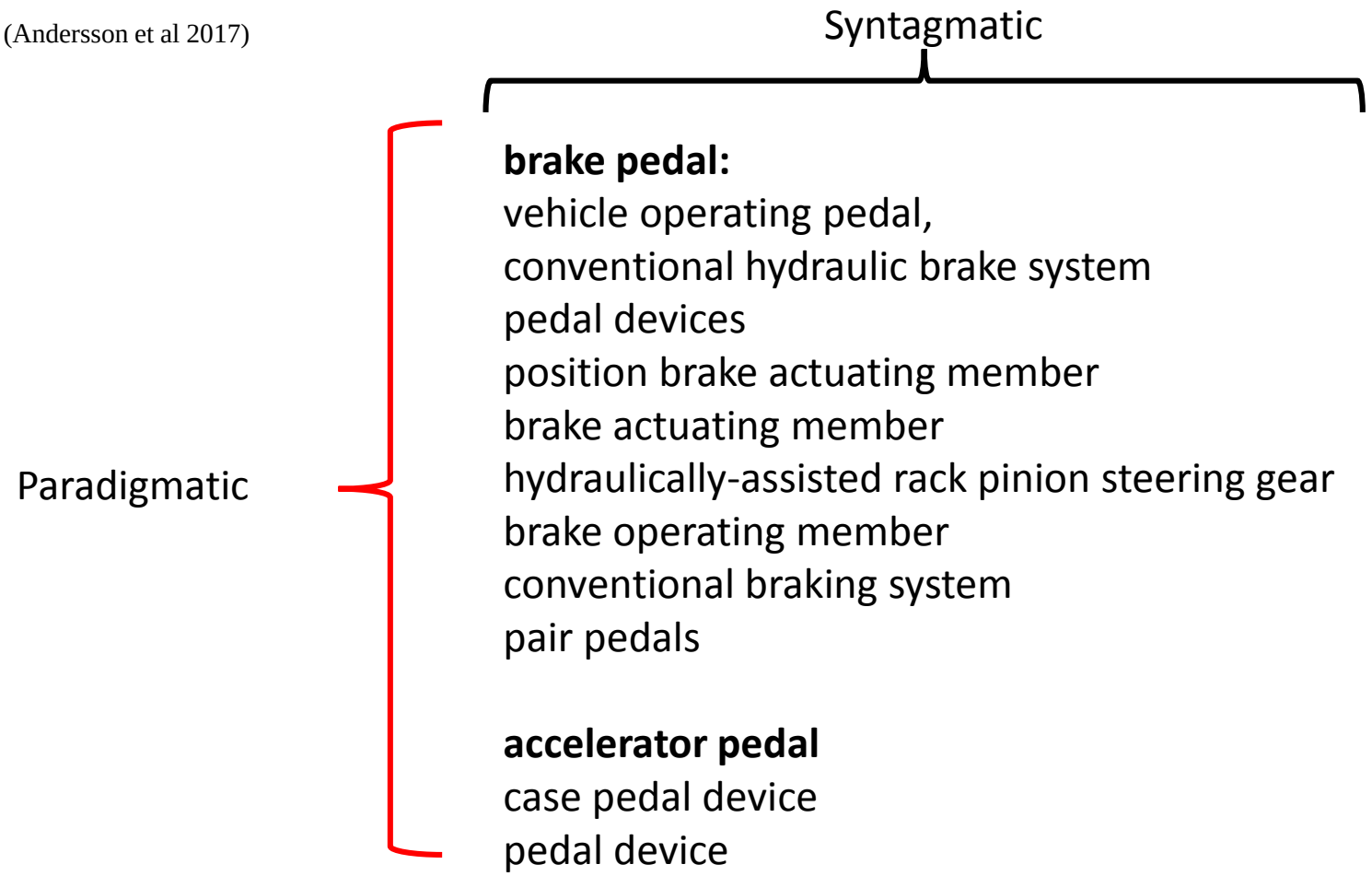
- Does ”mechanical stress” and “communication link” have a (hyponymy) relation? No

$$JoinedSimilarity = \sum_{\substack{i,j=1,n \\ i \neq j \\ i<j}}^{N} \frac{\cos\left(\overrightarrow{w_i} \quad , \quad \overrightarrow{w_j}\right)}{N}$$

- w_i, w_j represent each word vector pair cosine similarity of a MWT
- N is the number of words for a MWT (Andersson et al 2017)

Identification of technical term and related concepts

(Andersson et al 2017)



