# Elas4RDF: Multi-perspective Triple-centered Keyword Search over RDF using Elasticsearch

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# 1. Motivation

**Keyword search:** Familiar to plain users (web search engines) and entry point to the information space for faceted search **Elasticsearch:** A document-centric Information Retrieval System with widespread use in different contexts

The evaluation over DBpedia-Entity v2 test collection has shown that the approach presented in [1] performs similarly to systems built from scratch and use entity-oriented and dataset-specific index structures.

# 2. Elas4RDF **VELAS4RDF**

A triple-centered keyword search engine over RDF that offers Multiple Perspectives (tabs) for the search results: the user can easily inspect all tabs and get a better overview and understanding of the search <u>results</u>.

**3.**Perspectives b) Entities tab a) Triples tab Las4RDF El Greco paintings Q Q dElas4RDF( El Greco paintings) < Triples 🐇 Entities 🕸 Graph 🕸 Schema 📮 QA 2 📲 Triples 👫 Entities 🕸 Graph 比 Schema 📮 QA n You searched for "El Greco paintings" - found 629 entities You searched for "El Greco paintings" - found 3679014 triples Number of triples used: 1000 Download triples: Turtle N-Triples JSON-LD El Greco Score: 1.000 'oménikos Theotokópoulos (Greek: Δομήνικος Θεοτοκόπουλος [ðoʿminikos θeotoʿkopulos], 1541 – 7 April 1614), most wid**el**y known as **El Greco** (pronounced: " El Greco was a Cretan-born painter, sculptor List of works by El Greco <u>abstract</u> [el 'Yreko]; Spanish for \ The Greek\ ), was a painter, sculptor and architect of the Spanish Renaissance. The nickname \ El Greco\ refers both to his Greek origin El Greco was a Cretan-born painter, sculptor and architect of http://dbpedia.org/ontology/abstrac and architect of the Spanish Renaissance. El and Spanish citizenship. @en /dbpedia.org/resource/El Grec the Spanish Renaissance. El Greco left his birthplace for Venice **Greco** left his birthplace for Venice in 1567, in 1567, never to return. El Greco's three years in Venice never to return. **El Greco**'s three years in profoundly influenced his style. @en Venice profoundly influenced his style. In 1577, http://dbpedia.org/resource/List\_of\_works\_by\_El\_Greco he emigrated to Toledo, Spain, where he lived CategoryPaintings by El Greco Score: 0.675 and ... http://dbpedia.org/resource/CategoryPaintings\_by\_El\_Greco <u>Dormition\_of\_the\_Virgin\_(El\_Greco)</u> Score: 0.209 Dormition of the Virgin (El Greco) " El Greco painted his Dormition of the Virgin <u>abstract</u> El Greco painted his Dormition of the Virgin near the end of his Cretan period, probably before 1567. El Greco's signature on the base of the central El Greco painted his Dormition of the Virgin near the end of his http://dbpedia.org/ontology/abstract near the end of his Cretan period, probably candelabrum was discovered in 1983. The discovery of the Dormition led to the attribution of three other signed works of \ Doménicos\ to El Greco (Modena Cretan period, probably before 1567. El Greco's signature on before 1567. **El Greco**'s signature on the base riptych, St. @en the base of the central candelabrum was discovered in 1983. source/Dormition of the Virgin (El Greco of the central cand**el**abrum was discovered in The discovery of the Dormition led to the attribution of three

Shows the **top-ranked triples** (precise, explainable) Extended information from rdfs\_comment Triples can be downloaded

Shows the **top-ranked entities** (from the ranking of triples we produce the ranking of entities). For each entity, the corresponding image from Wikipedia/DBpedia page is shown

#### d) QA tab

### c) Graph tab



Q dElas4RDF El Greco paintings < Triples 🐇 Entities 📽 Graph 🕸 Schema 📮 QA Best answer for "El Greco paintings" ttp://dbbedia.org/resource/<u>Boy\_Leading\_a\_Horse</u> - <u>http://dbpedia.org/ont</u> tp://dbpedia.org/resource/Saint\_Martin\_and\_the\_Beggar\_(El\_Greco) Saint Martin and the Beggar (El Greco) Relevant keywords: painting, greco, el, el greco Score: 96.744 <u>El\_Greco)">Saint\_Martin\_and\_the\_Beggar\_(El\_Greco)</u> Score: 96.712 From triple: http://dbpedia.org/resource/Art\_Institute\_of\_Chicago - http://dbpedia.org/ontology/wikiPageWikiLink - http://dbpedia.org/resource <u>/Saint\_Martin\_and\_the\_Beggar\_(El\_Greco)</u> Relevant keywords: painting, greco, el, el greco El\_Greco)">Saint\_Martin\_and\_the\_Beggar\_(El\_Greco) Score: 96.675 From triple: http://dbpedia.org/resource/Horses\_in\_art - http://dbpedia.org/ontology/wikiPageWikiLink - http://dbpedia.org/resource/

Visualizes the top-ranked triples as a graph to show **how they** are connected. The number of retrieved triples can be adjusted (implementation using the JavaScript InfoVis Toolkit)

Interprets the query as a question and attempts to find the triples that contain a **natural language answer**. The triple containing the answer, and relevant keywords are shown

## 4. Conclusions

Elas4RDF is a scalable, efficient and effective method for keyword search over RDF datasets. It follows a triple-centered approach

(in contrast to the entity-based approach) for providing more precise and explainable results. It relies on a special configuration of ElasticSearch for the needs of RDF. The approach is totally schema agnostic, and thus widely applicable. For capturing a wide range of information needs, Elas4RDF offers various perspectives for the search results. The current deployment is over DBpedia version 2015-10. In future we plan to add more perspectives, to work on the automatic recognition of the query type and prioritization of the perspectives, and to test the approach over various domain-specific datasets

6. TRY Elas4RDF

https://demos.isl.ics.forth.gr/elas4rdf





[1] G. Kadilierakis, P. Fafalios, P. Papadakos, and Y. Tzitzikas, "Keyword Search over RDF using Document-centric Information Retrieval Systems," in ESWC, 2020.

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