BaSCo: An Annotated Basque-Spanish Code-Switching Corpus for Natural Language Understanding

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Introduction

BaSCo – Basque-Spanish Code-Switching – is the first corpus with annotated linguistic resources encompassing Basque-Spanish code-switching. Publicly available at: https://github.com/Vicomtech/BaSCo-Corpus

Data Curation and Annotation

Three Basque-Spanish bilingual annotators would consider an utterance valid if:

- It is, to whatsoever extent, in a mixture of Spanish and Basque.
- Its semantic content remains the same as its reference text’s.
- It sounds natural.

The corpus is annotated at three levels:

- NLU Annotation: intents and entities.
- Code-Switching Level Annotation: annotators’ subjective perspectives on the proportion of Basque and Spanish.
- Domain of Origin: administration, transport, fiscal, generic or social.

Source Data and Compilation

- Departure point: the texts used for training the NLU modules of four task-oriented bilingual chatbots.
- Domains: administration, transport, fiscal, generic, and social.
- BaSCo gathering: distribution of a web interface for submitting code-switched proposals given a reference utterance.

Corpus Structure

- "referent": "dónde está la casa del deporte?",
- "source_language": "es",
- "domain": "administration",
- "intent": [
  "preguntar[ubicación]",
  "informar[loca[=7]]"
],
- "entities": [
  {
    "entity": "tipo-oficina",
    "value": "casa del deporte",
    "normative_value": "deportes",
    "start": 14,
    "end": 50,
    "type": "bounded"
  }
],
- "code_switching": [
  "text": "Casa de deporte non dago",
  "entities": [
    {
      "entity": "tipo-oficina",
      "value": "Casa de deporte",
      "normative_value": "deportes",
      "start": 14,
      "end": 40,
      "type": "bounded"
    }
  ],
  "lang_proportion": "balanced"
]

Statistics

- Final corpus:
  - more-es: 313
  - more-eu: 662
  - balanced: 402
- Reference samples:
  - Spanish: 707
  - Basque: 670

<table>
<thead>
<tr>
<th>Domain</th>
<th>Basque</th>
<th>Spanish</th>
<th>Euskañol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>517</td>
<td>383</td>
<td>119</td>
</tr>
<tr>
<td>Social</td>
<td>256</td>
<td>271</td>
<td>205</td>
</tr>
<tr>
<td>Admin.</td>
<td>488</td>
<td>490</td>
<td>538</td>
</tr>
<tr>
<td>Transport</td>
<td>141</td>
<td>136</td>
<td>55</td>
</tr>
<tr>
<td>Fiscal</td>
<td>820</td>
<td>656</td>
<td>460</td>
</tr>
<tr>
<td>Total</td>
<td>2216</td>
<td>1936</td>
<td>1377</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain</th>
<th>Intents (Unique/Freq.)</th>
<th>Entities (Unique/Freq.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>9/191</td>
<td>0</td>
</tr>
<tr>
<td>Social</td>
<td>18/245</td>
<td>0</td>
</tr>
<tr>
<td>Admin.</td>
<td>36/495</td>
<td>77/389</td>
</tr>
<tr>
<td>Transport</td>
<td>6/55</td>
<td>2/9</td>
</tr>
<tr>
<td>Fiscal</td>
<td>26/924</td>
<td>11/552</td>
</tr>
<tr>
<td>Total</td>
<td>90/2331</td>
<td>20/950</td>
</tr>
</tbody>
</table>

- 1377 utterances
- Inter-Annotator Agreement (IAA) of determining valid/invalid utterances is \( \kappa = 0.4998 \), moderate agreement.
- IIA on the language proportion label is \( \kappa = 0.6083 \), substantial agreement.
- Labelled intents per sample between 1 and 4.
- Labelled entities per sample between 0 and 4.
- Average number of words per utterance in the corpus is 5.43

Potential Uses

- Multilingual chatbots. Compare the capacity of different language representation models when it comes to understanding intents and entities in the case of a corpus containing Basque-Spanish code-switching.
- Speech recognition. Develop speech to text systems that can perform adequately when the input audio source is given in Euskañol.
- Linguistic analysis. Explore the most common structures, characteristics, and patterns that emerge in Basque-Spanish code switching.
- Performance evaluator. Evaluate how much services –like dialogue systems or speech recognisers– are degraded by the phenomenon of code-switching.
- Language identifier evaluator. Evaluate the performance of language detectors by using the proportion labels and analyse their behaviour in cases where the label is tagged as balanced.

Acknowledgements

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