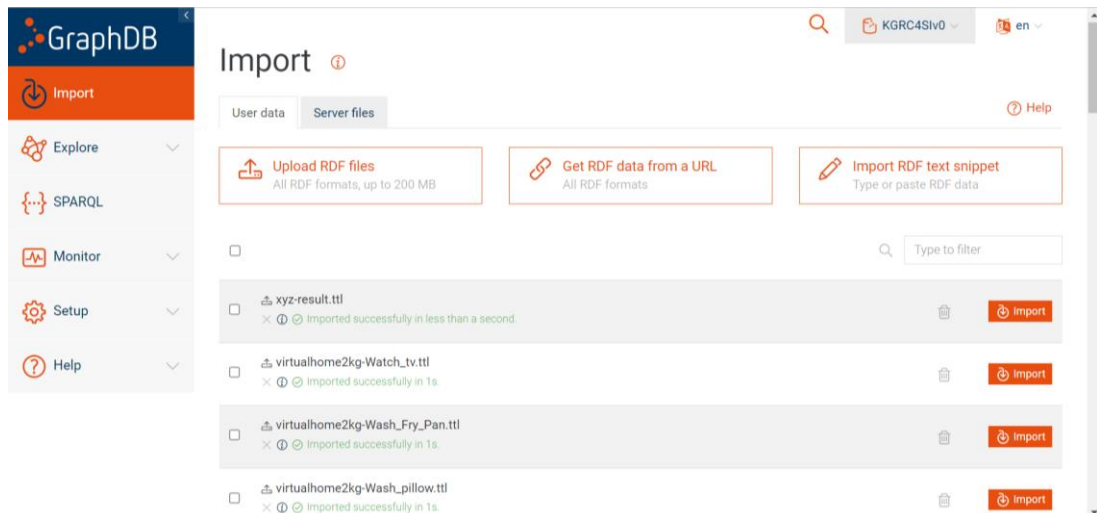


SPARQL クエリの使用手順

- ① Graph DB のインストール(ローカル環境で実行します)
リポジトリは「**KGRC4Siv01**」を選択してください。(2022/12/28 時点)
- ② 左の Import タブからテストデータセットのインポート



Upload RDF files ボタンでデータセットのアップロード後、右のオレンジの Import ボタンを押して緑のチェックマークがついたことを確認してください

- ③ 物体のサイズ情報を取得するクエリの実行
左の SPRAQL タブから以下のクエリを書いて実行してください

```
PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX : <http://example.org/virtualhome2kg/ontology/>
PREFIX ex: <http://example.org/virtualhome2kg/instance/>
CONSTRUCT {
    ?object :xzahyo ?xzahyo_node .
    ?object :yzahyo ?yzahyo_node .
    ?object :zzahyo ?zzahyo_node .
    ?xzahyo_node rdf:value ?size_x ;
        :unit :meter .
    ?yzahyo_node rdf:value ?size_y ;
        :unit :meter .
    ?zzahyo_node rdf:value ?size_z ;
        :unit :meter .

} WHERE {
```

```

        ?state1 :isStateOf ?object ; :bbox ?shape1 .
        ?shape1 x3do:bbboxSize ?size1 .
        ?size1  rdf:first ?size_x .
        ?size1  rdf:rest  ?size2 .
        ?size2  rdf:first ?size_y .
        ?size2  rdf:rest  ?size3 .
        ?size3  rdf:first ?size_z .
        BIND(REPLACE(STR(?object), STR(ex:), "") AS ?object_name)
        BIND(URI(CONCAT(STR(ex:), "xzahyo_", ?object_name))
AS ?xzahyo_node)
        BIND(URI(CONCAT(STR(ex:), "yzahyo_", ?object_name))
AS ?yzahyo_node)
        BIND(URI(CONCAT(STR(ex:), "zzahyo_", ?object_name))
AS ?zzahyo_node)
    }
}

