The Luxembourg BabelNet Workshop

2 March 2016: Session 3

Tech session

...

Disambiguating text with Babelfy. The Babelfy API

Claudio Delli Bovi

Outline

- Multilingual disambiguation with Babelfy
- Using Babelfy
- How to query Babelfy programmatically:
  - HTTP and Java APIs
- The Babelfy Java API: Download and set up
- The Babelfy Java API: Main classes
- Usage example

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Usage example

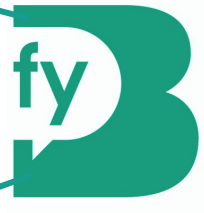
Technical part!

Multilingual disambiguation with Babelfy

Babelfy is a joint approach to multilingual word sense disambiguation and entity linking powered by BabelNet

- It leverages the BabelNet network and represents the semantic interpretations of an ambiguous sentence using a graph.
- Then it extracts the *densest subgraph* (=most coherent interpretation)!

Multilingual disambiguation with Babelfy



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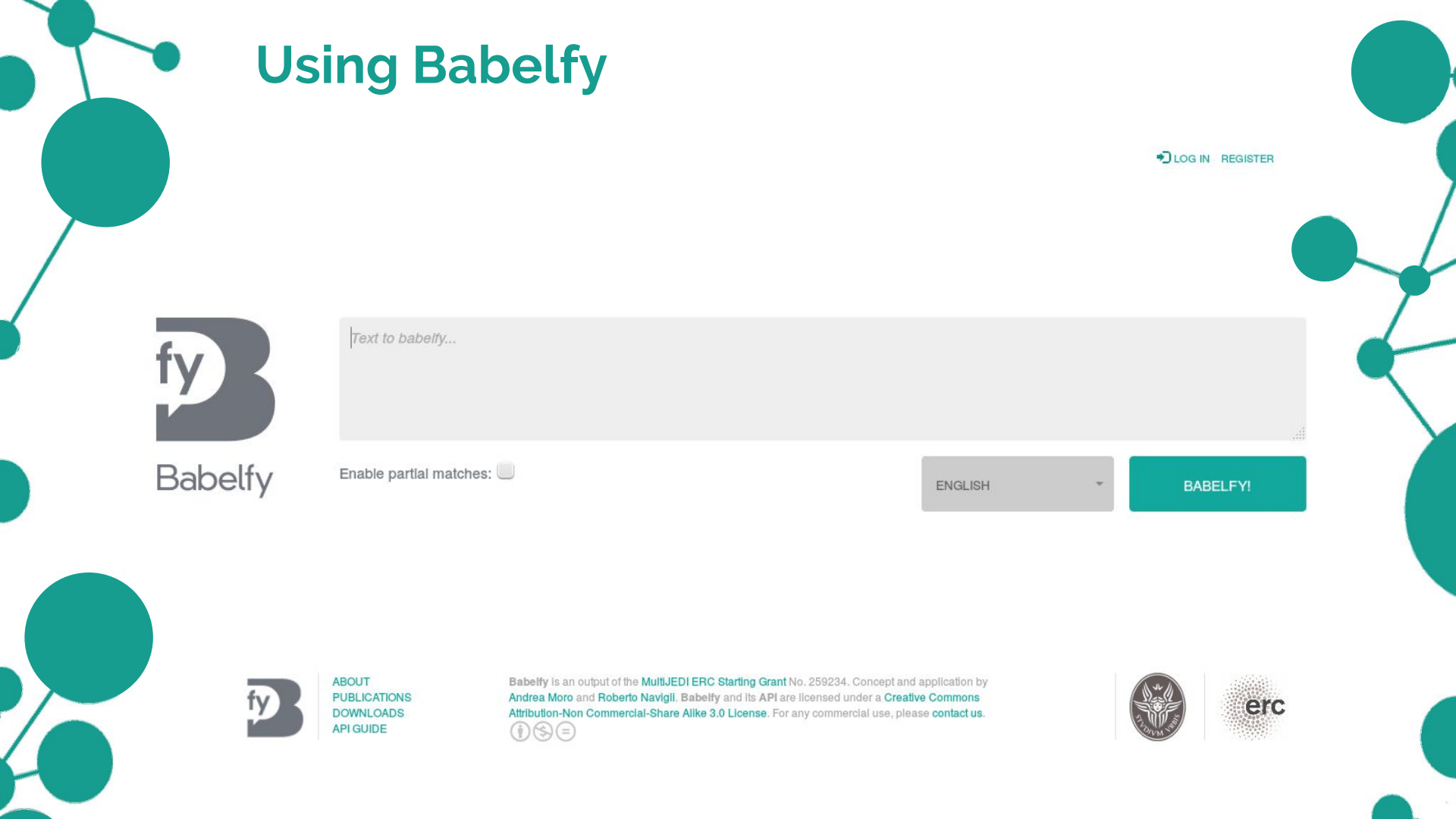
- It leverages the BabelNet network and represents the semantic interpretations of an ambiguous sentence using a graph.
- Then it extracts the *densest subgraph* (=most coherent interpretation)!

Gory details here:

A. Moro, A. Raganato, R. Navigli. **Entity Linking meets Word Sense Disambiguation: a Unified Approach**. Transactions of the Association for Computational Linguistics (TACL), 2, pp. 231-244, 2014.

