Google Home Final Presentation

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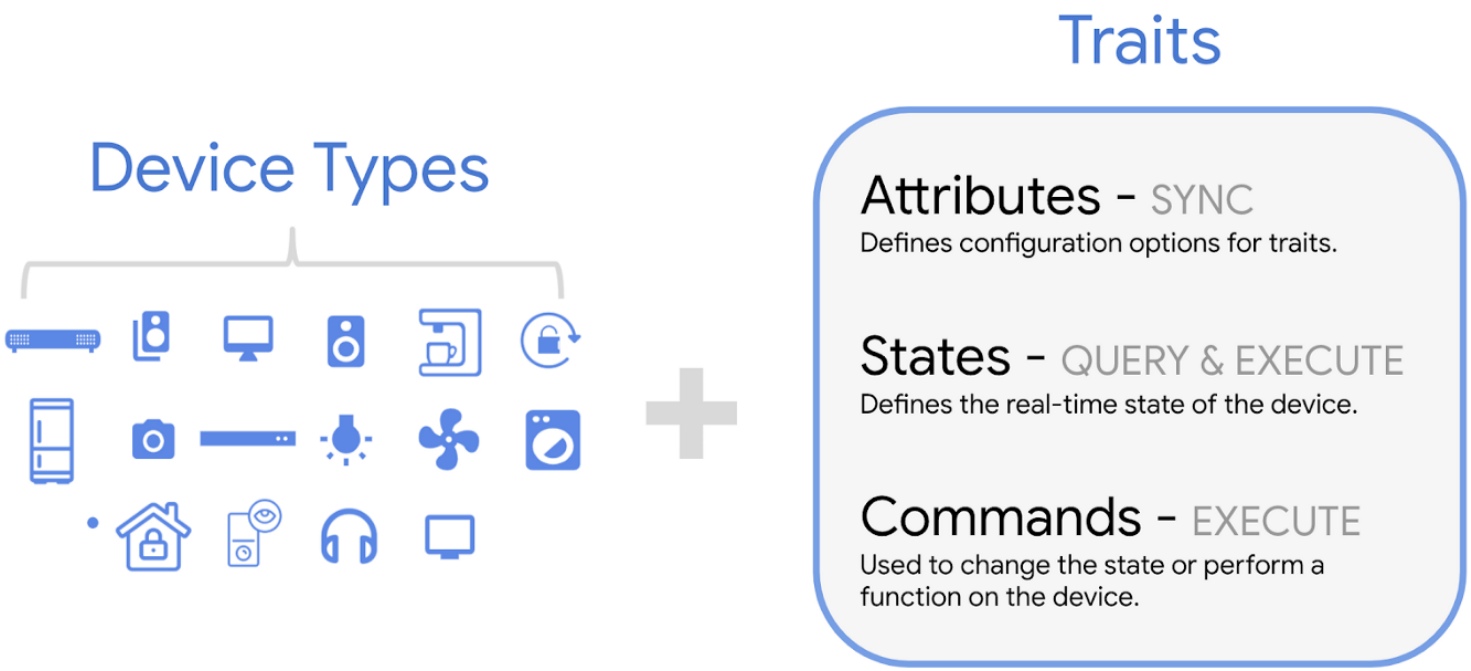
Agenda