```

```

1  PREFIX x3do: <https://www.web3d.org/specifications/X3d0ntology4.0#>
2  PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3  PREFIX : <http://example.org/virtualhome2kg/ontology/>
4  PREFIX ex: <http://example.org/virtualhome2kg/instance/>
5  CONSTRUCT {
6      ?object :xzahyo ?xzahyo_node .
7      ?object :yzahyo ?yzahyo_node .
8      ?object :zzahyo ?zzahyo_node .
9      ?xzahyo_node rdf:value ?size_x ;
10         :unit :meter .
11      ?yzahyo_node rdf:value ?size_y ;
12         :unit :meter .
13      ?zzahyo_node rdf:value ?size_z ;
14         :unit :meter .
15  }
16  WHERE {
17      ?state1 :isStateOf ?object ; :bbox ?shape1 .
18      ?shape1 x3do:bbboxSize ?size1 .
19      ?size1  rdf:first ?size_x .
20      ?size1  rdf:rest  ?size2 .
21      ?size2  rdf:first ?size_y .
22      ?size2  rdf:rest  ?size3 .
23      ?size3  rdf:first ?size_z .
24      BIND(REPLACE(STR(?object), STR(ex:), "") AS ?object_name)
25      BIND(URI(CONCAT(STR(ex:), "xzahyo_", ?object_name)) AS ?xzahyo_node)
26      BIND(URI(CONCAT(STR(ex:), "yzahyo_", ?object_name)) AS ?yzahyo_node)
27      BIND(URI(CONCAT(STR(ex:), "zzahyo_", ?object_name)) AS ?zzahyo_node)
28  }
29

```

実行後、Download as ボタンから Turtle 形式などで結果をダウンロードし、③の手順と同様にインポートしてください(このインポートが完了しないと次のクエリが実行でき

ません)

④ 各クエリの実行

- ・ 高い場所に手を伸ばす動作を検出するための SPARQL クエリ

```
PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
PREFIX x3do:<https://www.web3d.org/specifications/X3dOntology4.0#>
PREFIX rdf:<http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX : <http://example.org/virtualhome2kg/ontology/>
PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
PREFIX                                     ob:
<http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>

PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
CONSTRUCT{
    ?a hra:riskFactor ?e.
    ?e a hra:DoSomethingToHighPositionObject.
}WHERE{
    ?a :hasEvent ?e.
    ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
    ?o :yazahyo/rdf:value ?oy.
    ?person :yazahyo/rdf:value ?py.
    ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
    ?state2 :isStateOf ?o; :partOf ?situation; :bbox ?shape2.
    ?shape1 x3do:bbboxCenter ?center1; x3do:bbboxSize ?size1.
    ?center1 rdf:rest/rdf:first ?center_y1.
    ?shape2 x3do:bbboxCenter ?center2; x3do:bbboxSize ?size2.
    ?center2 rdf:rest/rdf:first ?center_y2.
    FILTER(( ?center_y2+(?oy*0.5))>=(?center_y1+(?py*0.5)))
    FILTER(?action!=ac:walk&&?action!=ac:watch      &&      ?action!=ac:turnTo
&& ?action!=ac:lookAt)
    MINUS{?o rdf:type/rdfs:subClassOf*ob:Room}
}
```

```

1 PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
2 PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 PREFIX : <http://example.org/virtualhome2kg/ontology/>
5 PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
6 PREFIX ob: <http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>
7 PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
8 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
9 CONSTRUCT{
10   ?a hra:riskFactor ?e.
11   ?e a hra:DoSomethingToHighPositionObject.
12 }WHERE{
13   ?a :hasEvent ?e.
14   ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
15   ?o :yzahyo/rdf:value ?oy.
16   ?person :yzahyo/rdf:value ?py.
17   ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
18   ?state2 :isStateOf ?o; :partOf ?situation; :bbox ?shape2.
19   ?shape1 x3do:bboxCenter ?center1; x3do:bboxSize ?size1.
20   ?center1 rdf:rest/rdf:first ?center_y1.
21   ?shape2 x3do:bboxCenter ?center2; x3do:bboxSize ?size2.
22   ?center2 rdf:rest/rdf:first ?center_y2.
23   FILTER(( ?center_y2+(?oy*0.5))>=?center_y1*(?py*0.5))
24   FILTER(?action!=ac:walk&&?action!=ac:watch && ?action!=ac:turnTo && ?action!=ac:lookAt)
25   MINUS{?o rdf:type/rdfs:subClassOf*ob:Room}
26 }
27

