



Improve Your Translation Workflow in CotranslatorAI with Generative AI Iterative Translation (GAIT)



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Korean > English translator

Part 1: Core concepts and workflow

Part 2: Advanced concepts and techniques

Part 2: Core concepts and workflow

- Superpowers of generative AI
- Necessity of new workflows
- Workflow fundamentals of Generative AI Iterative Translation (GAIT)

Superpowers of generative AI



Context



Superpowers of generative AI

What happens without context:

- Inconsistent terminology
- Inconsistent spelling
- Inconsistent use of person and gender
- Overused words
- Incorrect register
- Mistranslations induced by lack of context, especially with source errors
- Unnatural writing style (?)

Source

보고서

보고 번호 : 가93-0124

보고자 : 홍길동

보고일 : 1993년 9월 1일

보고 제목 : 3벌식 자판과 2벌식 자판의 비교/①

보고 내용 :

3벌식 자판과 2벌식 자판의 비교/①

3벌식 글자판과 2벌식 글자판의 특징을 다룬 글들을 조사하여 요약하였습니다. 검토하여 보시고 한글 자판 연구에 도움이 되시기를 바랍니다.

한글문화원(원장 공병우)의 글자판 비교 자료

수동식 한글 타자기는 2벌식과 3벌식 모두 개발되어 있고, 3벌식이 두 배 정도 능률적이다. 수동식 한/영 타자기는 2벌식으로 개발이 불가능하지만 3벌식으로는 이미 수십만대가 보급되어 널리 쓰이고 있다. 시각 장애자를 위한 점자 한글 타자기도 2벌식으로는 개발이 불가능하지만 3벌식은 최근 개발되어 보급 단계에 있다. 전자식 한글 타자기는 2벌식과 3벌식 모두 개발되었다. 이 역시 3벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다. 2벌식은 한글 자모를 따로 따로 찍을 수 없고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다. 그러나 3벌식은 어떤 방식으로든 한글을 찍을 수 있다. 정부에 의해 표준 글자판으로 지정된 컴퓨터 2벌식 자판은 수동식 타자기와 찍는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현한다. 3벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 찍을 수가 있다. 특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3벌식 자판이 필수적이다. 또 3벌식이 2벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약할 수 있다.

연세대 조관희 교수님이 지은 "컴퓨터 길잡이" 중에서

2벌식 글자판은 3벌식 글자판에 비하여 한글 글자쇠가 적다는 장점이었는데는 나온 것이 없다. 작은 문자를 입력할 때

Translated in DeepL

ID	Korean	English
4	벌식 글자판과 2 벌식 글자판의 특징을 다룬 글들을 조사하여 요약하였습니다.	We've researched and summarized articles that discuss the characteristics of bee and two-bar typefaces.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.	We hope you find it helpful in your research.
6	한글 자판 문제를 다룬 글들을 더 조사하여 다시 고하겠습니다.	I will research more articles on Hangeul and summarize them.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 벌식과 3 벌식 모두 개발되어 있고, 3 벌식이 두 배 정도 능률적이다.	Comparison of Hangeul Typefaces by the Hangeul Cultural Center (Gong Byung-woo, Director) Dong-Sik Hangeul typewriters have both two- and three-column typefaces, and the three-column typeface is about twice as efficient.
8	수동 한/영 타자기는 2 벌식으로 개발이 불가능하지만 3 벌식으로는 이미 수십만대가 보급되어 널리 이용 있다.	Manual Korean/English typewriters are impossible to develop in the two-column format, but the three-column format is already widely available, with hundreds of thousands of units sold.
9	시각 장애자를 위한 점자 한글 타자기도 2 벌식으로는 개발이 불가능하지만 3 벌식은 근 개발되어 보급 단계에 있다.	Braille Hangeul typewriters for the visually impaired are also impossible to develop with a two-valve system, but a three-valve system has been developed and is in the process of being widespread.
10	전자식 한글 타자기는 2 벌식과 3 벌식 모두 개발되었다.	Electronic Hangeul typewriters have been developed in both two- and three-column styles.
11	이 역 3 벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.	The reverse three-column type is more efficient and has a 30% faster typing speed.
12	2 벌식은 한글 자모를 따로 따로 찍을 없고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.	The two-format typewriter doesn't have a separate alphabet and the letters don't appear as soon as you press the key.
13	그러나 3 벌식은 어떤 방식으로든 한 을 찍을 수 있다.	However, the three-format can stamp han in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 벌식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다.	Computerized two-valve keyboards, which are designated as standardized by the government, work differently than manual typewriters, and they display the characters through a process that does not spell out Hangeul on the screen.
15	3 벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 찍을 가 있다.	The three-valve keyboard appears on the screen as soon as you press the key, so you can take a picture of the base alone.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 벌식 자판이 필수적이다.	Especially for teaching children how to spell Hangeul correctly, a three-ball keyboard is essential.
17	또 3 식이 2 벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.	In addition, a three-format keyboard is about 10% faster than a two-format keyboard and can save about 40% of software development time.

Context-related errors

- Inconsistent terminology
- Inconsistent spelling
- Inconsistent use of person
- Overused words.
- Mistranslation induced by lack of context
- Non-idiomatic expression

Other errors

- Ordinary missing translation/mistranslation

Translated in CotranslatorAI (GPT-4-Turbo; no context)

ID	Korean	English
4	벌식 글자판과 2 벌식 글자판의 특징을 다룬 글들을 조사하여 요약하였습니다.	Investigated and summarized articles dealing with the characteristics of the 1-beul and 2-beul keyboard layouts.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.	Review and hope it helps with your keyboard research.
6	한글 자판 문제를 다룬 글들을 더 조사하여 다시 고하겠습니다.	I will further investigate articles dealing with the Korean keyboard issue and report back.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 벌식과 3 벌식 모두 개발되어 있고, 3 벌식이 두 배 정도 능률적이다.	Korean Culture Center (Director Gong Byung-Woo)'s character board comparison material Dongshik Korean typewriter has both 2-set and 3-set developed, and the 3-set is about twice as efficient.
8	수동 한/영 타자기는 2 벌식으로 개발이 불가능하지만 3 벌식으로는 이미 수십만대가 보급되어 널리 이고 있다.	Manual Korean/English typewriters cannot be developed in 2-set type but hundreds of thousands have already been distributed and are widely used in 3-set type.
9	시각 장애자를 위한 점자 한글 타자기도 2 벌식으로는 개발이 불가능하지만 3 벌식은 근 개발되어 보급 단계에 있다.	Braille typewriters for the visually impaired cannot be developed in 2-set type, but 3-set type has been recently developed and is in the distribution stage.
10	전자식 한글 타자기는 2 벌식과 3 벌식 모두 개발되었다.	Electronic Korean typewriters have been developed in both 2-set and 3-set types.
11	이 역 3 벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.	This station's three-set system is more efficient and the input speed is about 30% faster.
12	2 벌식은 한글 자모를 따로 따로 짚을 않고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.	Double-set type does not require pressing each Korean character separately, and the characters do not appear immediately as the keys are pressed.
13	그러나 3 벌식은 어떤 방식으로든 한 을 짚을 수 있다.	However, the triple set can mark a one in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 벌식 자판은 수동식 타자기와 는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다.	The computer 2-set keyboard designated as the standard keyboard by the government is completely different from the manual typewriter, and the characters are expressed through a process where Korean does not appear on the screen according to the spelling rules.
15	3 벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 짚을 가 있다.	3-beol keyboard layout displays characters on the screen exactly as they are typed, allowing even final consonants to be typed on their own.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 벌식 자판이 필수적이다.	Especially for teaching children the correct Korean spelling, the 3-set keyboard is essential.
17	또 3 식이 2 벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.	Additionally, the 3-meal system is about 10% faster in input speed than the 2-meal system and can save about 40% of the time required for software development.

Context-related errors

- Inconsistent terminology
- Inconsistent spelling
- Inconsistent use of person
- Overused words.
- Mistranslation induced by lack of context
- Non-idiomatic expression

Other errors

- Ordinary missing translation/mistranslation

Translated in CotranslatorAI (GPT-4-Turbo, with context)

I will provide you with Korean text to translate to English.

- Keep each translated segment on its own line to match the source segments. Do not combine text from multiple segments into sentences or paragraphs or add empty lines between sections.
- Provide no explanations or labels; just translate.

Translate this:



Microsoft Word
17 - 2003 Documen

Translated in CotranslatorAI (GPT-4-Turbo, with context)

ID	Korean	English
4	벌식 글자판과 2 벌식 글자판의 특징을 다룬 글들을 조사하여 요약하였습니다.	I have researched and summarized articles on the characteristics of the 1-beol and 2-beol keyboard layouts.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.	Please review this and I hope it will be helpful for your research on keyboard layouts.
6	한글 자판 문제를 다룬 글들을 더 조사하여 다시 고하겠습니다.	I will further investigate articles on the Korean keyboard layout issue and report back.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 벌식과 3 벌식 모두 개발되어 있고, 3 벌식이 두 배 정도 능률적이다.	The Korean Culture Center (Director Gong Byung-woo) has developed both 2-beol and 3-beol typewriters, with the 3-beol being about twice as efficient.
8	수동 한/영 타자기는 2 벌식으로 개발이 불가능하지만 3 벌식으로는 이미 수십만대가 보급되어 널리 이고 있다.	Manual Korean/English typewriters cannot be developed in 2-beol, but hundreds of thousands of 3-beol typewriters have already been distributed and are widely used.
9	시각 장애자를 위한 점자 한글 타자기도 2 벌식으로는 개발이 불가능하지만 3 벌식은 근 개발되어 보급 단계에 있다.	A braille Korean typewriter for the visually impaired cannot be developed in 2-beol, but the 3-beol has been recently developed and is in the distribution phase.
10	전자식 한글 타자기는 2 벌식과 3 벌식 모두 개발되었다.	Electronic Korean typewriters have been developed in both 2-beol and 3-beol layouts.
11	이 역 3 벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.	Here, the 3-beol layout is more efficient and the input speed is about 30% faster.
12	2 벌식은 한글 자모를 따로 따로 찍을 없고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.	With the 2-beol layout, Korean characters cannot be typed separately and characters do not appear immediately as the keys are pressed.
13	그러나 3 벌식은 어떤 방식으로든 한 을 찍을 수 있다.	However, with the 3-beol layout, any Korean character can be typed in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 벌식 자판은 수동식 타자기와 는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다.	The computer 2-beol keyboard, designated as the standard keyboard layout by the government, is completely different from the manual typewriter, and characters are displayed on the screen through a process that does not immediately show correct Korean spelling.
15	3 벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 찍을 가 있다.	The 3-beol keyboard layout allows characters to appear on the screen as soon as the keys are pressed, and even final consonants can be typed on their own.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 벌식 자판이 필수적이다.	Especially for teaching correct Korean spelling to children, the 3-beol keyboard layout is essential.
17	또 3 식이 2 벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.	Also, the 3-beol layout is about 10% faster in input speed than the 2-beol and can save about 40% of the time required for software development.

Context-related errors

- Inconsistent terminology
- Inconsistent spelling
- Inconsistent use of person
- Overused words.
- Mistranslation induced by lack of context
- Non-idiomatic expression

Other errors

- Ordinary missing translation/mistranslation

We could have gotten close to these results by adding the entire source text to the prompt and translating segment by segment both with or without context. But, as we will see later, that would have sent our costs through the roof! (It also would have taken longer.)

Easy and flexible trainability



Superpowers of generative AI

What?

- Terminology
- Writing style
- Orthography
- Project-specific instructions

When?

- In advance
- On the fly
- At the end

How?

- Natural-language instructions
- Any of many different kinds of training data

Knowledge of the world

쿠팡	Coupang
지에스	GS
11번가	11th Street
엘지	LG
씨유	CU
유튜브	YouTube
구글	Google
요기요	Yogiyo
알리익스프레스	AliExpress
삼성	Samsung
스타벅스	Starbucks
카카오	Kakao
지니	Genie
토스	Toss
힐라	Fila

Superpowers of generative AI

DeepL

Coupang
G.S.
11th Street
L
CYU
YouTube
youtube
Yogiyo
Aliexpress
Samsung
Starbucks
Kakao
Gini
TOSS
Wheela

CotranslatorAI (GPT-4-Turbo)

Coupang
GS
11th Street
LG
CU
YouTube
Google
Yogiyo
AliExpress
Samsung
Starbucks
Kakao
Genie
Toss
Fila

This one's just a bonus!