Using Babelfy



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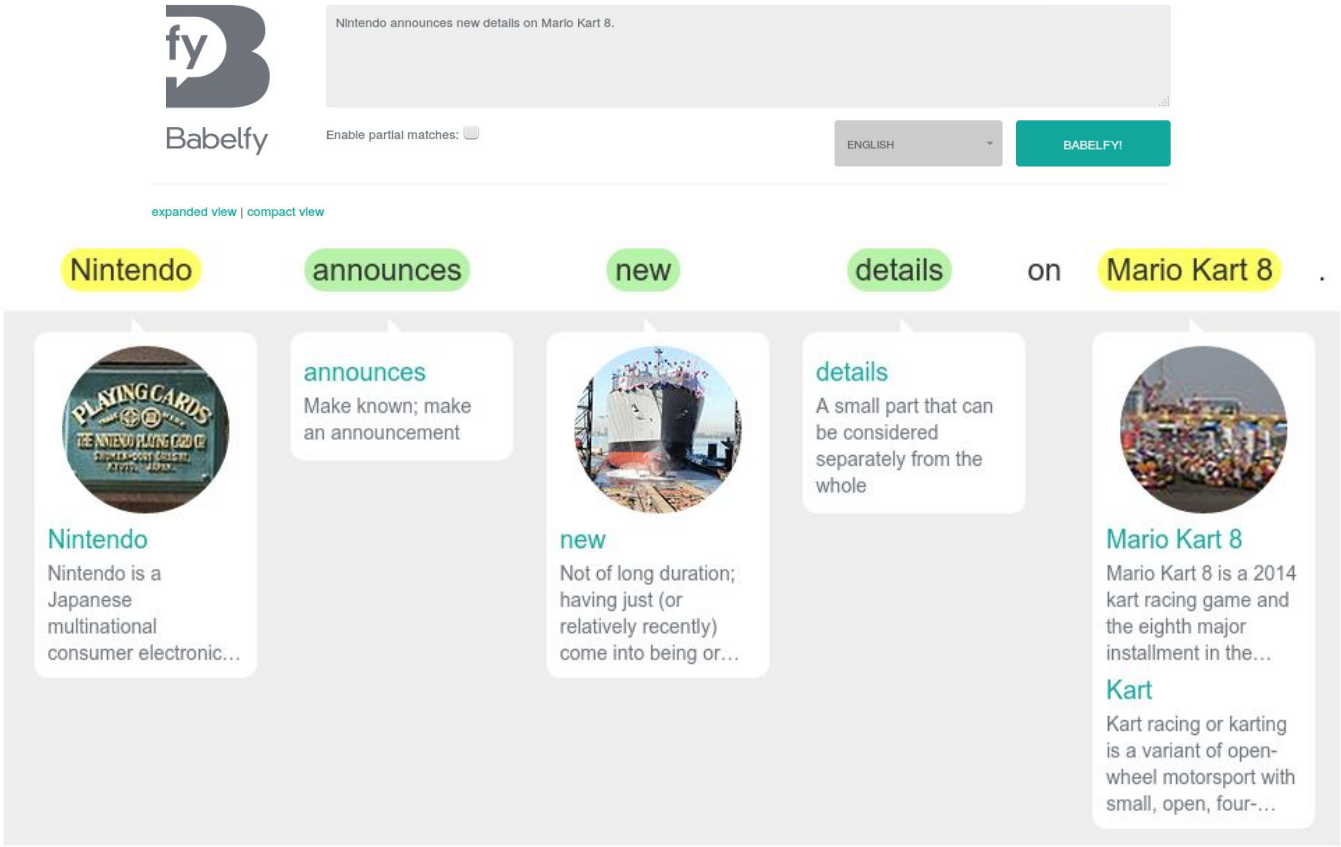

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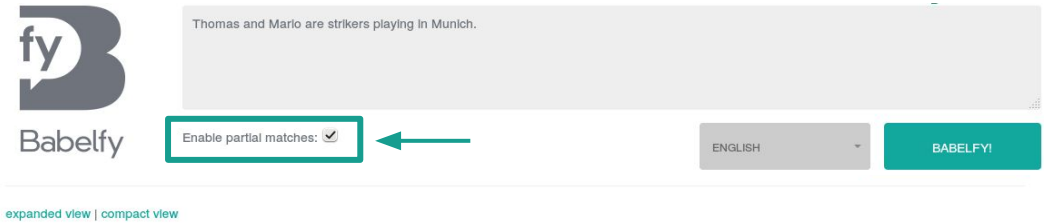

