CRAMT: Cross-Lingual Resource Aggregation of Low-Resource Machine Translation and Metadata

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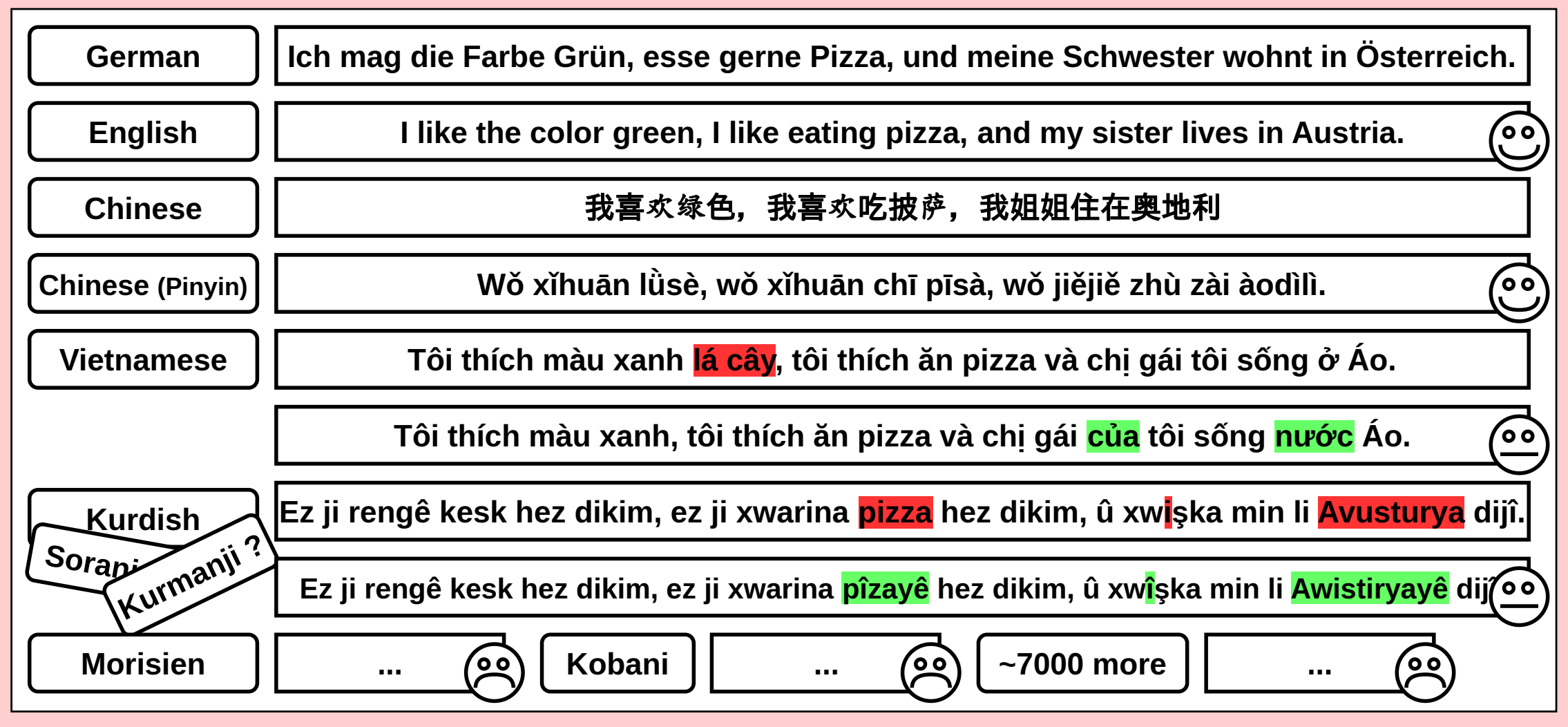
Introduction

This work addresses the issue of scant text data for **Machine Translation** of **low-resource languages** by introducing a **corpus creation tool**. This easy-to-use tool enables the creation of multilingual aligned text data for extremely low-resource languages. By including an annotation schema utilizing monolingual native speakers, even aggregated data of **zero-resourced languages** can be evaluated, resulting in higher quality datasets for these languages.

Motivation

Google Translate: Translating German text



German: Ich mag die Farbe Grün, esse gerne Pizza, und meine Schwester wohnt in Österreich.

English: I like the color green, I like eating pizza, and my sister lives in Austria.

Chinese: 我喜欢绿色，我喜欢吃披萨，我姐姐住在奥地利

Chinese (Pinyin): Wǒ xǐhuān lǜsè, wǒ xǐhuān chī pīsà, wǒ jiějiě zhù zài àodìlì.

Vietnamese: Tôi thích màu xanh lá cây, tôi thích ăn pizza và chị gái tôi sống ở Áo.