```

- ・低い棚から物を取り出す動作を検出するための SPARQL クエリ

```

PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX : <http://example.org/virtualhome2kg/ontology/>
PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
PREFIX                                     ob:
<http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>

PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
CONSTRUCT{
  ?a hra:riskFactor ?e.
  ?e a hra:GrabLowPositionObject.
}WHERE{
  ?a :hasEvent ?e.
  ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
  ?o :yzahyo/rdf:value ?oy.
  ?person :yzahyo/rdf:value ?py.

```

```

?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
?state2 :isStateOf ?o;:partOf ?situation; :bbox ?shape2.
?shape1 x3do:bboxCenter ?center1; x3do:bboxSize ?size1.
?center1 rdf:rest/rdf:first ?center_y1.
?shape2 x3do:bboxCenter ?center2; x3do:bboxSize ?size2.
?center2 rdf:rest/rdf:first ?center_y2.
FILTER(( ?center_y2+(?oy*0.5))<=(?center_y1)+(?py*0.5))
FILTER(?action=ac:grab)
}

```

```

1 PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
2 PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 PREFIX : <http://example.org/virtualhome2kg/ontology/>
5 PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
6 PREFIX ob: <http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>
7 PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
8 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
9 CONSTRUCT{
10     ?a hra:riskFactor ?e.
11     ?e a hra:GrabLowPositionObject.
12 }WHERE{
13     ?a :hasEvent ?e.
14     ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
15     ?o :yzahyo/rdf:value ?oy.
16     ?person :yzahyo/rdf:value ?py.
17     ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
18     ?state2 :isStateOf ?o;:partOf ?situation; :bbox ?shape2.
19     ?shape1 x3do:bboxCenter ?center1; x3do:bboxSize ?size1.
20     ?center1 rdf:rest/rdf:first ?center_y1.
21     ?shape2 x3do:bboxCenter ?center2; x3do:bboxSize ?size2.
22     ?center2 rdf:rest/rdf:first ?center_y2.
23     FILTER(( ?center_y2+(?oy*0.5))<=(?center_y1)+(?py*0.5))
24     FILTER(?action=ac:grab)
25 }
26

```

- ・物の近くを歩く動作を検出するための SPARQL クエリ
(こちらのクエリではとくに実行に時間がかかるため末尾に
limit 5 等をつけることを推奨します)

```

PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX : <http://example.org/virtualhome2kg/ontology/>
PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
PREFIX
                                                                    ob:
<http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.ow

```

l#>

```
PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
CONSTRUCT{
    ?a hra:riskFactor ?e.
    ?e a hra:WalkClose.
}WHERE{
    ?a :hasEvent ?e.
    ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
    ?o :xzahyo/rdf:value ?ox.
    ?person :xzahyo/rdf:value ?px.
    ?o :zzahyo/rdf:value ?oz.
    ?person :zzahyo/rdf:value ?pz.
    ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
    ?state2 :isStateOf ?o; :partOf ?situation; :bbox ?shape2.
    ?shape1 x3do:bbboxCenter ?center1; x3do:bbboxSize ?size1.
    ?center1 rdf:first ?center_x1.
    ?center1 rdf:rest/rdf:rest/rdf:first ?center_z1.
    ?shape2 x3do:bbboxCenter ?center2; x3do:bbboxSize ?size2.
    ?center2 rdf:first ?center_x2.
    ?center2 rdf:rest/rdf:rest/rdf:first ?center_z2.
    FILTER((?center_x2-?center_x1)<=((?px/2)+(?ox/2)))
    FILTER((?center_z2-?center_z1)<=((?pz/2)+(?oz/2)))
    FILTER(?action=ac:walk)
}
```