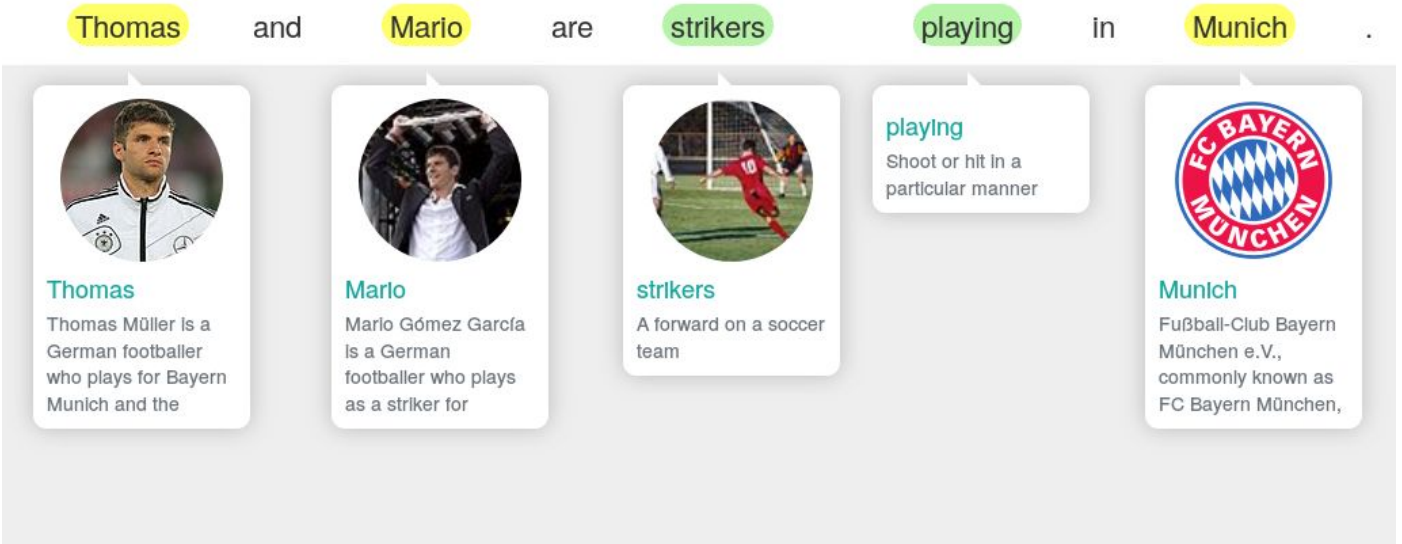

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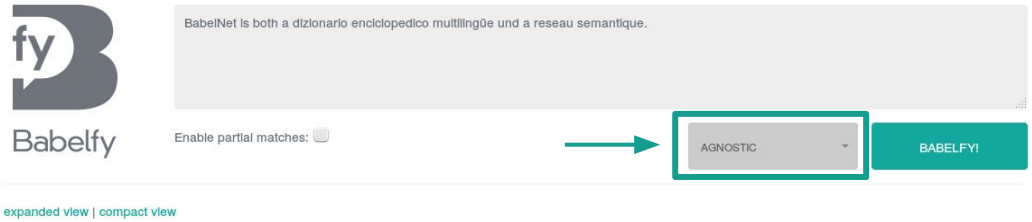
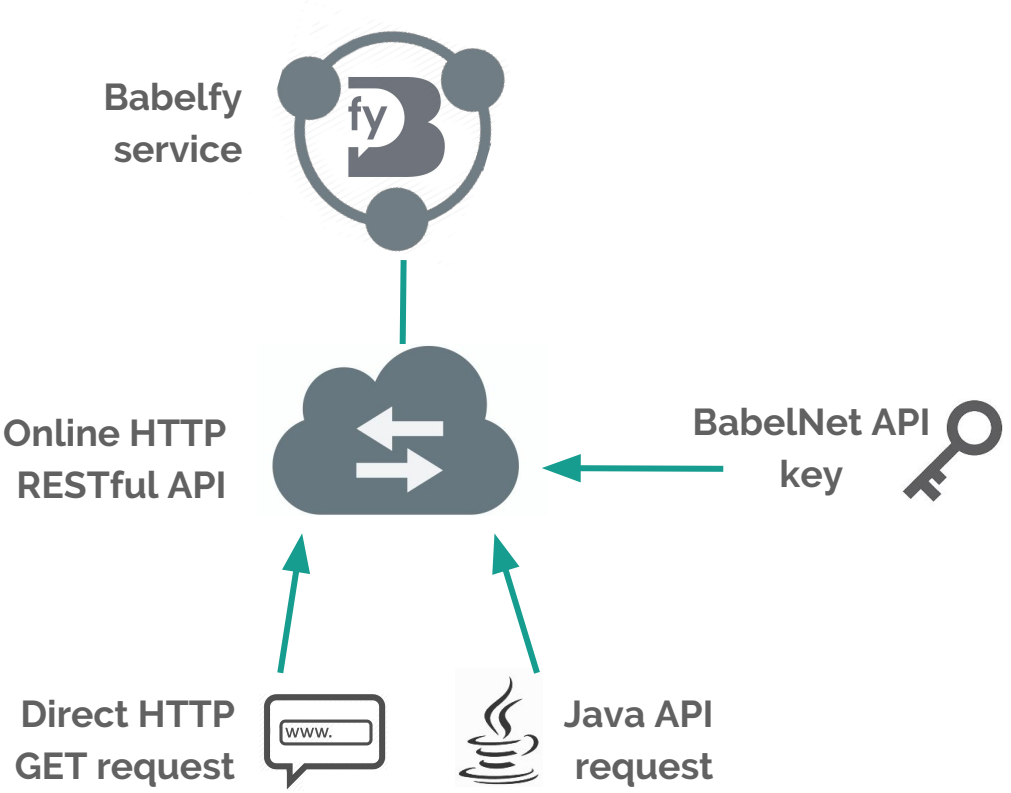


Using Babelfy… programmatically



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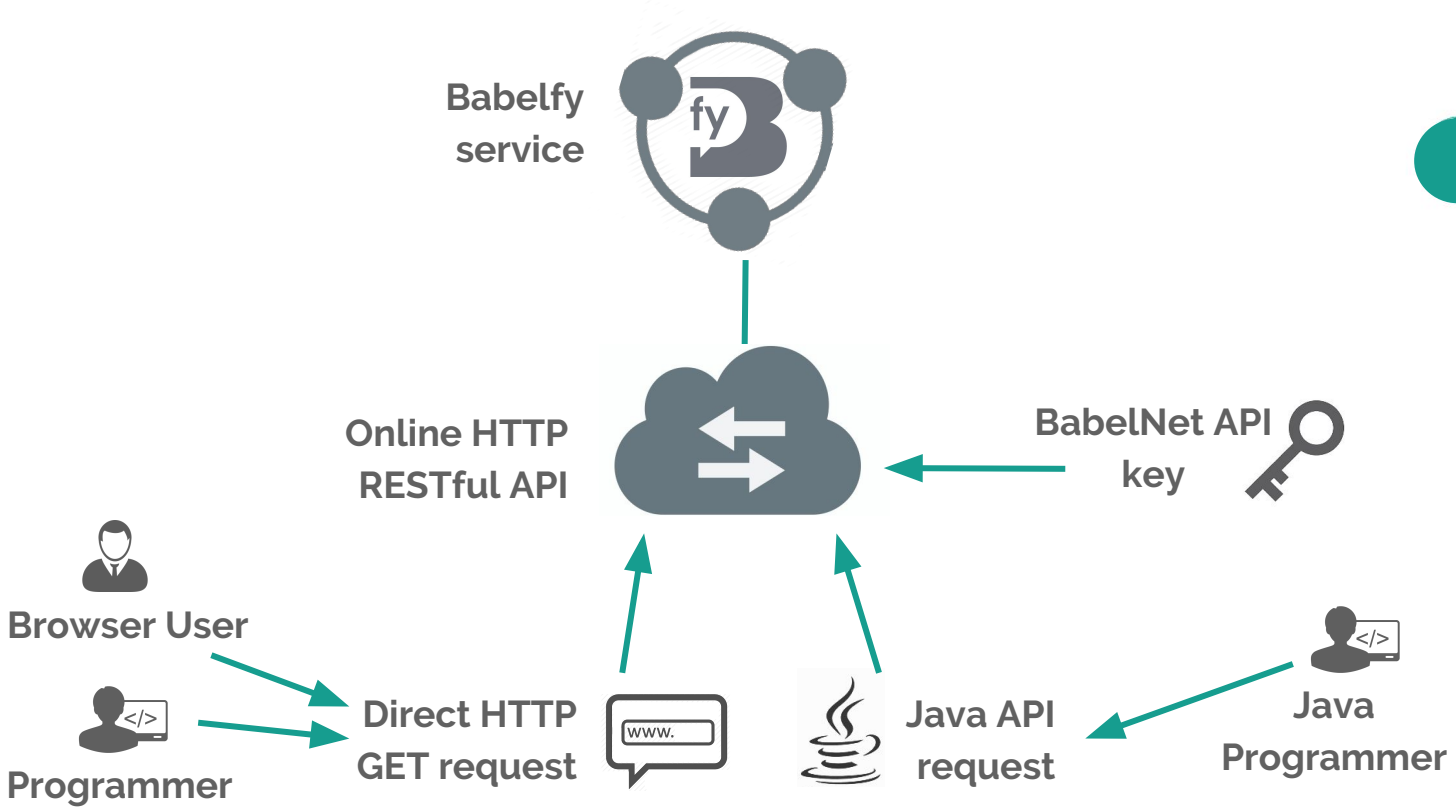

Using Babelfy... programmatically

The BabelNet and Babelfy APIs use the very same key.

If you already registered an account on BabelNet, **no** need to register again: just log in with the same credentials!

Otherwise:

babelnet.org/register

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The Babelfy API also relies on **Babelcoins** to track user requests:

1 Babelcoin = **1** query to BabelNet or Babelfy

Base account: **1000** Babelcoins per day

The HTTP and Java APIs

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Like BabelNet, Babelfy can be queried programmatically via an HTTP RESTful interface that returns JSON.

You just have to append a **`key`** parameter to the HTTP request.