Introduction to Google Home

Daniel Linter

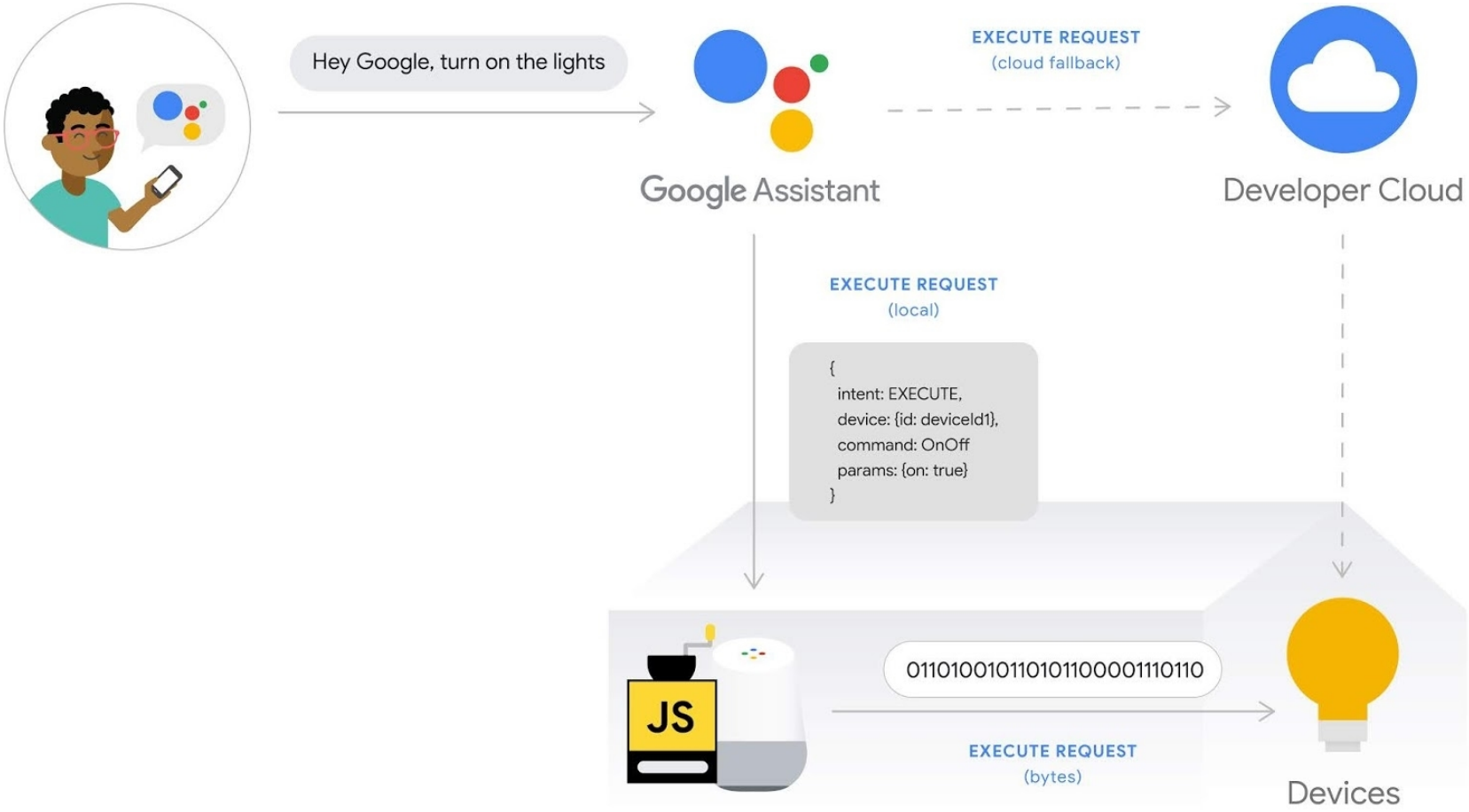
- Founded by Google in 2016
- Development through Googles developer console and Dialogflow
- Creating skills pretty easy
- No programming skills required

Device Types & Traits



- Various device types (air purifier to yogurt maker)
- Capabilities of a device ⇒ traits

