01

HOW MACHINE TRANSLATION WORKS?

one language to another

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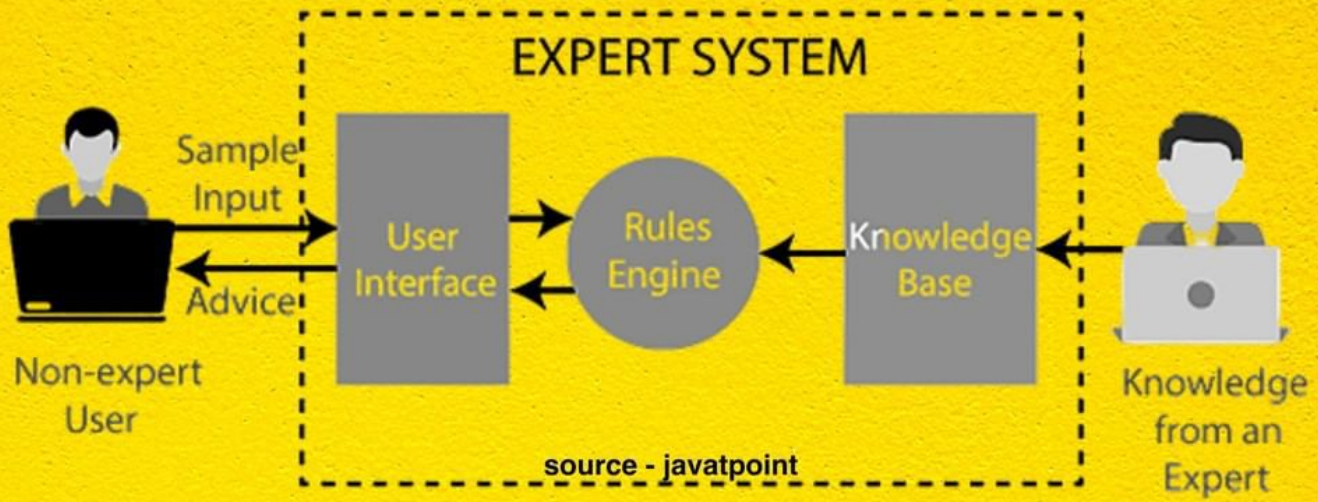
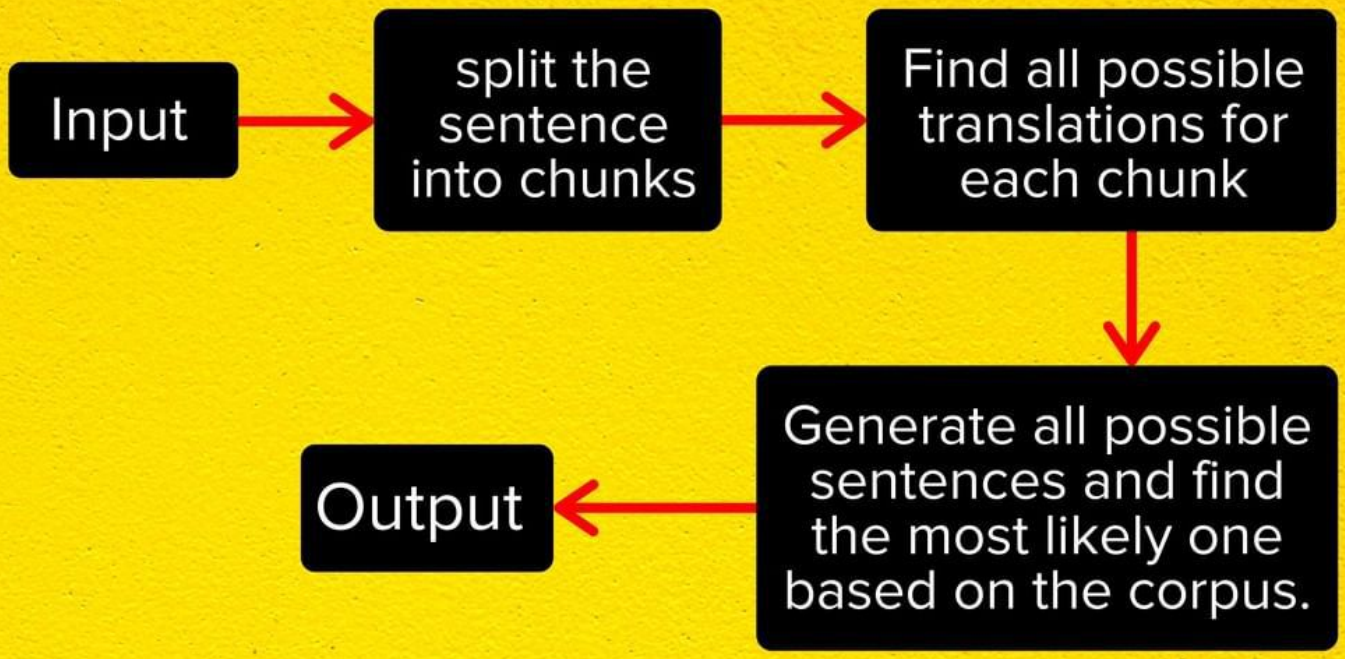
WHAT IS MACHINE TRANSLATION?

