COMP0173-CW2-NOTEBOOK-Model-P3

December 10, 2025

1 COMP0173: Coursework 2

The paper HEARTS: A Holistic Framework for Explainable, Sustainable, and Robust Text Stereotype Detection by Theo King, Zekun Wu et al. (2024) presents a comprehensive approach to analysing and detecting stereotypes in text [1]. The authors introduce the HEARTS framework, which integrates model explainability, carbon-efficient training, and accurate evaluation across multiple bias-sensitive datasets. By using transformer-based models such as ALBERT-V2, BERT, and DistilBERT, this research project demonstrates that stereotype detection performance varies significantly across dataset sources, underlining the need for diverse evaluation benchmarks. The paper provides publicly available datasets and code [2], allowing full reproducibility and offering a standardised methodology for future research on bias and stereotype detection in Natural Language Processing (NLP).

2 Instructions

All figures produced during this notebook are stored in the project's `/COMP0173_Figures` directory. The corresponding LaTeX-formatted performance comparison tables, including ALBERT-V2, BERT, and DistilBERT are stored in `/COMP0173_PDF`, with the compiled document available as `COMP0173-CW2-TABLES.pdf`.

3 Technical Implementation (70%)

[1]:
```
# %%capture
# pip install -r requirements.txt
# pip install transformers
# pip install --upgrade transformers
# pip install --upgrade tokenizers
# pip install -U sentence-transformers
# pip install natasha
# pip install datasets
# pip install --user -U nltk
# conda install -c anaconda nltk
# pip install --upgrade openai pandas tqdm
# pip install dotenv
# python -m spacy download ru_core_news_lg
```

[2]:
```
# pip install -U pip setuptools wheel
# pip install -U spacy
# python -m spacy download en_core_web_trf
# python -m spacy download en_core_web_sm
# python -m spacy download ru_core_news_lg

# # GPU
# pip install -U 'spacy[cuda12x]'
# # GPU - Train Models
# pip install -U 'spacy[cuda12x,transformers,lookups]'
```

[3]:
```
# Import the libraries
import random, numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
sns.set(color_codes=True)
plt.style.use('seaborn-v0_8')

# To ignore warnings
import warnings
warnings.filterwarnings('ignore')
np.random.seed(23)

warnings.filterwarnings(
    "ignore",
    message="pkg_resources is deprecated as an API"
)
```

[4]:
```
# Import libraries
import pandas as pd
import os
import sys
import importlib.util, pathlib
from pathlib import Path
import warnings
from importlib import reload
from importlib.machinery import SourceFileLoader
from IPython.display import display
import pandas as pd
from pathlib import Path
import re
import difflib
import string
from collections import defaultdict
import json
import gc
```

[5]:
```
import torch
import transformers
from transformers import AutoModelForMaskedLM, XLMWithLMHeadModel
from transformers import AutoTokenizer, AutoConfig
from transformers import TrainingArguments, Trainer
from sentence_transformers import SentenceTransformer, util
import platform
from datasets import Dataset
# import spacy
import requests
from tqdm import tqdm
import yaml
import os
os.environ["TOKENIZERS_PARALLELISM"] = "false"
```

[6]:
```
sys.path.append("Exploratory Data Analysis")
sys.path.append("Model Training and Evaluation")

from Initial_EDA import (
    prepare_target_variable_distribution,
    prepare_group_distribution,
    prepare_text_length_analysis,
    create_word_cloud
)

from Sentiment_Toxicity_Analysis_Ru import analyse_sentiment_and_regard
```

[7]:
```
# # Check the GPU host (UCL access)
# print("CUDA available:", torch.cuda.is_available())
# print("Device:", torch.cuda.get_device_name(0))

# # Path
# import os
# os.chdir("/tmp/HEARTS-Text-Stereotype-Detection")
# os.getcwd()
```