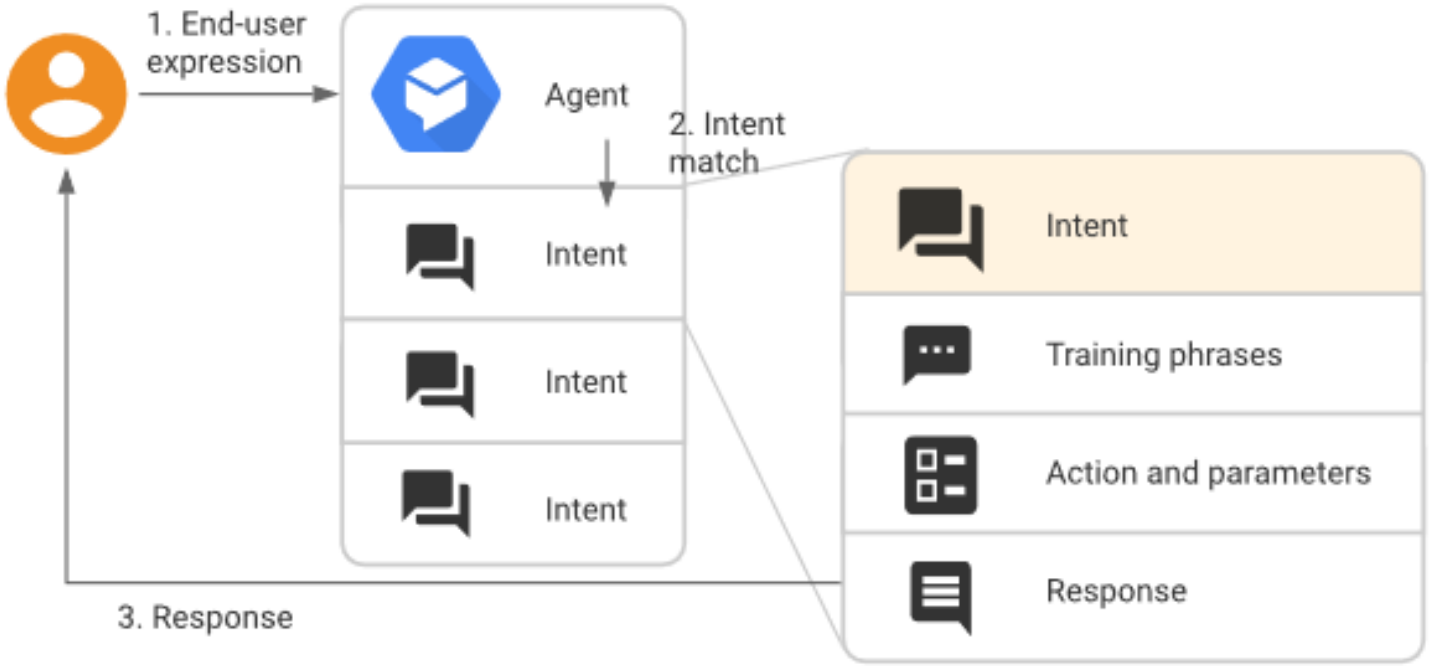
Execution Path



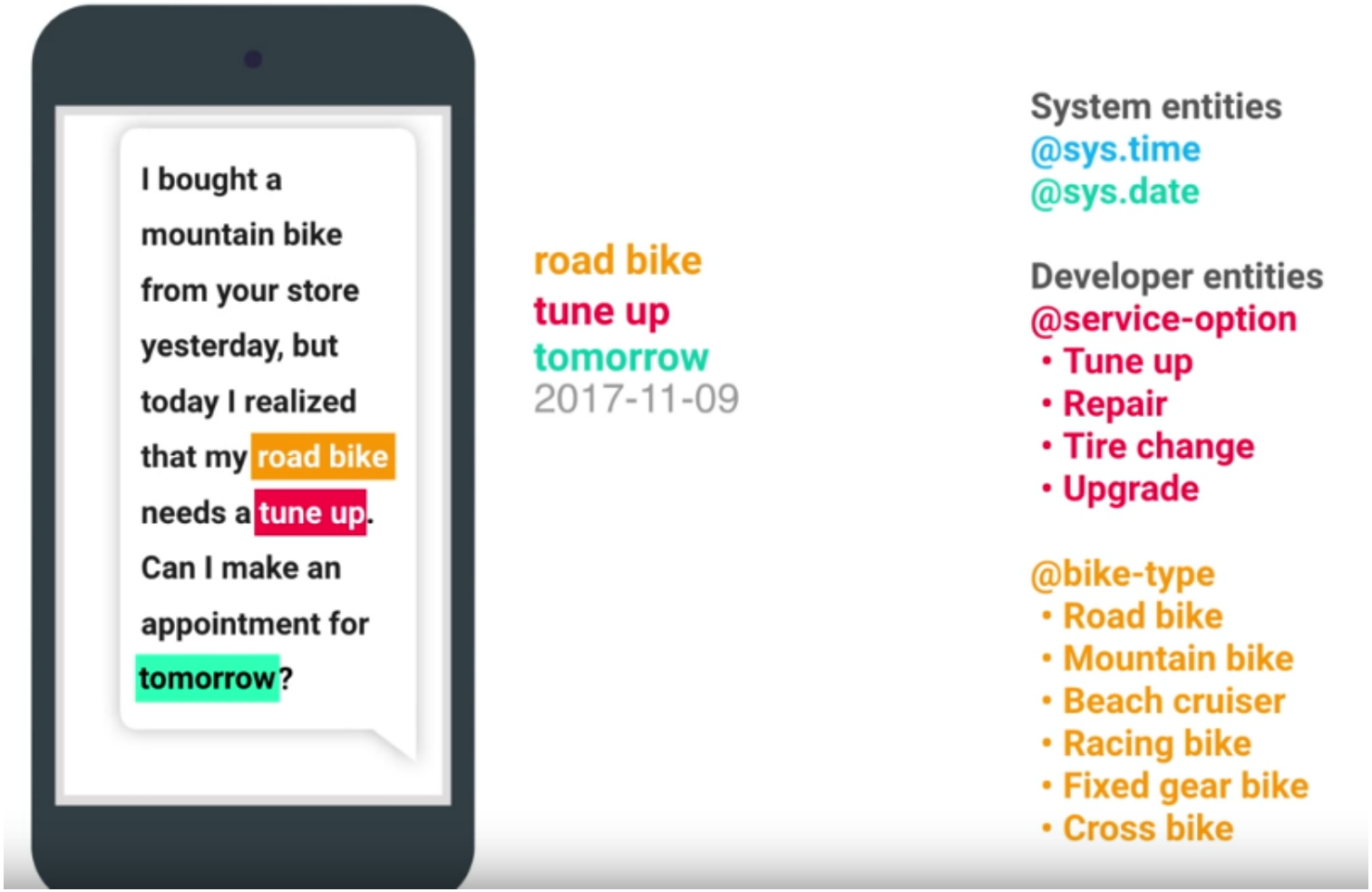
Introduction to Dialogflow

- Service developed and provided by Google
- Natural language tool to create conversational user interfaces for apps, chatbots, etc.
