Workpackage 5
Integration

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Overview

- Task 5.1: Specification - Completed
- Task 5.2: Graphical Interface (M. García Martínez, CBS)
- Task 5.3: E-pen (V. Alabau, UPVLC)
- Task 5.4: Logging Functions (M. García Martínez, CBS)
- Task 5.5: MT Server (P. Koehn, UEDIN)
- Task 5.6: Manual Gaze-to-word Alignment - Completed
- Task 5.7: Automatic Gaze-to-word Alignment (M. Carl, CBS)
- Task 5.8: Replay Mode for User Activity Data (M. García-Martínez, CBS)
- Task 5.9: Visualization of Translation Processes. (M. Carl, CBS)
Task 5.2: Graphical Interface (I)

CasMaCat prototype 2

- **PE**

- **ITP:**
  - Basic
  - Limit suffix length
  - Confidence measures
  - Alignments and prediction rejection
  - Search and replace
  - Additional advanced features:
    * highlight validated
    * highlight prefix
    * highlight last validated
  - Example from field trial
Task 5.2: Graphical Interface (II)

New interface (MaTeCaT + CasMaCat)

• Advantages:
  – Common interface
  – Functionality can be switched on or off

• Problems:
  – Reimplement CasMaCat
  – Difficulties: encoding, function hooks, new tables in DB
  – Functionalities are missing (multi-user)

• Views:
  – Upload
  – Translate
  – List documents
  – Replay
E-pen integration

- HTR communication and visualization decoupled from standard CasMaCat UI

- All functionality is inserted by a JavaScript file:
  - An e-pen toggle button is added to the command area
  - Styles are modified: horizontal layout
  - Target area margins are increased
  - An area for $n$-best lists and feedback on gestures is added
  - Communication with the server is established

- Gestures implemented in JavaScript: delete, insert, reject, validate, set caret

- Separated HTR server (iAtros): strokes are processed independently

- Post-editing or interactive translation prediction modes
E-pen integration

Queda claro que la sentencia Bosman tiene consecuencias no solo para el fútbol, sino también para otros deportes en los que el jugador sea asalariado.

It is clear that the Bosman judgment has consequences not only for the football, but also for sports other in the whom he is employed.

<table>
<thead>
<tr>
<th>only</th>
<th>funding</th>
<th>today</th>
<th>under</th>
<th>fully</th>
<th>study</th>
<th>family</th>
<th>similar</th>
<th>affair</th>
<th>could</th>
</tr>
</thead>
</table>

Live demo
Task 5.4: Logging functions (I)

- Different types of events are saved in the logging.
  - Configuration and statistics
  - Start and stop session
  - Segment opened and closed
  - Text and key
  - Gaze and fixation
  - Scroll and resize
  - Search and replace
  - Suggestions loaded and suggestion chosen
  - Mouse
  - ITP
Task 5.4: Logging functions (II)

- In every event we save:
  - Type
  - In which element was produced
  - Time

- Special attributes are kept for some types of events, p.e.:
  - Diff of a text change
  - Current cursor position
  - Character looked at
  - Clicked UI element
  - Selected text
Task 5.4: Logging functions (III)

- Re-written from scratch

- Better techniques: Traditional mouse and key logging -> text change logging

- New features (ITP) to be logged
  - ITP is often triggered
  - Special tags (sanitation)

- Export XML log files to do analysis (WP1)

- Difficult to handle the large amount of data (ITP and ET)
Task 5.5: Machine Translation Server

- Modular component with API
- Extended from Google Translate API
- Example request
  http://demo.casmacat.eu:8000/translate?q=test&key=0&source=en&target=es
- JSON object response

The server responds to requests with a JSON object.

```json
{
  "data":
  {
    "translations":
    [
      {
        "sourceText": "test",
        "translatedText": "testo",
        "tokenization": {
          "src": [[0, 3]],
          "tgt": [[0, 4]]
        }
      }
    ]
  }
}
```
Task 5.5: Machine Translation Server

