



# 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. Pitрэ'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):
  - 16,891 lines for training – 262,582 Sicilian words, 266,740 English words
  - 121 hand selected for validation – 1836 Sicilian words, 1878 English words
  - 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:
  - 35.1 on English-to-Sicilian translation
  - 34.6 on Sicilian-to-English translation

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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*)
- ▶ This further improved translation quality. Our BLEU scores increased:
  - from 25.1 to 35.1 on English-to-Sicilian translation
  - from 29.1 to 34.6 on Sicilian-to-English translation
- ▶ And it enabled “zero-shot translation” between Sicilian and 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](https://github.com/ewdowiak/Sicilian_Translator)
- ▶ We hope you’ll join us.

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► *Grazzi!*