- Machine translation (MT) is automated translation. It is the process by which computer software is used to translate a text from one natural language (such as English) to another (such as French).



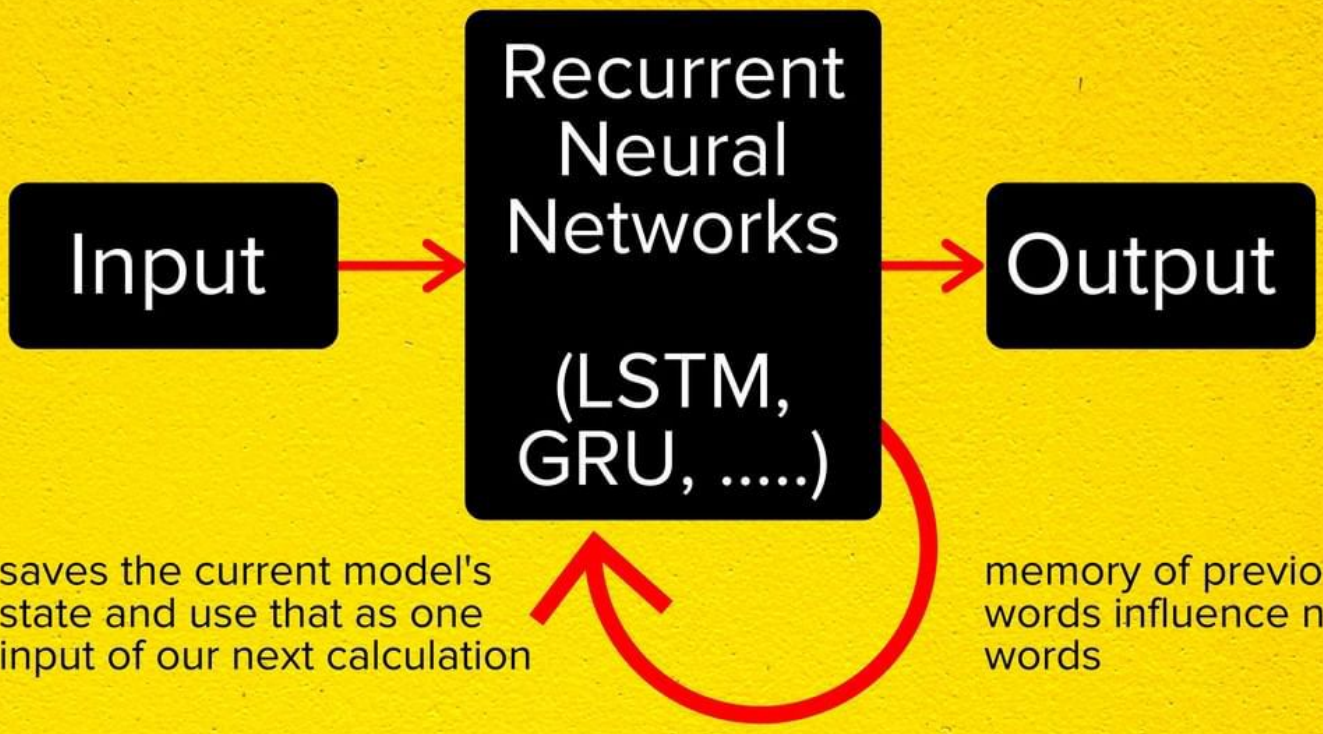
RULE - BASED TRANSLATION?