- **Functionality**
  - core: translate a raw sentence
  - reports tokenization and alignment
  - reports n-best lists
  - reports search graphs
  - word-level confidence estimates
  - accepts new sentence pairs for incremental updating
  - tokenizes monolingual sentences
  - aligns words in sentence pairs

- **Moses MT Server Implementation**
  - wraps pre-processing, post-processing
  - makes XML request to core Moses server implementation

- **UPVLC has integrated its ITP server into the CasMaCat Workbench (WP4)**
  - The ITP server was extended in different ways before the integration
  - A new version of the open source Thot toolkit has been released
Task 5.7: Automatic Gaze-to-Word Alignment

- Problem: Accuracy and precision of gaze samples:

\[ \ast = \text{eye tracker result} \]
\[ \bullet = \text{target looked at} \]

Good precision, poor accuracy
Good accuracy, poor precision
Task 5.7: Gaze-to-Word Mapping

- Recorded gaze locations and fixations:

**Right eye gaze samples**

Families hit with increase in cost of living
British families have to cough up an extra £31,300 a year as food in supermarkets have climbed at an alarming rate over the past, still, making it hard for the Bank of England to cut interest rates control. To make matters worse, escalating prices are racing above healthcare professionals, who have suffered from the government below-inflation salary increases. In addition to fuel and food, elec

**Left eye gaze samples**

- Gaze-to-word mapping:
Task 5.7: Composition of penalty score

\[
\min \{ C(n, m) + S(n, m) + L(m) + P(f, m) \}
\]

- **Cursor distance:** \( C(n, m) = \text{abs}(\text{CurPos}(m) - \text{CurPos}(n) - 10) \)
  - \( n \): character offset of previous fixation mapping
  - \( m \): character offset of next fixation mapping

- **Source ID distance:** \( S(n, m) = \text{abs}(\text{STID}(m) - \text{STID}(n) + 2) \)

- **Last keystroke distance:** \( L(m) = \text{abs}(\text{STID}(m) - \text{STID}(l)) \)

- **Fixation-symbol distance:** \( P(f, c) = \text{EuclidDistance}(f, c)/z \)
  - \( f \): fixation center (left, right, average)
  - \( c \): center of mapped character
  - \( z \): size of character (in pixels)
Task 5.7: Evaluation of automatic gaze-to-word mapping

- Two automatic gaze-to-word mappings: naive (N) and re-mapped (R)
- Three manually aligned gaze-to-word mappings (R, K, H)
- Compare three human inter annotator agreement
- Compare three human-naive gaze-to-word mapping
- Compare three human-automatically re-mapped gaze-to-word mapping

Average character distance between gaze mappings:

<table>
<thead>
<tr>
<th>Annotator</th>
<th>Human</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HK</td>
<td>KR</td>
<td>RH</td>
<td>RN</td>
<td>HN</td>
<td>KN</td>
</tr>
<tr>
<td>Source Window</td>
<td>8.7</td>
<td>13.9</td>
<td>10.3</td>
<td>48.0</td>
<td>42.0</td>
<td>44.7</td>
</tr>
<tr>
<td>Target Window</td>
<td>3.5</td>
<td>6.7</td>
<td>8.5</td>
<td>16.8</td>
<td>16.4</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RA</td>
<td>HA</td>
<td>KA</td>
</tr>
<tr>
<td></td>
<td>25.3</td>
<td>25.2</td>
<td>24.2</td>
<td>13.4</td>
<td>10.9</td>
<td>11.5</td>
</tr>
</tbody>
</table>
Task 5.8: Replay Mode for User Activity Data

- **Show video**

- `<text id=“18008983” elementId=“segment-2618-editarea” xpath=“” time=“1371463009585” cursorPosition=“58” deleted=“sostienen” inserted=“”/>`
Task 5.9: Visualization of Translation Processes