Using Machine Learning to Validate a Novel Taxonomy of Phenomenal Translation States

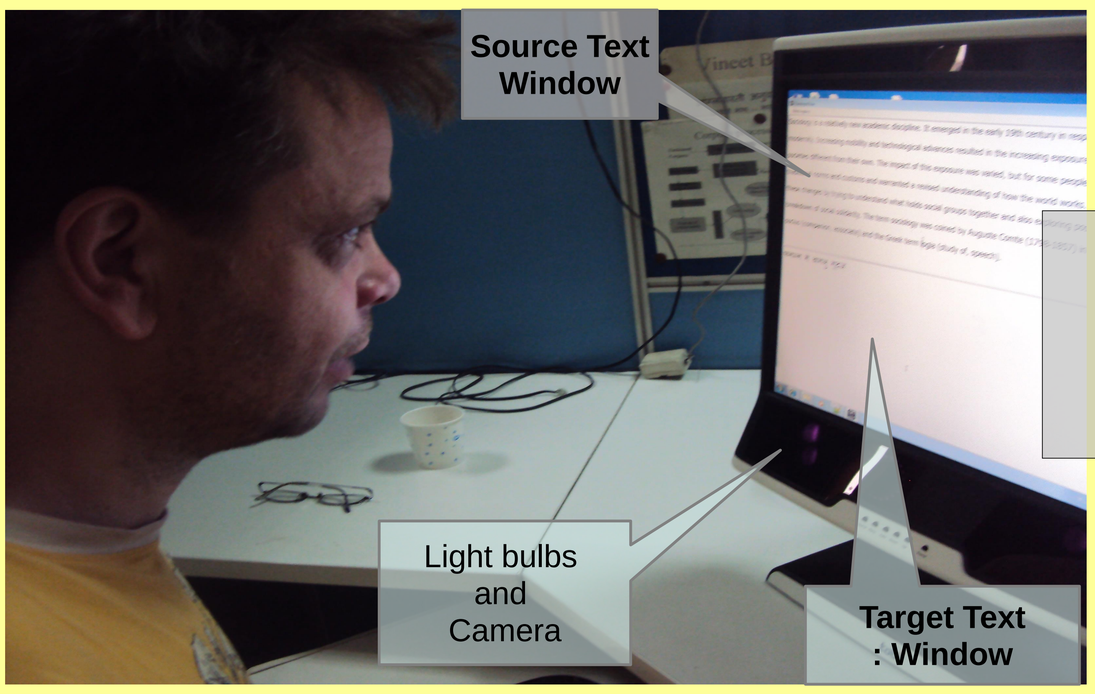
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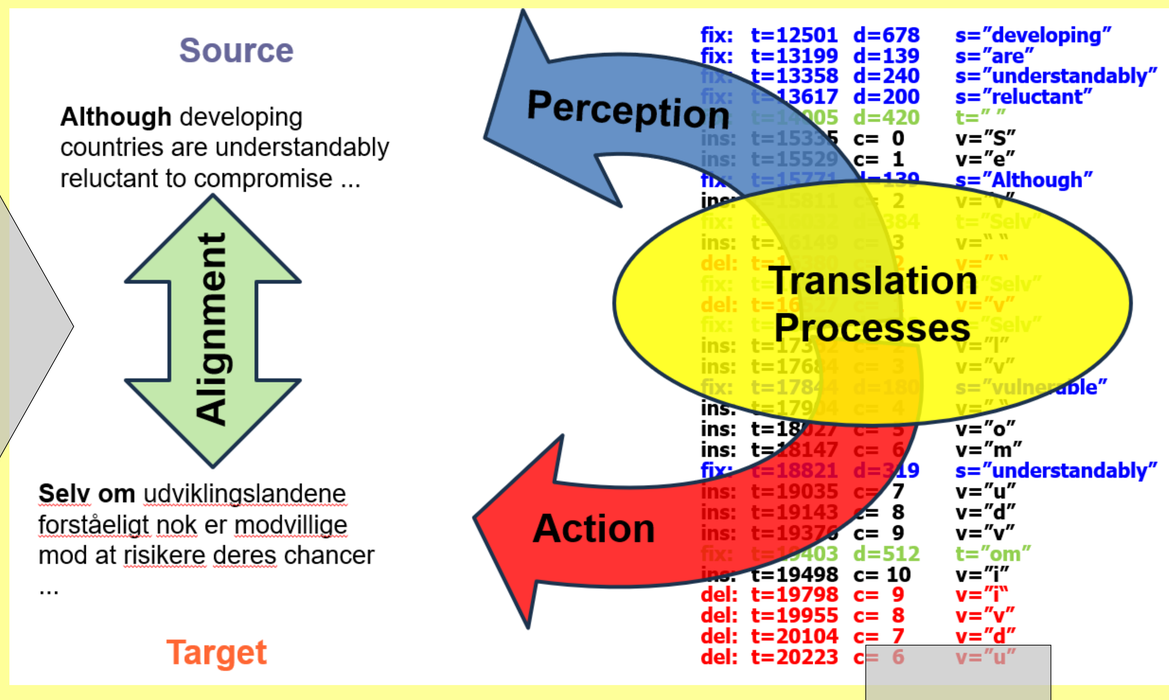
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1) Record Translator Activity Data



Keylogging and Eyetracking with Translog-II. Download for free:
https://sites.google.com/site/centretranslationinnovation/home

2) Align Product and Process Data



3) Annotate Product and Process Data

- Two annotators Y and T each annotate
- Six English-Spanish translation sessions:
  - 900 words / 1813 Activity Units (AUs)