- By adding 'Training phrases' Dialogflow automatically trains the machine learning model

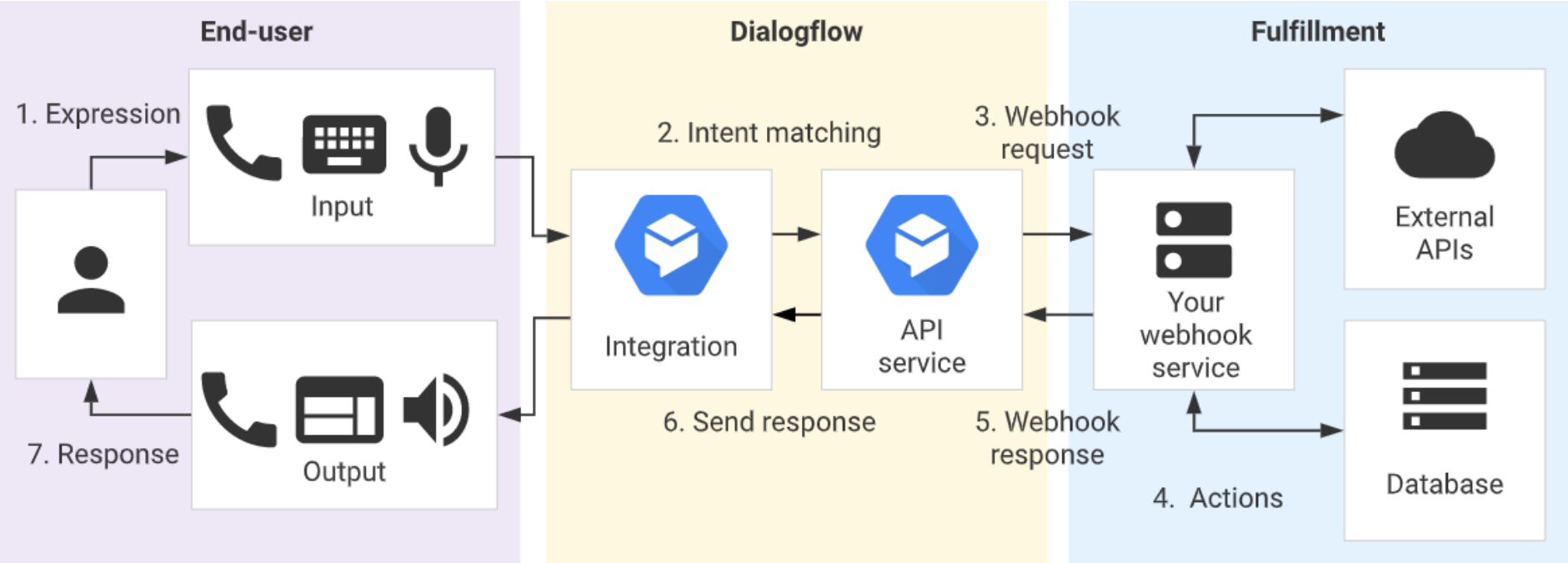
Intents


1. End-user expression
Agent
2. Intent match
Intent
Intent
Intent
Intent
Training phrases
Action and parameters
Response
3. Response

