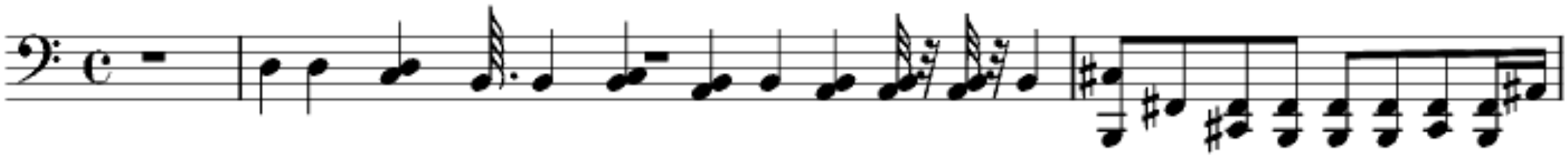
MWE:
I can’t help falling in love with you



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MWE identification via **non-translatability**

Identifying MWEs from parallel multi-lingual corpora via

- **Non-translatability** property: an MWE cannot be translated from one language to another on a word by word basis (Sag et al., 2002; Monti, 2012).
- Using **String Kernels** on sentence-aligned parallel corpora

English	**Italian**
I feel we will have to **call it a day** at this point.	Credo che a questo punto dobbiamo **passare oltre**.
He would like us to adjourn the vote to the next part-session and **call it a day** for now.	Il relatore chiede di rinviare la votazione alla prossima seduta e, per ora, di **passare oltre**.

➡ I. A. Sag, T. Baldwin, F. Bond, A. Copestake, and D. Flickinger. Multiword Expressions: A Pain in the Neck for NLP. In Computational Linguistics and Intelligent Text Processing, volume 2276 of Lecture Notes in Computer Science, pages 1–15. Springer Berlin Heidelberg, 2002.

➡ J. Monti. Multi-word unit processing in Machine Translation - Developing and using language resources for Multi-word unit processing in Machine Translation. PhD thesis, University of Salerno, 2012.

Case Study

Corpus: TED Talks EN-IT (Cettolo et al., 2012)

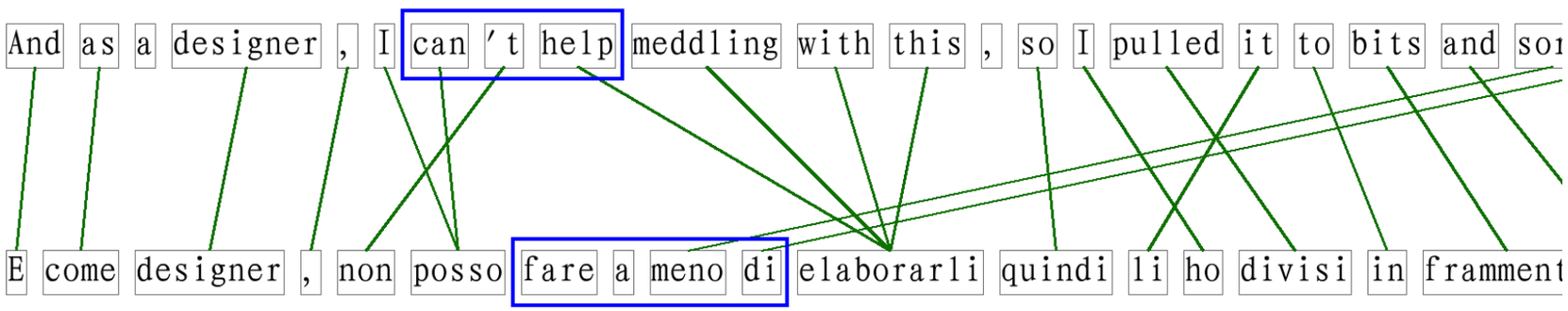
- Number of sentences: 187,809
- Tokenized and aligned with GIZA++

Target MWE: EN: **can't help** → IT: **fare a meno di**

Corpus Analysis:

- Intersection (4) [1760, 41845, 87214, 107792]

GIZA++ alignements:



➡ M. Cettolo, C. Girardi, and M. Federico. Wit3: Web inventory of transcribed and translated talks. In EAMT, 2012.

Related Work

Recent approaches exploiting of the translational correspondences of MWEs:

- **De Medeiros Caseli et al. (2010)** identification of MWEs in a multilingual context, exploiting a word alignment process. Also associates some multiword expressions with semantics.
- **Tsvetkov and Wintner (2014)** exploit non-compositional translation of MWEs and developed a new alignment-based algorithm for MWE extraction focused on misalignments, augmented by validating statistics computed from a monolingual corpus.
- **Segura and Prince (2014)** propose an alignment process between pairs of sentences, strongly based on syntax. It relies on a rule-based system combining partial alignments from a database through a non-iterative graph-theory based process.
- **Arcan et al. (2014)** address the problems of automatic identification of bilingual terminology using Wikipedia as a lexical resource, and its integration into an SMT system using the XML mark-up and the Fill-Up model methods.

➡ H. de Medeiros Caseli, C. Ramisch, M. das Gracas Volpe Nune, and A. Villavicencio. Alignment-based extraction of multiword expressions. Language Resources and Evaluation, 44(1-2):59–77, April 2010.