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The Babelfy Java API provides a **Java binding** to the online HTTP RESTful service with classes, types and methods to query Babelfy for disambiguation from inside a Java program.

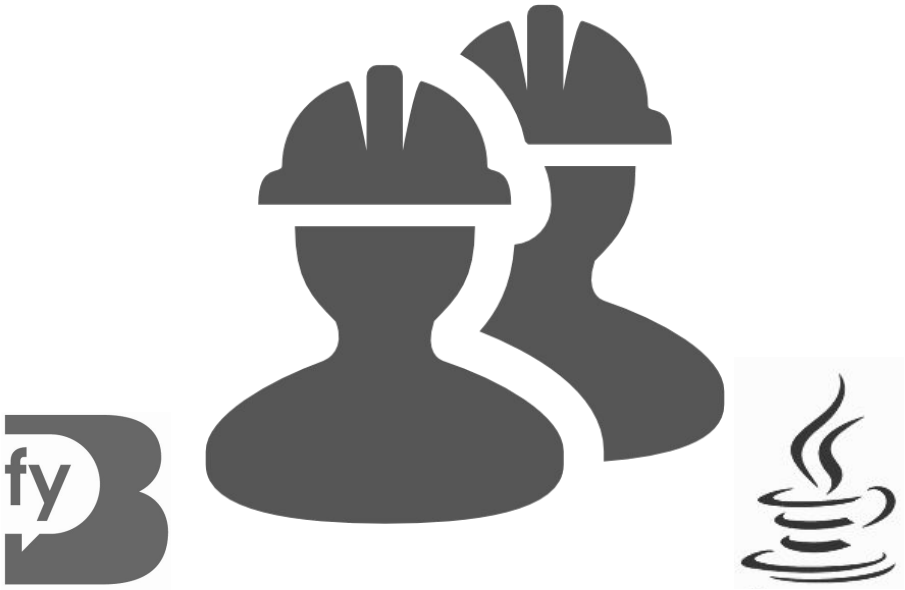
Only requirement:

Standard installation of **Java JDK** (version ≥ 1.7)

Detailed Javadoc:

babelfy.org/javadoc

Technical part ahead!



Downloading and installing instructions

babelfy.org/download

LOG IN REGISTER

Babelfy

ABOUT PUBLICATIONS DOWNLOADS API GUIDE

Babelfy RESTful API

Babelfy RESTful Java API version 1.0 (April 2015 - Size: 2M)

The Babelfy Java API is an extension of our online HTTP RESTful service. It provides classes to work with Babelfy.
If you would rather use the raw HTTP API, please read the HTTP guide.

The **legacy API v0.9** has been shutdown as of June 1, 2015.

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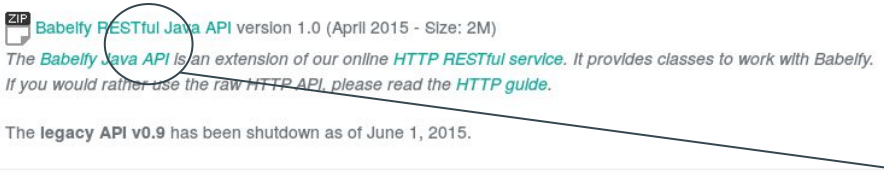


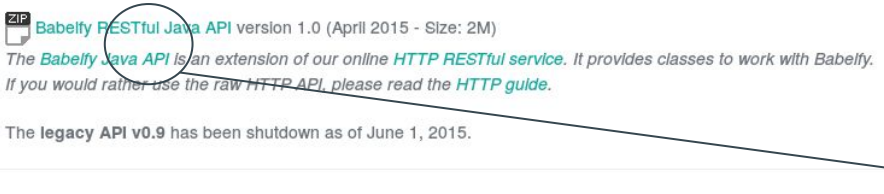
Java API

Download and **unpack** the package: **`BabelfyAPI-1.0.zip`**

You will find the following:

babelfy-online-1.0.jar
config
docs
lib
run-babelfydemo.sh
README
CHANGELOG
LICENSE
run-babelfydemo.bat

babelfy.org/download



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Jar, Javadoc and changelog of the API
Third party libraries
Test shell scripts (Linux and Windows)

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1. Specify a **valid key** in the "`babelfy.key`" property inside the configuration file `config/babelfy.var.properties`

2. Test the API with the corresponding shell script:

`run-babelfydemo.sh` Linux

`run-babelfydemo.bat` Windows

Configuring the API on Eclipse/Netbeans

Assuming you have your Java (or Scala) project in the workspace of your favourite IDE under **`projectDir/`**:

1. Copy (or link) the **`config/`** directory from the API folder into **`projectDir/`**;

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Find the project in the package explorer view → Project → Properties → Java build path → Libraries → Add external JARs

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The `SemanticAnnotation` class models Babelfy's response objects, i.e. token-based disambiguation results (fragment of text + disambiguation).

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`BabelfyToken`

A `BabelfyToken` is a token unit that can be used to build *custom* input sentences for Babelfy. Each `BabelfyToken` stores information about its language and may be associated with constraints (`BabelfyConstraints`)

The Java API: Babelfy

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```
Babelfy bfy = new Babelfy();
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Babelfy's disambiguation setting can be modified in various ways. When you create a `Babelfy` object you can specify different behaviors using the `BabelfyParameters` class as input for the constructor:

```
Babelfy bfy = new Babelfy(BabelfyParameters bp);
```

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- **`setMatchingType`**: selects the candidates extraction strategy;

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- **`setScoredCandidates`**: defines whether to return just the top ranked candidate or all candidates for a fragment of text;
- **`setThreshold`**: sets the disambiguation confidence threshold;
- ...

The Java API: BabelfyParameters

setMatchingType selects the candidates extraction strategy:

```
public enum MatchingType
{
        /**
         * Only exact matches are considered for disambiguation
         */
        EXACT_MATCHING,

        /**
         * Both exact and partial matches (e.g. Thomas for Thomas Muller)
         *  are considered for disambiguation
         */
        PARTIAL_MATCHING
}
```

The Java API: BabelfyParameters

`setPosTaggingOptions` sets options for the POS-tagging phase:

```
public enum PosTaggingOptions
{
        /**
         * Standard POS tagging process.
         */
        STANDARD,

        /**
         * Interprets all adjectives as nouns.
         */
        NOMINALIZE_ADJECTIVES,

        /**
         * Interprets input fragment words as nouns.
         */
        INPUT_FRAGMENTS_AS_NOUNS,

        /**
         * Tokenize the input string by splitting all characters as single tokens (all tagged as
         * nouns, so that we can disambiguate nouns). This should be used for languages and texts in
         * which there is no standard word separator such as spaces and punctuation marks.
         */
        CHAR_BASED_TOKENIZATION_ALL_NOUN,
}
```

The Java API: BabelfyParameters

The `BabelfyParameters` class provides a set of dedicated methods to specify disambiguation parameters for the Babelfy call.