Tôi thích màu xanh, tôi thích ăn pizza và chị gái của tôi sống nước Áo.

Kurdish / Sorani / Kurmanji ?: Ez ji rengê kesk hez dikim, ez ji xwarina pizza hez dikim, û xwîşka min li Avusturya dijî.

Ez ji rengê kesk hez dikim, ez ji xwarina pîzayê hez dikim, û xwîşka min li Awistiryayê dijî.

Lower performance of translation systems can often be linked to a severe lack of data for specific languages.

Some languages have more **language varieties** [1] than are covered by language codes or the existence of Wikipedia entries would indicate.

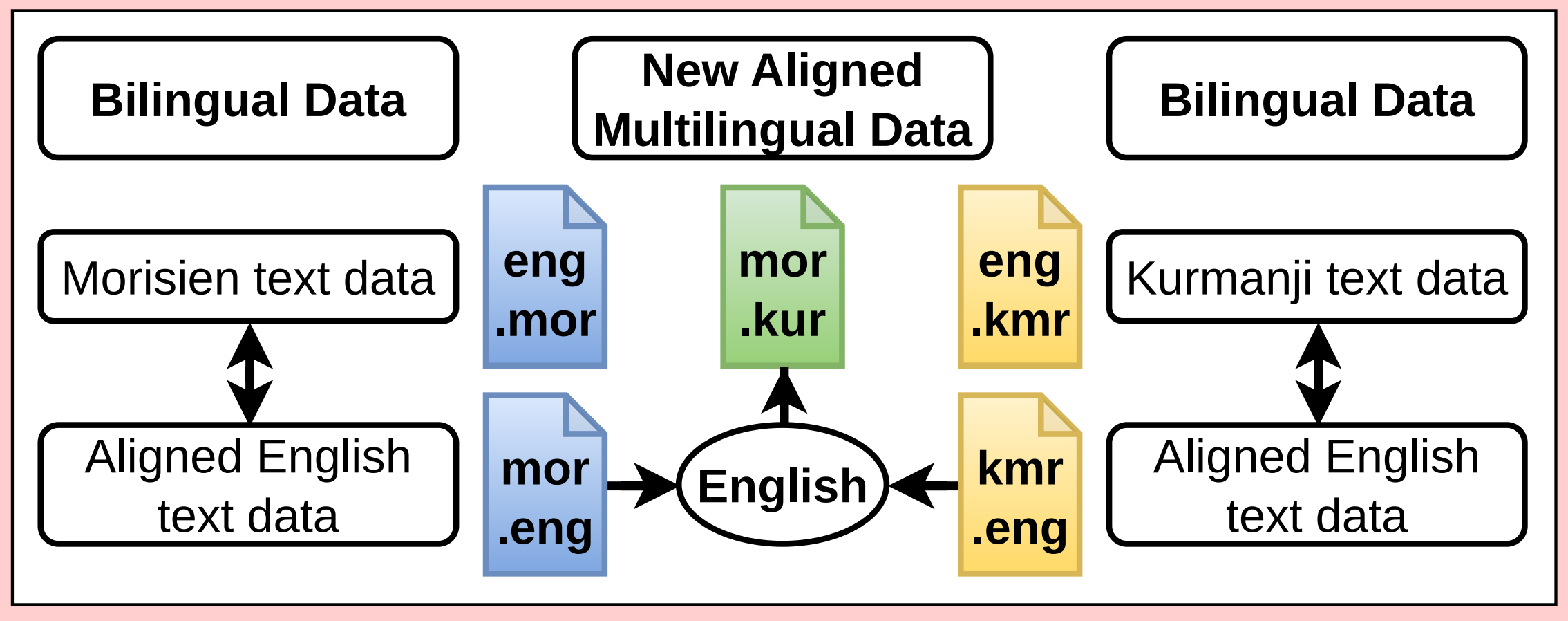
Lack of standardization: Kurdish example

Dialect Group	#Variants	#Wiki
Central Kurdish	13	53,856
Northern Kurdish	28	75,358
Southern Kurdish	13	0
Zazaki	10	41,811
Gorani	13	0

Related Work

Recent work on **multilingual dataset construction** [2] found that the dataset availability of a language correlates with the number of NLP researchers that are fluent in this language.

Data acquisition: Using pivot language



Recently, methods were presented for unsupervised BLI for **data-imbalanced, closely related language pairs** [7], which can benefit low-resource languages that have a related more dominant language for which more data exists.

Since there do not even exist expert translators for most language pairs, **utilizing monolingual data** [8, 9, 10] and **enabling native speakers** [11, 12] to participate, has been a prominent direction in recent years.

This aligns with the growing notion of importance for dataset creators to pay closer attention to the often very **different needs of language communities** [13, 14], which was also shown to increase the quality of resulting data [15].

