

Asiya: An Open Toolkit for Automatic Machine Translation (Meta-)Evaluation

Jesús Giménez and Lluís Màrquez

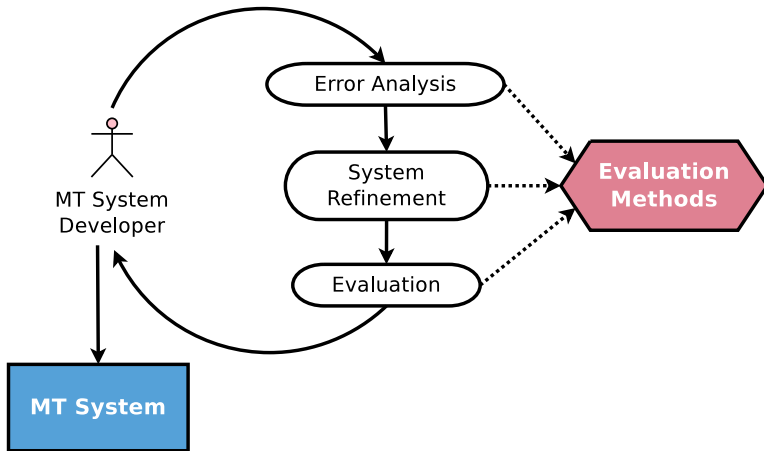
Universitat Politècnica de Catalunya

Fifth MT Marathon
Le Mans, September 13-18, 2010



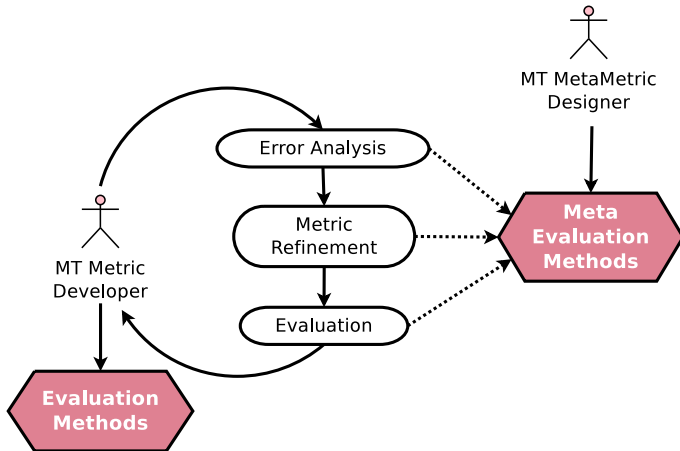
MT System Development Cycle

The Role of Evaluation Methods



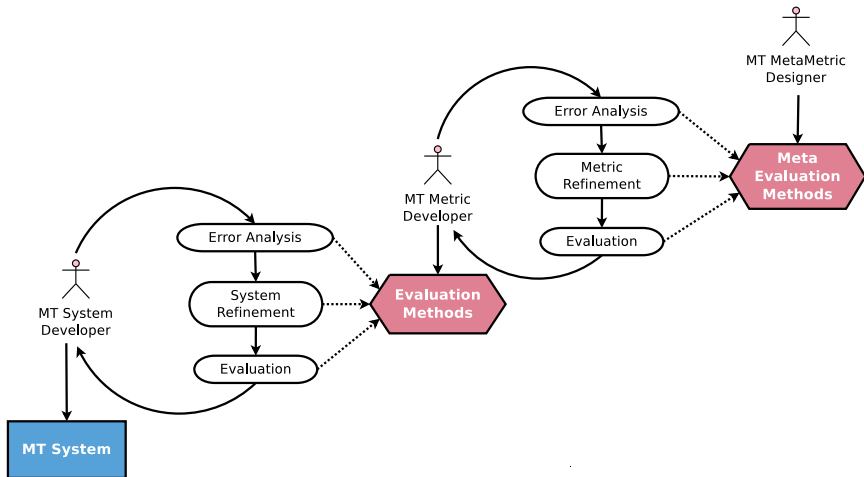
MT System Development Cycle

The Role of Evaluation Methods



MT System Development Cycle

The Role of Evaluation Methods



Tool Description

Test Suite Definition

Asiya operates over test suites (or test beds).

→ a *test suite* is a collection of test cases:

- Source segment
- Candidate translation(s)
- Reference translation(s)



Tool Description

Test Suite Definition

```
Asiya.pl Asiya.config
```

```
src=source.xml  
sys=candidates.xml  
ref=references.xml
```

Table: Sample config file (NIST XML input format)



Tool Description

Test Suite Definition

```
src=source.sgm
sys=system_01.sgm
sys=system_02.sgm
sys=system_03.sgm
sys=system_04.sgm
sys=system_05.sgm
ref=reference_A.sgm
ref=reference_B.sgm
ref=reference_C.sgm
```

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Table: Sample config file (RAW input format)



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General Options

- **Input Format:** raw text, NIST XML/SGML
- **Language Pair:** source/target language and case sensitivity
- **Predefined Sets** of metrics, systems and references

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[GO TO DEMO]



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Evaluation Options

```
Asiya.pl -v -eval single Asiya.config
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Metric Repository:

- **Lexical** (Precision, Recall, F_1 , Overlap, Error Rate)
- **Shallow Syntactic** (Lemmatization, PoS Tagging, and Base Phrase Chunking)
- **Syntactic** (Constituency and Dependency Parsing)
- **Shallow Semantic** (Semantic Roles and Named Entities)
- **Semantic** (Discourse Representations)



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Asiya.pl -v -eval <schemes> Asiya.config
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Schemes:

- **Single** metric scores
- **Ulc** normalized arithmetic mean of metric scores [GM10]
- **Queen** scores [AGPV05]



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- **Output Format:** metric matrix, system matrix
NIST/WMT score files
- **Other Options:**
 - Include reference scores
 - Granularity → system/document/segment level
 - L^AT_EX / PDF output
 - etc...



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Meta-Evaluation Options

```
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Asiya.config
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Criteria:

- Correlation with human assessments
 - Pearson r [Pea14]
 - Spearman ρ [Spe04]
 - Kendall τ [Ken55]
- ORANGE [LO04]
- KING [AGPV05]
- Consistency [CBKMS09]

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Meta-Evaluation Options

```
Asiya.pl -v -metaeval <schemes> <criteria>  
-ci <method> Asiya.config
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Statistical significance tests:

- Fisher [Fis24]
- Bootstrap resampling [ET86]
- Paired bootstrap resampling [Koe04]
- Options:
 - α significance level
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Metric set optimization (greedy):

- 1 Metrics are ranked by their individual quality
- 2 They are progressively added to the optimal set if and only if, when doing so, quality increases

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Ongoing and Future Work

Augment the (meta-)metric repositories

Metrics and meta-metrics:

- Port metrics to languages other than English (Arabic, Czech, French, German, Czech, Romanian, Spanish)
- More sophisticated metric combination schemes
- Alternative meta-evaluation criteria
- Confidence estimation metrics



Ongoing and Future Work

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Ongoing and Future Work

A web interface for Asiya

Interface:

- Upload test suites → download results
- (Meta-)Evaluation reports
- Error analysis
 - visualization of linguistic structures
- User authentication/authorization/profile
- This week:
 - 1 learned Catalyst (<http://www.catalystframework.org/>)
 - 2 started implementation
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Thanks For Your Attention!

<http://www.lsi.upc.edu/~nlp/Asiya/>



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