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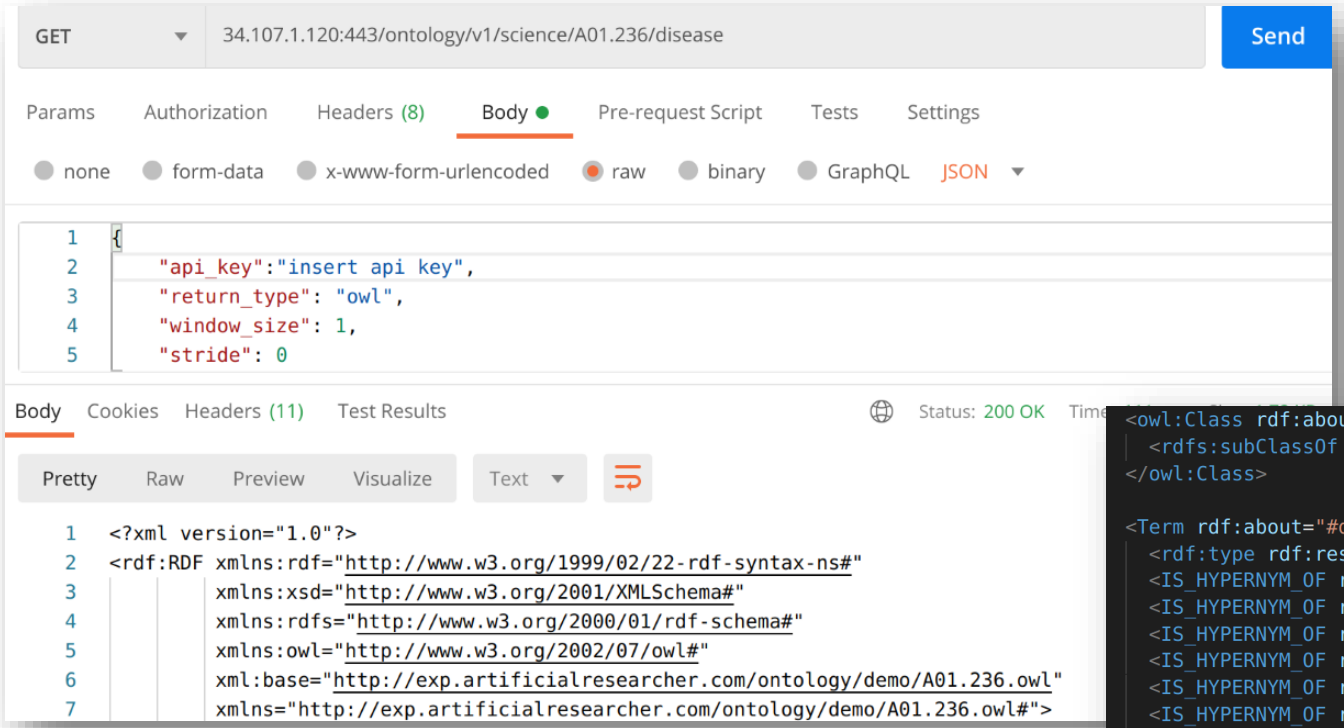

