

Create your own interactive diachronic semantic maps: a flexible and user-friendly open-source tool for historical linguistics

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1. What is Pygmalion?

Pygmalion is a user-friendly open-source tool conceived to draw and visualise diachronic semantic maps. It was designed in the framework of the WoPoss project and it comes in two flavours:

- **Pygmalion-simple**: for any diachronic semantic map
- **Pygmalion-modal**: for diachronic semantic maps describing the evolution and the relations between modal readings



2. Data visualisation: development

Key components:

- HTML5, CSS3, ECMAScript 6
- Data-Driven Documents (D3)

```

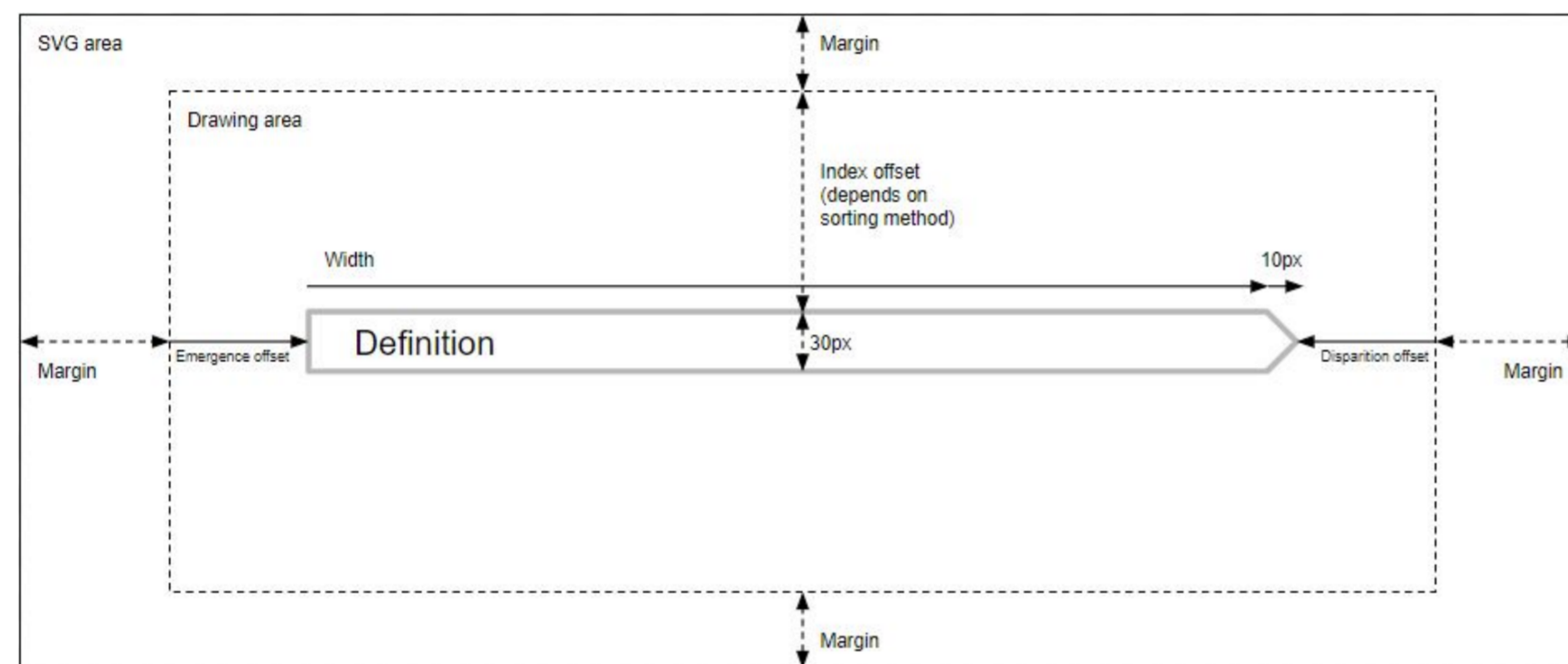
< form_simplified.html
JS form_simplified.js
# form.css
JS form.js
< index.html
< map.html
JS map.js
JS network.js
i readme.md
< sem_rel_form.html
JS sem_rel_form.js
    
```

