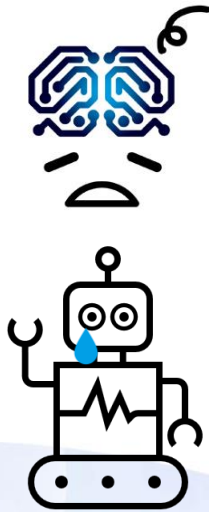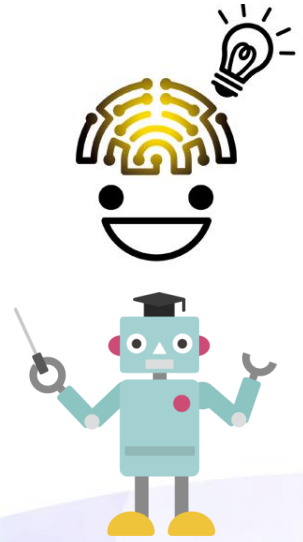## 1. Advanced AI translation technology (Transformer method)

The "Transformer method", a second-generation neural machine translation technology, improves syntax recognition accuracy. Long sentences, which are often used in patent documents, can be translated with higher accuracy than conventional methods.
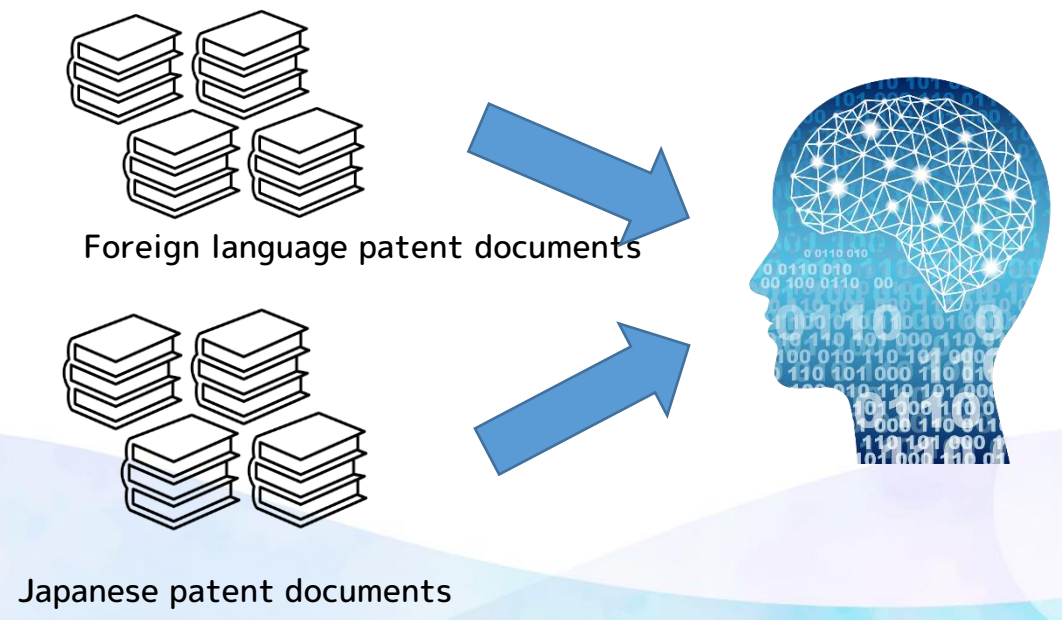

Sequence-to-sequence type AI translation

Transformer type AI translation

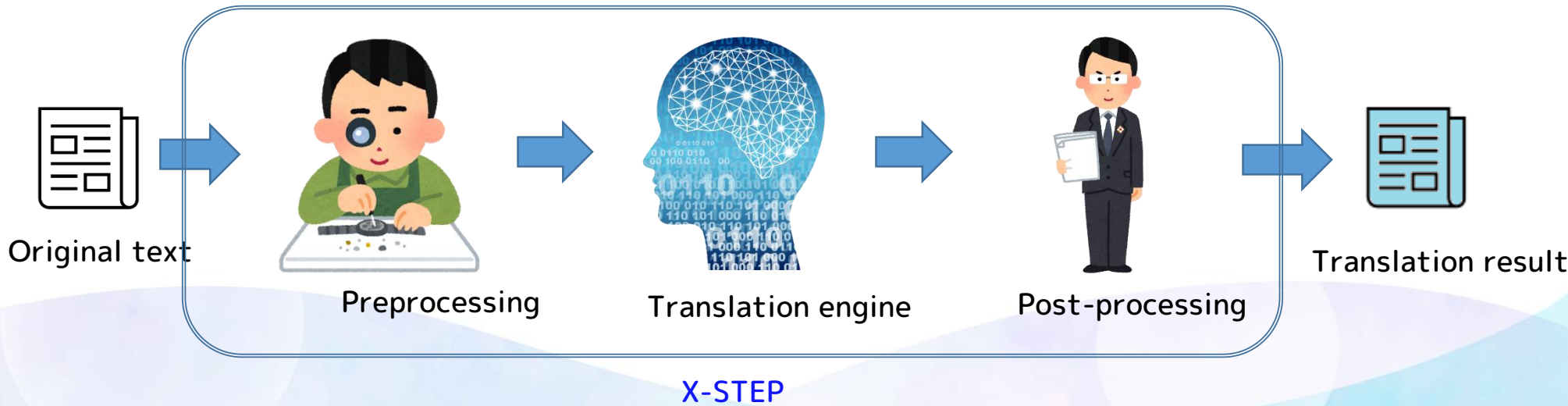## 2. Training data, specialized for patent translation