Entities

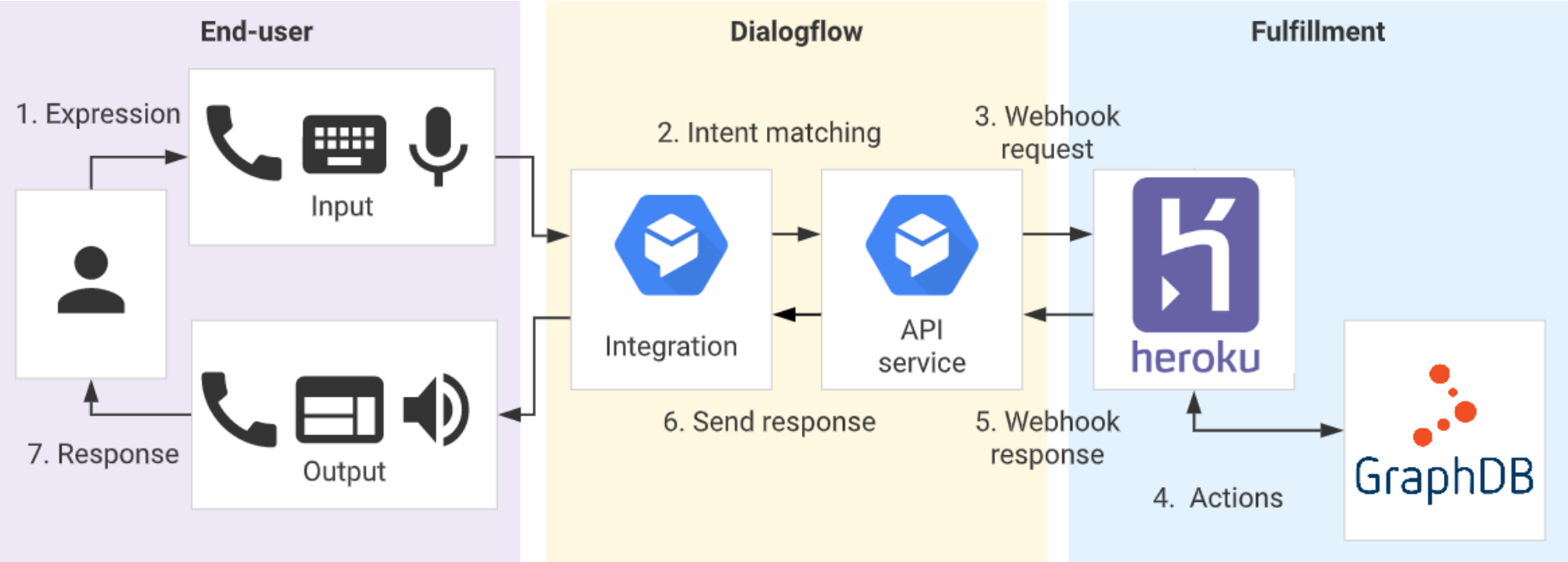

I bought a mountain bike from your store yesterday, but today I realized that my road bike needs a tune up. Can I make an appointment for tomorrow?
road bike
tune up
tomorrow
2017-11-09
System entities
@sys.time
@sys.date
Developer entities
@service-option
• Tune up
• Repair
• Tire change
• Upgrade
@bike-type
• Road bike
• Mountain bike
• Beach cruiser
• Racing bike
• Fixed gear bike
• Cross bike

Architecture



Implementation

- Coding in JavaScript



Entities Extraction

- An entity for each class in the knowledge graph is created

```
SELECT DISTINCT ?class
WHERE {
        ?s a ?class .
}
```

- Then schema.org's property *name* is used to fill the entities with values

```
PREFIX sc: <http://schema.org/>
SELECT ?name
WHERE {
        ?resource  a [entityTypeName] .
        ?resource sc:name ?name .
}
```

Entities Extraction cont'd

Concept

SAVE

Define synonyms | Regexp entity | Allow automated expansion | Fuzzy matching

Search entries

1 OF 3

Knowledge Generation Tool	Knowledge Generation Tool
Manual Editing Tool	Manual Editing Tool
Manual Editing	Manual Editing
Unstructured Content Extraction Technique	Unstructured Content Extraction Technique
Small Data Set	Small Data Set

Queries, Intents and Response Handling

- Divided questions into the Intents.
- Defined a query for specific intent type.
- Response handling function for the queries.