Create a `BabelParameters` object

Use the public methods of `BabelParameters` to specify the preferred setting

```
BabelfyParameters bp = new BabelfyParameters();
bp.setAnnotationResource(SemanticAnnotationResource.BN);
bp.setMCS(MCS.ON_WITH_STOPWORDS);
bp.setScoredCandidates(ScoredCandidates.ALL);
Babelfy bfy = new Babelfy(bp);
```

Initialize a `Babelfy` object with the `BabelParameters` object as input

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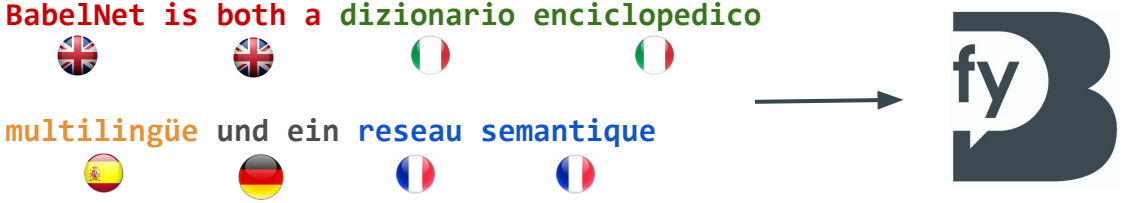
Each `BabelfyToken` has its own *word*, *lemma*, *POS tag* and *language*, allowing the user to generate an arbitrary text with multiple languages at the same time.



The Java API: BabelfyToken

The `BabelfyToken` class enables you to provide to Babelfy with a custom-tokenized text, specifying each token individually.

```
List<String> myEnText = Arrays.asList("java", "bytecode");
List<String> myFrText = Arrays.asList("programme", "informatique");
List<BabelfyToken> tokenizedInput = new ArrayList<>();

//building tokens for the English text
for (String word : myEnText)
        tokenizedInput.add(new BabelfyToken(word, Language.EN));

//add an EOS token to separate the different texts
tokenizedInput.add(BabelfyToken.EOS);

//building tokens for the French text
for (String word : myFrText)
        tokenizedInput.add(new BabelfyToken(word, Language.FR));
```

The Java API: BabelfyToken

First we add **English** tokens "java" and "bytecode"

Add a **separator** (EOS) to tell Babelfy not to mix tokens in different languages

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//add an EOS token to separate the different texts
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//building tokens for the French text
for (String word : myFrText)
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```

Then we add **French** tokens "programme" and "informatique"

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The basic ones are:

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List<SemanticAnnotation> babelfy(String, Language)

List<SemanticAnnotation> babelfy(List<? extends
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Input text (either raw or tokenized)

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Language of the input text (or language-agnostic setting)

The Java API: SemanticAnnotation

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- **`getBabelSynsetID/getBabelNetURL`**: returns the `BabelSynset` associated with the fragment as `BabelSynsetID` object/URL;
- **`getDBpediaURL`**: returns a link to the DBpedia entry associated with the selected `BabelSynset` (if any);

Disambiguation result (meaning associated to that particular fragment)

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- **`getDBpediaURL`**: returns a link to the DBpedia entry associated with the selected `BabelSynset` (if any);
- **`getCharOffsetFragment`**: returns the char-based offset of the annotation (when the input text is given as a `String`);
- **`getTokenOffsetFragment`**: returns the token-based offset of the annotation (when the input text is given as a `List<BabelfyToken>`);

Information about the disambiguated fragment in the input text

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- **`getCharOffsetFragment`**: returns the char-based offset of the annotation (when the input text is given as a `String`);
- **`getTokenOffsetFragment`**: returns the token-based offset of the annotation (when the input text is given as a `List<BabelfyToken>`);
- **`getSource`**: returns the method used to select that particular `BabelSynset` (Babelfy itself or the back-off strategy);

Disambiguation method

The Java API: SemanticAnnotation

```
//bfyAnnotations is the result of Babelfy.babelfy() call
for (SemanticAnnotation annotation : bfyAnnotations)
{
        //splitting the input text using the CharOffsetFragment start and end anchors
        String frag = inputText.substring(annotation.getCharOffsetFragment().getStart(),
                annotation.getCharOffsetFragment().getEnd() + 1);
        System.out.println(frag + "\t" + annotation.getBabelSynsetID());
        System.out.println("\t" + annotation.getBabelNetURL());
        System.out.println("\t" + annotation.getDBpediaURL());
        System.out.println("\t" + annotation.getSource());
}
```

The Java API: SemanticAnnotation

Retrieve the corresponding input fragment from the `CharOffset`

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        System.out.println(frag + "\t" + annotation.getBabelSynsetID());
        System.out.println("\t" + annotation.getBabelNetURL());
        System.out.println("\t" + annotation.getDBpediaURL());
        System.out.println("\t" + annotation.getSource());
}
```

Print information about the associated `BabelSynset` and the disambiguation method

The Java API: BabelfyConstraints

When you already have some information on the input text, the Babelfy API allows you to define *constraints* for the disambiguation process via the `BabelfyConstraints` class.

The Java API: BabelfyConstraints

When you already have some information on the input text, the Babelfy API allows you to define *constraints* for the disambiguation process via the `BabelfyConstraints` class.

You can do it in two ways:

1. by specifying `SemanticAnnotation`s for particular text fragments you already know how to disambiguate;

```
boolean addAnnotatedFragments(SemanticAnnotation... )
```

The Java API: BabelfyConstraints

When you already have some information on the input text, the Babelfy API allows you to define *constraints* for the disambiguation process via the `BabelfyConstraints` class.

You can do it in two ways:

1. by specifying `SemanticAnnotation`s for particular text fragments you already know how to disambiguate;
2. by specifying *which* fragments of the input text you want to disambiguate.