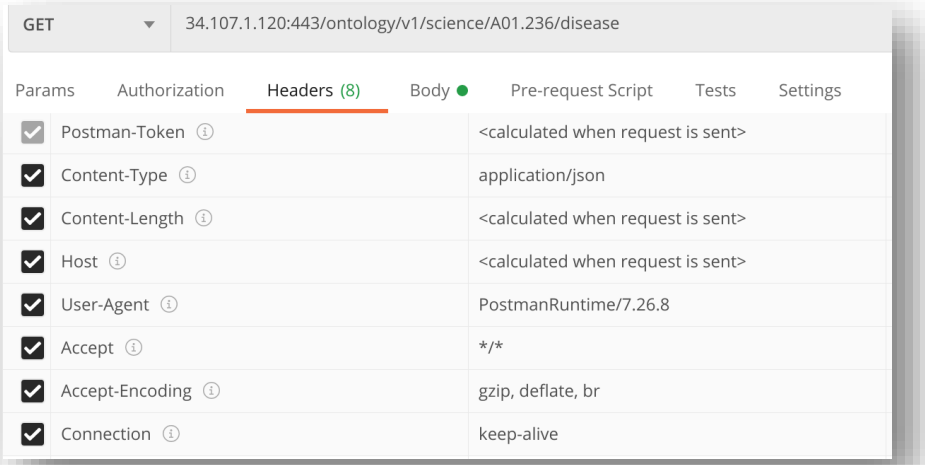

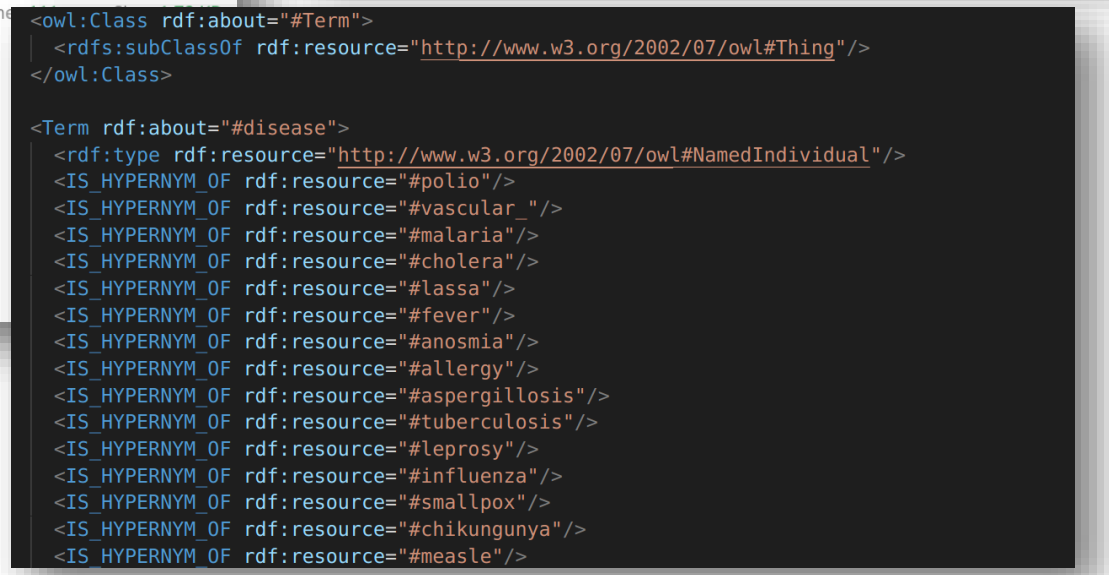

Artificial Research NLP Toolkit

Artificial Researcher

Release First Quarter 2021

- SciPatentBERT Multi Word Term Detection
  - Alpha already released (Fink et al 2019)
  - Automatic Domain Term Recognition
    - MWT and single terms
- SciBERT text segment similarities
  - Alpha already released (Pretrained language model in Beltagy et 2019)
- COVID PIC identification
  - Population Intervention Comparison
- Patent SPECTER

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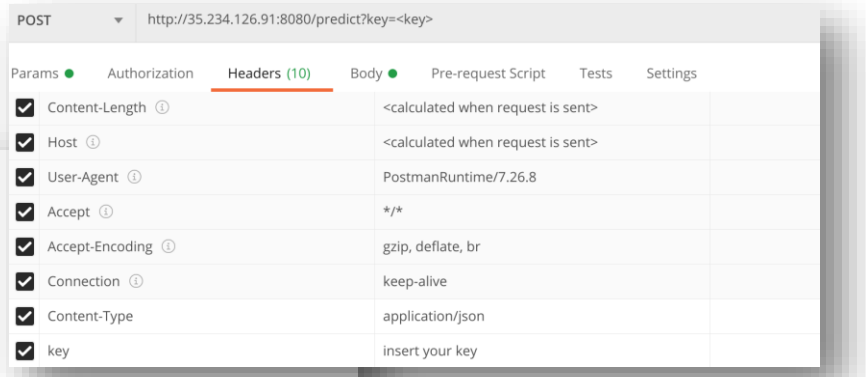
Multi Word Term Detection



POST http://35.234.126.91:8080/predict?key=<key>

Params Authorization Headers (10) Body Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1  {"sentence": "At this time, in step S110, the tape is determined as a general recording tape, if there is no key
     information, and the tape is determined as the first recording tape if encrypted keystreams E G (KS) are detected.
     ."}
```

Body Cookies Headers (5) Test Results Status: 200 OK Time: 2.05 s Size: 2.59 KB Save Response

Pretty Raw Preview Visualize Text


