Dual View Knowledge Graph Explorer

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Abstract. Exploring knowledge graphs with **Graph Walks** by following edges from a starting node of interest is a natural approach for domain experts. Unfortunately, there are often frustrating obstacles to completing a path that is considered relevant and might be a core component of a workflow or use case. Users might not find what they are looking for, or a step in the walk is cumbersome or impossible. Links may have rotted, and information may be outdated or incomplete. For the **semantification of use cases**, Graph Walks are a valuable source for gathering requirements in a "Specification by Example" style.
This work introduces a Dual View Knowledge Graph Explorer. It is a software application written in Python with a Jupyter Notebook demo.

Keywords: Knowledge Graphs · Graph Walks
License: Apache 2.0
URL: https://github.com/WolfgangFahl/DualViewKnowledgeGraphExplorer

1 Introduction

User-friendly exploring of knowledge graphs is a core selling point of the Semantic Web. There are plenty of cool presentations showing off what a knowledge graph might look like. Unfortunately, this state of affairs is usually the result of hard work and the effort of a larger community. Wikidata [2] and OpenStreetMap [1] are examples of projects that have achieved high impact and visibility.

2 Background

The Wikidata Walkabout (Q99677798)[1] won the Coolest Tool Award 2024 [2]. Starting from a class such as "City" users can select an instance of their choice e.g., London (Q84)[3] and end up on the corresponding Wikidata page. The shortcomings of this approach have motivated this work. Users might get frustrated when they end up in a presentation style that is technology-focused. They might not be familiar with the properties being used and not be able to continue their exploration as intended.

[1] https://www.wikidata.org/wiki/Q99677798

[2] `https://meta.wikimedia.org/wiki/Coolest_Tool_Award`

[3] https://www.wikidata.org/wiki/Q84

3 Dual View Knowledge Graph Explorer

The idea behind the Dual View Knowledge Graph Explorer is to present two views of a Graph Walk side-by-side. One view shows the knowledge graph representation of the current node and one the “natural” view. A common pair is a Wikidata Q-item shown side-by-side with the official website of the item.

The prototype of the explorer is implemented as a Jupyter Notebook. It uses a YAML file declaring

- entity types
- node types
- entities
- nodes
- a walk with steps

in a straightforward way. The Python code to render the YAML content in dual-view-style was generated using Claude Sonnet 4.5 requiring some manual fixes.

3.1 SEEKCommons Query Objects Use Case

The approach was first tried out at a SEEKCommons (Q118147033)[4] Workshop in November 2025. The Graph Walk to be shown was quickly generated with a set of LLM tools (GPT-5, Grok4, Gemini3, Claude Sonnet 4.5) accessed via OpenRouter to create a YAML file describing the walk see Listing 1.1

Listing 1.1. YAML description of the SEEKCommons Graph Walk

```
# Dual-View Knowledge Graph Explorer - Navigation Steps
# Author: Wolfgang Fahl / bitplan.com
# 2025-11-16 for SeekCommons Workshop

node_types:
  organization:
    label: "Organization"
    wikidata_id: "Q43229"
    icon: ""
...

edge_types:
  funded_by:
    label: "funded␣by"
    wikidata_id: "P8324"
    icon: ""
...
nodes:
  seekcommons:
    label: "SeekCommons"
```

[4] https://www.wikidata.org/wiki/Q118147033

```
    type: project
    wikidata_id: "Q118147033"
    web_url: "https://seekcommons.org/"

...

edges:
  seekcommons_funded_by_nsf:
    from: seekcommons
    to: nsf_grant
    type: funded_by


walks:
  seekcommons_grant_walk:
    label: "SeekCommons␣Grant␣Exploration"
    start_node: seekcommons
    sequence:
      - edge: seekcommons_funded_by_nsf
      - edge: nsf_operated_by_nd
      - edge: nsf_has_pi_luis
      - edge: luis_employed_by_nd
```

This walk is a typical “Happy Path” walk. Figure 1 shows the starting node of the walk displayed as a side-by-side view by the `%run kgwebwalker.py` Jupyter cell command. Figure 4 shows steps 3 and 4.

