



RESEARCH STAY WEEK 8,

**► Encoder-Decoder Architecture
for Sequence-to-Sequence
Tasks**

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► CONTEXT

Sequence to sequence tasks (aka. seq2seq) encompasses any “translation” task (transforming an input sequence to a new one). This could be actual machine translation, error correction, etc.

Seq2seq tasks offer some unique challenges. One of which is that the input and output sequences may not be fully aligned (input length might be different from output length). There are many different ways to tackle this but one common way is making use of RNNs in a encoder-decoder architecture.

In this architecture an encoder receives the input sequence and calculates a context vector that represents its contents. Then the decoder receives this vector and generates the output sequence.

► SEARCH METHODOLOGY

I wanted to delve deeper into grammatical error correction as it would have never occurred to me to see this as a seq2seq problem. I looked for grammatical error detection / correction in scopus and found papers that focused mostly on the sequence generation part of the problem and see if there are noble approaches.

► COMPARISON

Title	Objective	Detection/Correction	Arquitecture	Year	Takeaways
A survey of word embeddings evaluation methods	Shows a seq2seq implementation for error correction. It shows the difference between using word embeddings (word2vec) and a character level CNN and optimizes the hyperparameters for the model.	Correction (Detection through comparing the translated result)	Encoder / decoder model with attention but using a highway nerwork intead of a fully conected one for the next word predictions.	2016	Attention based encoder decoder models can be used for gramatical error correction if trated as a translation task.
Detection-Correction Structure via General Language Model for Grammatical Error Correction	Showing a noble integration of detection and correction tasks into a single, faster model than normal seq2seq correction.	Both toguether	GLM with autoregressive blank infilling and an specialized layer for error clasification.	2024	A GLM with autregresive blank infilling allows to reak the benefits of a seq 2 seq arquitecture while only requiring recalculation of the sentence sections with errors, saving considerably on computation.

► BIBLIOGRAFÍA

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