The screenshot shows a SPARQL query editor with a light blue background. The query code is displayed in a monospaced font, with line numbers 1 through 17 on the left. The code is identical to the one in the previous block. On the right side of the editor, there is a vertical toolbar with icons for saving, opening, and running queries. At the bottom right, there is a red 'Run' button and a 'keyboard shortcut' label.

```
* 1 PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>
2 PREFIX x3do: <https://www.web3d.org/specifications/X3dOntology4.0#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 PREFIX : <http://example.org/virtualhome2kg/ontology/>
5 PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>
6 PREFIX ob: <http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>
7 PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>
8 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
9 CONSTRUCT{
10     ?a hra:riskFactor ?e.
11     ?e a hra:WalkClose.
12 }WHERE{
13     ?a :hasEvent ?e.
14     ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.
15     ?o :xzahyo/rdf:value ?ox.
16     ?person :xzahyo/rdf:value ?px.
17     ?o :zzahyo/rdf:value ?oz.
```



```

18    ?person :zzahyo/rdf:value ?pz.
19    ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.
20    ?state2 :isStateOf ?o; :partOf ?situation; :bbox ?shape2.
21    ?shape1 x3do:bbboxCenter ?center1; x3do:bbboxSize ?size1.
22    ?center1 rdf:first ?center_x1.
23    ?center1 rdf:rest/rdf:rest/rdf:first ?center_z1.
24    ?shape2 x3do:bbboxCenter ?center2; x3do:bbboxSize ?size2.
25    ?center2 rdf:first ?center_x2.
26    ?center2 rdf:rest/rdf:rest/rdf:first ?center_z2.
27    FILTER((?center_x2-?center_x1)<=((?px/2)+(?ox/2)))
28    FILTER((?center_z2-?center_z1)<=((?pz/2)+(?oz/2)))
29    FILTER(?action=ac:walk)
30 }

```

⑤ Dgl-ke のプログラムの利用

④で作成したクエリの結果を turtle ファイルでダウンロードして使用してください
(詳しくは Dgl-ke のプログラムや使用方法を参照してください)

⑥ GPT3 のプログラムの利用(以下、直接利用する場合)

④で作成したクエリの CONSTRUCT~WHERE の部分を SELECT WHERE に変更して
実行すると結果を CSV 形式でダウンロードできます

GPT3 のプログラムではこの CSV 形式のファイルで使用してください

(詳しくは GPT3 のプログラムや使用方法を参照してください)

以下、高い場所に手を伸ばす動作を検出するための SPARQL クエリを
SELECT WHERE 文に変更した例です

PREFIX hra: <http://example.org/virtualhome2kg/ontology/homeriskactivity/>

PREFIX x3do:<https://www.web3d.org/specifications/X3dOntology4.0#>

PREFIX rdf:<http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX : <http://example.org/virtualhome2kg/ontology/>

PREFIX ho: <http://www.owl-ontologies.com/VirtualHome.owl#>

PREFIX

ob:

<http://raw.githubusercontent.com/aistairc/HomeObjectOntology/main/HomeObject.owl#>

PREFIX ac: <http://example.org/virtualhome2kg/ontology/action/>

PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT WHERE{

 ?a :hasEvent ?e.

 ?e :agent ?person; :situationAfterEvent ?situation; ho:object ?o; :action ?action.

 ?o :yzahyo/rdf:value ?oy.

 ?person :yzahyo/rdf:value ?py.

 ?state1 :isStateOf ?person; :partOf ?situation; :bbox ?shape1.

 ?state2 :isStateOf ?o; :partOf ?situation; :bbox ?shape2.

 ?shape1 x3do:bbboxCenter ?center1; x3do:bbboxSize ?size1.

```

?center1 rdf:rest/rdf:first ?center_y1.
?shape2 x3do:bbboxCenter ?center2; x3do:bbboxSize ?size2.
?center2 rdf:rest/rdf:first ?center_y2.
FILTER(( ?center_y2+(?oy*0.5))>=(?center_y1+(?py*0.5)))
FILTER(?action!=ac:walk&&?action!=ac:watch      &&      ?action!=ac:turnTo
&& ?action!=ac:lookAt)
MINUS{?o rdf:type/rdfs:subClassOf*ob:Room}
}

```