



Sicilian Translator

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Why don't we have a Sicilian Translator?

- ▶ Google Translate doesn't translate the Sicilian language.
- ▶ Nor does Bing Translator, Yandex Translate or DeepL Translator.

- ▶ Why not? What are we going to do about it?



What is the Sicilian Language?

- ▶ The Sicilian School of Poets at the imperial court of Frederick II:
 - created the first literary standard in Italy (13th century)
 - inspired Dante, the “father of the Italian language”
- ▶ Sicilian emerged as a literary language before Italian.
- ▶ The people of Sicily, Calabria and Puglia speak it everyday.
 - They speak Italian at work.
 - But at home – with family and friends – they speak Sicilian.
 - More precisely, their own dialect of the language.
- ▶ And Sicilian is a language spoken here in Brooklyn, NY.



So why don't we have a Sicilian Translator?

- ▶ No one had assembled the parallel text to train a translator.
- ▶ There's plenty! For over 40 years, [Arba Sicula](#) has been:
 - organizing poetry recitals, concerts, cultural events and tours of Sicily
 - publishing books on Sicilian language, literature, history, cuisine, fiction, ...
 - translating Sicilian poetry and prose
 - publishing a bilingual journal, *Arba Sicula*.
- ▶ So we assembled the parallel text.



Sicilian Translator



<https://translate.napizia.com>



How did we do it?

- ▶ We did **NOT** start with data collection.
- ▶ We started by collecting the rules of Sicilian vocabulary and grammar.
 - Arthur Dieli's *Sicilian Vocabulary*
 - Kirk Bonner's *Introduction to Sicilian Grammar* (2001)
 - Gaetano Cipolla's *Mparamu lu sicilianu* (2013)
- ▶ And we created the *Chiu dâ Palora* (*More About the Word*) dictionary.
 - vocabulary annotated with grammar, proverbs, poetry, prose and examples
 - provides a reference for standardizing Sicilian language text



More About the Word



<https://www.napizia.com/cgi-bin/cchiu-da-palora.pl>

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Then We Began Collecting Data

- ▶ Sources of parallel text:
 - the bilingual literary journal *Arba Sicula*
 - A. Dieli's translations of Sicilian poetry, proverbs and G. Pitre's *Folk Tales*
 - examples from G. Cipolla's *Mparamu* and K. Bonner's *Introduction*
- ▶ Data Preparation
 - Selected Sicilian language text that could be edited to Standard Sicilian.
 - Used *hunalign* to identify translated sentence pairs.
 - Manually edited the text (both languages) for quality and standardization.
- ▶ Our parallel corpus (so far):
 - 12,357 lines of bilingual text – 237,456 Sicilian words, 236,568 English words
 - 4,660 lines of trilingual textbook exercises – Sicilian, English and Italian
 - 121 hand-selected lines for validation (in all three languages)
 - the Italian-English subset of *Farkas' Books*

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And We Began Modeling

- ▶ We trained our translation models with [Sockeye](#).
- ▶ Adding parallel text always improves translation quality more than adjusting hyperparameters.
- ▶ But some ways of training a model are better than others.
- ▶ We avoid overfitting by training:
 - a self-attentional Transformer model ([Vaswani et al., 2017](#))
 - a smaller network with fewer layers ([Sennrich and Zhang, 2019](#))
 - with small subword vocabularies ([Sennrich, Haddow and Birch, 2016](#))
 - with high-dropout parameters ([Srivastava et al., 2014](#))
- ▶ Large empirical improvements when we added theoretical knowledge:
 - by pushing the subword distribution toward textbook desinences
 - by using textbook examples to give structure to the sequences

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Evaluation Metrics

- ▶ BLEU score – measure of translation quality
 - Higher when sequences of words in the candidate translation match sequences in the reference translation.
 - Highly correlated with human judgements of translation quality.
- ▶ What's a good score?
 - In theory, BLEU score ranges from 0 to 100.
 - In practice, there are many ways to translate a sentence.
 - Scores reported by [Vaswani et al. \(2017\)](#):
 - 41.8 on English-to-French translation
 - 28.4 on English-to-German translation
- ▶ Our *Traduttori Sicilianu* achieved BLEU scores of:
 - 35.0 on English-to-Sicilian, 36.8 on Sicilian-to-English
 - 36.5 on Italian-to-Sicilian, 30.9 on Sicilian-to-Italian

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Comparing Models

- ▶ Translation quality improves with parallel text. As our dataset grew from 120,000 to 270,000 words, our BLEU scores increased:
 - from 11.4 to 25.1 on English-to-Sicilian translation
 - from 12.9 to 29.1 on Sicilian-to-English translation
- ▶ Within a given dataset, pushing the subword distribution toward textbook desinences increased BLEU scores:
 - from 20.3 to 22.4 on English-to-Sicilian translation
 - from 21.4 to 24.1 on Sicilian-to-English translation
- ▶ We also observed larger increases in BLEU scores when we added parallel text from textbook examples than from other sources.
 - We did not conduct any formal tests to confirm this observation.
 - With our eyes, we could see the structure that textbook examples added.

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Multilingual Translation

- ▶ To further improve translation quality, we added the Italian-English subset of [Farkas' Books](#) (from the [OPUS project](#)) to our dataset.
- ▶ To enable multilingual translation, we added a directional token – ex. <2it> (“to Italian”) – to the source sequence ([Johnson et al., 2016](#)).
- ▶ And we trained a larger model ([Arivazhagan et al., 2019](#)) with a “bridging strategy” ([Fan et al., 2020](#)).
- ▶ This further improved translation quality. Our BLEU scores increased:
 - from 25.1 to 35.0 on English-to-Sicilian
 - from 29.1 to 36.8 on Sicilian-to-English
- ▶ And it yielded good translation quality between Sicilian and Italian:
 - 36.5 on Italian-to-Sicilian
 - 30.9 on Sicilian-to-Italian




Come to Napizia!

- ▶ So come to *Napizia* and try our *Traduttori Sicilianu*:
 - <https://translate.napizia.com>
- ▶ To see how it works “behind the curtain,” come *Darrerì lu Sipariu*:
 - <https://translate.napizia.com/cgi-bin/darrerì.pl>
- ▶ Read our “Introduction to Sicilian NLP”
 - <https://www.doviak.net/pages/ml-sicilian/>
- ▶ And check out our *Sicilian_Translator* repository at Github:
 - https://github.com/ewdowiak/Sicilian_Translator
- ▶ We hope you’ll join us.

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► *Grazzi!*