➡ Y. Tsvetkov and S. Wintner. Identification of multiword expressions by combining multiple linguistic information sources. Computational Linguistics, 40(2):449–468, 2014.

➡ J. Segura and V. Prince. Using Alignment to detect associated multiword expressions in bilingual corpora. Translation and Natural Language Processing (TAL), 2014.

➡ M. Arcan, C. Giuliano, M. Turchi, and P. Buitelaar. Identification of bilingual terms from monolingual documents for statistical machine translation. In Proceedings of Computerm, 2014.

16:15-17:15 (session 7) poster session B

MWE: I CAN'T HELP FALLING IN LOVE WITH YOU

FONDAZIONE BRUNO KESSLER

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Abstract

We investigate new ways for identifying MWEs from parallel multi-lingual corpora, based on the **non-translatability** property of MWEs: an MWE cannot be translated from one language to another on a word by word basis (Sag et al., 2002; Monti, 2012).

MWE and Non-Translatability

TARGET CASES

Fixed expressions e.g., EN. by and large → IT. *da e largo.

Idioms e.g., EN. Call it a day → IT. *Chiamarlo un giorno.

Proverbs e.g., EN. There's no such thing as a free lunch → IT. *Non esiste una cosa come un pranzo gratuito.

Phrasal verbs e.g., EN. Bring somebody down → IT. *Portare qualcuno giù.

EXCEPTIONS

A number of MWEs can be translated literally to all other languages, such as proper names and universal proverbs. These are therefore excluded from the scope of the current work.

Phase 1: Kernel Methods

Goal: Identify potential MWEs in parallel pairs of sentences (in one language, in the other, or in both).

Input: large bilingual corpus sentence aligned.

Kernel methodology:

- For every pair of sentences in the corpus, the algorithm will detect a pair of sentences in the source language which **share** a certain expression, for which the correspondent pair of sentences in the target language also **share** an expression.
- Can be computed efficiently via **string kernel** (Lodhi et al., 2002) for aligned text, while **tree kernels** can be employed (Sangati et al., 2010; van Cranenburgh, 2014) if a parallel treebank is available.

Example:

English	Italian
I feel we will have to **call it a day** at this point.	Credo che a questo punto dobbiamo **passare oltre**.
He would like us to adjourn the vote to the next part-session and **call it a day** for now.	Il relatore chiede di rinviare la votazione alla prossima seduta e, per ora, di **passare oltre**.

Outcome cases:

	English	Italian
1.	**MWE** *bring up to date*	× *modernizzare*
2.	× *he died*	**MWE** *ha tirato le cuoia*
3.	**MWE** *call it a day*	**MWE** *passare oltre*
4.	× *aims at adapting*	× *mira ad adattare*

PARSEME Working Groups

WG1: Lexicon-Grammar Interface Depelopment of linguistic resources, MWE dictionaries.

WG3: Statistical, Hybrid and Multilingual Processing of MWEs Hybrid methodology for MWE identification and translation.

Phase 2: MT Filtering

Goal: remove candidate pairs without MWEs.

- Phase 1 is prone to find many pairs of candidate expressions which do not include MWEs (e.g., last row of outcome cases).

Methods:

- Traditional "word by word" translation system (detect which candidate pairs are literal translations).
- 1:1 alignement pairs between source and target languages obtained via GIZA++ (Och and Ney, 2003).

Phase 3: Crowdsourcing

Goal: validate the final list of candidate pairs using crowdsourcing methods:

- Amazon Mechanical Turk
- CrowdFlower
- Educ. tools for second language learners
- CAT systems for human translators

Related Work

Some recent approaches rely on the exploitation of the translational correspondences of MWEs.

De Medeiros Caseli et al. (2010) identification of MWEs in a multilingual context, exploiting a word alignment process. Also associates some multiword expressions with semantics.

Tsvetkov and Wintner (2014) exploit non-compositional translation of MWEs and developed a new alignment-based algorithm for MWE extraction focused on misalignments, augmented by validating statistics computed from a monolingual corpus.

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Arcan et al. (2014) address the problems of automatic identification of bilingual terminology using Wikipedia as a lexical resource, and its integration into an SMT system using the XML mark-up and the Fill-Up model methods.

Case Study: can't help

Corpus: TED Talks EN-IT (Cettolo et al., 2012)

- Number of sentences: 187,809
- Tokenized and aligned with GIZA++ (many thanks to Mihael Arcan)

Target MWE: EN: **can't help** → IT: **fare a meno di**

Corpus Analysis:

- Intersection (4) [1760, 41845, 87214, 107792]
- Only in EN (22) [9303, 9316, 13677, 13687, 15336, 22592, ...]
- Only in IT (7) [41031, 41213, 46509, 101575, 117009, 161383, 165466]

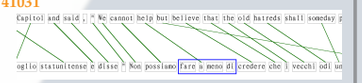
GIZA++ alignements:

1760

107792

9303

41031



MT Systems:
EN source: "I **can't help** falling in love with you."

Google (2014.09.01)	Correct
* Non posso **fare a innamorarsi** di te.	Non posso **fare a meno di** innamorarmi di te.

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