3.1 Part 4: Adapt the model architecture and training pipeline to your local context

Helper Functions

[8]:
```
def pie_chart_domain(df, column, name):

    """
    Plot the percentage distribution of social-group domains as a styled pie␣
 ↪chart.

    Parameters
```

```
    ----------
    df : pandas.DataFrame
        Input dataframe containing a categorical column representing social␣
↪domains.
    column : str, optional
        Name of the column in `df` holding domain labels.

    column : str, optional
        Name of the dataset.

    Returns
    -------
    None
        Displays a pie chart visualising the proportional distribution of␣
↪categories.

    Notes
    -----
    The function applies a custom colour palette tailored for the RuBias␣
↪dataset
    (gender, class, nationality, LGBTQ). Any unseen categories default to grey.
    """

    # Compute relative frequency (%) of categories
    domain_counts = df[column].value_counts(normalize=True) * 100
    labels = domain_counts.index
    sizes = domain_counts.values

    # Predefined colour palette
    color_map = {
        'gender':      "#CA5353",
        'profession':  "#F1A72F",
        'nationality': "#559A67",
        'lgbtq':       "#527BCD",
    }
    # Assign colours; fallback to grey for unknown labels
    colors = [color_map.get(lbl, 'grey') for lbl in labels]

    # Create compact, high-resolution figure
    plt.figure(figsize=(5.5, 4), dpi=155)

    # Draw pie chart with formatted percentages
    wedges, texts, autotexts = plt.pie(
        sizes,
        labels=None,
        autopct='%1.1f%%',
        pctdistance=0.55,
```

```
        startangle=90,
        colors=colors,
        wedgeprops={'linewidth': 2, 'edgecolor': 'white'}
    )

    # Style displayed percentage numbers
    for t in autotexts:
        t.set_fontsize(10)
        t.set_color("black")

    # Title
    plt.title(f"Social Group Distribution: {name}", fontsize=16)

    # Legend placed to the right of the figure
    plt.legend(
        wedges,
        labels,
        title="Domain",
        loc="center left",
        bbox_to_anchor=(1.02, 0.5),
        fontsize=11,
        title_fontsize=12
    )

    plt.tight_layout()
    plt.show()
```

[9]:
```
def format_text(texts: pd.Series) -> pd.Series:

    """
    Normalise Russian stereotype strings.

    Operations
    ----------
    - remove the phrases ",          ," and ",             ,"
    - lowercase
    - remove punctuation (including comma)
    - replace '-' and '-' with spaces
    - collapse multiple spaces
    - normalise ' ' → ' '

    Parameters
    ----------
    texts : pd.Series
        Series of raw text strings.

    Returns
```

```
    -------
    pd.Series
        Normalised text strings.
    """

    # remove all punctuation except underscore (keep '_' if you use it as a␣
↪token)
    punc = ''.join(ch for ch in string.punctuation if ch not in '_')

    # replace '-' and '–' with spaces, remove other punctuation (including␣
↪commas)
    trans_table = str.maketrans('–-', '  ', punc)

    PHRASES_TO_REMOVE = [
        "          ",
        "            ",
        "           ",
        "            ",
        "           "
    ]

    def _norm(s: str) -> str:
        s = str(s)

        # remove specific filler phrases
        for ph in PHRASES_TO_REMOVE:
            s = s.replace(ph, "")

        # lowercase + strip punctuation
        s = s.lower().translate(trans_table)

        # collapse multiple spaces
        s = " ".join(s.split())

        # normalise  →
        s = s.replace(" ", " ")

        return s

    return texts.apply(_norm)
```

[10]:
```
def clean_rubist(df: pd.DataFrame, text_col: str = "text") -> pd.DataFrame:

    """
    Clean and restructure the augmented RUBIAS dataset.

    Steps:
```

```
    - Drop rows where stereotype_type is missing
    - Drop old 'category' column if present
    - Rename 'label_level' → 'category'
    - Create 'label' column: category_stereotype_type
    - Reorder columns to: stereotype_type, text, category, label
    """

    df = df.copy()

    # Drop rows with missing stereotype_type
    df = df.dropna(subset=["stereotype_type"])

    # Drop old category column if exists
    if "category" in df.columns:
        df = df.drop(columns=["category"])

    # Rename label_level → category
    df = df.rename(columns={"label_level": "category"})

    # Format strings
    df[text_col] = format_text(df[text_col])

    # Remove duplicates
    df = df.drop_duplicates(subset="text")

    # Reorder columns
    desired_order = ["stereotype_type", text_col, "category"]
    df = df[desired_order]

    return df
```