```
boolean addFragmentToDisambiguate(TokenOffsetFragment... )
boolean addFragmentToDisambiguate(CharOffsetFragment... )
```

The Java API: BabelfyConstraints

`BabelfyConstraints` works similarly to `BabelfyParameters`. You just have to create a `BabelfyConstraints` object, add your constraints using its public interface, and then pass it as input parameter for the Babelfy call:

```
Babelfy bfy = new Babelfy();
String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";
BabelfyConstraints constraints = new BabelfyConstraints();
SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
    "http://dbpedia.org/resource/BabelNet", Source.OTHER);
constraints.addAnnotatedFragments(a);
Babelfy bfy = new Babelfy();
List<SemanticAnnotation> bfyAnnotations = bfy.babelfy(inputText, Language.EN, constraints);
```

The Java API: BabelfyConstraints

Initalizing a `BabelfyConstraints` object

Specifying a pre-annotated fragment (i.e. the first word of the sentence is assigned the `BabelSynset` bn:03083790n)

```
Babelfy bfy = new Babelfy();
String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";
BabelfyConstraints constraints = new BabelfyConstraints();
SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
    "http://dbpedia.org/resource/BabelNet", Source.OTHER);
constraints.addAnnotatedFragments(a);
Babelfy bfy = new Babelfy();
List<SemanticAnnotation> bfyAnnotations = bfy.babelfy(inputText, Language.EN, constraints);
```

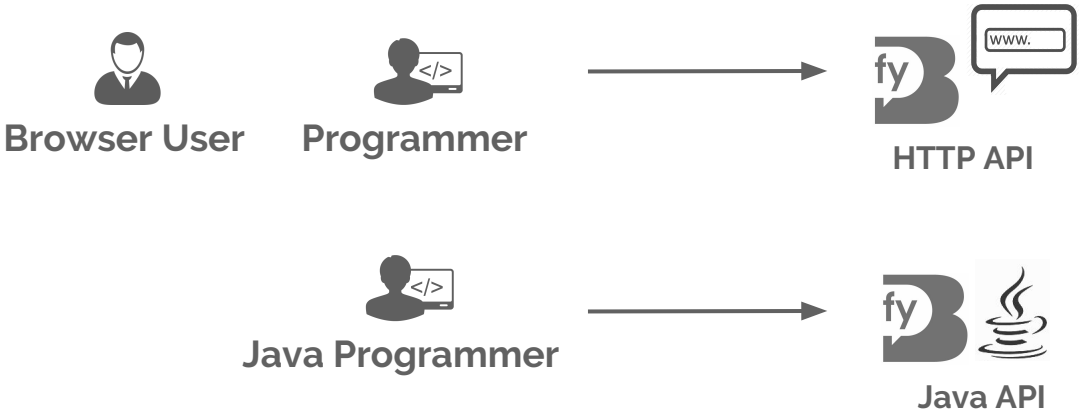
Adding the prea-annotated fragment to the `BabelfyConstraints` object

Passing the constraint as input argument for the method `Babelfy#babelfy`

Full usage example

Full usage example

As in the previous session, we will look at this example from two perspectives:

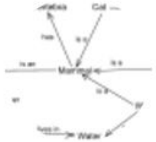


Full usage example

"BabelNet is both a multilingual encyclopedic dictionary and a semantic network."

0-0
BabelNet
bn:03083790n

5-6
encyclopedic dictionary
bn:02290297n

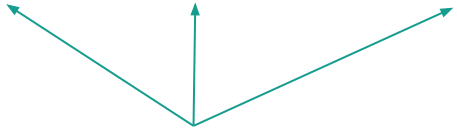


9-10
semantic network
bn:02275757n

Full usage example

Basic call to the HTTP RESTful service:

URL: `https://babelfy.io/v1/disambiguate?text=text & lang=lang & key=key`



The required input parameters are the same of the Java API method `Babelfy#babelfy` (input text and language) + **the registration key**

HTTP API

Full usage example

Basic call to the HTTP RESTful service:

URL: `https://babelfy.io/v1/disambiguate?text=text & lang=lang & key=key`

Call with disambiguation parameters:

URL:
```
https://babelfy.io/v1/disambiguate?
text=text & lang=lang & annType=NAMED_ENTITIES & ...
& match=PARTIAL_MATCHING & key=key
```

Disambiguation parameters specified in the same service call
(complete list: **http://babelfy.org/guide#Disambiguateatext**)

HTTP API

Full usage example

URL: `https://babelfy.io/v1/disambiguate?text=text & lang=lang & key=key`

...


```
[{"tokenFragment":{"start":0,"end":0},"charFragment":
{"start":0,"end":7},"babelSynsetID":"bn:03083790n","DBpediaURL":"http://dbpedia.org/resource/BabelNet","BabelNetURL":"http://babelnet.org/rdf/s03083790n","score":1.0,"coherenceScore":0.6,"globalScore":0.09574468085106383,"source":"BABELFY"},{"tokenFragment":{"start":4,"end":4},"charFragment":
{"start":19,"end":30},"babelSynsetID":"bn:00107021a","DBpediaURL":"","BabelNetURL":"http://babelnet.org/rdf/s00107021a","score":0.0,"coherenceScore":0.0,"globalScore":0.0,"source":"MCS"},{"tokenFragment":
{"start":5,"end":5},"charFragment":
{"start":32,"end":43},"babelSynsetID":"bn:00102202a","DBpediaURL":"","BabelNetURL":"http://babelnet.org/rdf/s00102202a","score":0.0,"coherenceScore":0.0,"globalScore":0.0,"source":"MCS"},{"tokenFragment":
{"start":5,"end":6},"charFragment":
{"start":32,"end":54},"babelSynsetID":"bn:02290297n","DBpediaURL":"http://dbpedia.org/resource/Encyclopedic_dictionary","BabelNetURL":"http://babelnet.org/rdf/s02290297n","score":1.0,"coherenceScore":0.4,"globalScore":0.0425531914893617,"source":"BABELFY"},{"tokenFragment":{"start":6,"end":6},"charFragment":
{"start":45,"end":54},"babelSynsetID":"bn:00026967n","DBpediaURL":"http://dbpedia.org/resource/Dictionary","BabelNetURL":"http://babelnet.org/rdf/s00026967n","score":0.8823529411764706,"coherenceScore":1.0,"globalScore":0.3191489361702128,"source":"BABELFY"},{"tokenFragment":{"start":9,"end":9},"charFragment":
{"start":62,"end":69},"babelSynsetID":"bn:00110347a","DBpediaURL":"","BabelNetURL":"http://babelnet.org/rdf/s00110347a","score":1.0,"coherenceScore":0.2,"globalScore":0.010638297872340425,"source":"BABELFY"},{"tokenFragment":
{"start":9,"end":10},"charFragment":
{"start":62,"end":77},"babelSynsetID":"bn:02275757n","DBpediaURL":"http://dbpedia.org/resource/Semantic_network","BabelNetURL":"http://babelnet.org/rdf/s02275757n","score":1.0,"coherenceScore":0.6,"globalScore":0.12765957446808051,"source":"BABELFY"},{"tokenFragment":{"start":10,"end":10},"charFragment":
{"start":71,"end":77},"babelSynsetID":"bn:00057379n","DBpediaURL":"","BabelNetURL":"http://babelnet.org/rdf/s00057379n","score":0.0,"coherenceScore":0.0,"globalScore":0.0,"source":"MCS"}]
```


Browser User

HTTP API

Full usage example