- Classical machine translation methods often involve rules. The rules are often developed by linguists and may operate at the lexical, syntactic, or semantic level.
- The key limitations of the classical machine translation approaches are both the expertise required to develop the rules, and the vast number of rules and exceptions required.



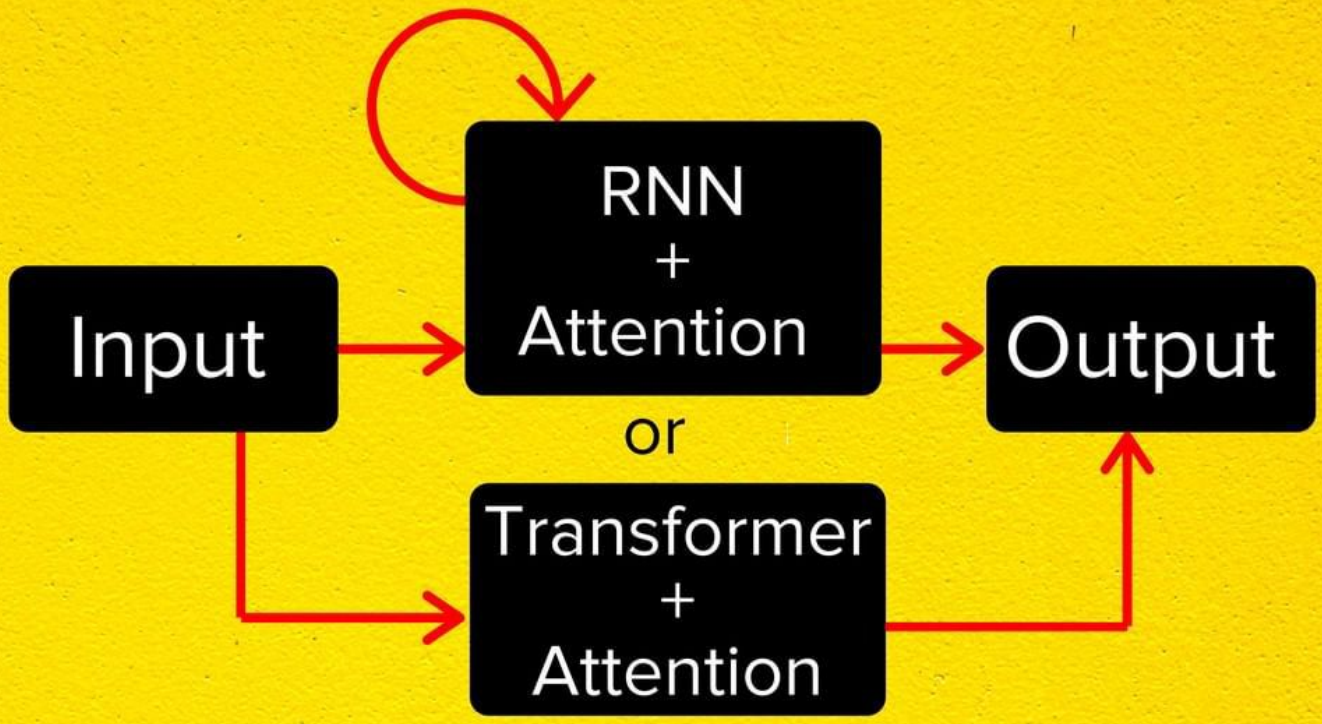
STATISTICS - BASED TRANSLATION?

