# Biomedical Neural Machine Translation

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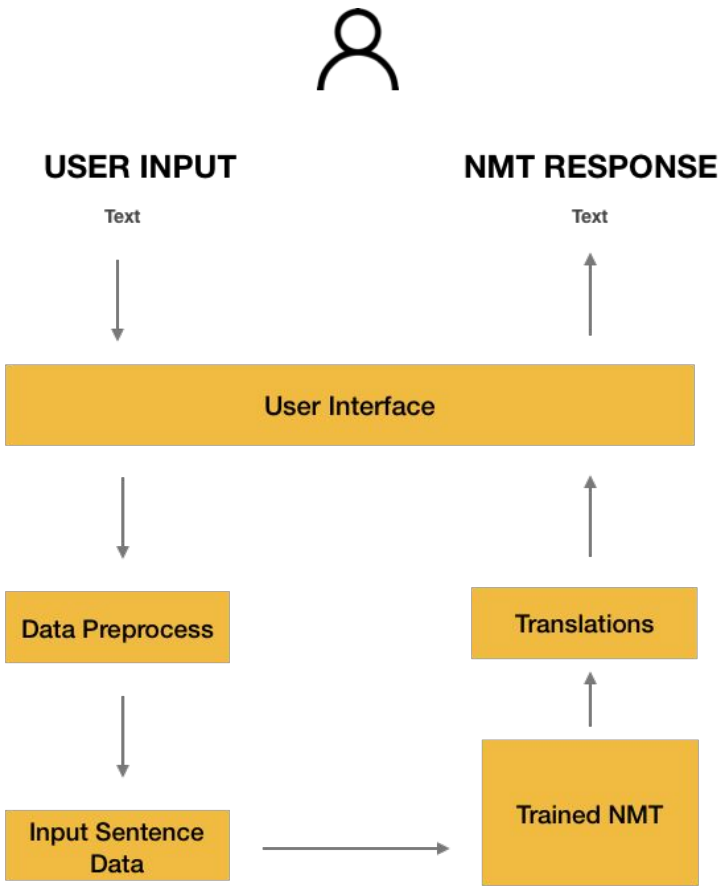
# Goals

- Build a Neural Machine Translation product for biomedical phrases which can be utilized in the healthcare industry.
- To try out various architectures of sequence to sequence models and determine the best NMT model.
- And hence improve the patient-physician engagement

# Workflow


USER INPUT
Text
NMT RESPONSE
Text
User Interface
Data Preprocess
Translations
Input Sentence Data
Trained NMT

# Best Models According to Our Experiments

| # | Encoder | Decoder | Attention | # Neurons | BLEU | Loss |
|---|---|---|---|---|---|---|
| 1 | 4 Layer bi-LSTM | 4 Layer LSTM | Bahdanau | 512 | 0.41 | 1.69 |
| 2 | 1 Layer bi-LSTM | 2 LSTM | Luong | 256 | 0.32 | 0.35 |
| 3 | 4 Layer bi-LSTM | 4 Layer LSTM | Bahdanau | 512 | 0.38 | 0.38 |

Note: Experiments showed above are on 50k experiment data set, and the epochs are 20