Main steps:

1. Data gathering – forms
2. Data structuring – preprocessing
3. Data visualisation – drawing pipeline

Main visualisation:

1. Chronological line
2. Definitions (and modal readings):
 - Sort algorithm
 - Positions calculations
 - Height correction
3. Left-hand side metadata – reflect sort method: gather elements by semantic group or collocation
4. Right-hand side metadata (when a definition is clicked):
 - Rather complex path calculations
 - Certain or hypothetical relationship
 - Direction of the relationship (if any)



Network graph:

1. Data restructure – keep only the relevant information
2. Simulation elements (nodes and links)
3. Simulation environment (type, forces applied)

Relevant/interesting code snippets:

```

function prepareDefinitions() {
  const meanings = data.meanings;
  const definitions = [];
  if (data.normalForm) {
    meanings.forEach((meaning) => {
      if (meaning.modalities.length > 1) {
        meaning.modalities.forEach((modality) => {
          definitions.push(modalityFormatting(meaning, modality));
        });
      } else {
        definitions.push(modalityFormatting(meaning, meaning.modalities[0]));
      }
    });
  } else {
    meanings.forEach((meaning) =>
      definitions.push(simpleModalityFormatting(meaning))
    );
  }
  return definitions;
}

const offset =
lines[elementIndex] * 30 + wrap(element.meaning, cW, cP, element) * 15;
const x0 =
element.disparition != -1 && !isNaN(element.disparition)
? element.disparition * cP + 10
: cW + 10;
const y0 = elementIndex * 37 + offset;
    
```

To know more:



WoPoss website: <http://woposs.unil.ch/>
 Pygmalion website: <http://woposs.unil.ch/pygmalion.php>
 Pygmalion Github repository: <https://github.com/WoPoss/Pygmalion>

3.1 Data entry: headword and etymology

Headword: Fr. carte

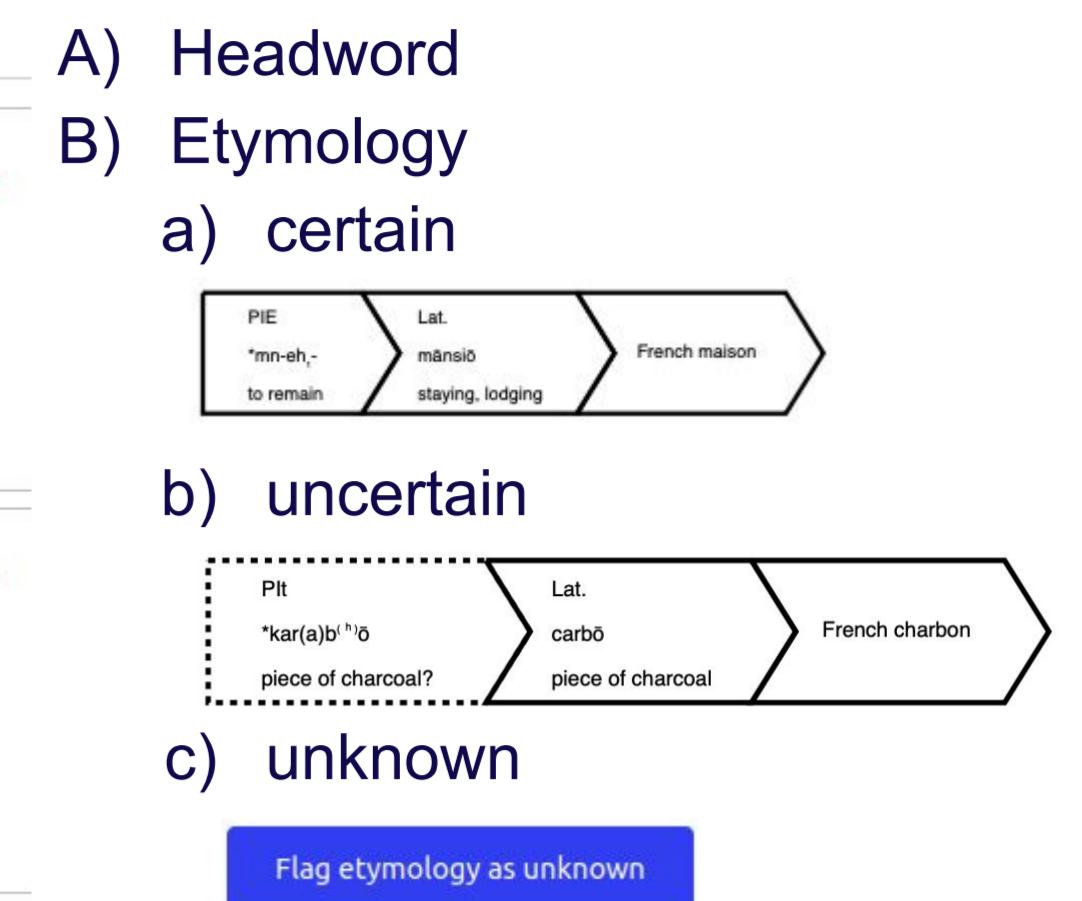
Etymology:

Etmological step: Greek (Language/period) khártēs (Etmological form) papyrus, roll made the (Short definition) [checked] (Etmology is certain)

Etmological step: Latin (emprunt au grec) charta (Language/period) 'paper' made from pap. (Etmological form) [checked] (Short definition) (Etmology is certain)

Etmological step: French (emprunt au lat) carte (Language/period) Rectangle or square of (Etmological form) [checked] (Short definition) (Etmology is certain)

Buttons: Flag etymology as unknown, Add etymological step



3.2 Data entry: meanings

Date format: Centuries

Meanings:

Meaning / function / use: playing card

Collocation: jouer aux cartes

Semantic group (or other kind of groups): playing card

Description: XIV

Date of meaning emergence: Century (II BC, I BC, I, II) or Year

Date of meaning disappearance: Ménagier, I, 72 ds T.-L.: les autres jouans aux cartes et aux autres jeux d'e

First attestation:

- C) Date format:
- centuries
 - decades
 - specific years
- D) Meanings
- meaning/function/use (mandatory)
 - collocation
 - semantic group (or other kind of group)
 - description
 - date of meaning emergence (mandatory)
 - date of meaning disappearance
 - first attestation

Pygmalion-modal includes additional subfields in the field "description":

- E) Description of modality (recursive):
- modality type
 - certainty of the modal description

3.3 Data entry: relations between meanings/functions

Semantic relationships

paperboard (piece of paper, paperboard) to geographical map (map) [checked] Relationship is certain