Generative AI vs. legacy NMT



Superpowers of generative AI

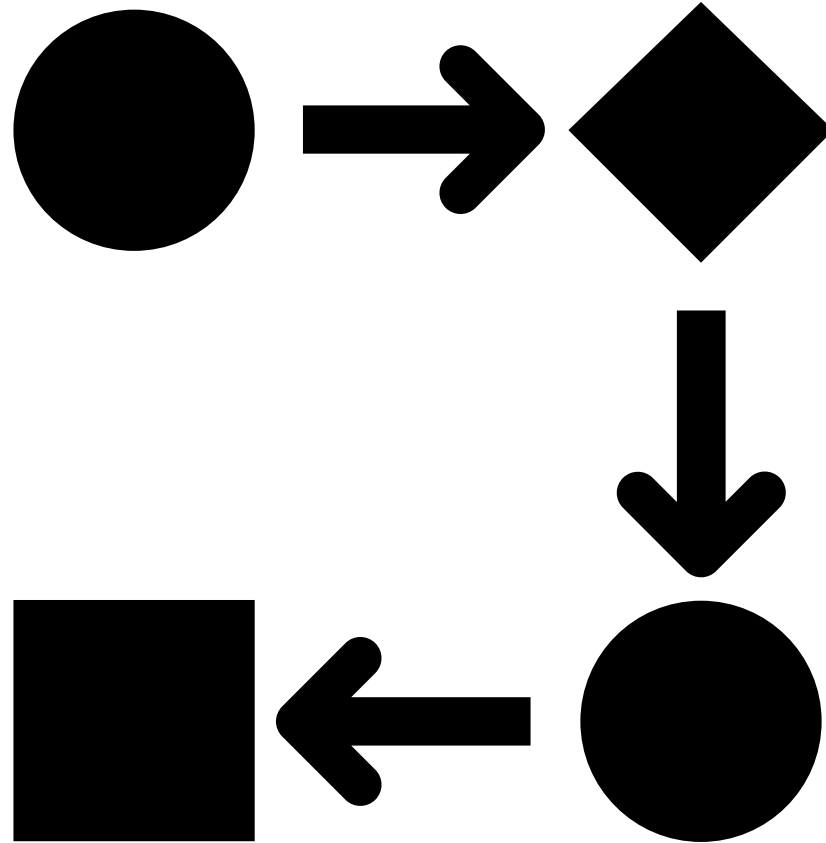
Context

1. Consistent and field-related terminology
2. Consistent use of person and gender
3. Consistent spelling
4. Enjoyable writing style/variety
5. Appropriate register
6. Translations that see through source mistakes.

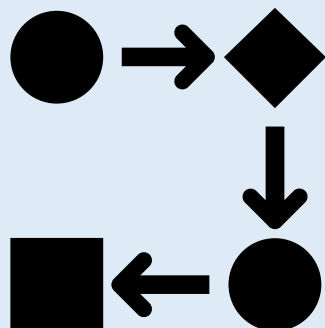
Easy and flexible trainability

Knowledge of the world

Necessity of new workflows

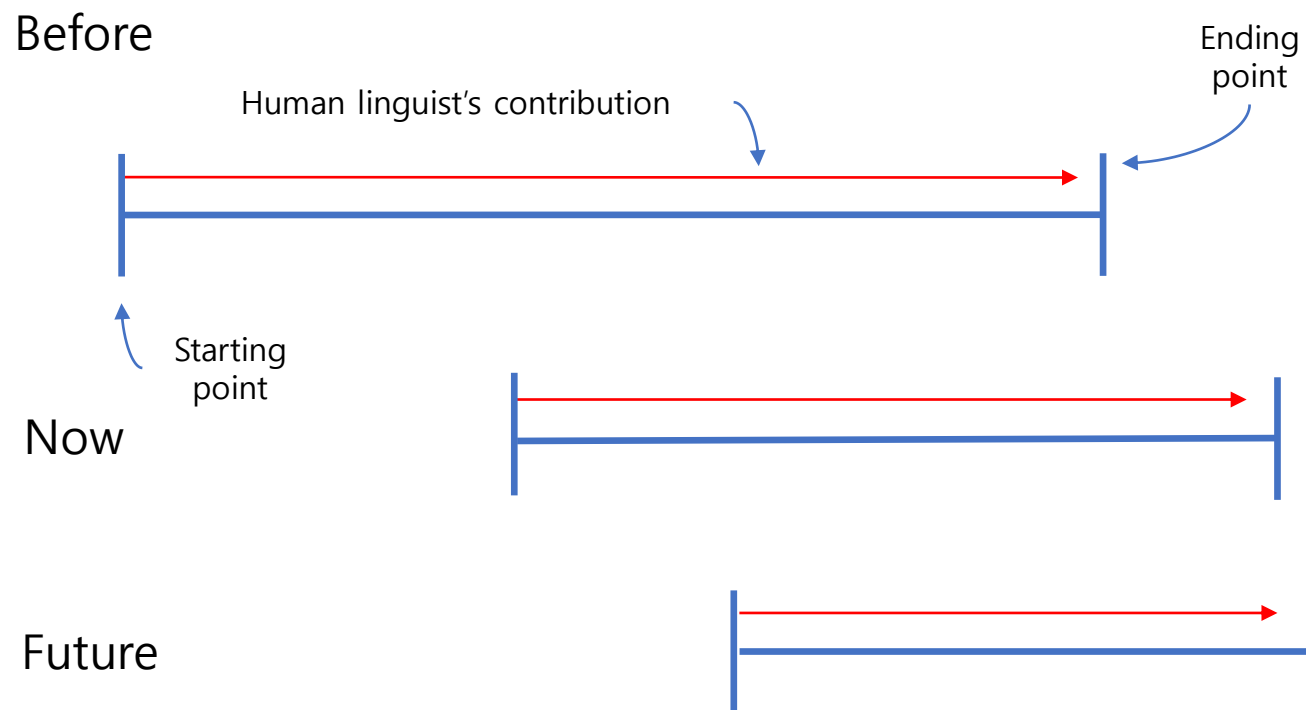


All translation is now revision.

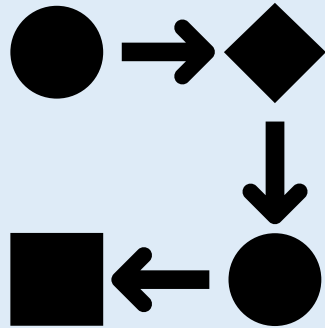


Necessity of new workflows

1. Translators will never work from an empty target segment again.
2. Linguist-created value is added to the extent that the linguist manages the AI to pre-translate a source text and/or then gets the pre-translated target text to a pre-agreed "optimal state".



Machine translation post-editing (MTPE) assumes a static workflow imposed from above.



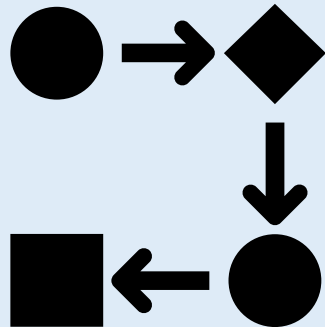
Optimized for:

1. Training from 100s of 1000s of segments and huge termbases
2. High-quality training data
3. Homogenous source content
4. Clean source content
5. Long source content

Legacy MTPE is an inflexible but scalable NMT-powered provider-directed workflow with a heavy up-front investment.

Necessity of new workflows

Neural machine translation (NMT) is a legacy technology.



Necessity of new workflows

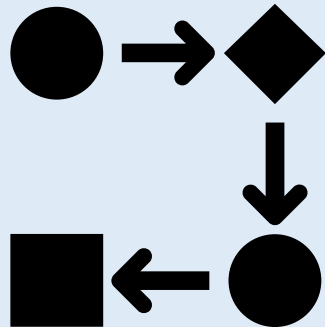
Problems of NMT:

1. Same term translated different ways
2. Overused words
3. Ordinary missing translation/mistranslation
4. "No context"-induced mistranslations
5. Different spellings/wordings of non-glossary words/phrases
6. Inconsistent use of person
7. Non-idiomatic expressions

A glossary only fixes this problem.

You cannot simulate an MTPE workflow simply by OCR-processing a PDF file and then running it through an NMT engine!

Translation memory (TM) was also designed for yesterday's workflows.



Necessity of new workflows

- TM technology does not account for context either and it's too late to go back and fix most of it.
- TM technology doesn't realize these are the same:
 - ✓ *Legacy MTPE assumes a static workflow imposed from above.*
 - ✓ *Legacy MTPE assumes a static workflow imposed from above*

Or that these are the same:

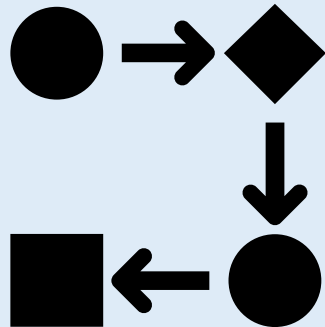
- ✓ *Legacy MTPE assumes a static workflow imposed from above.*
- ✓ *Legacy MTPE assumes a workflow imposed from above that is static.*

Or even that these are somehow related!

- ✓ *Oct. 5, 2019*
- ✓ *5 Oct. 2019*

Today's CAT tools aren't ready for the future, either.

- Built for MTPE
- Treat generative AI as NMT
- TM use hasn't evolved in a generation!
- Segment-unit limited



Necessity of new workflows

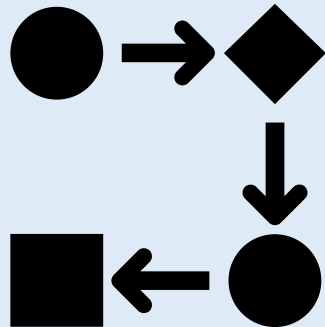
“State of the art” in tools

	DeepL Pro	ChatGPT+	CAT tools	CotranslatorAI
Data privacy	Yes	No	Yes	Yes
Context	No	Yes (-ish)	No	Yes
Easy and flexible trainability	No	Yes	No	Yes
Knowledge of the world	?	Yes	Yes (-ish)	Yes
AI model	NMT	GPT-4-Turbo*	GPT 3.5 and/or GPT-4 Turbo	GPT-4-Turbo
Segment-unit limited	Yes	No	Yes	No
File upload support	Yes	Yes (-ish)	No	No
Speed	Fast	Slow	Fast (-ish)	Slow
Cost	\$9-58/month	\$20/month	?	\$0-?
Languages	31	Unlimited	20	Unlimited

Necessity of new workflows

* GPT-4-Turbo access in ChatGPT+ is subject to a usage cap.

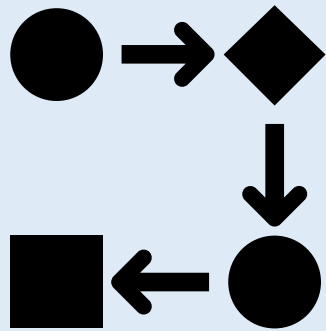
Legacy technologies still have a role.



Necessity of new workflows

1. **MTPE** – Efficient on projects for which it is optimized, especially legacy projects
2. **NMT** – MTPE workflows that are properly optimized. (No use to freelance translators(?))
3. **CAT tool** – Still useful for many tasks, and moreso after improvement
4. **Translation memory** – Useful for reusing content and for generative AI training data

Generative AI Iterative Translation (GAIT) leverages the superpowers of generative AI at the translator level.

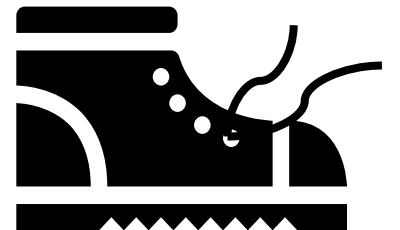


Necessity of new workflows

Works with:

1. Lack of training data
2. Low-quality training data
3. Heterogeneous source content
4. Messy and defective source content
5. Short source content

GAIT is a linguist-directed AI-powered "bootstrapped" workflow.



Keep “slow” and “expensive” in perspective.

Here are the numbers with CotranslatorAI and GPT-4-Turbo:

- English word count: 270
- Tokens: 1,200
- Cost: 3¢ (USD)
- Workflow time: 3 minutes*

* Assumes one minute to export from your CAT tool, one minute to enter the page of text into CotranslatorAI and wait for the response, and another minute to import the page back to your CAT tool.

ID	Korean	English
4	벌식 글자판과 2벌식 글자판의 특징을 다른 글들을 조사하여 요약하였습니다.	I have researched and summarized articles on the characteristics of the 1-beol and 2-beol keyboard layouts.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.	Please review this and I hope it will be helpful for your research on keyboard layouts.
6	한글 자판 문제를 다른 글들을 더 조사하여 다시 고하겠습니다.	I will further investigate articles on the Korean keyboard layout issue and report back.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2벌식과 3벌식 모두 개발되어 있고, 3벌식이 두 배 정도 효율적이다.	The Korean Culture Center (Director Gong Byung-woo) has developed both 2-beol and 3-beol typewriters, with the 3-beol being about twice as efficient.
8	수동 한/영 타자기는 2벌식으로 개발이 불가능하지만 3벌식으로는 이미 수십만대가 보급되어 널리 이용되고 있다.	Manual Korean/English typewriters cannot be developed in 2-beol, but hundreds of thousands of 3-beol typewriters have already been distributed and are widely used.
9	시각 장애자를 위한 점자 한글 타자기도 2벌식으로는 개발이 불가능하지만 3벌식은 근 개발되어 보급 단계에 있다.	A braille Korean typewriter for the visually impaired cannot be developed in 2-beol, but the 3-beol has been recently developed and is in the distribution phase.
10	전자식 한글 타자기는 2벌식과 3벌식 모두 개발되었다.	Electronic Korean typewriters have been developed in both 2-beol and 3-beol layouts.
11	이 역 3벌식이 효율이 높고 입력 속도도 30% 가량 더 빠르다.	Here, the 3-beol layout is more efficient and the input speed is about 30% faster.
12	2벌식은 한글 자모를 따로 따로 짚을 것과 글자쇠를 누르면 바로 글자가 나타나지 않는다.	With the 2-beol layout, Korean characters cannot be typed separately and characters do not appear immediately as the keys are pressed.
13	그러나 3벌식은 어떤 방식으로든 한 글 짚을 수 있다.	However, with the 3-beol layout, any Korean character can be typed in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2벌식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현한다.	The computer 2-beol keyboard, designated as the standard keyboard layout by the government, is completely different from the manual typewriter, and characters are displayed on the screen through a process that does not immediately show correct Korean spelling.
15	3벌식 자판은 글쇠를 누르면 화면에 그대로 나타나기 때문에 받침만 단독으로도 짚을 수 있다.	The 3-beol keyboard layout allows characters to appear on the screen as soon as the keys are pressed, and even final consonants can be typed on their own.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3벌식 자판이 필수적이다.	Especially for teaching correct Korean spelling to children, the 3-beol keyboard layout is essential.
17	또 3벌식이 2벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약할 수 있다.	Also, the 3-beol layout is about 10% faster in input speed than the 2-beol and can save about 40% of the time required for software development.

