

Smart Data. Smart Apps. Smart Decisions.

Searching Linked Data Graphs with GraphScope

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metaphacts at a Glance



COMPANY FACTS

- Founded in Q4 2014
- Headquartered in Walldorf, Germany
- Acquired SearchHaus GmbH in 2017
- Currently ~10 people
- Platform for knowledge graphs and knowledge graph applications



What are Knowledge Graphs?



- Semantic descriptions of entities and their relationships
- Uses a knowledge representation formalism (RDF, RDF-Schema, OWL)



- Entities: real world objects (places, people,...) and abstract concepts (religions, professions,...)
- **Relationships**: graph-based data model where relationships are first-class
- Semantic descriptions: types and properties with a well-defined meaning
- Possibly axiomatic knowledge (e.g. rules) to support automated reasoning

Knowledge Graphs Enable Intelligent Applications







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metaphactory

End-to-end platform to create and utilize enterprise knowledge graphs

metaphactory supports the lifecyle







the graphsearch engine for Linked Data 🐝



GraphScope helps you to find related objects in your data





Scenario: Danish Agricultural Government Data





Agricultural data

- Fields
- Crops

Business data

- Fieldownership
- Companies with address, activities

Alex B. Andersen, Nurefsan Gür, Katja Hose, Kim A. Jakobsen, and Torben Bach Pedersen *Publishing Danish Agricultural Government Data as Semantic Web Data* 2015, Springer International Publishing, 978-3-319-15615-6

http://extbi.cs.aau.dk/govAgriBus/index.php https://link.springer.com/chapter/10.1007%2F978-3-319-15615-6_13

"Who grows spinach?" (danish spinat)



Daniel							
← → C ① agriculture.localhost/resource/graphscope#/page/datasources/b72a6ee7-22a8-47bc-90a9-4cb8c8f82e2f/database/table?keywords=spinat%20company					Q 🛠 🛆 G :		
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DANMARKS NATURFOND	247297_77-0		Spinat				
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Sloth Rasmussen	247297_79-0		Spinat				
Ole Kjærulff Davidsen	247297_8-0		Spinat				
GØRLØSE AUTOIMPORT ApS	247297_80-0		Spinat				
PETER GASBJERG	247297_81-0		Spinat				
Rydskovgård v/Anne Mette Riber og Lars r	Qvist Ibsen 247304		Spinat				
Sine Lewis & Till Junkel	247304		Spinat				
Landmand/Udlejer Anders Peter Laustsen	247304		Spinat				
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Gdr Nels Peter Jensen	247304		Spinat				
Leif Mortensen	247304		Spinat				
GÅRDEJER TORBEN FLINCH	247304		Spinat				
	247304		Spinat				



spinat company



```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX extbi: <http://extbi.lab.aau.dk/ontology/business/>
PREFIX gs: <http://ns.graphscope.io/>
PREFIX extbi1: <http://extbi.lab.aau.dk/ontology/agriculture/>
SELECT DISTINCT ?v0 ?v1 ?v2 ?v1_1797851581_1394573921
WHERE {
   SERVICE <http://graphscope:9090/graphscope/api/spargl/internal/> {
        ?v1 extbi1:cropname ?v1_1797851581_1394573921 .
        ?v1_1797851581_1394573921 gs:hasKeyword "s:spinat|spinat"@keyword .
        ?v1 rdf:type extbi1:Crop .
   }
    hint:Prior hint:runFirst true .
    ?v0 extbi1:produces ?v1 .
    ?v2 extbi:owns ?v0 .
    ?v0 rdf:type extbi1:Field .
    ?v2 rdf:type extbi:Company .
}
LIMIT 1000
```

Keyword query is internally translated into SPARQL by GraphScope

What crops are companies producing, which are registered with activity dairy cattle.



Daniel								
← → C 🗿 agriculture.localhost/resource/graphscope#/page/datasources/c877fd9b-ddd6-4257-9fcc-2b056fd0224b/database/table?keywords=crop%20company%20malk 🖡 Q ☆ 🔥 💿 🗄								
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Bladbedefrø, rødbedefrø	357459	GRAM OG NYBØL GODSER A/S	avl_af_malkekvaeg Avl af malkekvæg					
permanent_graes%2C_lavt_udbytte_251	357459	GRAM OG NYBØL GODSER A/S	avl_af_malkekvaeg Avl af malkekvæg					
Bælgsæd, flerårig	358105	GRAM OG NYBØL GODSER A/S	avl_af_malkekvaeg Avl af malkekvæg					
Vinterhvede	358105	GRAM OG NYBØL GODSER A/S	avl_af_malkekvaeg Avl af malkekvæg					
Spinat	247331_9-0	Kristiansminde v/M Rasmussen & M Christensen	avl_af_malkekvaeg Avl af malkekvæg					
Vinterhvede	247331_9-0	Kristiansminde v/M Rasmussen & M Christensen	avl_af_malkekvaeg Avl af malkekvæg					
Bladbedefrø, rødbedefrø	248758_3-1	Kristiansminde v/M Rasmussen & M Christensen	avl_af_malkekvaeg Avl af malkekvæg					
Vinterbyg	248758_3-1	Kristiansminde v/M Rasmussen & M Christensen	avl_af_malkekvaeg Avl af malkekvæg					
Spinat	357409	FRANK JESSEN	avl_af_malkekvaeg Avl af malkekvæg					
Havre	357409	FRANK JESSEN	avl_af_malkekvaeg Avl af malkekvæg					
Spinat	357443_12-0	JAN PETER LEY	avl_af_malkekvaeg Avl af malkekvæg					
permanent_graes_og_kloever_uden_norm_276	357443_12-0	JAN PETER LEY	avl_af_malkekvaeg Avl af malkekvæg					
Bladbedefrø, rødbedefrø	357465	JAN PETER LEY	avl_af_malkekvaeg Avl af malkekvæg					
Vårbyg	357465	JAN PETER LEY	avl_af_malkekvaeg Avl af malkekvæg					
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GraphScope Technology



• Just keywords, no more SPARQL

• Users don't need to be SPARQL experts to leverage the power of graph data. Just searching by keywords is enough to take advantage of the relationships in their data and find relevant data.

• Simple interface

• A search box, known to every user, is the interface to start a search. GrapeScope understands users' requests and provides feedback on how their search was interpreted. Users can alter their request easily.

• Engages everybody

• GraphScope enables everybody to search the data graph, not just IT-experts. More insights to the knowledge captured by your data will be gained.

Exploration

• GraphScope allows you to discover data related to your search result and explore relevant data.



GraphScope Technology











GraphScope generates SPARQL queries from keywords in subseconds for a given RDF graph

Graphical user interface for result modifications and further interactions

GraphScope combines the simplicity of keyword search with the precision of database queries

GraphScope is part of the metaphactory platform



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