Task52_The_Lidar_Ontology

March 1, 2024

0.1 Objective

1. Develop a formal, clear and dedicated controlled vocabulary for lidar terms

2. Convert lidar knowledge into FAIR

3. Long term updates and maintenance of the ontology

0.2 Wind lidar ontology tool application

https://github.com/IEAWindTask52/Extract-lidar-ontology-concepts

[1]:
```
# Import packages
import json
import sys
import pprint

# Import local functions:
from fun.getLabel import getLabel
from fun.edit_yaml_from_ontology import edit
```

```
#Select language: "English", "Spanish", "Chinese" and "Italian"
SelIdiom = input('Select language? ')
```

```
Select language? English
```

0.3 Downloading the lidar concept

Step 1. Visit https://data.windenergy.dtu.dk/ontologies/view/ontolidar/en/

Step 2. Click on the ontology concept you are interested in downloading

0.4 Downloading the lidar concept

Step 3. Scroll down and click on `Download this concept`

Step 4. Save the concept

0.4.1 Velocity azimuth display

Let's take a look to the data

[2]:
```
# Point to the local repository:
sys.path.append("C:/SWE_LOCAL/Task32/Lidar_ontology/Example_coding_efficiency/
 ↪LidarOntologyConceptsRepo/Extract-lidar-ontology-concepts/fun/")

# Select the ontology concept
path2data = r'./Ontology_Concepts/VAD_da'

# Features of the lidar concepts we want to use/edit
Preferred_Label, Alternative_Label, Definition = '','',''
Lidar_Dictionary = {}
```