[47]:
```
def _grouped_barplot(percent_table, title, color_map):

    import seaborn as sns
    sns.set_style("whitegrid")

    categories = percent_table.index.tolist()
    labels = percent_table.columns.tolist()

    x = np.arange(len(categories))

    total_width = 0.55
    width = total_width / max(len(labels), 1)

    fig, ax = plt.subplots(figsize=(6, 4), dpi=200)

    # Bars
```

```
    for i, lab in enumerate(labels):
        offsets = x - total_width/2 + (i + 0.5) * width
        ax.bar(
            offsets,
            percent_table[lab].values,
            width=width * 0.75,
            label=lab,
            color=color_map.get(lab, "grey"),
            edgecolor=None,             # <<< NO BLACK OUTLINE
        )

    #
    ax.set_xticks(x)
    ax.set_xticklabels(categories, fontsize=11)

    ax.set_ylim(0, 100)
    ax.set_yticks(np.arange(0, 101, 10))
    ax.tick_params(axis='y', labelsize=9)
    ax.set_ylabel("")

    ax.yaxis.set_major_formatter(plt.FuncFormatter(lambda v, pos: f"{int(v)}%"))

    ax.set_title(title, fontsize=14, fontweight="bold", pad=12)

    # Real seaborn-like grid:
    ax.grid(axis="y", color = "0.75", linewidth=0.5)
    ax.grid(axis="x", visible=False)

    # Remove seaborn-breaking spines
    sns.despine(ax=ax)

    ax.legend(
        loc="upper center",
        bbox_to_anchor=(0.5, -0.18),
        ncol=len(labels),
        frameon=False,
        fontsize=10,
    )

    fig.tight_layout()
    plt.show()
```

[28]:
```
def plot_sentiment_by_category(df, title, category_col="category",␣
↪sentiment_col="sentiment"):

    tab = pd.crosstab(df[category_col], df[sentiment_col], normalize="index") *␣
↪100
```

```
    tab = tab.reindex(
        index=["stereotype", "neutral", "unrelated"],
        columns=["positive", "neutral", "negative"]
    ).fillna(0)

    _grouped_barplot(tab, title, SENTIMENT_COLORS)
```

[29]:
```
def plot_toxic_by_category(df, title, category_col="category",␣
↪toxic_col="regard"):

    tab = pd.crosstab(df[category_col], df[toxic_col], normalize="index") * 100

    tab = tab.reindex(
        index=["stereotype", "neutral", "unrelated"],
        columns=["toxic", "non_toxic"]
    ).fillna(0)

    _grouped_barplot(tab, title, TOXIC_COLORS)
```

[30]:
```
def plot_sentiment_for_stereotypes_by_group(df, title,
                                            category_col="category",
                                            group_col="stereotype_type",
                                            sentiment_col="sentiment"):

    subset = df[df[category_col] == "stereotype"]

    tab = pd.crosstab(subset[group_col], subset[sentiment_col],␣
↪normalize="index") * 100

    tab = tab.reindex(
        index=["gender", "profession", "nationality", "lgbtq"],
        columns=["positive", "neutral", "negative"]
    ).fillna(0)

    _grouped_barplot(
        tab,title,
        SENTIMENT_COLORS
    )
```

[31]:
```
def plot_toxic_for_stereotypes_by_group(df, title,
                                        category_col="category",
                                        group_col="stereotype_type",
                                        toxic_col="regard"):

    subset = df[df[category_col] == "stereotype"]
```

```
    tab = pd.crosstab(subset[group_col], subset[toxic_col], normalize="index")␣
 ↪* 100

    tab = tab.reindex(
        index=["gender", "profession", "nationality", "lgbtq"],
        columns=["toxic", "non_toxic"]
    ).fillna(0)

    _grouped_barplot(
        tab, title,
        TOXIC_COLORS
    )
```

3.1.1 *Question 1 :* Justify architectural modifications for new context

Data Preparation

[16]:
```
# Load files
rubist_aug = pd.read_csv("COMP0173_Temp_Data/rubist_aug.csv", encoding="utf-8")
rubist_aug_second= pd.read_csv("COMP0173_Temp_Data/rubist_aug_second.csv",␣
 ↪encoding="utf-8")
```

[17]:
```
# Clean dataset
rubist_aug = clean_rubist(rubist_aug)
rubist_aug.head()
# Save cleaned final version
rubist_aug.to_csv("COMP0173_Data/rubist.csv", index=False)
```

[18]:
```
# Clean dataset
rubist_aug_second = clean_rubist(rubist_aug_second)
rubist_aug_second.head()
# Save cleaned final version
rubist_aug_second.to_csv("COMP0173_Data/rubist_second.csv", index=False)
```

[19]:
```
# Load final version
rubist = pd.read_csv("COMP0173_Data/rubist.csv", encoding="utf-8")
rubist_second = pd.read_csv("COMP0173_Data/rubist_second.csv", encoding="utf-8")
```