4 Evaluation

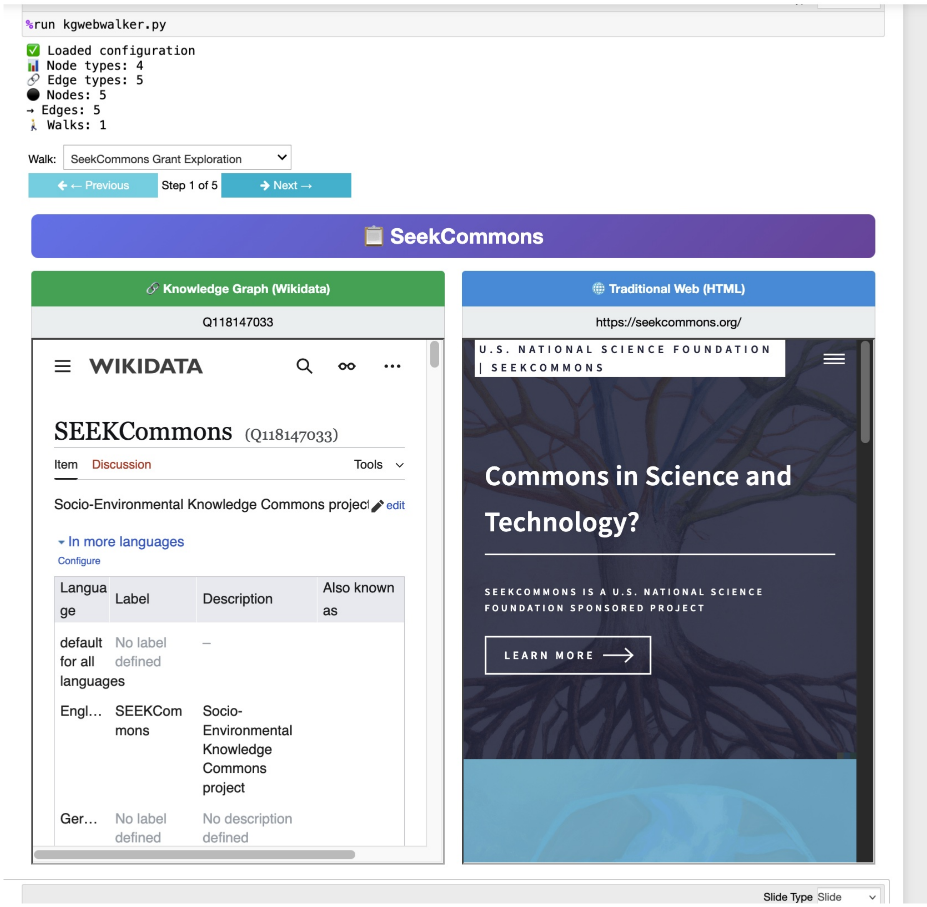
The Feedback from the SEEKCommons workshop participants was encouraging. It seems feasible to deduce **Query Objects** from given knowledge graphs and discuss the parameterization based on the **Specification by Example** walks.

5 Discussion

This paper presents a Jupyter Notebook prototype which seems to represent just the tip of the iceberg. There is huge potential in this approach since the properties of nodes are not explicitly discussed. The implicitness of the approach is what seems fitting for modern applications. For example, if you reference a person, the persistent identifier is enough to find the person’s details as a knowledge graph node and the corresponding entry, which might be a web page or a record in a database. There is no need to discuss the details of the web page or the record — these are readily available for inspection by humans and computers.

6 Future Work

A browser extension that allows tracking the intentions of a user by tracing relevant user interface events such as link clicks and data entered into input elements would be



```
%run kgwebwalker.py
```

```
✅ Loaded configuration
📊 Node types: 4
🔗 Edge types: 5
⚫ Nodes: 5
→ Edges: 5
🚶 Walks: 1
```

Walk: SeekCommons Grant Exploration

Q118147033

https://seekcommons.org/

SEEKCommons (Q118147033)

Socio-Environmental Knowledge Commons project

Language	Label	Description	Also known as
default for all languages	No label defined	–	
Engl…	SEEKCommons	Socio-Environmental Knowledge Commons project	
Ger…	No label defined	No description defined	

U.S. NATIONAL SCIENCE FOUNDATION | SEEKCOMMONS

Commons in Science and Technology?