Necessity of new workflows

Fast/free NMT is cheap, indeed!

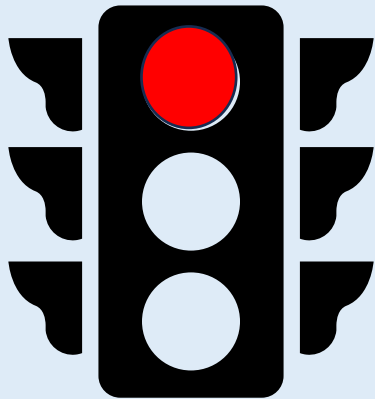
Based on today's example (and ignoring superpowers #2 and #3), if you cannot get this NMT output up to GPT-4-Turbo quality in less than 3 minutes of work, then you're wasting your time with legacy NMT.

Of course, it's not this simple, but you get the point, right?

ID	Korean	English
4	벌식 글자판과 2 벌식 글자판의 특징을 다른 글꼴을 조사하여 요약하였습니다.	We've researched and summarized articles that discuss the characteristics of bee and two-bar typefaces.
5	검토하여 보시고, 글자판 연구에 도움이 되시기를 바랍니다.	We hope you find it helpful in your research.
6	한글 자판 문제를 다른 글꼴을 더 조사하여 다시 고하겠습니다.	I will research more articles on Hangeul and summarize them.
7	한글문화원(인장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 벌식과 3 벌식 모두 개발되어 있고, 3 벌식이 두 배 정도 능률적이다.	Comparison of Hangeul Typefaces by the Hangeul Cultural Center (Gong Byung-woo, Director) Dong-Sik Hangeul typewriters have both two- and three-column typefaces, and the three-column typeface is about twice as efficient.
8	수동 한/영 타자기는 2 벌식으로 개발이 불가능하지만 3 벌식으로는 이미 수십만대가 보급되어 널리 이용 있다.	Manual Korean/English typewriters are impossible to develop in the two-column format, but the three-column format is already widely available, with hundreds of thousands of units sold.
9	시각 장애자를 위한 점자 한글 타자기도 2 벌식으로는 개발이 불가능하지만 3 벌식은 근 개발되어 보급 단계에 있다.	Braille Hangeul typewriters for the visually impaired are also impossible to develop with a two-valve system, but a three-valve system has been developed and is in the process of being widespread.
10	전자식 한글 타자기는 2 벌식과 3 벌식 모두 개발되었다.	Electronic Hangeul typewriters have been developed in both two- and three-column styles.
11	이 역 3 벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.	The reverse three-column type is more efficient and has a 30% faster typing speed.
12	2 벌식은 한글 자모를 따로 따로 짚을 없고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.	The two-format typewriter doesn't have a separate alphabet and the letters don't appear as soon as you press the key.
13	그러나 3 벌식은 어떤 방식으로든 한 줄을 짚을 수 있다.	However, the three-format can stamp han in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 벌식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다.	Computerized two-valve keyboards, which are designated as standardized by the government, work differently than manual typewriters, and they display the characters through a process that does not spell out Hangeul on the screen.
15	3 벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 짚을 가 있다.	The three-valve keyboard appears on the screen as soon as you press the key, so you can take a picture of the base alone.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 벌식 자판이 필수적이다.	Especially for teaching children how to spell Hangeul correctly, a three-ball keyboard is essential.
17	또 3 식이 2 벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.	In addition, a three-format keyboard is about 10% faster than a two-format keyboard and can save about 40% of software development time.

Necessity of new workflows

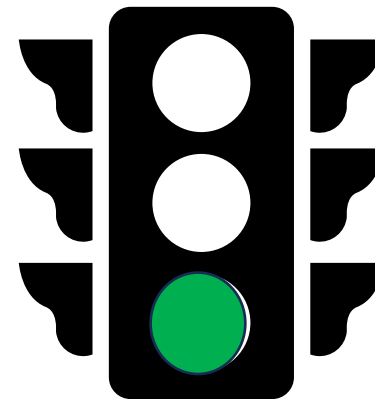
If you don't yet see the potential of generative AI in your translation workflow, then stop here!



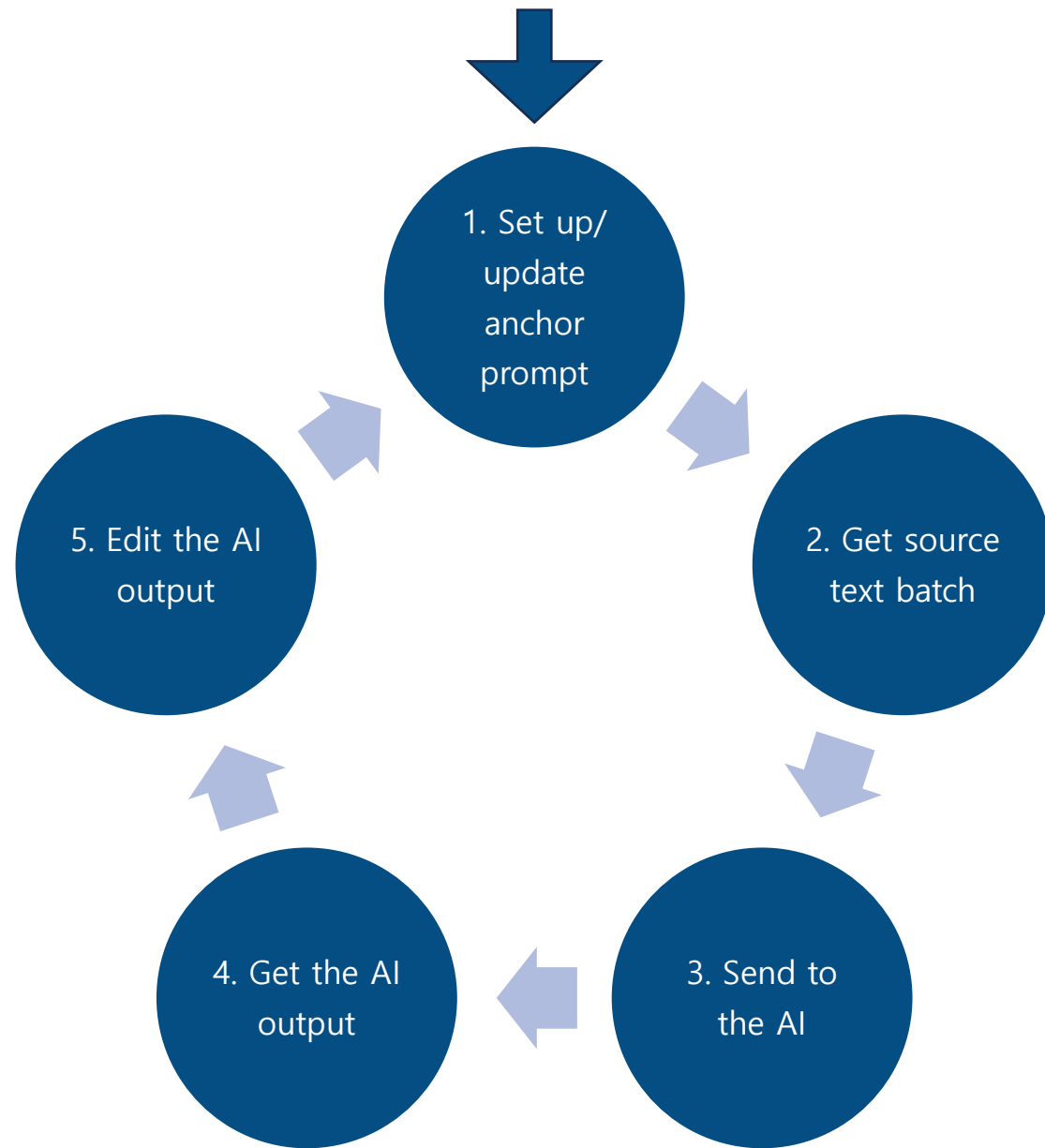
Necessity of new workflows

My key assumptions going forward:

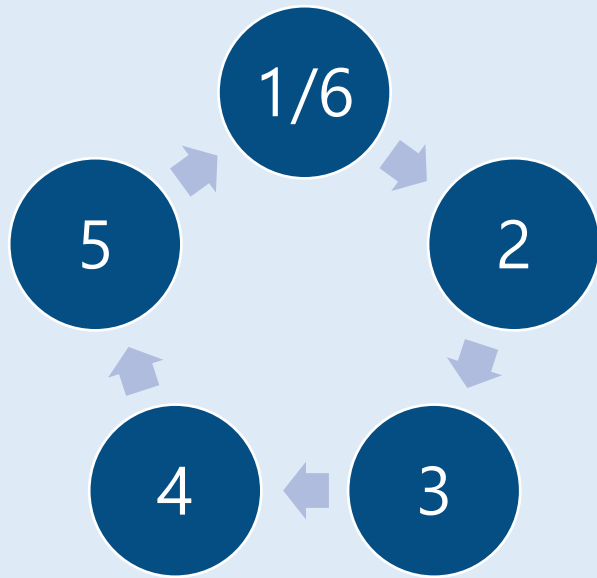
1. The legacy technologies (NMT, TM, segment-by-segment translation grid) are outdated and limited in various ways.
2. Generative AI is slower, more expensive, less predictable, and more difficult to direct than the legacy technologies.
3. Learning to use a generative AI-powered workflow properly will be hard.
4. But the payoff from this effort will be huge!



Workflow fundamentals of Generative AI Iterative Translation (GAIT)



1. Set up the anchor prompt



Things to include:

- Setting
- General instructions
- Monolingual content
 - The whole document
 - Articles with keywords and style
- Bilingual content
 - Translations of similar document
 - TM matches, including fuzzy matches
 - Prior translation of same document/segments into another language (?!)
- Glossary terms
- Project-specific instructions

1. Set up the anchor prompt

Setting

You are an expert [subject] translator of Korean [document types] to English. I need your help translating [document title] to English.

I will provide you with Korean text to translate to English. Correctly translate it, matching the translation as closely as possible to the following requirements.

General instructions

Here are general instructions to follow:

- Keep each translated segment on its own line to match the source segments. Do not combine text from multiple segments into sentences or paragraphs or add empty lines between sections.
- Do not capitalize each word on a line.
- Place tags and symbols in the correct locations.
- Provide no explanations or labels; just translate.

Early training data

Here is are source and target segments from a similar section of a similar document. Refer to this for general style and terminology. [I don't have similar source and target segments for you.]

Here is some related English content to refer to: [I don't have any related English content to refer to.]

Training data to be updated

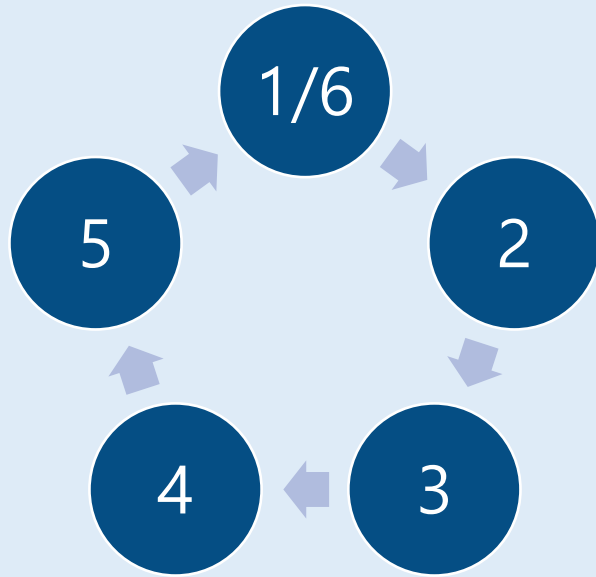
Here are project-specific instructions to follow: [I don't have any project-specific instructions for you yet.]

Here is a glossary of key terms to follow: [I don't have a glossary for you yet.]

