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MTM 2014 LAB

Humans in the Loop for MT Improvement: a Hands-on Experience with Manual Error Annotation

L. Bentivogli[1], C. Girardi[1], M. Negri[1], D. Torregrosa Rivero[2], M. Turchi[1]

1. FBK - Fondazione Bruno Kessler

2. University of Alicante

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Lab Material

- Annotation guidelines:

  www.statmt.org/mtm14/uploads/Main/Guidelines.pdf

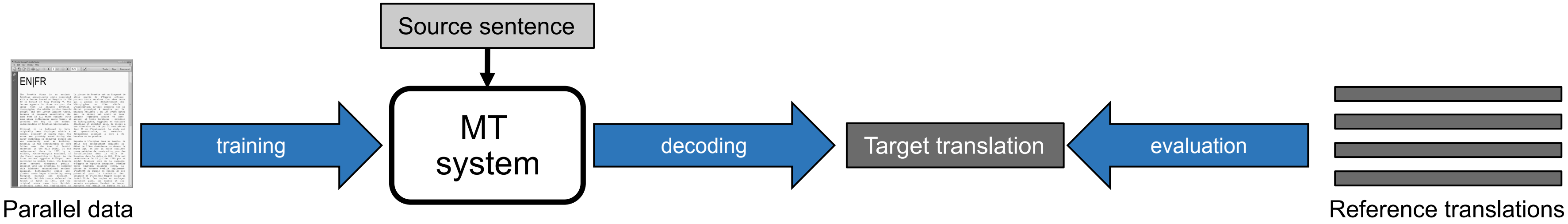
- Annotation results:

  www.statmt.org/mtm14/uploads/Main/Results.pdf

- Lab presentation: next slides, just go on…

Framework

- SMT typically learns from parallel data and is evaluated by using reference translations



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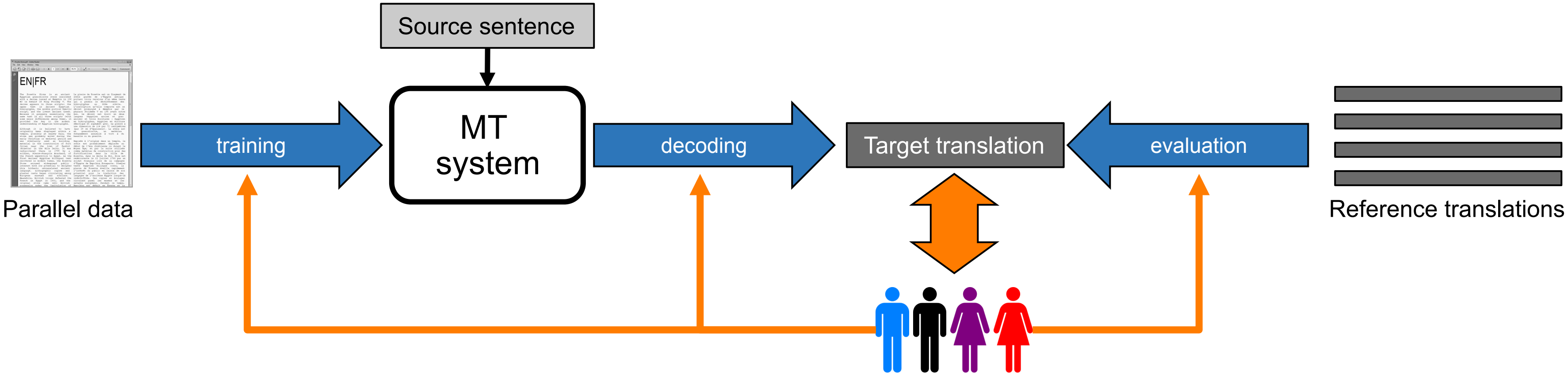

- Further improvements, however, might derive from analyzing different types of human-derived information

Framework

- What types of human feedback can be useful for MT?
- How can we collect useful information from humans?
- What human-annotated corpora are available?
- What tools do we have for the various annotation tasks?
- Is human annotation a difficult task?

