What is neural transfer?

Neural transfer is a method which, like the human **brain**, uses **associations** for selecting translation alternatives. It helps in choosing the correct translation if there are several possible translations available.

Example:
Gericht = court and **Gericht = dish.**
bill = Gesetz and **bill = Rechnung**

The central idea is: What do humans do in such cases to find the correct translation? They analyse the **conceptual context** of the word in question. If they find words like "parliament", "adopt", "legislation" etc. used in the context of "bill", they think: In <u>this</u> context it must be translated as "Gesetz". If, on the other hand, they find words such as "pay", "phone", "invoice" etc., they conclude: In <u>this</u> context it must be translated as "Rechnung". And the "bill" of a "bird" which can be "yellow" and "spoon-shaped" is a third meaning, which would be "Schnabel" in German.

The next question is: How do humans <u>come</u> to this conclusion? By knowing that these things are related to each other (this is the concept of "**world knowledge**"). Such world knowledge is stored and networked in the human brain (forming a "neural network").

The neural transfer function tries to replicate this associative human approach. Using linguistic and neuroinformatics methods, enormous quantities of text are analysed (with more than 1.5 <u>billion</u> words, the **linguatec corpus** is the largest collection we know!) to identify which concepts are usually used in context with each other.
These concepts are extracted and saved in an associative memory (a neural network). The information held here would indicate, for example, that "plant" is probably translated as "Pflanze" if used in the context of "flower", "water" etc., but is probably translated as "Werk" if used in the context of "electrical", "chemical", "workforce" etc.

This neural network is activated if the system encounters such a term:
• It looks at the context in the text,
• compares it with its knowledge of such contexts as saved in the neural network, and
• decides on the best translation.

This makes it possible to find translation alternatives which have so far not been possible to identify in machine translations because previous systems
• only analyse the individual sentence (instead of the entire context), and
• do not have this associative knowledge capability.
Of course, no system is perfect and the intelligent human can always find cases in which the ignorant machine chooses the wrong option, for example if the "parliament" "pays" its "phone" "bill". The progress here is not that there <u>are</u> such examples but that they are increasingly hard to find ...

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