SEEKCOMMONS IS A U.S. NATIONAL SCIENCE FOUNDATION SPONSORED PROJECT

Fig. 1. Step 1 of the sample Graph Walk

useful. For finding out the a user's intentions, there could be an interactive dialog asking questions about the role, background, and needs. There might also be an option to let the user point to areas of interest on the screen. A research question would be how state-of-the-art LLM support would enable navigation of existing knowledge graph nodes in parallel and ideally suggest additions essentially leading to a full-fledged knowledge graph curation-support tool.

References

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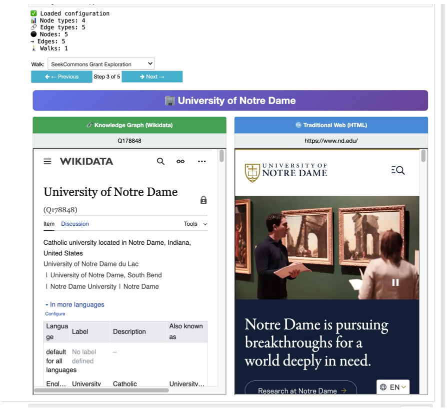
2. Vrandečić, D., Krötzsch, M.: Wikidata: a free collaborative knowledgebase. Communications of the ACM **57**(10), 78–85 (Sep 2014). https://doi.org/10.1145/2629489, `http://dx.doi.org/10.1145/2629489`



```
✅ Loaded configuration
📊 Node types: 4
🔗 Edge types: 5
● Nodes: 5
→ Edges: 5
🚶 Walks: 1
```

Walk: SeekCommons Grant Exploration

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University of Notre Dame

Knowledge Graph (Wikidata) — Q178848

WIKIDATA

University of Notre Dame (Q178848)

Item Discussion Tools

Catholic university located in Notre Dame, Indiana, United States

University of Notre Dame du Lac | University of Notre Dame, South Bend | Notre Dame University | Notre Dame

In more languages

Configure

Language	Label	Description	Also known as
default for all languages	No label defined	–	
Engl…	University	Catholic	University…

Traditional Web (HTML) — https://www.nd.edu/

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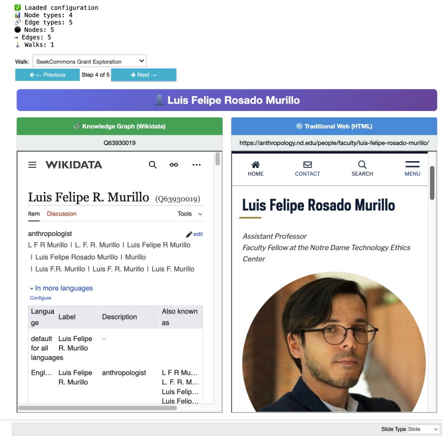
EN

Fig. 2. Step 3 of the walk



```
✅ Loaded configuration
📊 Node types: 4
🔗 Edge types: 5
● Nodes: 5
→ Edges: 5
🚶 Walks: 1
```

Walk: SeekCommons Grant Exploration

← Previous | Step 4 of 5 | Next →

Luis Felipe Rosado Murillo

Knowledge Graph (Wikidata) — Q63930019

WIKIDATA

Luis Felipe R. Murillo (Q63930019)

Item Discussion Tools

anthropologist

L F R Murillo | L. F. R. Murillo | Luis Felipe R Murillo | Luis Felipe Rosado Murillo | Murillo | Luis F.R. Murillo | Luis F. R. Murillo | Luis F. Murillo

In more languages

Configure

Language	Label	Description	Also known as
default for all languages	Luis Felipe R. Murillo	–	
Engl…	Luis Felipe R. Murillo	anthropologist	L F R Mu… L. F. R. M… Luis Felip… Luis Felip…

Traditional Web (HTML) — https://anthropology.nd.edu/people/faculty/luis-felipe-rosado-murillo/

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Slide Type: Slide

Fig. 3. Step 4 of the walk

Fig. 4. Further progression in the SEEKCommons Graph Walk