Here are some previous translated segments from this document to refer to: [I don't have any previous translated segments to refer to.]

Translate this:

2. Get source text batch

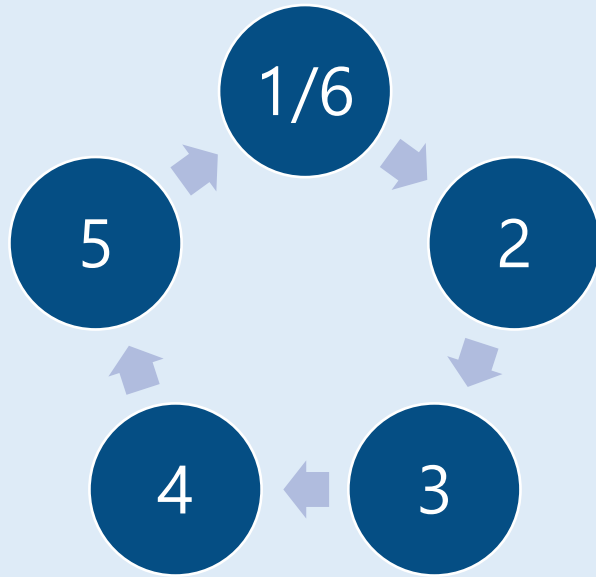


Selected source text batch

- Work from bilingual Word files exported from your CAT tool.
- Segmenting should be perfect.
- Content should be clean.
- 10-15 segments seems to be a good batch size.
- Cut-and-paste in a block. Note the exact segments you've selected.

KOR_BK_J00SV0JLH.trn_output.txt	
CAUTION: Do not change segment ID or source text	
V10 4 11 MQ041110 e0b7ebf4 7ccc 4cd9-8300-8e179db70008	
ID	Korean
4	법식 글자판과 2 법식 글자판의 특징을 다른 글들을 조사하여 요약하였습니다.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.
6	한글 자판 문제를 다른 글들을 더 조사하여 다시 고하겠습니다.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 법식과 3 법식 모두 개발되어 있고, 3 법식이 두 배 정도 능률적이다.
8	수동 한/영 타자기는 2 법식으로 개발이 불가능하지만 3 법식으로는 이미 수십만대가 보급되어 널리 이용되고 있다.
9	시각 장애자를 위한 점자 한글 타자기도 2 법식으로는 개발이 불가능하지만 3 법식은 큰 개발되어 보급 단계에 있다.
10	전자식 한글 타자기는 2 법식과 3 법식 모두 개발되었다.
11	이 역 3 법식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.
12	2 법식은 한글 자모를 따로 따로 짚을 않고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.
13	그러나 3 법식은 어떤 방식으로든 한을 짚을 수 있다.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 법식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현한다.
15	3 법식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 짚을 수 있다.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 법식 자판이 필수적이다.
17	또 3 식이 2 법식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.
18	현재에 보면 외국어 컴퓨터는 컴퓨터를 개발할 때 글자판은 3 법식 글자판에 비하여 한글 글자쇠가 적다는 장점 외에는 나은 것이 없다.
19	같은 장을 입력할 때, "쉬프트" 글자쇠를 누른 채로 입력하는 글자가 3 법식 글자판이 2 법식에 비해 4분의 1 정도에 불과하기 때문에 3 법식이 30% 정도

3. Send to the AI



Workflow fundamentals of GAIT

Option 1: Start a new dialogue context with your first anchor prompt and every time you update your anchor prompt after that.

Do this by sending your prompt through the Structured Prompt fields in CotranslatorAI.

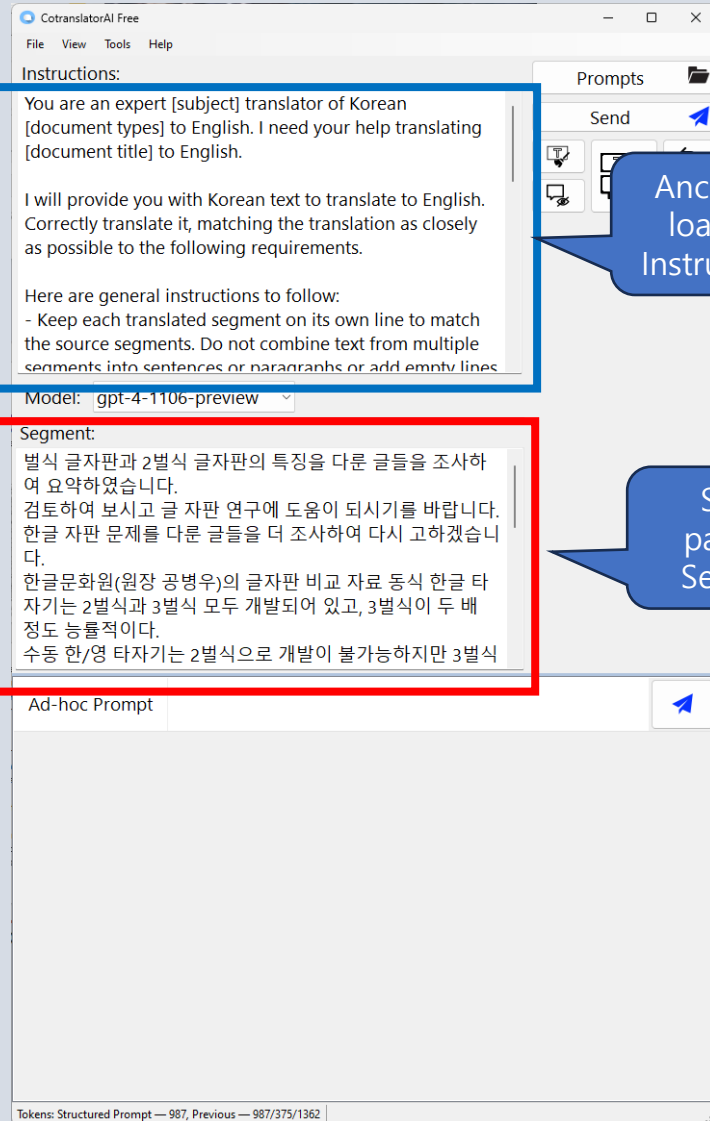
Option 2: If your anchor prompt is working well, you can ensure greater internal consistency by continuing to translate within the same dialogue context.

Do this by sending your prompt through the Ad-hoc Prompt field in CotranslatorAI.

But watch your token counts! Keep your anchor prompt updated and leverage it with a new dialogue context every once and a while to keep your costs down. (See next section for token and cost management analysis.)

3. Send to the AI

Structured Prompt fields

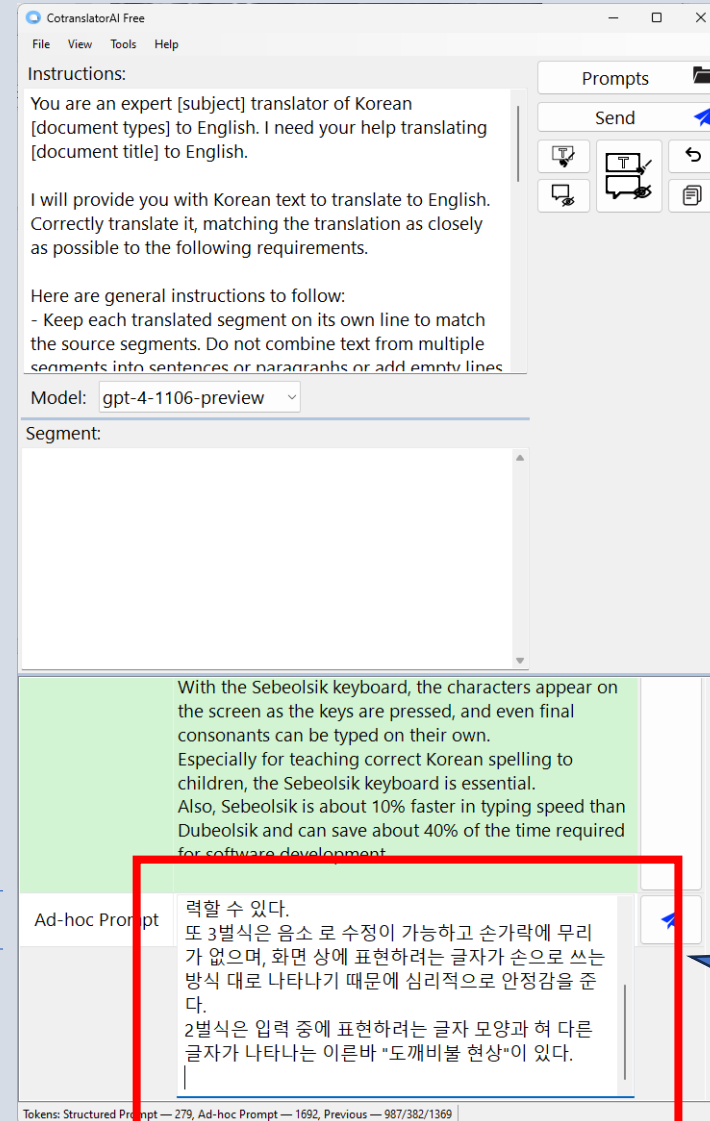


Start a new dialogue context

Anchor prompt loaded in the Instructions field.

Source text pasted to the Segment field

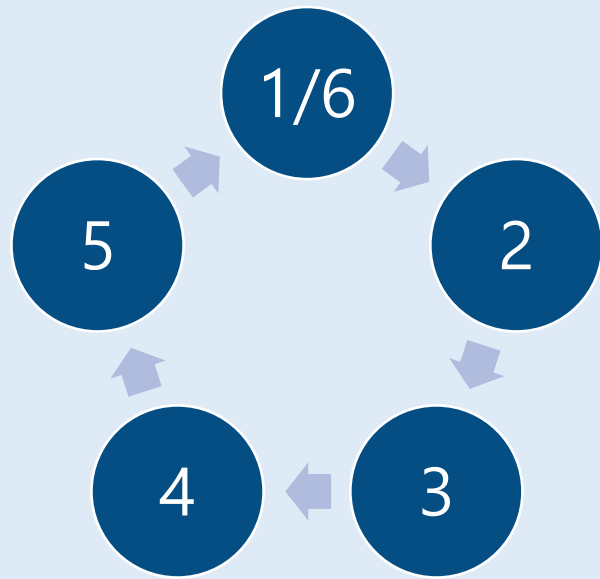
Ad-hoc Prompt field



Continue the same dialogue context

Source text pasted to the Ad-hoc Prompt field

4. Get the AI output



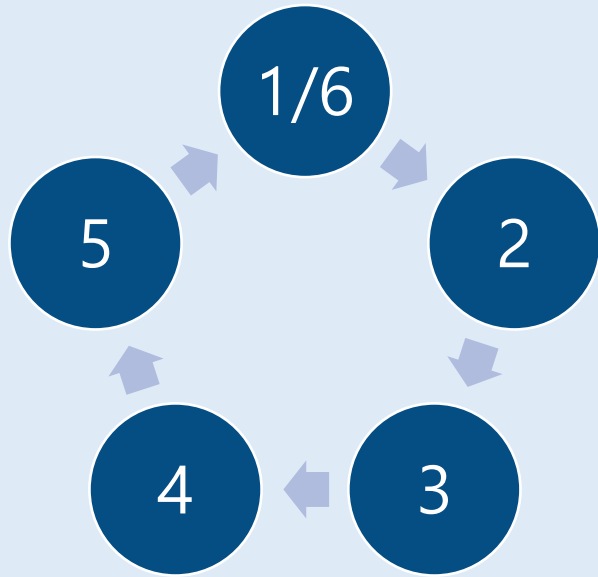
Workflow fundamentals of GAIT

- Paste the AI back into the bilingual Word file from your CAT tool.
- Preselect the exact same segments on the target side before pasting.
- Check that it pastes correctly. If the source and target segments don't all line up perfectly, then you will need to fix them manually.