0.4.2 Velocity azimuth display

Let's take a look to the data

[3]:
```
with open(path2data, encoding='utf-8') as f:
    d = json.load(f)
pp = pprint.PrettyPrinter(indent=4)
pp.pprint(d)
```

```
{   '@context': {   'altLabel': 'skos:altLabel',
                    'broadMatch': 'skos:broadMatch',
                    'broader': 'skos:broader',
                    'closeMatch': 'skos:closeMatch',
                    'dc11': 'http://purl.org/dc/elements/1.1/',
                    'dct': 'http://purl.org/dc/terms/',
                    'exactMatch': 'skos:exactMatch',
                    'graph': '@graph',
```

```
                    'hiddenLabel': 'skos:hiddenLabel',
                    'inScheme': 'skos:inScheme',
                    'isothes': 'http://purl.org/iso25964/skos-thes#',
                    'label': 'rdfs:label',
                    'lang': '@language',
                    'narrowMatch': 'skos:narrowMatch',
                    'narrower': 'skos:narrower',
                    'owl': 'http://www.w3.org/2002/07/owl#',
                    'prefLabel': 'skos:prefLabel',
                    'rdfs': 'http://www.w3.org/2000/01/rdf-schema#',
                    'related': 'skos:related',
                    'relatedMatch': 'skos:relatedMatch',
                    'skos': 'http://www.w3.org/2004/02/skos/core#',
                    'type': '@type',
                    'uri': '@id',
                    'value': '@value'},
    'graph': [   {   'prefLabel': {   'lang': 'en',
                                      'value': 'IEA Wind Task 32 Wind Lidar '
                                               'Ontology'},
                     'type': 'skos:ConceptScheme',
                     'uri': 'http://vocab.ieawindtask32.org/wind-lidar-
ontology/'},
                 {   'altLabel': {'lang': 'en', 'value': 'VAD'},
                     'broader': {   'uri': 'http://vocab.ieawindtask32.org/wind-
lidar-ontology/WindfieldReconstruction'},
                     'inScheme': {   'uri':
'http://vocab.ieawindtask32.org/wind-lidar-ontology/'},
                     'prefLabel': [   {   'lang': 'es',
                                          'value': 'Muestreo de velocidad en '
                                                   'azimut'},
                                      {   'lang': 'it',
                                          'value': 'Campionamento di velocità '
                                                   'in azimut'},
                                      {'lang': 'cn', 'value': ' -  VAD  '},
                                      {   'lang': 'en',
                                          'value': 'Velocity-azimuth display'}],
                     'skos:definition': [   {   'lang': 'it',
                                                'value': 'Un particolare '
                                                         'metodo di analisi '
                                                         'dati di un lidar a '
                                                         'geometria conica. '
                                                         'Data una scansione '
                                                         'completa del cono ad '
                                                         'una specifica '
                                                         'altezza, i punti di '
                                                         'misurazione contigui '
                                                         "l'uno all'altro "
                                                         'nello spazio vengono '
```

```
                                                'combinati secondo '
                                                'metodi statistici di '
                                                'interpolazione per '
                                                'ricostruire la '
                                                'velocità del vento.'},
                                            {   'lang': 'cn',
                                                'value':
'VAD                                       '},
                                            {   'lang': 'es',
                                                'value': 'VAD es un método de '
                                                         'análisis de datos '
                                                         'provenientes de un '
                                                         'escaneo de geometría '
                                                         'cónica en el que '
                                                         'varios puntos '
                                                         'azimutales '
                                                         'estrechamente '
                                                         'espaciados son '
                                                         'muestreados por el '
                                                         'lidar. Dichos datos '
                                                         'se utilizan para '
                                                         'estimar la velocidad '
                                                         'del viento a una '
                                                         'determinada altura '
                                                         'utilizanso métodos '
                                                         'de ajuste '
                                                         'estadísticos.'},
                                            {   'lang': 'en',
                                                'value': 'VAD is a method of '
                                                         'analyzing data from '
                                                         'a complete conical '
                                                         'scan whereby many '
                                                         'closely spaced '
                                                         'azimuthal points may '
                                                         'be sampled by the '
                                                         'lidar, and the data '
                                                         'are used to estimate '
                                                         'the wind speed at '
                                                         'each height using a '
                                                         'statistical fitting '
                                                         'method.'}],
                            'skos:editorialNote': [   {   'lang': 'en',
                                                          'value': 'The VAD method is '
                                                                   'described in '
                                                                   'Lhermitte (1966) '
                                                                   'and Browning and '
                                                                   'Wexler (1968).'},
                                                      {   'lang': 'it',
```

```
                                                'value': 'Il metodo VAD è '
                                                         'descritto in '
                                                         'Lhermitte (1966) '
                                                         'e Bowning e '
                                                         'Wexler (1968).'}],
                        'type': 'skos:Concept',
                        'uri': 'http://vocab.ieawindtask32.org/wind-lidar-
ontology/VelocityAzimuthDisplay'},
                    {   'narrower': {   'uri':
'http://vocab.ieawindtask32.org/wind-lidar-ontology/VelocityAzimuthDisplay'},
                        'prefLabel': [   {'lang': 'cn', 'value': '     '},
                                         {   'lang': 'de',
                                             'value': 'Windfeld Rekonstruktion'},
                                         {   'lang': 'es',
                                             'value': 'Reconstrucción del campo '
                                                      'de vientos'},
                                         {   'lang': 'it',
                                             'value': 'Ricostruzione del campo di '
                                                      'vento'},
                                         {   'lang': 'en',
                                             'value': 'Windfield Reconstruction'}],
                        'type': 'skos:Concept',
                        'uri': 'http://vocab.ieawindtask32.org/wind-lidar-
ontology/WindfieldReconstruction'}]}
```

0.5 Extracting data from the Lidar Ontology

- definition
- altLabel
- prefLabel

0.6 Extracting data from the Lidar Ontology

- definition
- altLabel
- prefLabel

Step 1. Find the path to the data (dictionary keys):