# Over-translations

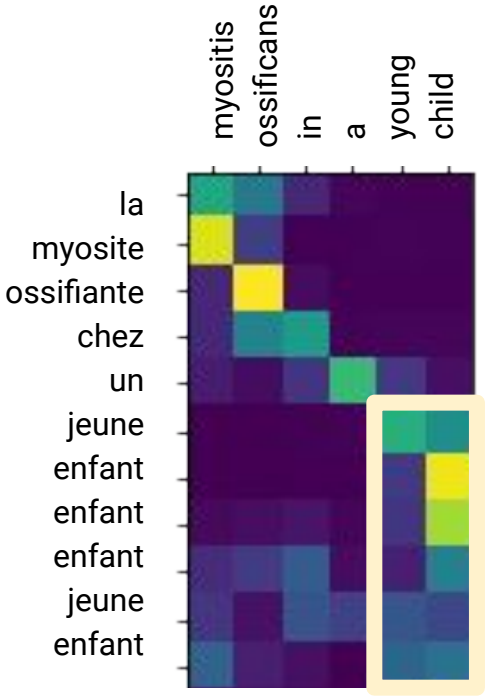



Figure 1: Attention Plot
From a shallow Network

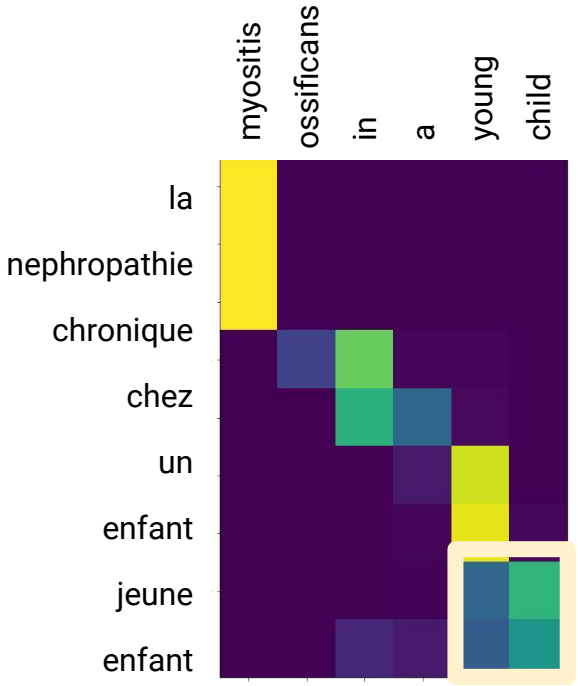
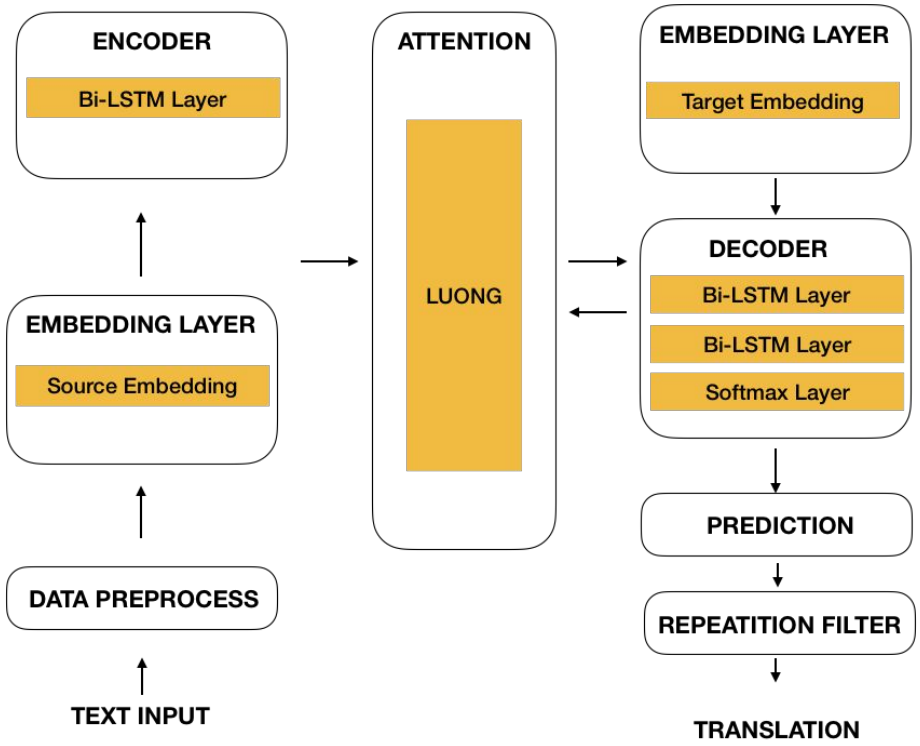



Figure 2: Attention Plot
From a bigger Network

# Model Architecture

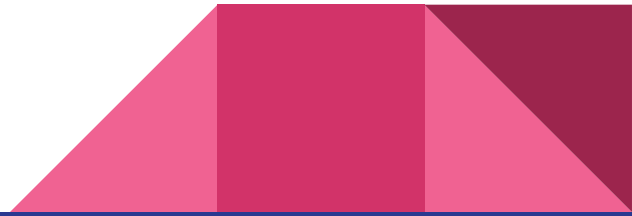



Final Model Decision Is Based On:

1. Balanced BLEU and Loss
2. Manual Check
3. Complexity of the Model

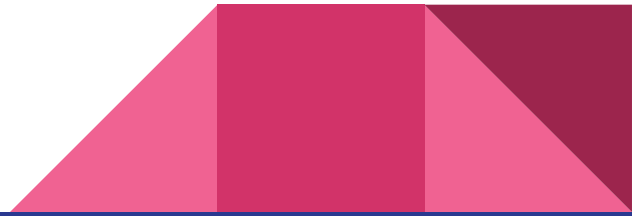
# Challenges

- Linguistic knowledge
- Domain knowledge
- Evaluation metric
- Recurring words



# Application Demo

Running on an Amazon EC 2 t2.micro instance



# Thank You!