KOR_BK_J00SV0JLH.trn_output.txt CAUTION: Do not change segment ID or source text V10.4.11 MQ941110 a8b7ebf4-700c-4c00-8200-8a170db70008		
ID	Korean	English
4	법식 글자판과 2 법식 글자판의 특징을 다른 글들을 조사하여 요약하였습니다.	I have researched and summarized articles on the characteristics of the <u>Dubeolsik</u> and <u>Sebeolsik</u> keyboard layouts.
5	검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다.	Please review and I hope it will be helpful in your research on keyboard layouts.
6	한글 자판 문제를 다른 글들을 더 조사하여 다시 고하겠습니다.	I will further investigate articles on the Korean keyboard layout issue and report back.
7	한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2 법식과 3 법식 모두 개발되어 있고, 3 법식이 두 배 정도 능률적이다.	The Korean Culture Center (Director Gong Byeong-woo) has developed both <u>Dubeolsik</u> and <u>Sebeolsik</u> typewriters, with the <u>Sebeolsik</u> being about twice as efficient.
8	수동 한/영 타자기는 2 법식으로 개발이 불가능하지만 3 법식으로는 이미 수십만대가 보급되어 널리 이용되고 있다.	Manual Korean/English typewriters cannot be developed in <u>Dubeolsik</u> , but millions of <u>Sebeolsik</u> typewriters have already been distributed and are widely used.
9	시각 장애자를 위한 점자 한글 타자기도 2 법식으로는 개발이 불가능하지만 3 법식은 근 개발되어 보급 단계에 있다.	A Braille Korean typewriter for the visually impaired cannot be developed in <u>Dubeolsik</u> , but <u>Sebeolsik</u> has been recently developed and is in the distribution phase.
10	전자식 한글 타자기는 2 법식과 3 법식 모두 개발되었다.	Electronic Korean typewriters have been developed in both <u>Dubeolsik</u> and <u>Sebeolsik</u> .
11	이 역 3 법식이 능률이 높고 입력 속도도 30% 가량 더 빠르다.	Here too, <u>Sebeolsik</u> is more efficient and the input speed is about 30% faster.
12	2 법식은 한글 자모를 따로 따로 찍을 않고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다.	With <u>Dubeolsik</u> , Korean characters cannot be typed separately and characters do not appear immediately as keys are pressed.
13	그러나 3 법식은 어떤 방식으로도 한글 을 찍을 수 있다.	However, with <u>Sebeolsik</u> , any Korean character can be typed in any way.
14	정부에 의해 표준 글자판으로 지정된 컴퓨터 2 법식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다.	The computer <u>Dubeolsik</u> keyboard, designated as the standard keyboard layout by the government, is entirely different from the manual typewriter, and characters are displayed on the screen through a process that does not conform to correct spelling.
15	3 법식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 찍을 가 있다.	With the <u>Sebeolsik</u> keyboard, characters appear on the screen as keys are pressed, and even final consonants can be typed on their own.
16	특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3 법식 자판이 필수적이다.	Especially for teaching correct Korean spelling to children, the <u>Sebeolsik</u> keyboard is essential.
17	또 3 식이 2 법식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다.	Also, <u>Sebeolsik</u> is about 10% faster in typing speed than <u>Dubeolsik</u> and can save about 40% of the time required for software development.

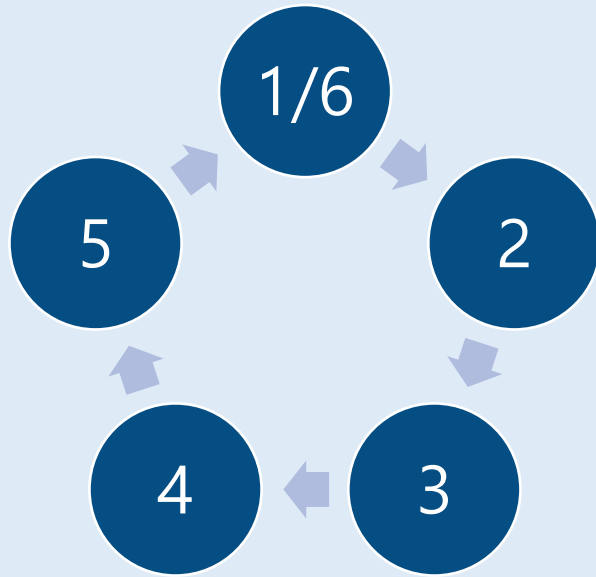
Pasted target text batch

5. Edit the AI output



- The first translated batch becomes the training data for future batches, so you must make an extra effort to edit it to perfection.
- While editing, look for key terms, style, and writing conventions that you can add to your glossary or instructions.
- You can either edit this text direct in the Word file, or import to your CAT tool, edit there, and then export the file back out before starting the next cycle.

6. Update the anchor prompt



Things to consider adding:

- More glossary terms
- More project-specific instructions
- The segments you just translated!

Things to consider removing:

- Training data that's no longer relevant or needed

Things to consider changing:

- Instructions the AI didn't follow well last time

6. Update the anchor prompt

You are an expert [subject] translator of Korean [document types] to English. I need your help translating [document title] to English.

I will provide you with Korean text to translate to English. Correctly translate it, matching the translation as closely as possible to the following requirements.

Here are general instructions to follow:

- Keep each translated segment on its own line to match the source segments. Do not combine text from multiple segments into sentences or paragraphs or add empty lines between sections.
- Do not capitalize each word on a line.
- Place tags and symbols in the correct locations.
- Provide no explanations or labels; just translate.

Here are project-specific instructions to follow:

- Write Korean names with family name last (e.g. Byung-Woo Gong)
- Use American data format.

Here is a glossary of key terms to follow:

- 2벌식 > 2-beol
- 3벌식 > 3-beol

Here are some previous translated segments from this document to refer to:

Translate this:

Removed unnecessary content and added project-specific instructions and glossary terms

Added the edited source and target segments from the first batch.

벌식 글자판과 2벌식 글자판의 특징을 다룬 글들을 조사하여 요약하였습니다.

I have researched and summarized articles on the characteristics of the 1-beol and 2-beol keyboard layouts. 검토하여 보시고 글 자판 연구에 도움이 되시기를 바랍니다. Please review this and I hope it will be helpful for your research on keyboard layouts.

한글 자판 문제를 다룬 글들을 더 조사하여 다시 고하겠습니다. I will further investigate articles on the Korean keyboard layout issue and report back.

한글문화원(원장 공병우)의 글자판 비교 자료 동식 한글 타자기는 2벌식과 3벌식 모두 개발되어 있고, 3벌식이 두 배 정도 능률적이다. The

Korean Culture Center (Director Byung-Woo Gon) has developed both 2-beol and 3-beol typewriters, with the 3-beol being about twice as efficient. 수동 한/영 타자기는 2벌식으로 개발이 불가능하지만 3벌식으로는 이미 수십 만대가 보급되어 널리 이용 있다. Manual Korean/English typewriters cannot be developed in 2-beol, but hundreds of thousands of 3-beol typewriters have [already] been distributed and are widely used.

시각 장애자를 위한 점자 한글 타자기도 2벌식으로는 개발이 불가능하지만 3벌식은 근 개발되어 보급 단계에 있다. A braille Korean typewriter for the visually impaired cannot be developed in 2-beol, but the 3-beol has been recently developed and is in the distribution phase. 전자식 한글 타자기는 2벌식과 3벌식 모두 개발되었다.

Electronic Korean typewriters have been developed in both 2-beol and 3-beol layouts.

이 역 3벌식이 능률이 높고 입력 속도도 30% 가량 더 빠르다. Here, the 3-beol layout is more efficient and the input speed is about 30% faster. 2벌식은 한글 자모를 따로 따로 찍을 없고 글자쇠를 누르는대로 바로 글자가 나타나지 않는다. With the 2-beol layout, Korean characters cannot be typed separately and characters do not appear immediately as the keys are pressed.

그러나 3벌식은 어떤 방식으로든 한 을 찍을 수 있다. However, with the 3-beol layout, any Korean character can be typed in any way.

정부에 의해 표준 글자판으로 지정된 컴퓨터 2벌식 자판은 수동식 타자기와는 방식이 전혀 다르고, 화면에서 한글이 맞춤법대로 나타나지 않는 과정을 거쳐 글자를 표현 다. The computer 2-beol keyboard, designated as the standard keyboard layout by the government, is completely different from the manual typewriter, and characters are displayed on the screen through a process that does not immediately show correct Korean spelling.

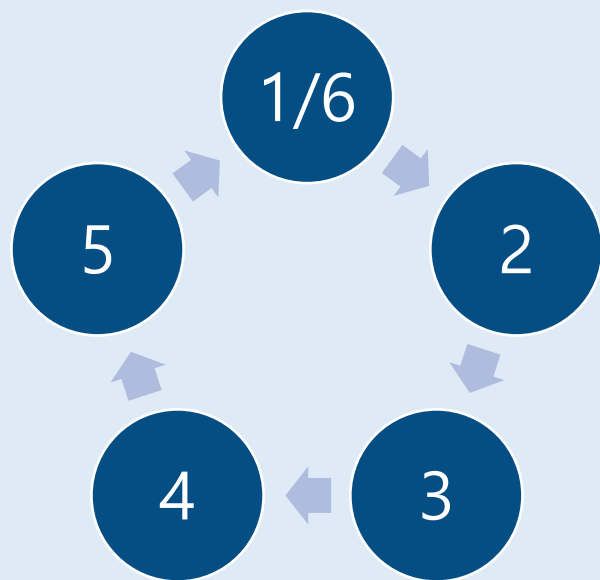
3벌식 자판은 글쇠를 누르는대로 화면에 그대로 나타나기 때문에 받침만 단독으로도 찍을 가 있다. The 3-beol keyboard layout allows

characters to appear on the screen as soon as the keys are pressed, and even final consonants can be typed on their own.

특히 어린이들에게 올바른 한글 맞춤법을 가르치려면 3벌식 자판이 필수적이다. Especially for teaching correct Korean spelling to children, the 3-beol keyboard layout is essential.

또 3 식이 2벌식보다 10% 정도 입력 속도가 빠르고 소프트웨어 개발에 걸리는 시간을 40% 정도 절약 수 있다. Also, the 3-beol layout is about 10% faster in input speed than the 2-beol and can save about 40% of the time required for software development.

Summary



Workflow fundamentals of GAIT

Prepare the source in your CAT tool.
Export the source to a bilingual Word file.

1. Update the anchor prompt with your best effort at instructions and training data likely to produce a good translation.
- 2-4. Translate 10-15 segments in CotranslatorAI with this anchor prompt.
5. Edit the translation as if your life depends on it.
6. Update the anchor prompt with any important instructions or key terminology you noticed during this edit.

Repeat.

Microsoft Word interface showing the ribbon with tabs: File, Home, Insert, Draw, Design, Layout, References, Mailings, Review, View, Help, KCTS, TransTools+, TransTools, Table Design, Layout. The Home tab is active, showing font settings (Malgun Gothic, size 10), paragraph styles (Normal, No Spacing, Heading 1), and editing tools (Editing, Dictate, Add-ins, Editor).

Microsoft Edge browser window showing the Copilot interface. The main area contains instructions for the AI translator, a glossary of key terms, and related content. The right sidebar shows 'Prompts' and 'Send' buttons. At the bottom, there is a video feed of a man and a 'Tokens: Structured Prompt — 208' indicator.

Instructions:
 You are an expert medical translator of Korean medical regulations to English. I need your help translating the Korean Good Clinical Practice to English.

I will provide you with Korean text to translate to English. Correctly translate it, matching the translation as closely as possible to the following requirements.

Here are some specific instructions to follow.

- Place the tags correctly in the translation.
- Do not capitalize all words in titles; just capitalize the first word.
- Provide no explanation, just translate.

Here is a glossary of key terms to follow.
 [I don't have any key terms for you yet.]

Here is some related English content to refer to:
 [I don't have any related English content to refer to.]

Here are some previous translated segments to refer to:
 [I don't have any previous translated segments to refer to.]

Model: gpt-4 Use default prompt settings

Segment:

Ad-hoc Prompt

Tokens: Structured Prompt — 208

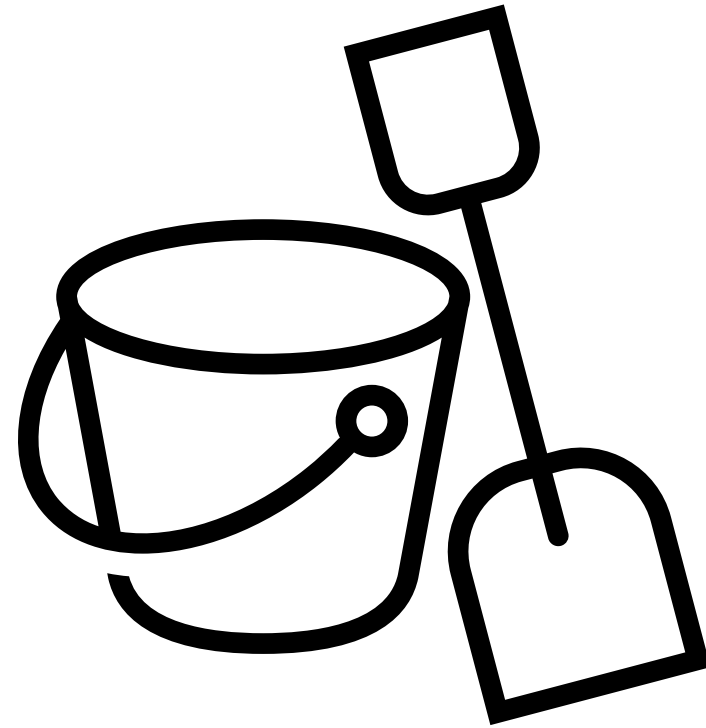
Korean Good Clinical Practice, Amended 2021.09.10 (KO)_condensed.docx
CAUTION: Do not change segment ID or source text
V10.2.13 MQ921310 a2e2b105-6ee6-44ab-8c0d-9de3cd453c3a