By learning AI translation with a large amount of patent bilingual texts collected uniquely by Japio, difficult patent texts can be translated in an accurate and readable form.
Whether in Japanese, English or other languages, writing of patent document is very unique.
Japio's AI translation can reproduce its uniqueness, because training data is oriented to patent translation.

Foreign language patent documents

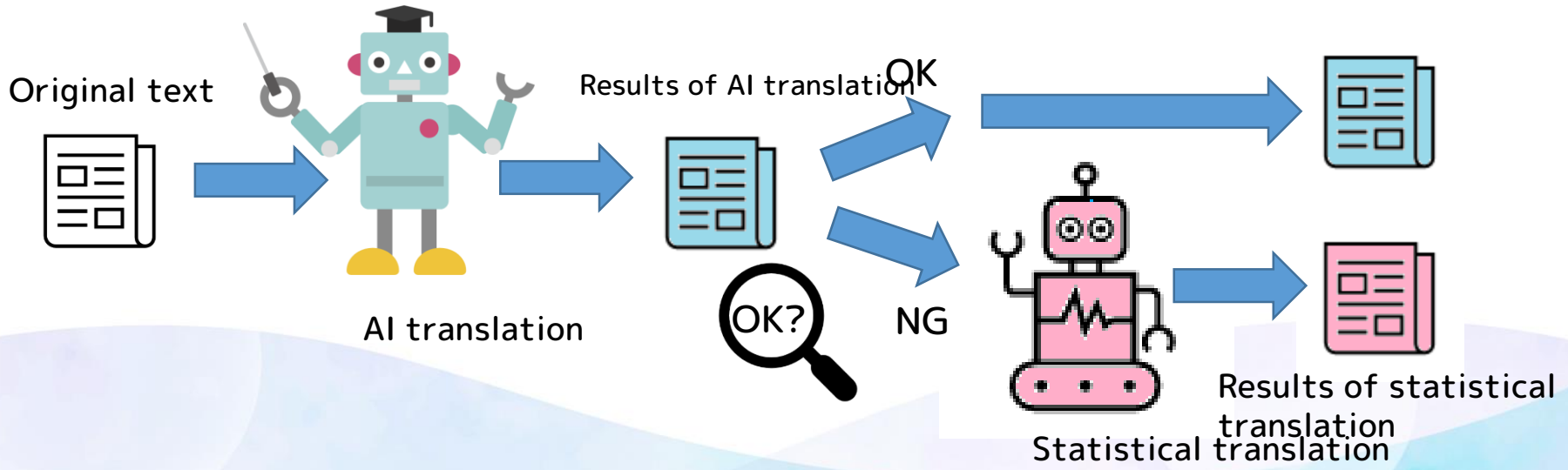Japanese patent documents

3. AI with patent translators know-how

"X-STEP" is a machine translation framework originally developed by Japio to translate patent document data in XML format published by national patent offices. In order to make the translation results of long claims accurate and easy to understand, it has a function of automatic pre-editing and high reproducibility in the translation of superscripts and subscripts frequently found in patent documents.

Original text   Preprocessing   Translation engine   Post-processing   Translation result

X-STEP

4. NMT in combination with SMT

Because AI translation is a developing technology, there is a certain probability that phrases written in the original text will not be translated (incomplete translation) or words not written in the original text will be translated (unnecessary translation). Therefore, we have adopted a method of checking the AI translation for errors and using statistical translation technology to back up any noticeable incomplete translation or unnecessary translation.

Original text

Results of AI translation   OK

AI translation

OK?   NG

Statistical translation

Results of statistical translation

5. A wide variety of languages

Japio's AI translation system allows machine translation from English, Chinese, Taiwanese, Korean, French, Russian, German into Japanese. This covers more than 92% of the languages used in the world's stored documents. It also covers all the languages used in the top 10 documents cited by the IP5 (IP Offices of Japan, the U.S., Europe, China, and Korea) over the past 10 years.

Table1: List of translatable language pairs

Original language	Translated language	Translation type
English	Japanese	AI translation for claims/ for specifications is possible.
Chinese		
Taiwanese		
French		
Russian		
German		
Korean		
Japanese	English	
	Chinese	
	Taiwanese	
	Korean	

6. Confidentiality

SSL encryption communication is used to communicate from the customer's environment to the translation server so that customers can safely translate patent documents before filing. When translating text other than published publication data, neither the original text nor the translation results are recorded in the translation server.