# Neural Machine Translation Introduction

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## Statistical Machine Translation (SMT)

The goal of statistical machine translation (SMT) is to produce target string from source string where models are estimated from examples. Among the possible target strings the one with max probability is chosen. The Bayes relation is used to introduce a target language model:

(1)

where is the *translation model* and is the *language model*. That is, the *translation model* is the probability that the source string is the translation of the target string while *language model* is the probability of seeing the target language string .

## Sequence to Sequence Network (Seq2Seq)

Drawback of Deep Neural Networks – can only be applied to problems whose inputs and targets can be sensibly encoded with vectors of fixed dimensionality. This is a significant limitation since many important problems are best expressed with sequences whose lengths are not known a-priori. For example, speech recognition and machine translation are sequential problems. Likewise, question answering can be seen as mapping a sequence of words representing the question to a sequence of words representing the answer.

## Continuous Space Language Models (CSLM) for Statistical Machine Translation