ID	Korean	English
2	의약품 등의 안전에 관한 규칙	의약품 등의 안전에 관한 규칙
5	의약품 임상시험 관리기준	의약품 임상시험 관리기준
7	목적	목적
8	이 기준은 의약품 임상시험 실시에 필요한 임상시험의 준비, 실시, 모니터링, 점검, 자료의 기록 및 보고 등에 관한 기준을 정함으로써, 정확하고 신뢰할 수 있는 자료의 결과를 얻고 시험대상자의 권익 보호와 비밀 보장이 적절하게 이루어질 수 있도록 하는 것을 목적으로 한다.	이 기준은 의약품 임상시험 실시에 필요한 임상시험의 준비, 실시, 모니터링, 점검, 자료 기록 및 보고 등에 관한 기준을 정함으로써, 정확하고 신뢰할 수 있는 자료의 결과를 얻고 시험대상자의 권익 보호와 비밀 보장이 적절하게 이루어질 수 있도록 하는 것을 목적으로 한다.
11	진행상황 보고	진행상황 보고
12	시험책임자는 1년에 1회 이상 임상시험의 진행상황을 요약하여 서면으로 심사위원회에 제출하여야 하며, 심사위원회의 요청을 받은 경우에도 진행상황을 요약하여 서면으로 제출하여야 한다.	시험책임자는 1년에 1회 이상 임상시험의 진행상황을 요약하여 서면으로 심사위원회에 제출하여야 하며, 심사위원회의 요청을 받은 경우에도 진행상황을 요약하여 서면으로 제출하여야 한다.
13	시험책임자는 대상자에 대한 위험이 증가하거나 임상시험의 실시 어부에 중대한 영향을 미치는 변화 또는 변경이 발생하였을 때에는 이를 의뢰자 및 심사위원회에 신속히 문서로 보고하여야 한다.	시험책임자는 대상자에 대한 위험이 증가하거나 임상시험의 실시 어부에 중대한 영향을 미치는 변화 또는 변경이 발생하였을 때에는 이를 의뢰자 및 심사위원회에 신속히 문서로 보고하여야 한다.
15	임상시험의 안전성과 관련한 보고	임상시험의 안전성과 관련한 보고
16	시험책임자는 모든 중대한 이상반응(임상시험 계획서나 임상시험자 자료집 등 그 밖의 문서에서 즉시 보고하지 않아도 된다고 정한 것은 제외 한다)을 임상시험 계획서에 정한 기간 내에 그 계획서에서 정한 보고방법에 따라 서면으로 신속히 의뢰자에게 보고하여야 한다.	시험책임자는 모든 중대한 이상반응(임상시험 계획서나 임상시험자 자료집 등 그 밖의 문서에서 즉시 보고하지 않아도 된다고 정한 것은 제외 한다)을 임상시험 계획서에 정한 기간 내에 그 계획서에서 정한 보고방법에 따라 서면으로 신속히 의뢰자에게 보고하여야 한다.
17	이 경우 시험 책임자는 대상자의 신상에 관한 비밀을 보호하기 위하여 대상자의 성명, 주민등록번호 및 주소 등 대상자의 신상정보를 대신하여 시험대상자식별 코드를 사용하여야 하며, 의뢰자가 제공하는 이상반응의 보고에 관한 지침이 있는 경우에는 이에 따라야 한다.	이 경우 시험 책임자는 대상자의 신상에 관한 비밀을 보호하기 위하여 대상자의 성명, 주민등록번호 및 주소 등 대상자의 신상정보를 대신하여 시험대상자식별 코드를 사용하여야 하며, 의뢰자가 제공하는 이상반응의 보고에 관한 지침이 있는 경우에는 이에 따라야 한다.
18	시험책임자는 임상시험 계획서에서 안전성 평가와 관련하여 중요하다고 별도로 정한 이상반응이나 실험실 검사결과와 이상 등을 임상시험 계획서에서 정한 기간 내에 그 계획서에서 정한 보고방법에 따라 의뢰자에게 보고하여야 한다.	시험책임자는 임상시험 계획서에서 안전성 평가와 관련하여 중요하다고 별도로 정한 이상반응이나 실험실 검사결과와 이상 등을 임상시험 계획서에서 정한 기간 내에 그 계획서에서 정한 보고방법에 따라 의뢰자에게 보고하여야 한다.
19	사망 사례를 보고하는 경우 시험책임자는 의뢰자와 심사위원회에 부검	사망 사례를 보고하는 경우 시험책임자는 의뢰자와 심사위원회에 부검

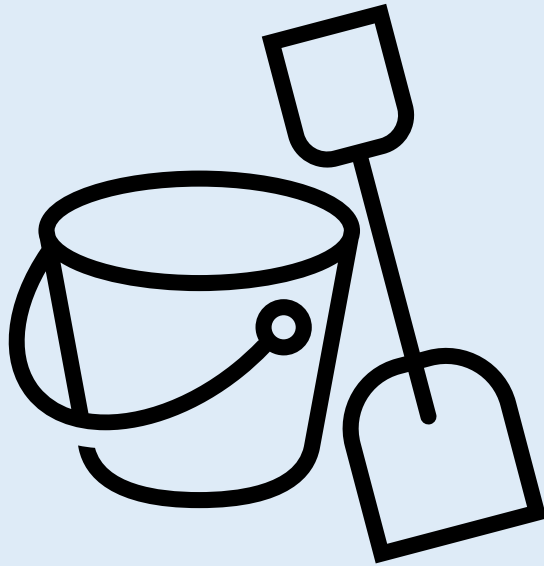
Part 2: Advanced concepts and techniques

- Context, tokens, and costs
- Working in your CAT tool
- Other advanced concepts and techniques

Context, tokens, and costs

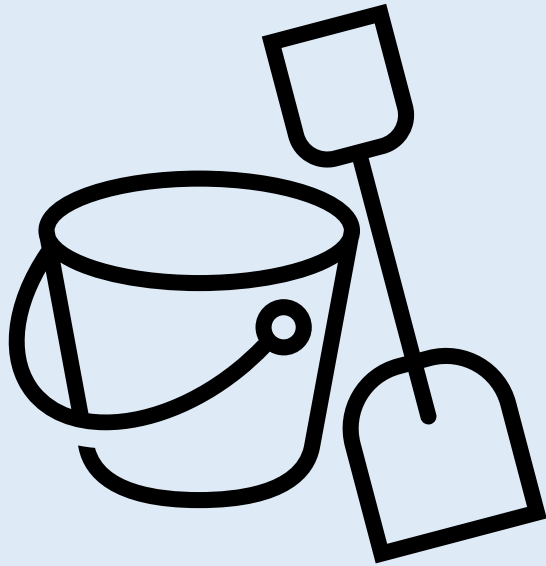


Understanding tokens



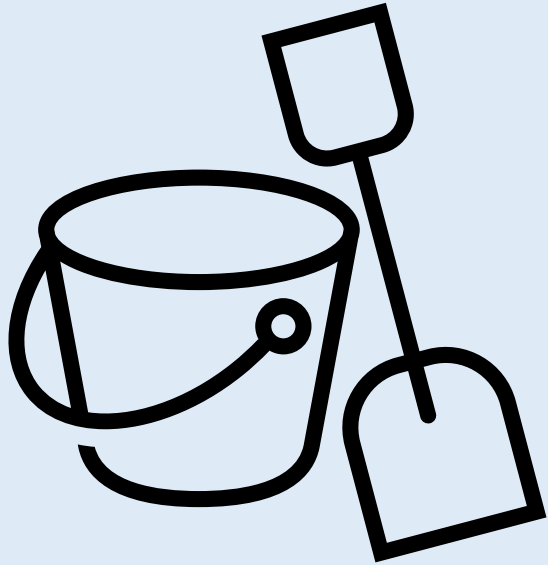
- Generative AI models process text by breaking it into tokens.
- Tokens can be words or character chunks.
- Examples: "hamburger" -> "ham", "bur", "ger"; "pear" -> single token
- Many tokens start with whitespace (e.g., " hello", " bye").
- 1 token \approx 4 characters or 0.75 words (in English, and less in other languages)
- You are billed for both the number of tokens you send to the AI and the number of tokens you get back.

Understanding context (A)



- When you interact with the AI, you communicate within a “context dialogue.”
- Every time you run a prompt, you add add tokens to the current context dialogue.
- Every time the AI responds, it also adds more tokens to the current context dialogue.
- When you get a response back from the AI, you can do one of two things:
 - 1) Start a new (empty) context dialogue, OR
 - 2) Keep the tokens that are in the current context dialogue, add more tokens with a new prompt, and send it all back to the AI again.

Understanding context (B)

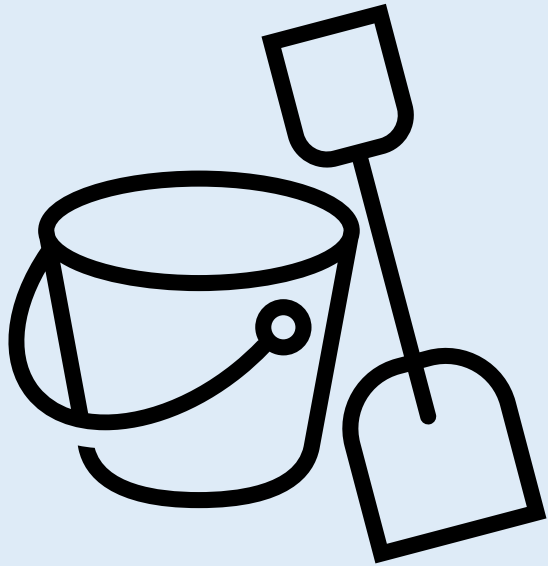


- If you start a new context dialogue, the new context dialogue only contains the tokens in your prompt and the tokens in the AI's response.

BUT...!!!!

- If you continue the previous context dialogue and send a new prompt to the AI, you must also send every token from the previous prompt and AI response back to the AI again!

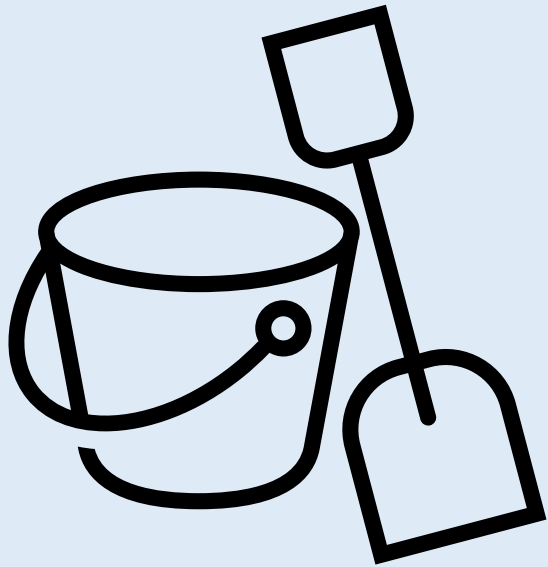
Understanding context (C)



Context, tokens, and costs

- With gpt-4-turbo, you pay \$0.01/1K tokens for the prompt you send to the AI, and you pay \$0.03/1K tokens for the response the AI sends back to you.
- So if you continue a previous context dialogue and send a new prompt to the AI, you must pay \$0.01/1K tokens again for every token already in the context dialogue (your previous prompt and the AI's previous responses), along with \$0.01/1K tokens for the new prompt you send to the AI, and \$0.03/1K tokens for the new response the AI sends back to you.
- And guess what? This process is repeated until you start a new context dialogue or the context dialogue reaches 128,000K tokens (the size of gpt-4-turbo's context window), at which time CotranslatorAI will error out and you will have to start over.

Costs under different workflows



- Segment by segment (light prompt, no context)
- Segment by segment (heavy prompt, no context)
- Segment by segment (light prompt, context)
- Segment by segment (heavy prompt, context)
- All at once (light prompt, context)
- All at once (heavy prompt, context)

Context, tokens, and costs

Scenario content

Light prompt (5 tokens)

Translate this to English:

Heavy prompt (460 tokens)

You are an expert translator of Korean content to English. I need your help translating some text to English, which I am translating for a client.

I will provide you with Korean text to translate to English. Correctly translate it, trying to match the translation as closely as possible to the following requirements.

Here are some specific instructions to follow.

- Provide no explanations or labels; just translate.
- Do not combine segments into paragraphs or add any extra lines between segments.
- Make sure to put the tags in the right places.
- Write dates in European style (ex. 25 September 2023)
- Write Korean monetary amounts in this format: 2,000 KRW

Here is a glossary of key terms to follow.

답변서 > Answer
반대신청 > Counterclaims
피신청인 > Respondent
신청인 > Claimant
ICC 중재규칙 > ICC Rules of Arbitration
양 당사자 > the Two Parties
본건 사업 > the Subject Project
본건 협약 > the Subject Agreement
수입 - revenue (not "income")
수입분할 방식 > revenue-sharing method
처분가능통행료수입 > disposable toll revenue
부가통행료 > additional tolls
경상가격 > current price
기준통행료 > standard tolls
처분승인대상통행료수입 > toll revenue subject to disposal approval
선순위원리금 > senior principal and interest
부채상환적립금 > debt repayment reserve
후순위 원리금 > subordinated principal and interest
재정지원금 > financial support funds
쟁점사항 > contested issues
재정지원금 차액 > difference in financial support funds

Here are some previous translated segments to refer to:
[I don't have any previous translated segments to refer to.]