```
<script>
    var service_url = 'https://babelfy.io/v1/disambiguate';
    var text = 'BabelNet is both a multilingual encyclopedic dictionary and a semantic network'
    var lang = 'EN'
    var key =

    var params = {
        'text'   : text,
        'lang' : lang,
        'key'  : key
    };

    $.getJSON(service_url + "?", params, function(response) {

        $.each(response, function(key, val) {

            // retrieving char fragment
            var charFragment = val['charFragment'];
            var cfStart = charFragment['start'];
            var cfEnd = charFragment['end'];

            var cfragment = "Start char fragment: " + cfStart
                + "<br/>" + "End char fragment: " + cfEnd;
            $('<div>', {html:cfragment}).appendTo(document.body);

            // retrieving annotation information
            var synsetId = val['babelSynsetID'];
            var id = "BabelNet Synset id: " + synsetId;
            $('<div>', {html:id}).appendTo(document.body);

            var synsetURL = val['BabelNetURL'];
            var url = "BabelNet URL: " + synsetURL;
            $('<div>', {html:url}).appendTo(document.body);

            var synsetSource = val['source'];
            var source = "Source: " + synsetSource;
            $('<div>', {html:source}).appendTo(document.body);

            var synsetCoherenceScore = val['coherenceScore'];
            var coherence = "Coherence Score: " + synsetCoherenceScore;
            $('<div>', {html:coherence}).appendTo(document.body);
        });

    });
</script>
```

Input parameters here

Call to the service

Disambiguation output (and related information)

Full usage example

Start char fragment: 0
End char fragment: 7
BabelNet Synset id: bn:03083790n
BabelNet URL: http://babelnet.org/rdf/s03083790n
Source: BABELFY
Coherence Score: 0.6

Start char fragment: 19
End char fragment: 30
BabelNet Synset id: bn:00107021a
BabelNet URL: http://babelnet.org/rdf/s00107021a
Source: MCS
Coherence Score: 0

Start char fragment: 32
End char fragment: 43
BabelNet Synset id: bn:00102202a
BabelNet URL: http://babelnet.org/rdf/s00102202a
Source: MCS
Coherence Score: 0

Start char fragment: 32
End char fragment: 54
BabelNet Synset id: bn:02290297n
BabelNet URL: http://babelnet.org/rdf/s02290297n
Source: BABELFY
Coherence Score: 0.4

Start char fragment: 45
End char fragment: 54
BabelNet Synset id: bn:00026967n
BabelNet URL: http://babelnet.org/rdf/s00026967n
Source: BABELFY
Coherence Score: 1

Start char fragment: 62
End char fragment: 69
BabelNet Synset id: bn:00110347a
BabelNet URL: http://babelnet.org/rdf/s00110347a
Source: BABELFY
Coherence Score: 0.2

Start char fragment: 62
End char fragment: 77
BabelNet Synset id: bn:02275757n
BabelNet URL: http://babelnet.org/rdf/s02275757n
Source: BABELFY
Coherence Score: 0.6

Start char fragment: 71
End char fragment: 77
BabelNet Synset id: bn:00057379n
BabelNet URL: http://babelnet.org/rdf/s00057379n
Source: MCS
Coherence Score: 0

Full usage example

BabelNet

Start char fragment: 0
End char fragment: 7
BabelNet Synset id: bn:03083790n
BabelNet URL: http://babelnet.org/rdf/s03083790n
Source: BABELFY
Coherence Score: 0.6

Start char fragment: 19
End char fragment: 30
BabelNet Synset id: bn:00107021a
BabelNet URL: http://babelnet.org/rdf/s00107021a
Source: MCS
Coherence Score: 0

Start char fragment: 32
End char fragment: 43
BabelNet Synset id: bn:00102202a
BabelNet URL: http://babelnet.org/rdf/s00102202a
Source: MCS
Coherence Score: 0

Start char fragment: 32
End char fragment: 54
BabelNet Synset id: bn:02290297n
BabelNet URL: http://babelnet.org/rdf/s02290297n
Source: BABELFY
Coherence Score: 0.4

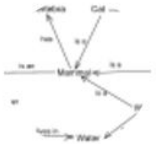
Start char fragment: 45
End char fragment: 54
BabelNet Synset id: bn:00026967n
BabelNet URL: http://babelnet.org/rdf/s00026967n
Source: BABELFY
Coherence Score: 1

Start char fragment: 62
End char fragment: 69
BabelNet Synset id: bn:00110347a
BabelNet URL: http://babelnet.org/rdf/s00110347a
Source: BABELFY
Coherence Score: 0.2

Start char fragment: 62
End char fragment: 77
BabelNet Synset id: bn:02275757n
BabelNet URL: http://babelnet.org/rdf/s02275757n
Source: BABELFY
Coherence Score: 0.6

Start char fragment: 71
End char fragment: 77
BabelNet Synset id: bn:00057379n
BabelNet URL: http://babelnet.org/rdf/s00057379n
Source: MCS
Coherence Score: 0

semantic network



encyclopedic dictionary

Programmer

HTTP API

Full usage example

```
public class LuxTechSession2 {

    public static void main(String[] args)
    {
        String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";

        BabelfyConstraints constraints = new BabelfyConstraints();
        SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
            "http://dbpedia.org/resource/BabelNet", Source.OTHER);
        constraints.addAnnotatedFragments(a);

        BabelfyParameters bp = new BabelfyParameters();
        bp.setAnnotationResource(SemanticAnnotationResource.BN);
        bp.setMCS(MCS.ON_WITH_STOPWORDS);
        bp.setScoredCandidates(ScoredCandidates.ALL);

        Babelfy bfy = new Babelfy(bp);

        List<SemanticAnnotation> bfyAnnotations = bfy.babelfy(inputText, Language.EN, constraints);

        for (SemanticAnnotation annotation : bfyAnnotations)
        {
            String frag = inputText.substring(annotation.getCharOffsetFragment().getStart(),
                annotation.getCharOffsetFragment().getEnd() + 1);
            System.out.println(frag + "\t" + annotation.getBabelSynsetID());
            System.out.println("\t" + annotation.getBabelNetURL());
            System.out.println("\t" + annotation.getSource());
            System.out.println("\tCoherence: "+annotation.getCoherenceScore());
        }
    }
}
```

Full usage example

```
public class LuxTechSession2 {

    public static void main(String[] args)
    {
        String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";

        BabelfyConstraints constraints = new BabelfyConstraints();
        SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
            "http://dbpedia.org/resource/BabelNet", Source.OTHER);
        constraints.addAnnotatedFragments(a);

    }
}
```

Input text (as `String`)

Defining a constraint: the first word of the input text is already annotated with a `BabelSynset`

Full usage example

```
public class LuxTechSession2 {

    public static void main(String[] args)
    {
        String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";