Structure of the LAB

- Introduction (15')
  - Framework, uses and types of human annotation, available resources and tools
- MT-EQuAl (15')
  - A Toolkit for Human Assessment of MT output
- Practice: using MT-EQuAl for MT error annotation (40')
- Analysis, discussion and concluding remarks (20')

Possible uses of human annotation/feedback

- **Evaluate** MT output
  - A posteriori, through reference-based automatic metrics (*e.g.* BLEU), fluency/adequacy scores, relative ranking, post-editions (HTER)
  - At run-time (quality estimation), to decide if a given translation is good enough for publishing, inform the readers if they can rely on a translation, filter out bad translations, etc.
- **Improve** MT output production
  - By identifying systems' weaknesses, improving alignment, dynamically modifying phrase tables and language models, etc.
- **Correct** MT output (automatic post-editing)
  - By identifying and correcting recurring errors

Types of human annotation/feedback

- Post-editions
  - Revision of automatic translations
- Quality judgments
  - Scoring (*e.g.* in a 1-to-5 interval) / Relative ranking
- Error annotation
  - Marking MT errors with respect to a given taxonomy

Types of human annotation/feedback

- Post-editions
  - Revision of automatic translations
  - **Natural task**, a by-product of the professional translation workflow
- Quality judgments
  - Scoring (*e.g.* in a 1-to-5 interval) / Relative ranking
  - **Less natural task**, relatively cheap
- Error annotation
  - Marking MT errors with respect to a given taxonomy
  - **Even less natural task**, costly

An additional common problem

All these types of annotation are inherently subjective!

- The same translation can be corrected in different ways [SPE11a]
- Different humans might have different quality standards [COH13,TUR13]
- They might prioritize different errors [LOM14]
- They might produce different rankings [CCB07,CCB08]

- The agreement is often low but…
- …the more the better!
  - For the different tasks, collecting data that account for the variety of human attitudes becomes crucial

Available resources: post-editions

- Few freely available datasets, for few language pairs
  - EN-ES [CCB12,BOJ13,BOJ14], EN-FR [WIS14], FR-EN [WIS13,POT12], EN-IT [TUR14a]
- Typically in the form of [*source, target, reference, post-edition*]
- Sometimes also *HTER scores* and *post-editing time* are provided
- 800 < Size < 10,000 instances
- Used to:
  - Train Quality Estimation components [BOJ14,DES13,DES14,TUR14b]
  - Evaluate and improve SMT systems [POT11,BER13,LOG14,DEN14]
  - Develop automatic post-editing tools [SIM07,BEC13]

Available resources: quality judgments

- Few datasets, not always freely available, for few language pairs
  - EN-ES [CCB08,CCB12,SPE10,TUR14a], EN-AR [SPE11b], FR-EN [SPE09,TUR14a], EN-IT [TUR14a], EN-RU [SPE09]
- Typically in the form of [*source, target, reference, judgment*]
  - Binary “good”/“bad” judgments indicating overall quality
  - Scores based on n-point Likert scales, indicating overall quality/adequacy/fluency
- 700 < Size < 16,000 instances
- Used to:
  - Train Quality Estimation components [MEH12,SPE11b]
  - Evaluate MT systems [GRA14] and automatic metrics [CCB06]

Available resources: error annotation

- Few freely available datasets, for few language pairs
  - EN-CZ, FR-DE, DE-EN, EN-SB [FIS12], EN-FR [WIS14], EN-PT [COS14]
- 60< Size < 2000 instances
- Used to:
  - Identify system's weaknesses [VIL06][STY12][CON10]
  - Train/evaluate error identification tools [POP11] [ZEM11] [BERK12]
  - Train/evaluate error correction tools [SIM07][PAR12][ROS12]
  - …

(Some) available manual annotation tools

- Appraise [FED12]: quality rating/ranking, post-editing, error annotation, web-based
- BLAST [STY11]: error annotation, stand-alone
- PET [AZI12]: post-editing, error annotation (sentence-level), stand-alone
- Translate5 [TRA5]: post-editing, error annotation, web-based
- COSTA [CHA13]: quality rating/ranking, error annotation, stand-alone
- MT-EQuAL [BEN14] quality rating/ranking, error annotation, word-alignment, web-based
- ...