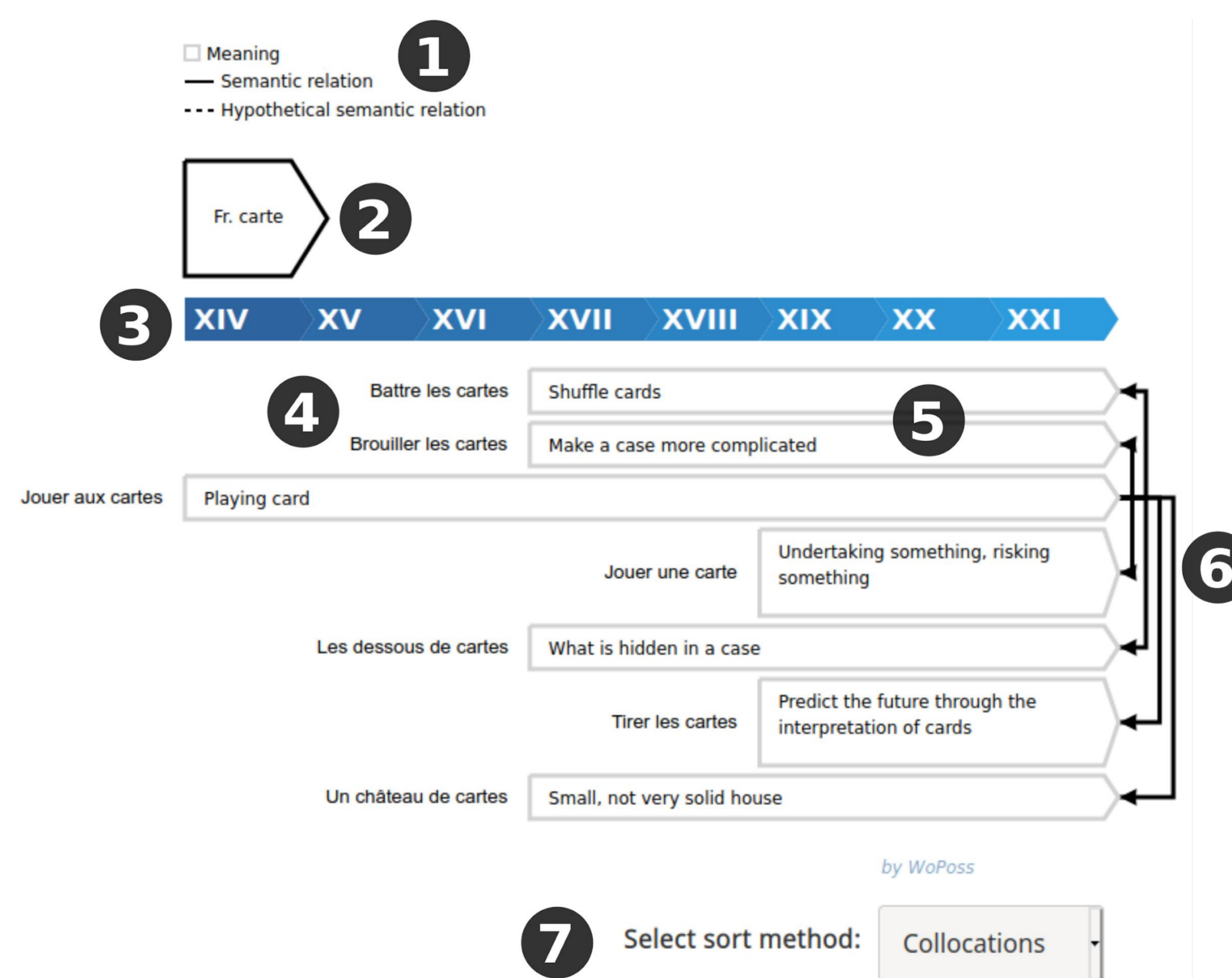
Buttons: Submit form, Add new relationship

F) Direction of the relation:

- from
- to
- unspecified

G) Certainty of the relation

4. Visualisations



4.1 Visualisation 1

- 1) Legend
- 2) Headword and etymology
- 3) Chronology
- 4) Collocations (or semantic groups if selected)
- 5) Meanings / uses
- 6) Semantic relations (with the direction)
- 7) Sorting options:
 - a) Chronologic
 - b) Collocations
 - c) Groups

When **clicking** on a meaning, the semantic relations of that meaning are visible (6). Double-clicking resets the visualization.

When **mouseover** a meaning, the chronology and the first attestation are visible.

Modal maps: meanings are color-coded by **modality type**

4.2 Visualisation 2: Network

- Node background color: chronology
- Node border color: modality (not displayed here)
- Edges: direction

