

PROJECT 2

English to French Neural Language Translator Using LSTM

Submitted By :

Divyansh Kashyap

(021323010)

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Please feel free to reach out to me at the following

Email : divyanshkashyap009@gmail.com

LinkedIn: <https://www.linkedin.com/in/divyansh-kashyap-231270301/>



College Dekho Assured(ImaginXp) Jagannath
Community College(Delhi)
Jagannath University,Bahadurgarh,Haryana

Project Report: English to French Neural Language Translator

1. Project Overview

This project presents a deep learning approach to language translation using a Long Short-Term Memory (LSTM) neural network. The goal is to convert English sentences into French by learning sequence mappings through a supervised neural network model.

2. Objectives

- To develop a neural language translator that converts English text to French.
- To preprocess and tokenize bilingual text data for neural sequence training.
- To build and train an LSTM-based encoder-decoder model.
- To evaluate and visualize the performance of the translation model.

3. Tools and Technologies Used

Programming Language:

- Python

Libraries and Frameworks:

- TensorFlow & Keras
- NLTK
- Gensim
- Matplotlib, Seaborn, Plotly
- Pandas & NumPy

4. Dataset and Preprocessing

Project Report: English to French Neural Language Translator

Data Source: Two small parallel corpora (`small_vocab_en.csv` and `small_vocab_fr.csv`) for English and French.

Cleaning Steps:

- Lowercasing and punctuation removal
- Stopword filtering
- Tokenization using NLTK

Tokenization & Padding:

- Keras Tokenizer and pad_sequences are used.

5. Model Architecture

The model is built using a sequence-to-sequence (seq2seq) architecture:

- Embedding Layer
- Encoder (LSTM)
- RepeatVector
- Decoder (LSTM)
- TimeDistributed(Dense with Softmax)

This architecture captures the mapping between English and French sequences.

6. Training & Evaluation

Loss Function: Categorical Crossentropy

Optimizer: Adam

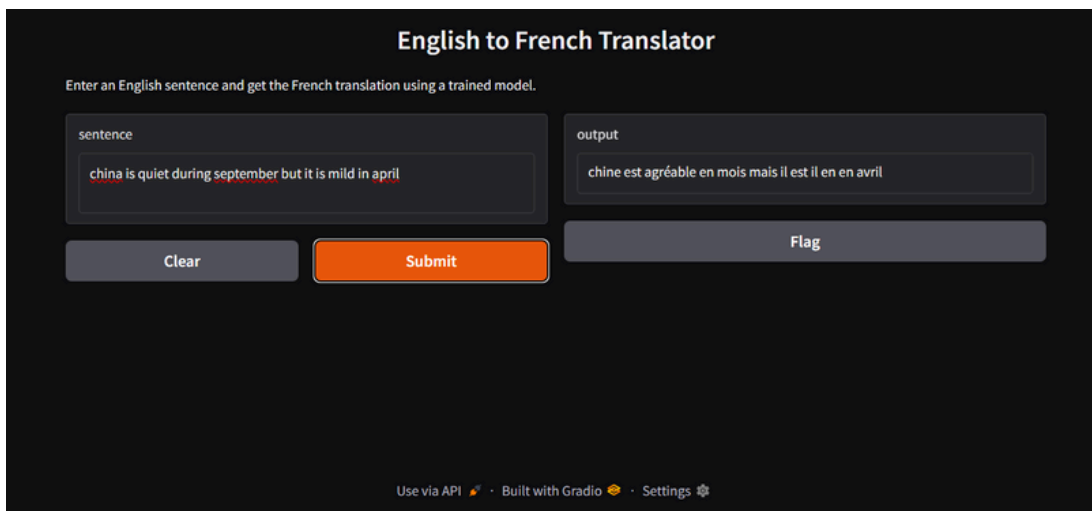
Project Report: English to French Neural Language Translator

Metrics: Accuracy

Epochs: Based on convergence

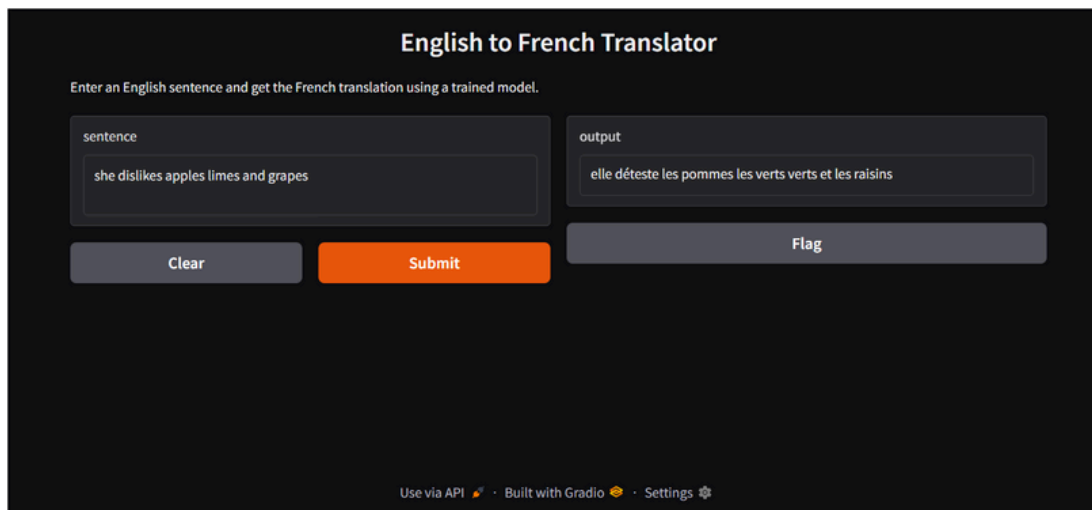
7. Sample Translations

Sample 1: EN -> FR Translation



The screenshot shows a web interface titled "English to French Translator". Below the title is a subtitle: "Enter an English sentence and get the French translation using a trained model." The interface has two main input/output areas. The "sentence" input area contains the text "china is quiet during september but it is mild in april". The "output" area contains the French translation "chine est agréable en mois mais il est il en en avril". Below the input areas are three buttons: "Clear", "Submit", and "Flag". At the bottom of the interface, there is a footer with the text "Use via API" followed by a small icon, "Built with Gradio" followed by a small icon, and "Settings" followed by a small icon.

Sample 2: EN -> FR Translation



The screenshot shows the same web interface as Sample 1. The "sentence" input area now contains the text "she dislikes apples limes and grapes". The "output" area contains the French translation "elle déteste les pommes les verts verts et les raisins". The "Clear", "Submit", and "Flag" buttons are still present. The footer text "Use via API", "Built with Gradio", and "Settings" remains the same.

8. Sample Deployment Link

Access a working demo or notebook for testing the translator:

<https://aed75960c6590ef289.gradio.live>

(Valid only for 1 week)