Acknowledgements

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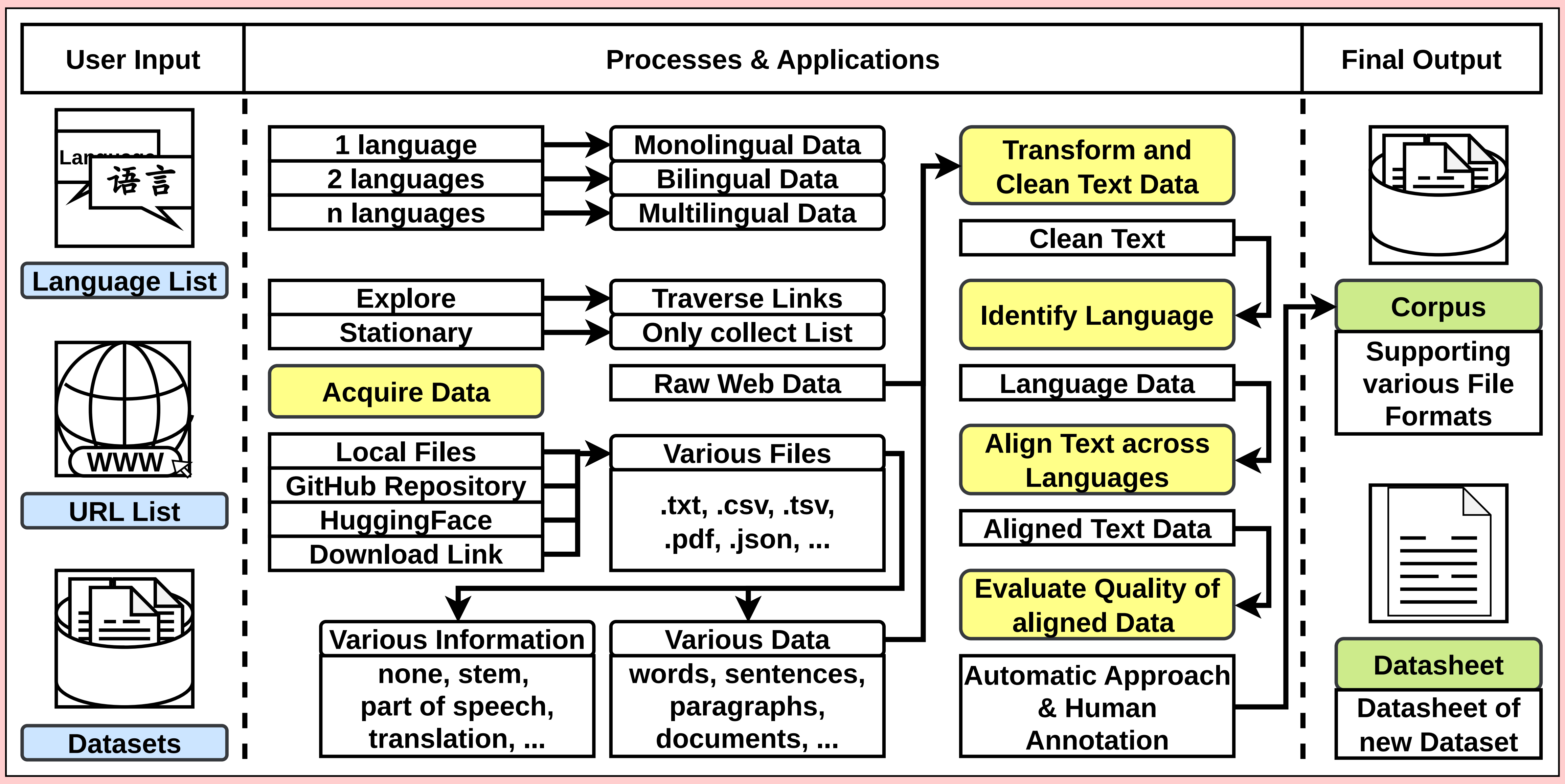
Design & Development

The following graph shows how the toolkit is used: The user inputs their data in various forms, or provide URLs directing to the desired data, which then are preprocesed, cleaned, aligned, and evaluated, to finally produce a corpus supporting various formats, with a datasheet describing the new dataset.



CRAMT tool: User inputs in blue, main processing steps in yellow and resulting artifacts in green

Implementation Tools

- The implementation mainly depends on **Python**, and the GUI is built with **PyQt**.
- We make use of **Potato** [16] to enable building human annotation tasks, which is easy to setup online via **Nginx** and **Docker**.
- To solve the challenging language identification task, we use **GlotLID** [17], which supports more than 1600 of the 7000 languages in this world.
- **Data cleaning** happens on a per-case basis.