A closer look at MT-EQuAl

- three different tasks in an integrated environment
  - annotation of translation errors
  - translation quality rating
  - word alignment
- web-based, multi-user
- project management functions, configurable tasks
- open source, available on GitHub under Apache 2.0 license

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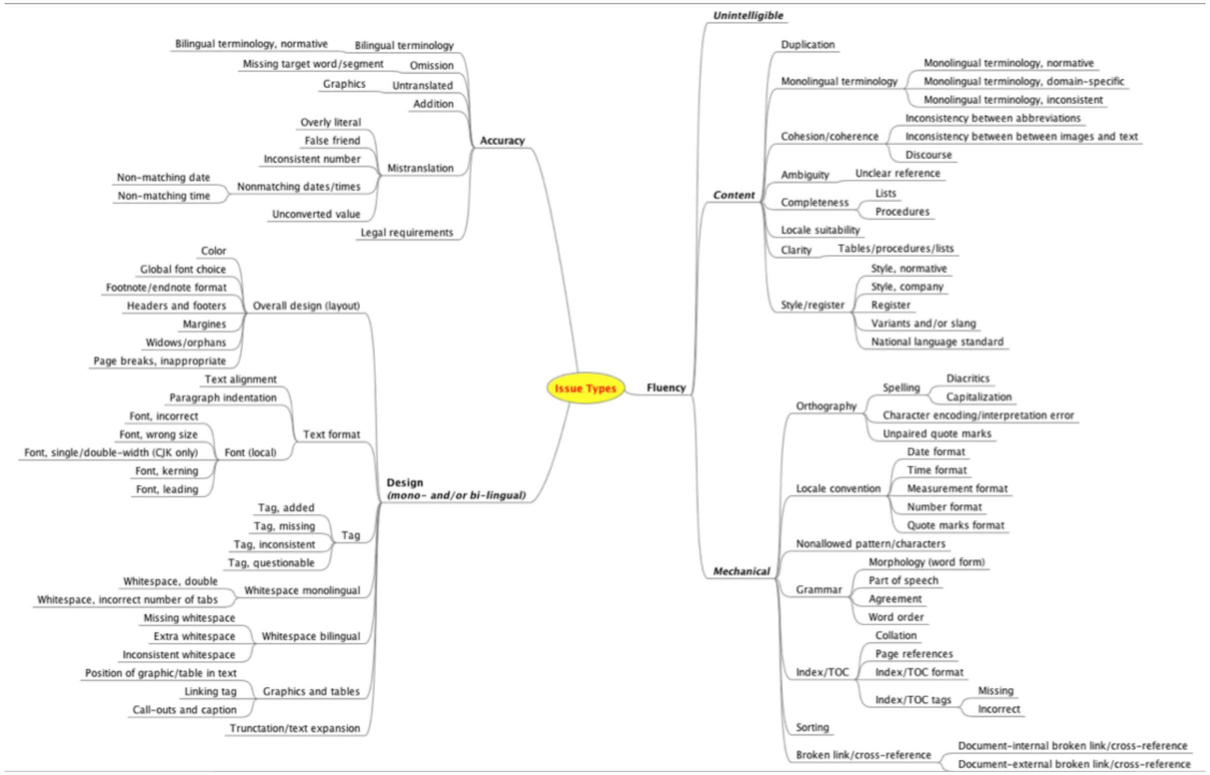
Exercise

Using MT-EQuAl for MT error annotation

Issues in MT error annotation

- Define a reference error **taxonomy**

[QTLP]



Issues in MT error annotation

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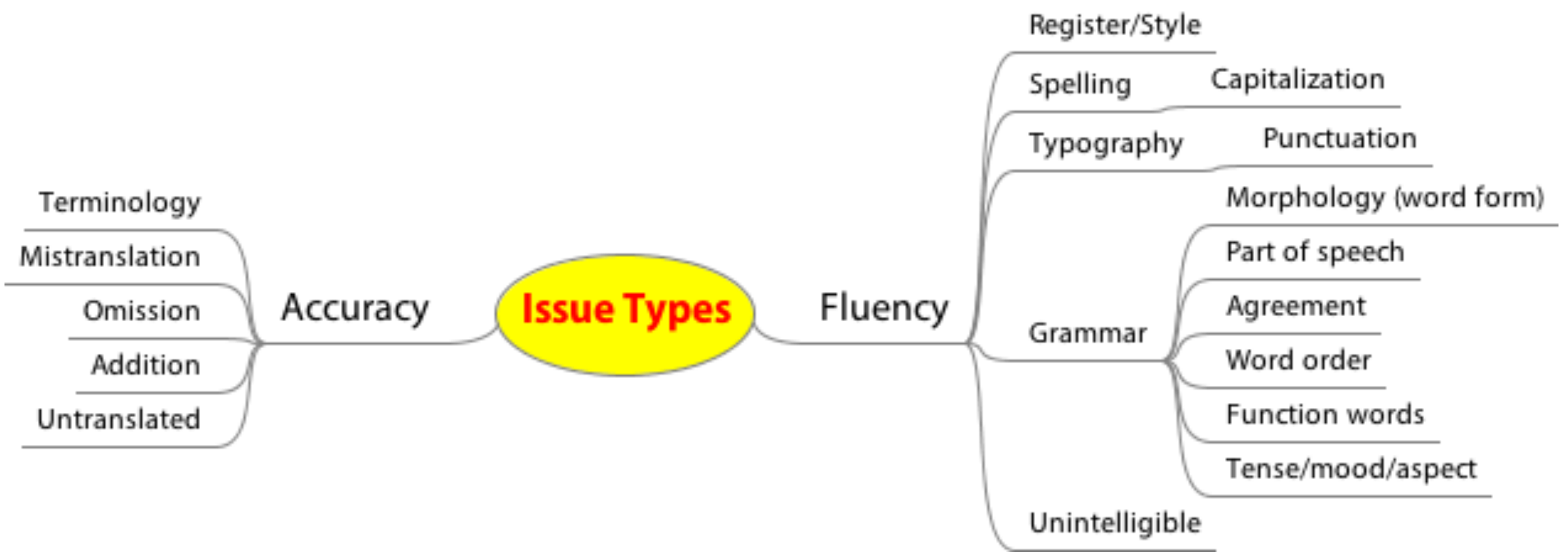
[BOJ14]