Translate the following text:

Segment 1 (27 tokens)

한 작은 마을에 꿈을 찾아 떠난 소년이 있었다.

Segment 2 (34 tokens)

그는 먼 여행 끝에 신비로운 숲에서 지혜로운 구미호를 만났다.

Segment 3 (49 tokens)

구미호는 소년에게 자신만의 길을 찾을 용기와 마음의 눈을 열어주는 마법을 선물했다.

Every prompt has a 17-token overhead.

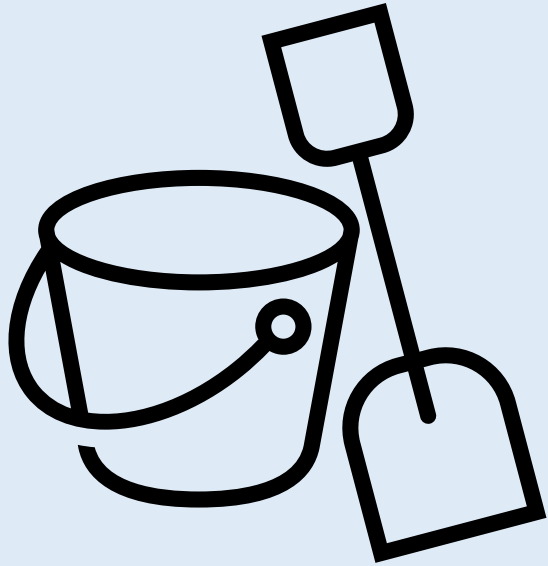
Scenario results

	Tokens	Cost
Segment by segment (light prompt, no context)	$49/17 + 56/20 + 71/25 = 176/62$	3.6¢
Segment by segment (heavy prompt, no context)	$491/14 + 498/20 + 513/24 = 1502/58$	16.8¢
Segment by segment (light prompt, context)	$49/17 + 109/21 + 186/26 = 344/64$	5.4¢
Segment by segment (heavy prompt, context)	$491/16 + 550/21 + 627/26 = 1668/63$	18.6¢
Batch-by-batch (light prompt, context)	$= 134/64$	3.3¢
Batch-by-batch (heavy prompt, context)	$= 576/65$	7.7¢

These take longer, too!

- **Batch-by-batch translation with context is cheaper than segment-by-segment translation without it!**
- **Heavy (i.e. advanced) prompting is more efficient with batch-by-batch translation.**

Segment-by-segment translation is not viable with generative AI!



Context, tokens, and costs

Translating segment-by-segment:

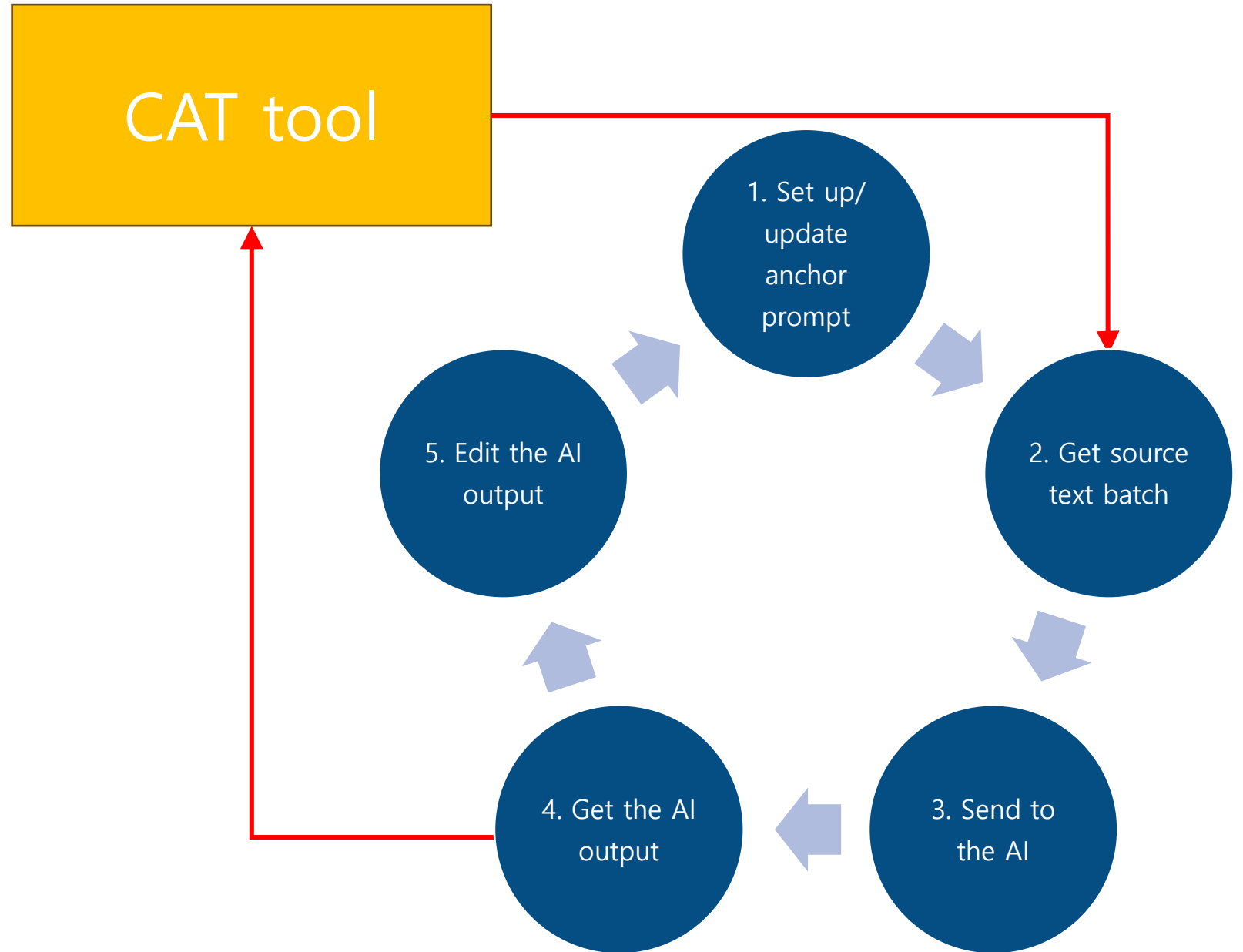
- Loses context
- Produces lower quality
- Costs more
- Takes longer

And these weaknesses deepen as prompt complexity increases!

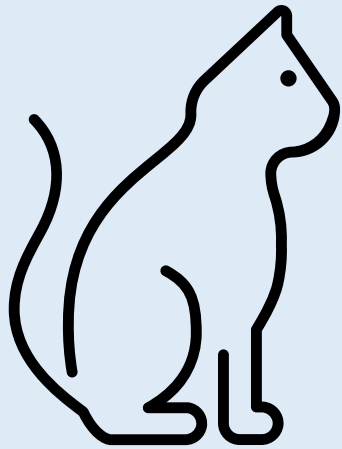
NO TOOL THAT REMAINS CONFINED TO A SEGMENT-BY-SEGMENT WORKFLOW CAN PROPERLY AND COMPETITIVELY SUPPORT A GENERATIVE AI WORKFLOW.

CotranslatorAI is not a CAT tool. But it is the ONLY application ready today to link your workflow inside and outside your CAT tool to tomorrow's new paradigm!!

Working with your CAT tool



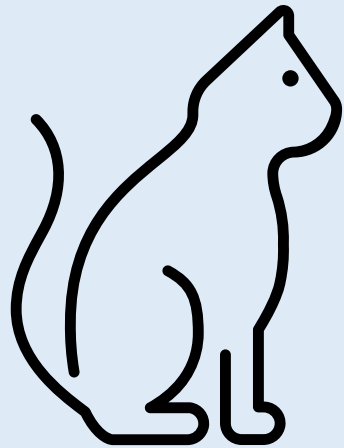
You still need your CAT tool.



- The CAT tool's segment-by-segment interface organizes content effectively.
- Editing the AI's output in the CAT tool helps keep you focused.
- Your CAT tool's advanced editing features increase your efficiency.
- Multi-linguist workflows need the CAT tool's project management features.
- Your CAT tool can handle huge TMs and glossaries, which are necessary in many projects.
- Your CAT tool's QA tools are indispensable.
- Your CAT tool manages file conversions.

Working with your CAT tool

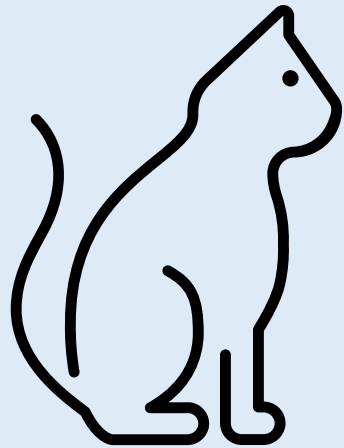
Until your CAT tool interface catches up, translate with the AI outside your CAT tool.



- Working in bilingual Word files is inconvenient; but it's the best option right now.
- You can still import the AI output back into your CAT tool for editing before returning to the bilingual Word file.
- Remember the "iterative" in "Generative AI Iterative Translation." Be patient and resist the temptation to translate your files all in one go.

Working with your CAT tool

Preparing your files for GAIT

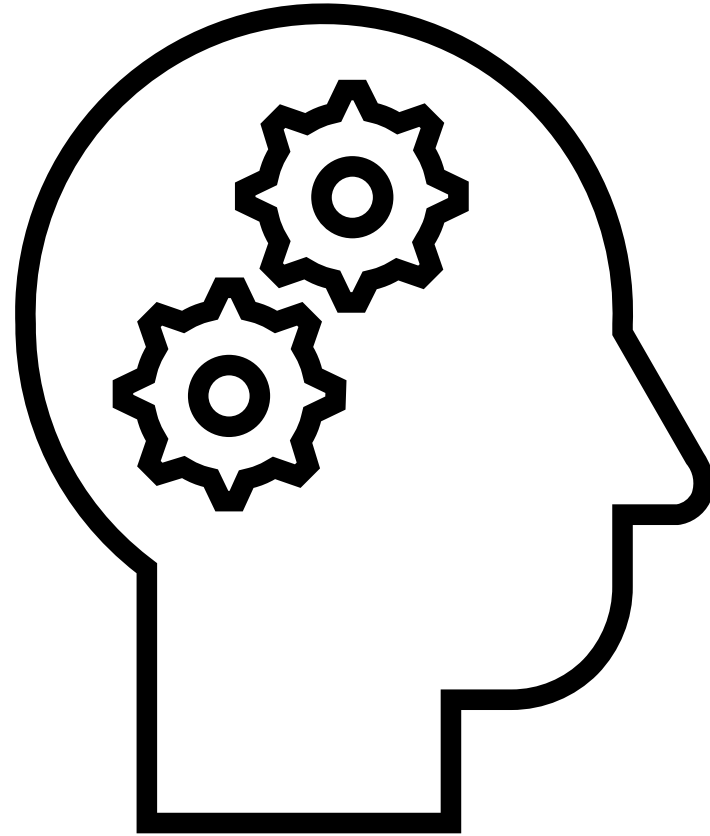


Working with your CAT tool

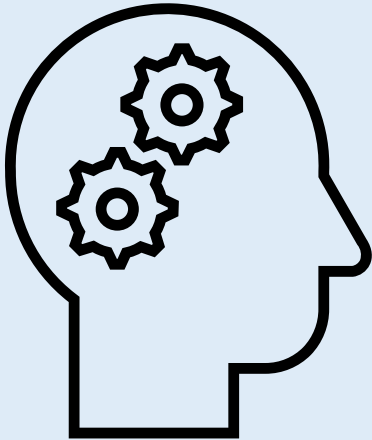
- Fix segmenting!
- Clean the source text.
- Lock out duplicates (especially if they're one after the other).
- Lock out TM matches (see guidelines) below)
- Lock out fuzzies that can't be easily translated with the TM.
- Consider grouping your content by type.
- Make a plan for formatting (see guidelines below).
- The AI does surprisingly well with OCR errors. Usually no need to manually go through carefully to fix everything.
- Auto-clean excessive tags, incorrect line breaks, and other strange characters from OCR with a tool like TransTools/TransTools+.*

* Stay tuned for a tutorial about this process at *AI4LanguageProfessionals*.
Join now at: <https://ai4languageprofessionals.groups.io>

Other
advanced
concepts and
techniques



Working with formatting in GAIT

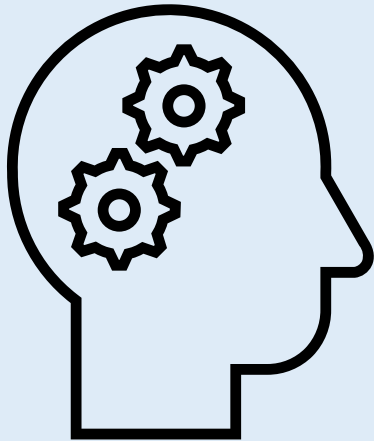


- The AI cannot directly process formatting.
 - Even though ChatGPT/ChatGPT+ appears to produce formatting, this seems to be done through markdown code on output only. Inputted formatting is not processed.
- However, the AI is good at placing tags correctly.
 - Prompt instructions: *Place tags and symbols in the correct locations.*
- Some CAT tools like Déjà Vu already convert all inline formatting to tags.
- Other tools only convert some formatting to tags and leave inline formatting.
 - Dave Neve worked with memoQ support to uncover a workflow for converting inline formatting to and from tags.*
- Convert straight quotes to smart quotes with a tool like TransTools/TransTools+.