Encoding Problems
Emer�ka � ��n t�ne cem hev.
→ Emerîka û Çîn têne cem hev.
America and China meet. (eng)

Example text line from a Kurdish text corpus [18], which used latin-1 intead of UTF-8 encoding.

Conclusion

This work resulted in **CRAMT**, a toolkit to collect data for low-resource languages, easily usable by MT research communities (experts and non-experts alike). The toolkit's results are three-fold:

1. **Text Corpus** for specific target languages aiming to provide new aligned text data.
2. **Analysis** of the collected and aligned data. Some help to get a quick idea of the data distribution such as generated word clouds, but also reports to provide deeper insights about the data.
3. **Datasheet** that can represent and explain the newly created dataset and its purpose.

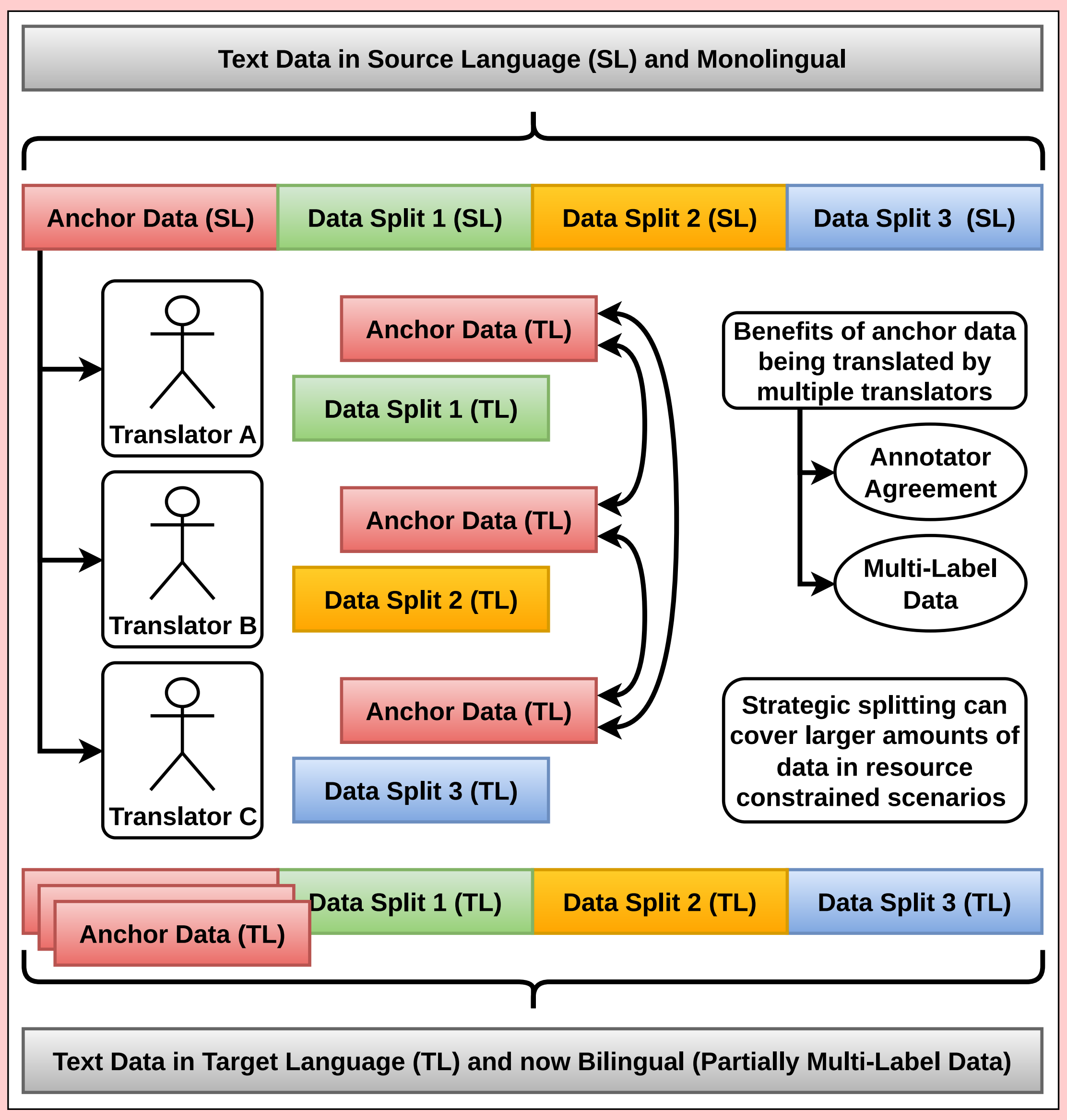
Toolkit in action for the **data acquisition**:

http://schuler-christian.de

Current state and future development found at:

https://github.com/christianschuler8989/CRAMT

Data Quality



Next Steps

Language data waiting to be collected.

References

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