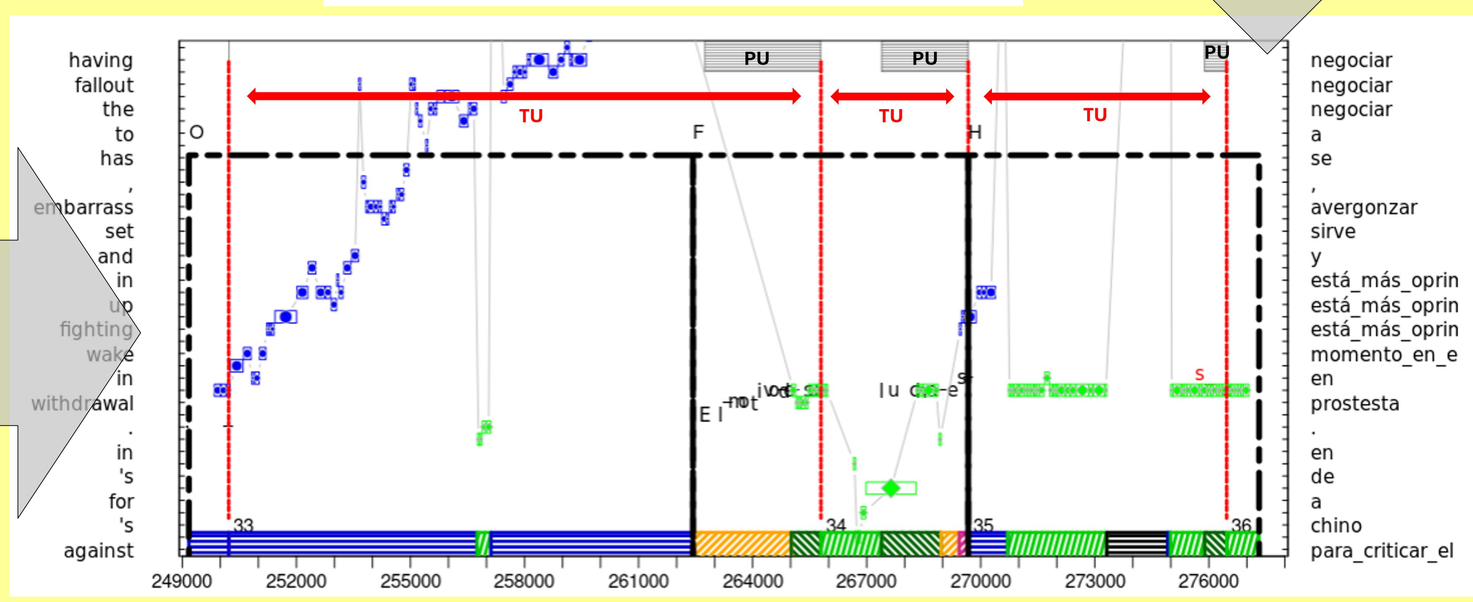
→ 1813 HOF annotated AUs per Annotator

Phenomenal HOF State AnnotationTaxonomy

Three basic Phenomenal Translation States:
Orientation (O):
translator gets acquainted with the source text (ST).
Behavior: linear forward-reading on the ST

Flow state (F):
immersed in fluent translation production, minimal interruption.
Behavior: minimal reading ahead short keystroke pauses

Hesitation (H):
Surprise/unexpected observation, translation challenge
Behavior: revision, re-reading, modifications



Epistemology: Annotation Taxonomy

	Epistemology	Ontology
Subjective	KNOWLEDGE OF THE SUBJECTIVE • Reality as it is judged by me (opinions, preferences, etc.) • What "I" know to be the case	EXISTENCE OF THE SUBJECTIVE • Reality as I experienced it (intentions, attitudes, pain, beliefs, desires, etc.) • Conscious personal experience
Objective	KNOWLEDGE OF THE OBJECTIVE • Reality as "we" describe it: norms, conventions (money, marriage, ..) • Assertions "we" make about reality	EXISTENCE OF THE OBJECTIVE • Reality as it exists: physical, spatial, temporal (mountains, molecules, etc.) • Exists independent of perception

Ontology: Progression Graphs

4) Evaluate Epistemological Objectivity across Human and Machine Classification

Training Classifiers

2 Classifiers and 2 Annotation sets each 1269 samples

Two Classifiers
- R: Random Forest
- M: Multi-Layer Perceptron

- And two Annotators:
- T
- Y

4 Trained Classifiers
- RY: R trained on Y
- RT: R trained on T
- MY: M trained on Y
- MT: M trained on T

Evaluation: Train/Test

Evaluation on 544 test samples:

15 evaluations pairs on
- 4 ML predictions (RY,RT,MY, MT)
- 2 Annotator predictions (T, Y)

Best → worst average accuracy ranking:
1. Different classifier – same test set
   MT/RT, MY/RY
2. Classifier - gold test-set
   RT/T, MT/T, RY/Y, MY/Y
3. Classifier - other classifier prediction
   MT/RY, RT/RY, RT/MY, MT/MY
4. The two manual annotations
   T/Y
5. Classifier - other gold test-set
   MT/Y, RT/Y, RY/T, MY/T

Epistemological Objectivity

Test Set (544 samples)

Train Set	T	Y	RT	RY	MT
Y	0.76	1	---	---	---
RT	0.87	0.72	1	---	---
RY	0.77	0.86	0.78	1	---
MT	0.85	0.71	**0.91**	0.77	1
MY	0.73	0.8	0.74	**0.85**	0.76

Hetero-Phenomenology

Inter-ML classifier agreement higher than:
- Between humans
- Between ML classifiers and humans