

Demo: Neural Machine Translation

Kyunghyun Cho *kyunghyun.cho@umontreal.ca*

Bart van Merriënboer *bart.vanmerrienboer@umontreal.ca*

Caglar Gulcehre *caglar.gulcehre@umontreal.ca*

Dzmitry Bahdanau *d.bahdanau@jacobs-university.de*

Jean Pouget-Abadie *jean.pougetabadie@gmail.com*

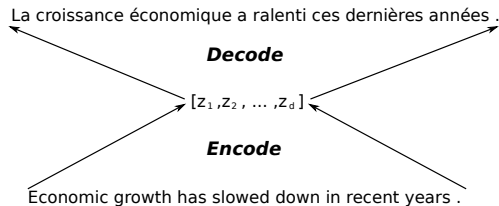
Fethi Bougares *fethi.bougares@lium.univ-lemans.fr*

Holger Schwenk *holger.schwenk@lium.univ-lemans.fr*

Yoshua Bengio *yoshua.bengio@umontreal.ca*

and others..

Machine Translation as Nothing, but a *Supervised Learning Task*



Properties

- ▶ *Variable-length* input/output
- ▶ *Many-to-many* mapping
- ▶ *End-to-end* trainable

Implications

- ▶ *Order-sensitive*
- ▶ *Probabilistic*
- ▶ *End-to-end Smooth*

Learning to Align and Translate Jointly – (1)

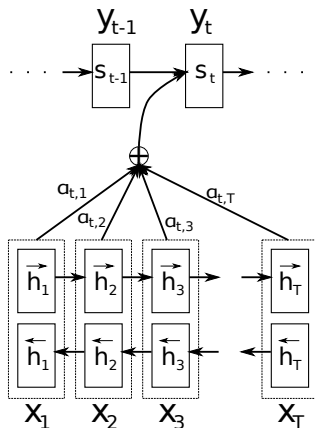
Annotation vector $h_j = \begin{bmatrix} \vec{h}_j \\ \overleftarrow{h}_j \end{bmatrix}$

- ▶ \vec{h}_j : Forward RNN
- ▶ \overleftarrow{h}_j : Backward RNN

For each target word y_t ,

1. Compute $\alpha_{t,j} = f(h_j, s_{t-1})$
 - ▶ $\sum_j \alpha_{t,j} = 1$
 - ▶ f is a feedforward neural network
2. Get a context vector $c_t = \sum_j \alpha_{t,j} h_j$

And, train the whole model with SGD and backpropagation!



Learning to Align and Translate Jointly – (2)

The agreement on the European Economic Area was signed in August 1992 .



L' accord sur l' Espace économique européen a été signé en août 1992 .

" This will change my future with my family , " the man said .



" Cela changera mon avenir avec ma famille " , dit l' homme .

Demo available now at...

<http://lisa.iro.umontreal.ca/mt-demo>