LLMA Dialogue Model experiment

This reposotory stores an implementation of the LLMA Dialogue Model for experiment purpose. The paper of LLMA Dialogue Model can be found here.

The implementation is a Java project using Maven and MELT.

This project uses GPT through Azure OpenAI. You will need to update model information in OpenAI.java file. The recommended model is gpt-4-32k.

Structure

Implementation is stored in simpleSealsMatcher folder. A copy of the used OAEI dataset Anatomy is stored in the .*/java/DataSet/ folder.

Results we retrieved and reported in paper is in the results folder. Note, we didn't use MELT generated statics, which you may find in the performance csv, as we found problems the toolkit handling our data. For example, one reference alignment between "http://human.owl#NCI_C12499" and "http://mouse.owl#MA_0000237", our exact alignment was evaluated as "false positive".

Implementation Files

Note: This project is started for experiments. Though we tried to clean codes, you may still find testing purpose codes.

The project entrance is in Main class, and other class work as following:

- MyMatcher is the matcher implemented using MELT. It's used as the entrance of the model.
- OntologyAgent is the agent class negotiating in the model. It contains functions agents need to negotiate and get correspondence.
- OpenAI is responsible for all API calls and prompt assembly that agents would need.
- Weaviate is the vector database used by agent. For Weaviate instruction, see here

Paper implementation

The implementation LLMA paper used is the v0.1.0

Embedding information

```
info += ontClass.getLocalName() +"\n";
info += ontClass.getLabel(null) +"\n";
info += ontClass.getComment(null);
```

Data stored in vector database

```
json_row.put("vector", ai.getEmbeddings(info));
json_row.put("uri", ontClass.getURI());
json_row.put("isNegotiated", false);
```

Query to GPT

The prompt template of selecting the most likely entity for alignment:

```
<Problem Definition>
In this task, we are giving a) one subject entity, and b) a set of

<Subject Entity>

<Entities Of Other Agent>

Among all entities of other ontology, select all entities that you
```

The prompt template of deciding if two entities are potentially aligned:

```
<Problem Definition>
In this task, we are given two entities in the form of Relation(Sub

<Entity Triples>
[Entity 1:Entity2]
Do you think these two entities are aligned? If so, please output:y
```

The information of entity:

```
URI: <getURI()>
Label: <getLabel(null)>
Local name: <getLocalName>
Comment: <getComment>

<if(listProperty startsWith(http) and not null), then below>
Property: <getPredicate().getLocalName()>
Value: <getObject().toString()>

... More listProperties...


<sub-info if exists, then below>
================ Relevant entity of this ontology ================
Label: <getLabel(null)>
URI: <getURI()>
Local name: <getLocalName()>
Comment: <getComment(null)>
<if(listProperty startsWith(http) and not null), then below>
Property: <getPredicate().getLocalName()>
Value: <getObject().toString()>

... More listProperties...
```

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