[4]:
```
index_inScheme=1
m = d['graph'][index_inScheme].keys()
while 'inScheme' not in m:
    index_inScheme += 1
    m = d['graph'][index_inScheme].keys()
print(m)
```

```
dict_keys(['uri', 'type', 'altLabel', 'broader', 'skos:definition',
'skos:editorialNote', 'inScheme', 'prefLabel'])
```

and let'store them

[6]:
```
KEYS = [ 'skos:definition','altLabel','prefLabel'
       ]
```

0.7 Extracting data from the Lidar Ontology

Step 2. Get information of the lidar concept provided by the lidar ontology

[7]:
```
# Get individual key-value pairs depending on the key requested
Definition        = getLabel(path2data, key = KEYS[0], lang='en',␣
 ↪index_inScheme=1)
Alternative_Label = getLabel(path2data, key = KEYS[1], lang='en',␣
 ↪index_inScheme=1)
Preferred_Label   = getLabel(path2data, key = KEYS[2], lang='en',␣
 ↪index_inScheme=1)

#Save in a new dictionary
Lidar_Dictionary['Definition']        = Definition
Lidar_Dictionary['Alternative Label'] = Alternative_Label
Lidar_Dictionary['Preferred Label']   = Preferred_Label

print(Lidar_Dictionary)
```

```
{'Definition': 'VAD is a method of analyzing data from a complete conical scan
whereby many closely spaced azimuthal points may be sampled by the lidar, and
the data are used to estimate the wind speed at each height using a statistical
fitting method.', 'Alternative Label': 'VAD', 'Preferred Label': 'Velocity-
azimuth display'}
```

0.8 What to do with these data?

0.8.1 Connect with local resources

- External database
- **Edit/Update lidar simulator template**

1 Edit/update inputs template for a lidar simulator

1) Select our lidar simulator local template

[8]:
```
local_yaml = './Ontology_yml.yml'
```

First, we will provide the path to our local template, in this case a yaml file: **./Ontology_yml.yml**

2 Example: Input for a lidar simulator

2.1 Example: Input for a lidar simulator

2) Select the lidar concept to be edited

[9]:
```
tag = 'Velocity azimuth display'
```

2.2 Example: Input for a lidar simulator

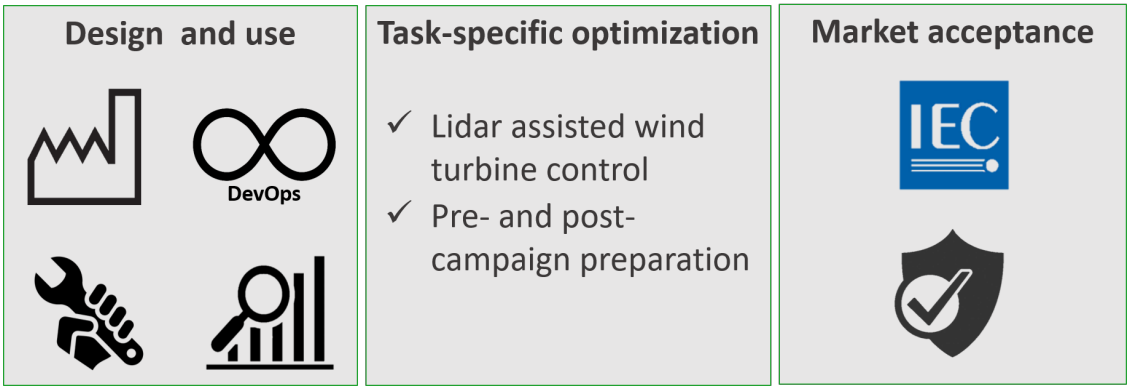
3) Select the variable to be edited

[10]:
```
fields2change = [ 'Definition','Alternative Label','Preferred Label']
```

2.3 Example: Input for a lidar simulator

4) Edit the local yaml file

[11]:
```
edit(local_yaml,tag,fields2change,Lidar_Dictionary)
```



3 Contact us

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- F. Costa – costa@ifb.uni-stuttgart.de # Lidar Ontology –> Lidar Ontology viewer # GitHub repository –> IEAWindTask52/Extract-lidar-ontology-concepts