```
152659893035889],[-1.3114492893218994,1.358341097831726],[-0.9331348538398743,1.0229604244232178],[1.
0260961055755615,-0.9564980268478394],[1.8108012676239014,-1.7507004737854004],[2.955803155899048,-2.
8779289722442627],[2.987224578857422,-2.9258599281311035],[3.912778377532959,-3.817582607269287],[3.
9477052688598633,-3.882110834121704],[3.541703701019287,-3.398561954498291],[4.405355930328369,-4.314597129821777]
],"mask":[1,1,1,
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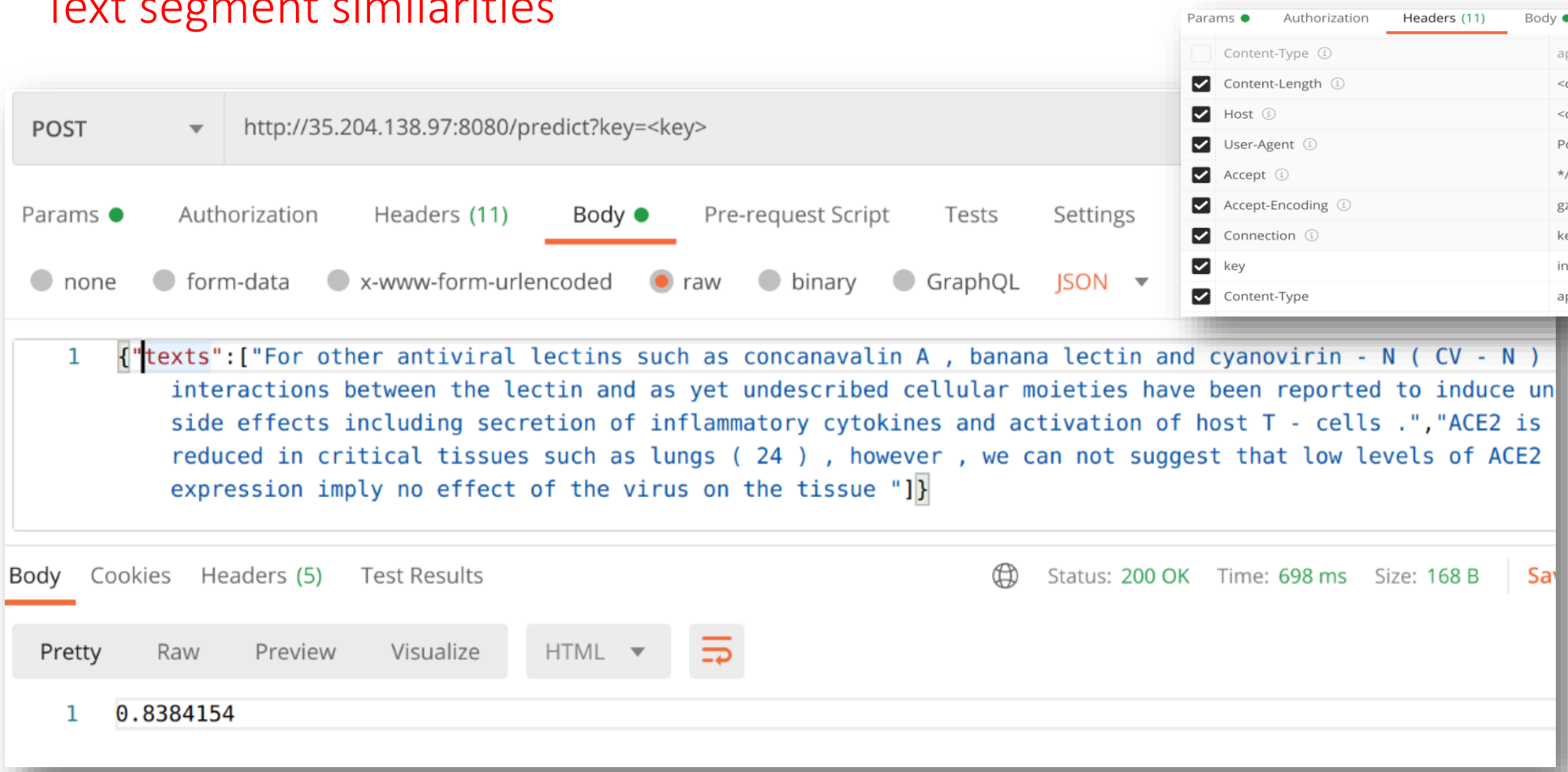
Request via Postman

Text segment similarities



For more information about the company and the team please visit www.artificialresearcher.com

Reference

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- Fink T., Andersson L., Hanbury A. (2019) *Detecting Multi Word Terms in Patents the same way as Named Entities.* In Proceeding 1st PatentSemTech Workshop, (Extended Abstract)
- Wang, L.L., Lo, K., Chandrasekhar, Y., Reas, R., Yang, J., Eide, D., Funk, K., Kinney, R.M., Liu, Z., Merrill, W., Mooney, P., Murdick, D., Rishi, D., Sheehan, J., Shen, Z., Stilson, B., Wade, A.D., Wang, K., Wilhelm, C., Xie, B., Raymond, D., Weld, D.S., Etzioni, O., & Kohlmeier, S. (2020*). CORD-19: The Covid-19 Open Research Dataset*. ArXiv.