Intents

- 6 question types defined in Dialogflow
  - Difference Type Question
  - Example Type Questions
  - List Type Questions
  - Narrower Type Question
  - Step Type Questions
  - What is Type Questions

Queries

- Queries are encoded with Query String module.
- For each intent type, we defined the following queries.

Query for "What is Type Question"

```
PREFIX schema: <http://schema.org/>
        PREFIX kgbs: <http://knowledgegraphbook.ai/schema/>
        select ?description ?purpose where {
            {
                ?Concept schema:name ?name.
                OPTIONAL { ?Concept schema:description ?description . }
                OPTIONAL { ?Concept kgbs:purpose ?purpose . }
                filter (LCASE(?name) = LCASE("${parameter}"))
            }
            union
            {
                ?Concept schema:alternateName ?name.
                OPTIONAL { ?Concept schema:description ?description . }
                OPTIONAL { ?Concept kgbs:purpose ?purpose . }
                filter (LCASE(?name) = LCASE("${parameter}"))
            }
        }
```

Query for "Difference Type Questions"

```
PREFIX schema: <http://schema.org/>
        PREFIX kgbs: <http://knowledgegraphbook.ai/schema/>
        PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
        PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

        select ?description where {
            ?Concept schema:name ?name.
            ?relatesTo rdf:type ?type.
            ?type rdfs:label ?labelcheck.
            ?relatesTo schema:name ?check_name.
            ?relatesTo schema:description ?description.
            filter (LCASE(?name) = LCASE("${first_parameter}") || LCASE(?name) = LCASE("${second_parameter}"))
            filter(?labelcheck = "Difference")
            filter (contains (LCASE(?check_name),LCASE("${first_parameter}")) || contains (LCASE(?
check_name),LCASE("${second_parameter})))
        }
```

Query for "List Type Questions"

```
PREFIX schema: <http://schema.org/>
PREFIX kgbs: <http://knowledgegraphbook.ai/schema/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
    select ?description where {
        {
            ?Concept schema:name ?name
            OPTIONAL {?Concept skos:narrower ?specialization.}
            OPTIONAL {?specialization schema:name ?description.}
            filter (LCASE(?name) = LCASE("${parameter}")) .
        }
        union
        {
            ?Concept schema:alternateName ?name
            OPTIONAL {?Concept skos:narrower ?specialization.}
            OPTIONAL {?specialization schema:name ?description.}
            filter (LCASE(?name) = LCASE("${parameter}")) .
        }
    }
```

Query for "Example Type Questions"

```
PREFIX schema: <http://schema.org/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>

    select ?name ?description where {
            ?Concept schema:name ?target.
            optional { ?Concept skos:example ?example . }
            optional {?example schema:name ?name . }
            optional {?example schema:description ?description . }
            filter (LCASE(?target) = LCASE("${parameter}"))
        }
```

Query for "Step Type Questions"

```
PREFIX schema: <http://schema.org/>
PREFIX kgbs: <http://knowledgegraphbook.ai/schema/>

    select ?description where {
        ?Concept schema:name ?name .
        ?Concept schema:step: ?Object .
        OPTIONAL { ?Object schema:text ?description . }
        filter contains (LCASE(?name), LCASE("${parameter}")) .
    }
```

Query for "Narrower Type Questions"

```
PREFIX schema: <http://schema.org/>
PREFIX kgbs: <http://www.knowledgegraphbook.ai/schema/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>

    select ?name where {
            ?Concept schema:name ?target.
            ?Concept skos:narrower ?example .
            ?example schema:name ?name .
            filter contains(LCASE(?target), LCASE("${parameter}"))
        }
```

Response Handling

```
function collectResponseDataFromGraphDb(response) {
    var ret_array = []
    for (i = 0; i < response.data.results.bindings.length; i++) {
        if ('purpose' in response.data.results.bindings[i]) {
            ret_array[i] = response.data.results.bindings[i].purpose.value;
        }
        else if ('description' in response.data.results.bindings[i]) {
            ret_array[i] = response.data.results.bindings[i].description.value;
        }
        else if ('name' in response.data.results.bindings[i]) {
            ret_array[i] = response.data.results.bindings[i].name.value;
        }
        else {
            ret_array[i] = "No description or purpose found in result of Graph DB."
        }
    }
    return ret_array;
}
```

- 3 different types of response will be handled.
- Default text for error handling.

Problems

- Changing namespaces of GraphDB
- No JavaScript library for GraphDB with authentication

Live Demo

Thank you for your attention!