- It uses of statistical models that learn to translate text from a source language to a target language given a large corpus of examples.
- Limitation of statistical approaches is, it requires careful tuning of each module in the translation pipeline.



NEURAL MACHINE TRANSLATION?

- It uses of neural networks especially Recurrent neural networks which are organized into an encoder-decoder architecture that allow for variable length input and output sequences.
- The benefit is that a single system can be trained directly on source and target text, no longer requiring the pipeline of specialized systems used in statistical machine learning.

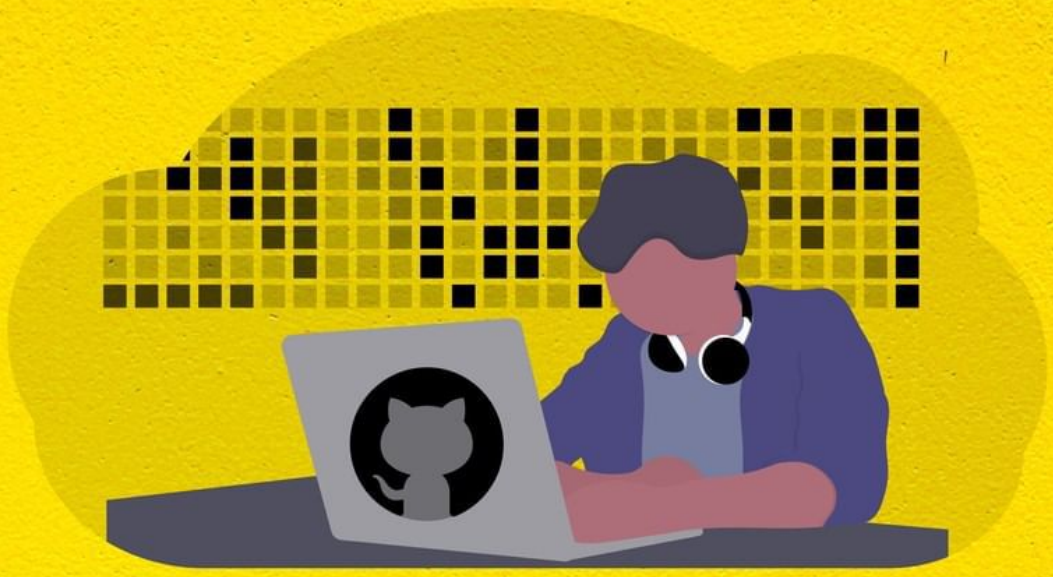


ATTENTION BASED TRANSLATION?

- Although effective, the Encoder-Decoder architecture has problems with long sequences of text to be translated.
- The problem stems from the fixed-length internal representation that must be used to decode each word in the output sequence.

ATTENTION BASED TRANSLATION?

- The solution is the use of an attention mechanism that allows the model to learn where to place attention on the input sequence as each word of the output sequence is decoded.
- The encoder-decoder recurrent neural network architecture with attention is currently the state-of-the-art on some benchmark problems for machine translation.



OPEN SOURCE IMPLEMENTATIONS

- Google-GNMT (Tensorflow)
- Facebook-fairseq (Torch)
- Amazon-Sockeye (MXNet)
- NEMATUS (Theano)
- THUMT (Theano)
- OpenNMT (PyTorch)
- StanfordNMT (Matlab)
- DyNet-lamtram(CMU)
- EUREKA(MangoNMT)
- Many more.....

APPLICATIONS OF MACHINE TRANSLATION

- Text-to-text
- Text-to-speech
- Speech-to-text
- Speech-to-speech
- Image (of words)-to-text
- Major domains like Government, Software & technology, Military & defence, Healthcare, Finance, Legal, E-discovery amd Ecommerce