

# Analyzing and Improving Machine Translation of Technical Text

**Objective:** Analyze the quality of machine translation using popular tools and propose ways to improve the translation of technical texts.

## Step 1: Text Selection

1. Choose a technical text. It can be:
  - An excerpt from a user manual for a device.
  - A description of a technical procedure or technology.
  - A product specification or operating instructions.

**Example:** "The operation of the device is controlled through the integrated software, which uses advanced algorithms to ensure optimal performance."

2. The text should be about 150-250 words to have enough data for analysis.

## Step 2: Machine Translation

1. Translate the chosen text using **two different online translators**:
  - **Google Translate**
  - **DeepL**

Important: Use the same source text and translate it into the same target language (e.g., from English to Russian).

## Step 3: Comparison of Translations

1. **Error Assessment:** Carefully compare the two translations. Look for the following types of errors:
  - Lexical errors: incorrect word choice, such as using a less suitable term.
  - Grammatical errors: incorrect sentence structure, tense or case mismatches.
  - Semantic errors: loss of meaning or misunderstanding in translation.
  - Terminological errors: incorrect translation of specialized technical terms.
2. **Documenting Errors:** Create a table with the identified errors for each translation, specifying the type of error and explaining why the translation is incorrect.

## Step 4: Metrics for Translation Quality Assessment

1. **Use metrics to evaluate the translation:**
  - **BLEU** (Bilingual Evaluation Understudy): measures translation accuracy by comparing n-grams of the translated text with a reference translation. The more matches, the higher the BLEU score.
  - **TER** (Translation Edit Rate): measures the number of changes (insertions, deletions, substitutions) needed to align the machine-generated translation with the reference translation.
2. For this, use **online calculators** for BLEU and TER metrics, such as:
  - **BLEU Calculator:** <https://www.moses-smt.org/> (for translation and BLEU score calculation).
  - **TER Calculator:** <https://www.statmt.org/tercom/> (for TER score calculation).

3. Enter the translated text into the calculator and get a quality score.

### **Step 5: Post-Editing**

1. **Manual Post-Editing:** Correct the identified errors in the translation. Make the following improvements:
  - Fix lexical and grammatical errors.
  - Ensure that technical terms are translated correctly, and if needed, replace words with more accurate ones.
  - Verify that the meaning of the text is preserved and that the sentence structure sounds natural.

#### **Post-Editing Tips:**

- Use specialized glossaries for technical terms.
- Read the corrected text multiple times to ensure its accuracy.

### **Step 6: Final Evaluation**

1. Evaluate the final result:
  - How accurate and natural does the translation sound after post-editing?
  - How would you rate the quality of machine translation before and after editing? Specify the metrics used.
2. Draw conclusions:
  - What are the main limitations of machine translation in technical texts?
  - Why is post-editing important, especially in professional fields?

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### **Task Result:** Students should provide:

- A comparative table of errors for both machine translations.
- A translation quality assessment using BLEU and TER metrics.
- A post-editing report explaining the changes made and suggestions for improving the translation quality.