Issues in MT error annotation

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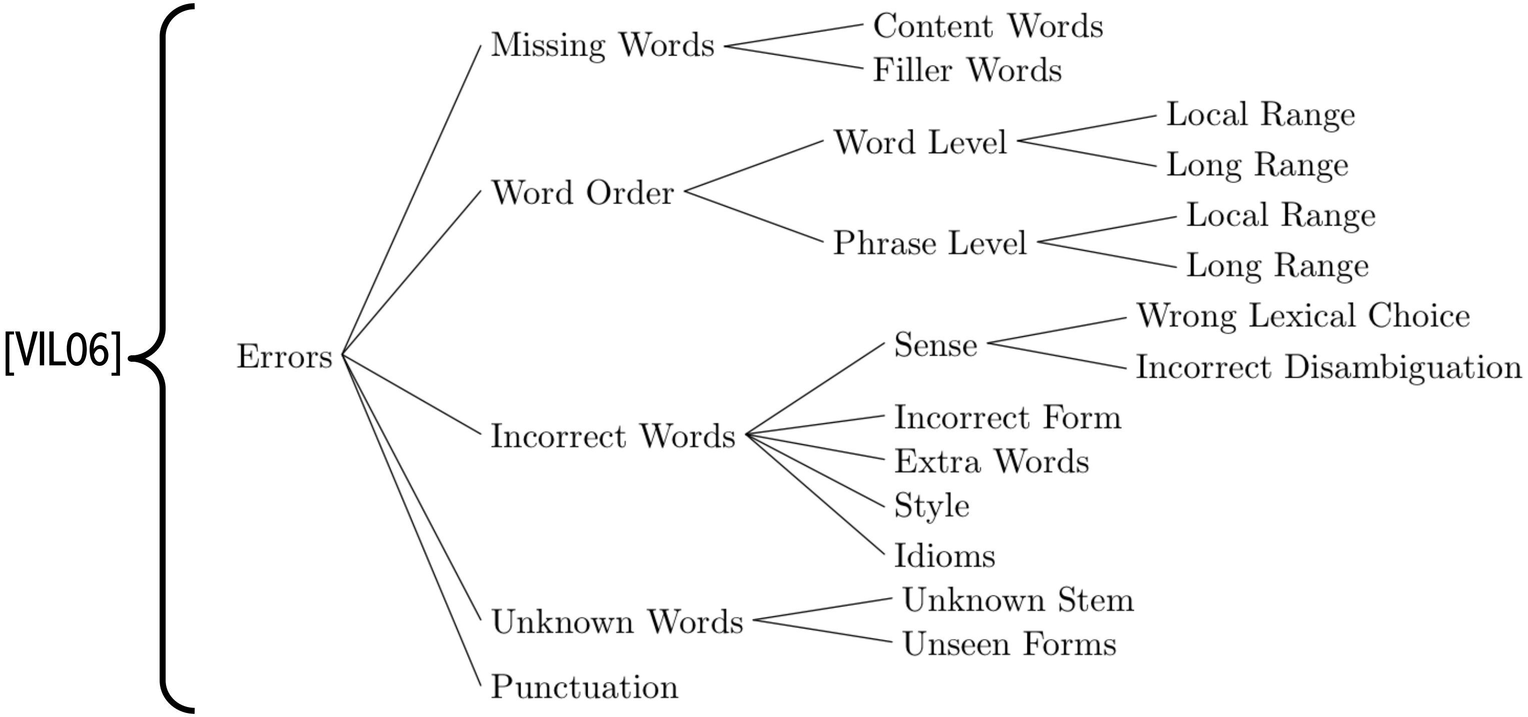
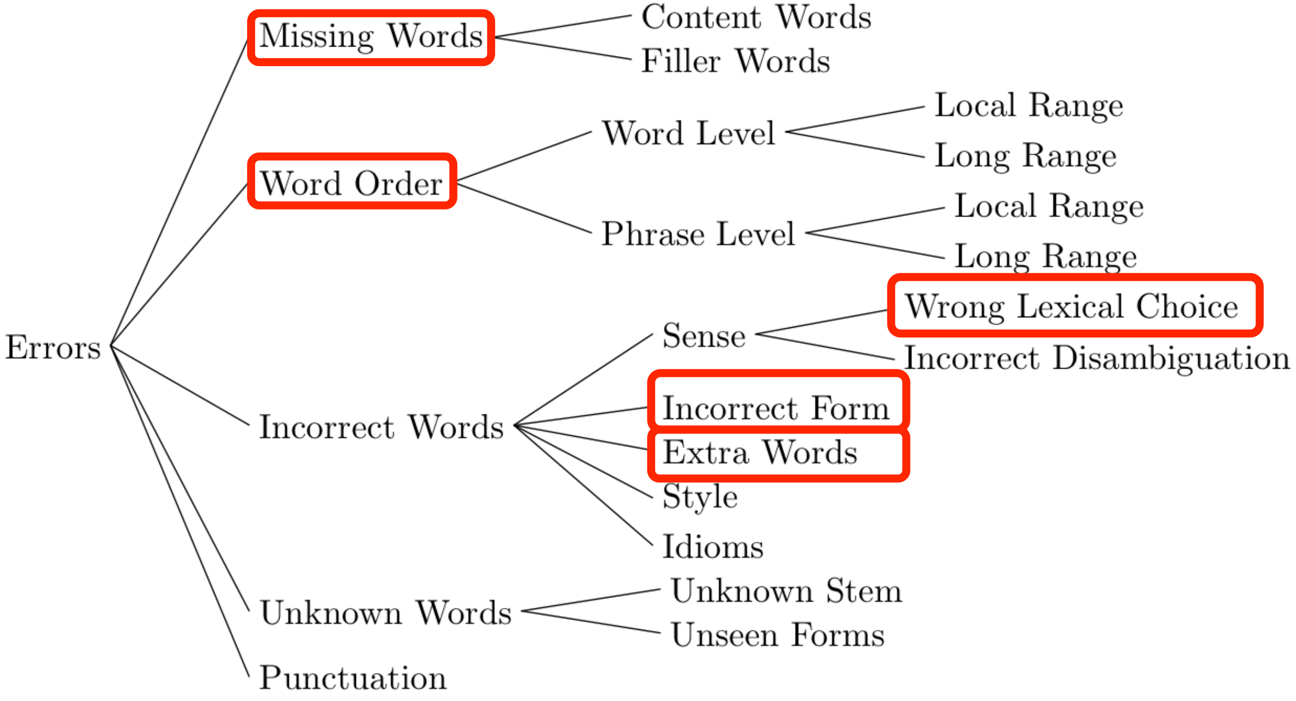


Issues in MT error annotation

- Set a **granularity** for the annotation



Issues in MT error annotation

- Annotation based only on the source text or guided by one or more references/post-editions?
- What to annotate?
  - Individual words OR phrases?
  - One OR multiple errors per word?
  - Only the hypothesis OR hypothesis and reference?
- Develop guidelines, train annotators
- …annotate ☺

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Our annotation exercise

- annotation of *one* MT *English* output with respect to its *post-edition*
- *two* different settings:
  - annotation from scratch
  - revision of existing annotations
- MT output missing words must be annotated in the reference sentence

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Typical error annotation issues

- disagreement as to whether something constitutes an error or not
- classification is ambiguous:
  - not easy to determine in which particular error category some error exactly belongs
  - there are several possible interpretations of the errors and different ideas about optimal solutions
- scope of span-level annotation: annotators agree on the error type but disagree on the precise span of the error (e.g. word order)
- one word can be assigned to more than one error category
- guidelines: often insufficient to guide annotators when faced with unfamiliar issues