        BabelfyConstraints constraints = new BabelfyConstraints();
        SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
            "http://dbpedia.org/resource/BabelNet", Source.OTHER);
        constraints.addAnnotatedFragments(a);

        BabelfyParameters bp = new BabelfyParameters();
        bp.setAnnotationResource(SemanticAnnotationResource.BN);
        bp.setMCS(MCS.ON_WITH_STOPWORDS);
        bp.setScoredCandidates(ScoredCandidates.ALL);

        Babelfy bfy = new Babelfy(bp);

    }
}
```

Initialize a `Babelfy` object with the specified parameters

Specifying disambiguation parameters:

1. BabelNet as annotation resource
2. MCS back-off strategy on only with stop words
3. return all scored candidates

Programmer

Java API

Full usage example

```
public class LuxTechSession2 {

    public static void main(String[] args)
    {
        String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";
```

Call `Babelfy#babelfy` with the input text, the corresponding language and constraints

Print the resulting list of `SemanticAnnotations`

```
        List<SemanticAnnotation> bfyAnnotations = bfy.babelfy(inputText, Language.EN, constraints);

        for (SemanticAnnotation annotation : bfyAnnotations)
        {
            String frag = inputText.substring(annotation.getCharOffsetFragment().getStart(),
                annotation.getCharOffsetFragment().getEnd() + 1);
            System.out.println(frag + "\t" + annotation.getBabelSynsetID());
            System.out.println("\t" + annotation.getBabelNetURL());
            System.out.println("\t" + annotation.getSource());
            System.out.println("\tCoherence: "+annotation.getCoherenceScore());
        }
    }
}
```

Full usage example

```
public class LuxTechSession2 {

    public static void main(String[] args)
    {
        String inputText = "BabelNet is both a multilingual encyclopedic dictionary and a semantic network";

        BabelfyConstraints constraints = new BabelfyConstraints();
        SemanticAnnotation a = new SemanticAnnotation(new TokenOffsetFragment(0, 0), "bn:03083790n",
            "http://dbpedia.org/resource/BabelNet", Source.OTHER);
        constraints.addAnnotatedFragments(a);

        BabelfyParameters bp = new BabelfyParameters();
        bp.setAnnotationResource(SemanticAnnotationResource.BN);
        bp.setMCS(MCS.ON_WITH_STOPWORDS);
        bp.setScoredCandidates(ScoredCandidates.ALL);

        Babelfy bfy = new Babelfy(bp);

        List<SemanticAnnotation> bfyAnnotations = bfy.babelfy(inputText, Language.EN, constraints);

        for (SemanticAnnotation annotation : bfyAnnotations)
        {
            String frag = inputText.substring(annotation.getCharOffsetFragment().getStart(),
                annotation.getCharOffsetFragment().getEnd() + 1);
            System.out.println(frag + "\t" + annotation.getBabelSynsetID());
            System.out.println("\t" + annotation.getBabelNetURL());
            System.out.println("\t" + annotation.getSource());
            System.out.println("\tCoherence: "+annotation.getCoherenceScore());
        }
    }
}
```

Full usage example

```
BabelNet        bn:03083790n
        http://babelnet.org/rdf/s03083790n
        http://dbpedia.org/resource/BabelNet
        BABELFY
multilingual    bn:00107021a
        http://babelnet.org/rdf/s00107021a
        null
        MCS
encyclopedic    bn:00102202a
        http://babelnet.org/rdf/s00102202a
        null
        MCS
encyclopedic dictionary bn:02290297n
        http://babelnet.org/rdf/s02290297n
        http://dbpedia.org/resource/Encyclopedic_dictionary
        BABELFY
dictionary      bn:00026967n
        http://babelnet.org/rdf/s00026967n
        http://dbpedia.org/resource/Dictionary
        BABELFY
semantic        bn:00110347a
        http://babelnet.org/rdf/s00110347a
        null
        BABELFY
semantic network        bn:02275757n
        http://babelnet.org/rdf/s02275757n
        http://dbpedia.org/resource/Semantic_network
        BABELFY
network bn:00021488n
        http://babelnet.org/rdf/s00021488n
        http://dbpedia.org/resource/Computer_network
        BABELFY
```

Programmer

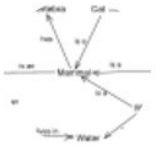
Java API

Full usage example

BabelNet

```
BabelNet          bn:03083790n
        http://babelnet.org/rdf/s03083790n
        http://dbpedia.org/resource/BabelNet
        BABELFY
multilingual      bn:00107021a
        http://babelnet.org/rdf/s00107021a
        null
        MCS
encyclopedic      bn:00102202a
        http://babelnet.org/rdf/s00102202a
        null
        MCS
encyclopedic dictionary bn:02290297n
        http://babelnet.org/rdf/s02290297n
        http://dbpedia.org/resource/Encyclopedic_dictionary
        BABELFY
dictionary        bn:00026967n
        http://babelnet.org/rdf/s00026967n
        http://dbpedia.org/resource/Dictionary
        BABELFY
semantic          bn:00110347a
        http://babelnet.org/rdf/s00110347a
        null
        BABELFY
semantic network          bn:02275757n
        http://babelnet.org/rdf/s02275757n
        http://dbpedia.org/resource/Semantic_network
        BABELFY
network bn:00021488n
        http://babelnet.org/rdf/s00021488n
        http://dbpedia.org/resource/Computer_network
        BABELFY
```

encyclopedic dictionary



semantic network

Programmer

Java API

Wrapping up

Wrapping up

- Babelfy API shares the same structure of the BabelNet API:
  - **HTTP RESTful** service and corresponding **Java binding**
  - Internal credit mechanism (**Babelcoins**)

Wrapping up

- Babelfy API shares the same structure of the BabelNet API:
  - **HTTP RESTful** service and corresponding **Java binding**
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- The Java API defines a set of convenient classes and methods to query Babelfy for disambiguation:
  - Many different parameter settings (**`BabelfyParameters`**)
  - Disambiguation constraints (**`BabelfyConstraints`**)

Wrapping up

- Babelfy API shares the same structure of the BabelNet API:
  - **HTTP RESTful** service and corresponding **Java binding**
  - Internal credit mechanism (**Babelcoins**)

- The Java API defines a set of convenient classes and methods to query Babelfy for disambiguation:
  - Many different parameter settings (`BabelfyParameters`)
  - Disambiguation constraints (`BabelfyConstraints`)

- Due to the multilingual nature of Babelfy, you can easily use the API to generate **custom-tokenized input text** (`BabelfyToken`) in multiple languages, and perform cross-lingual disambiguation.

Thanks for your attention !

Thanks

An acknowledgment of appreciation

attention

The process whereby a person concentrates on some features of the environment to t…