* Stay tuned for tutorials about these processes at *AI4LanguageProfessionals*.
Join now at: <https://ai4languageprofessionals.groups.io>

Other advanced concepts and techniques

Working with the bilingual Word file exported from your CAT tool.

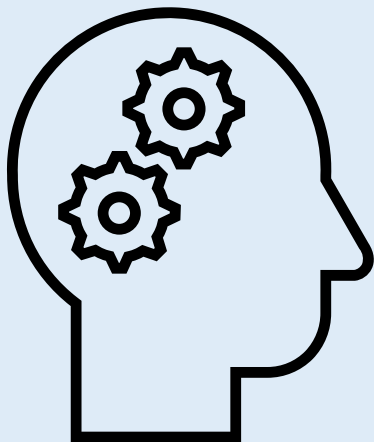


Other advanced concepts and techniques

- Most CAT tools can reimport files with tags processed by the AI.
 - This has not been the case with Trados. However, Martin Chamorro has discovered a hack to solve this.*
- When copying text from the source column, be sure to note the exact starting and ending cells. When pasting back, you must match these in the target column exactly.
 - Some users have found that this still doesn't always work, and that the translations of all cells are inserted together into each and every cell.
 - I haven't been able to reproduce this recently myself. But one hack that has worked in the past is to paste the AI output into Notepad first and to then select this again and paste to the Word file.
- Sometimes the AI translated output does not align cell for cell with the source.
 - This mostly happens if 1) key instructions are omitted from the prompt, 2) any model other than GPT-4 is used, 3) the source segmenting is bad, 4) there are repeat segments, or 5) there are segments with unusual text "pieces" (e.g. punctuation by itself).
 - If this happens, you will need to manually align the text back to match.

* Stay tuned for tutorials about these process at AI4LanguageProfessionals. Join now at: <https://ai4languageprofessionals.groups.io>

Leveraging context even if you can't escape your CAT tool



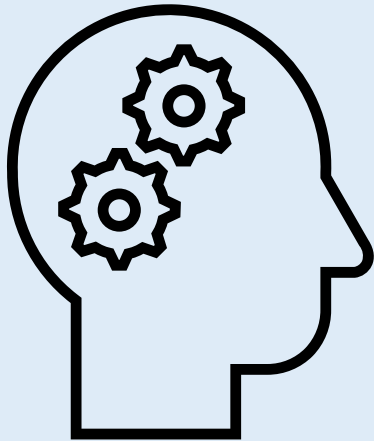
Other advanced concepts and techniques

- Translate with ad-hoc prompting. (But watch your costs!)
- Feed sections of your source document (or the entire source document, if small) into your prompt.
- Use on-screen OCR:^{*}
 - Pull source text; translate that at once in CotranslatorAI, and then paste it back into your CAT tool segment by segment.
 - Pull fuzzy and terminology matches from your TM/termbase results window (to simulate memoQ AGT approach)
 - Pull surrounding source and target text for training data.^{**}

^{*} I use ABBYY Screenshot Reader, but there are many other similar tools, even one built into Windows.

^{**} Stay tuned for a tutorial about this process at AI4LanguageProfessionals. Join now at: <https://ai4languageprofessionals.groups.io>

Using a two-cycle GAI workflow as a substitute for MTPE



Other advanced concepts and techniques

Cycle 1

Project manager

- Prepares the source files in the CAT tool
- Translates the first section of the document through part of one cycle of the GAI workflow (Steps 1-4)
- Sends the AI output to the translator

Translator

- Edits the AI output (Step 5)
- Sends the final version back to the project manager

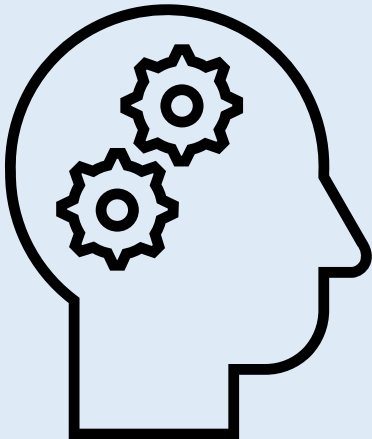
Cycle 2

Project manager

- Adds the improved translation to the anchor prompt as training data
- Translates the rest of the document with the updated anchor prompt
- Sends the translation back to the translator for final editing (dare I call this "MTPE"?)

With this workflow, payment to the translator should be based on edit-distance-rate (EDR) billing, an innovative linguist compensation structure designed for the new paradigm. Alas, I will have to give this presentation another time!

Writing and structuring your anchor prompt



Other advanced concepts and

Starts broad and gets more specific

Prepares the AI for the bilingual segment structure

The AI tends to capitalize more often than I like.

Usually ensures clean output, ready to paste into the bilingual file

Consider including non-glossary stylistic preferences (e.g. under > in accordance with > pursuant to; previous > prior)

Project-specific instructions also include how you want dates, names, units, etc. to be translated.

You are an expert [subject] translator of [source language] [document types] to [target language]. I need your help translating [document title] to [target language].

I will provide you with [source language] text to translate to [target language]. Correctly translate it, matching the translation as closely as possible to the following requirements.

Here are general instructions to follow:

- Keep each translated segment on its own line to match the source segments. Do not combine text from multiple segments into sentences or paragraphs or add empty lines between sections.
- Do not capitalize each word on a line.
- Place tags in the correct locations. Tags look like this: [1], {2}, etc. Make sure you transfer the tags with exactly the same format.
- Provide no explanations or labels; just translate.

Typical training data to include:

- Translated segments from similar content
- Related terminology-heavy target content
- Project-specific instructions
- Glossary of key terms (not your whole termbase!)
- Previous translated segments from the same document

To summarize:

- Do not write in title case
- Translate every segment on it's own line!

Translate this:

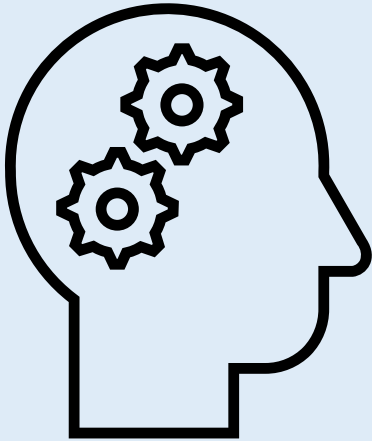
Important: Prioritize what's most important and don't overload the AI with instructions that are too complicated. Also, there's only so much you can refine a prompt; the AI is not always responsive to delicate nuances.

The AI generally knows what tags are. It doesn't hurt to be crystal clear though.

The AI apparently places more importance on instructions that come later in the prompt. So order your training data in order of how much you want the data to influence the outcome (remembering that this is more an art than a science at this point.)

Consider summarizing the most important instructions that the AI is having trouble following one more time at the end.

Using GAIT with existing TM matches



You'll lose a little context here, but it shouldn't make a big difference, especially with the TM hits in the training data.

Other advanced concepts and techniques

TM matches are perfect training data to kick off your anchor prompt!

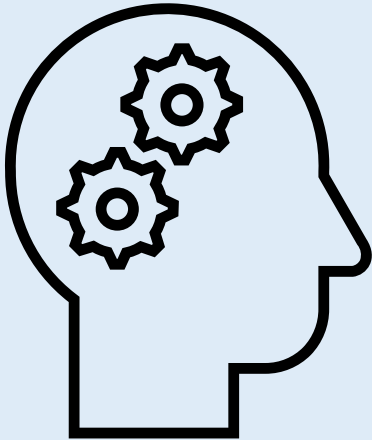
Step 1

1. "TM matches" include the fuzzy matches you can manually translate easily without the AI. So translate these first.
2. Also, make sure you properly prepare your file (i.e. remove "fluff"), as described above.
3. I also suggest locking out fuzzies (including internal fuzzies) you can't translate easily up front and pushing them to the end with a specialized fuzzy-match prompt.

Step 2

1. Export the TM-translated segments from your CAT tool and use that as training data in your anchor prompt.
2. Export out another file with only the segments that don't have TM matches.
3. Use the anchor prompt that you created in Step 1 and run the GAIT workflow.
4. Finish up in your CAT tool.

Understanding why the GAIT process must be iterative



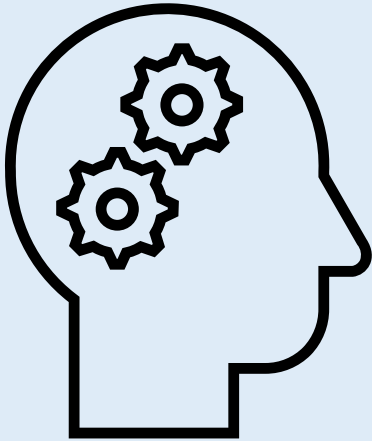
Other advanced concepts and techniques

On long documents, you can't use a single anchor prompt from beginning to end.

- You should update your anchor prompt iteratively and every time you update it, you will need to start a new dialogue context.
- Even if you don't update your prompt or change the dialogue context, you'll eventually hit the context window limit.
- Long before you reach the context window limit, the prompt will have become uneconomical anyway.
 - At 50,000 tokens, submitting the prompt one time will cost around 50¢ USD, and at 128,000 tokens (the GPT-4-Turbo limit), it will cost more than \$1.

Because of the iterative learning process and the cost of tokens, you have to develop and carry a summary of the "dialogue context" in the prompt itself!

Managing tokens to balance quality and cost

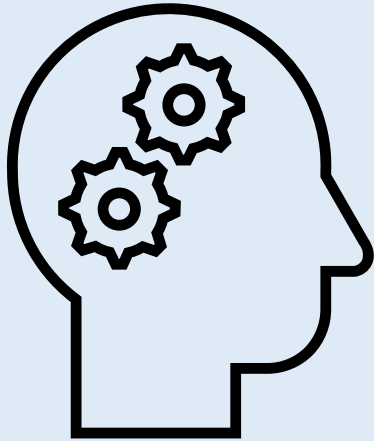


Other advanced concepts and techniques

- By staying within the same dialogue context, you maximize internal consistency, and it seldom makes sense to start a new dialogue context for every batch if you haven't updated your anchor prompt.
- The larger the batch, the fewer tokens you'll use. However, longer batches can be unwieldy to insert back into your bilingual Word file.
 - Make sure your "Max tokens" value is set adequately high. With GPT-4-Turbo, you might as well set it at 4,096 (the maximum) now. In CotranslatorAI: **Tools** menu > **Options** item > **OpenAI API** tab
- Watch the token counter and start new dialogue prompts from time-to-time.
 - As a rule of thumb, 10,000 tokens cost about 10¢ (about 8-12 pages of content)
- Along the way, make sure to update your anchor prompt so that it contains the most relevant instructions to maximize consistency.
- Keep updating your training data as well.
 - Ideally, your training data should cover the terminology, concepts, and styles of the content you are translating, and do so without duplication.
 - If the content allows, consider "anchoring" your training data from beginning to end with that very first page you translated.
 - However, you can't just keep throwing more and more in; you have to cull and cultivate the training data as well.
 - One hack is to randomize your content in Excel and then extract a certain number of segments for your training data.*
 - Rather than including your entire glossary, you can extract and use only document terms from your master glossary by pretranslating terms only.*

* Stay tuned for tutorials about these processes at AI4LanguageProfessionals. Join now at: <https://ai4languageprofessionals.groups.io>

Impact of GAIT on
the overall workflow
of a short
document

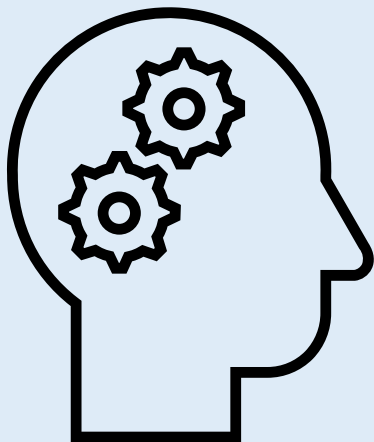


Other advanced concepts and techniques

Based on my experience with GAIT:

You will find yourself translating one-page documents with a single prompt in one go that is almost ready to deliver when you get it from the AI the first time... or the second time, or the third time!

Impact of GAIT on the overall workflow of a long document



Other advanced concepts and techniques

Based on my experience with GAIT:

1. You will spend more time:
 - Preparing your source file in your CAT tool (including recreating from PDF)
 - Getting the workflow going with your anchor prompt
 - Getting the translations of your first few batches perfect.
2. You will spend less time:
 - Translating the rest of your document
3. You will spend about the same amount of time:
 - Doing final Q/A

You may also be amazed how much better your work is than it was before!



It's now time for Q&A/discussion!



Steven S. Bammel, PhD
Korean > English translator