[20]:
```
# Run EDA
target_dist = prepare_target_variable_distribution(rubist, "category")
group_dist = prepare_group_distribution(rubist, "stereotype_type")
text_length = prepare_text_length_analysis(rubist, "text")
# create_word_cloud(rubist, text_col='text', output_filename='rubist_wordcloud.
 ↪png')

# Run EDA
target_dist = prepare_target_variable_distribution(rubist_second, "category")
group_dist = prepare_group_distribution(rubist_second, "stereotype_type")
```

```
text_length = prepare_text_length_analysis(rubist_second, "text")
# create_word_cloud(rubist_second, text_col='text',␣
 ↪output_filename='rubist_second_wordcloud.png')
```

[21]:
```
# Sentiment and Toxicity
rubist_sentiment = analyse_sentiment_and_regard(rubist, text_col="text")
rubist_sentiment.head()
rubist_sentiment.to_csv("COMP0173_Results/rubist_sentiment", index=False,␣
 ↪encoding="utf-8-sig")

# Sentiment and Toxicity
rubist_second_sentiment = analyse_sentiment_and_regard(rubist, text_col="text")
rubist_second_sentiment.head()
rubist_second_sentiment.to_csv("COMP0173_Results/rubist_second_sentiment",␣
 ↪index=False, encoding="utf-8-sig")
```

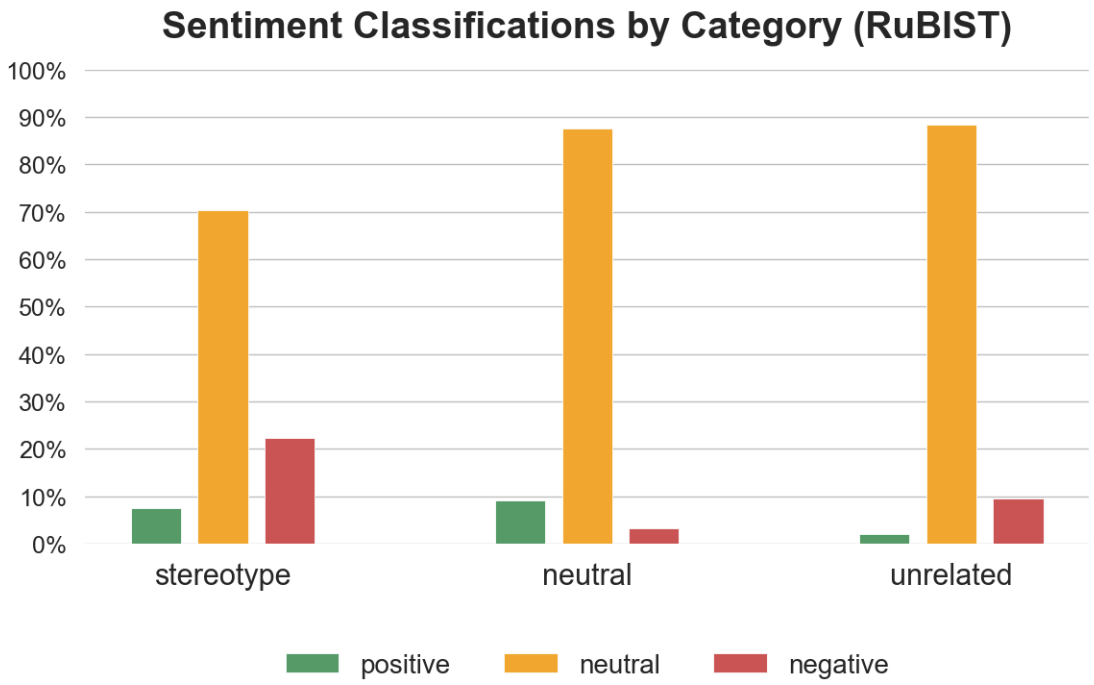
```
Analyzing Russian Sentiment: 100%|      | 4216/4216 [01:59<00:00, 35.14it/s]
Analyzing Russian Toxicity / Regard: 100%|      | 4216/4216 [02:01<00:00,
34.74it/s]
Analyzing Russian Sentiment: 100%|      | 4216/4216 [02:00<00:00, 35.10it/s]
Analyzing Russian Toxicity / Regard: 100%|      | 4216/4216 [02:02<00:00,
34.40it/s]
```

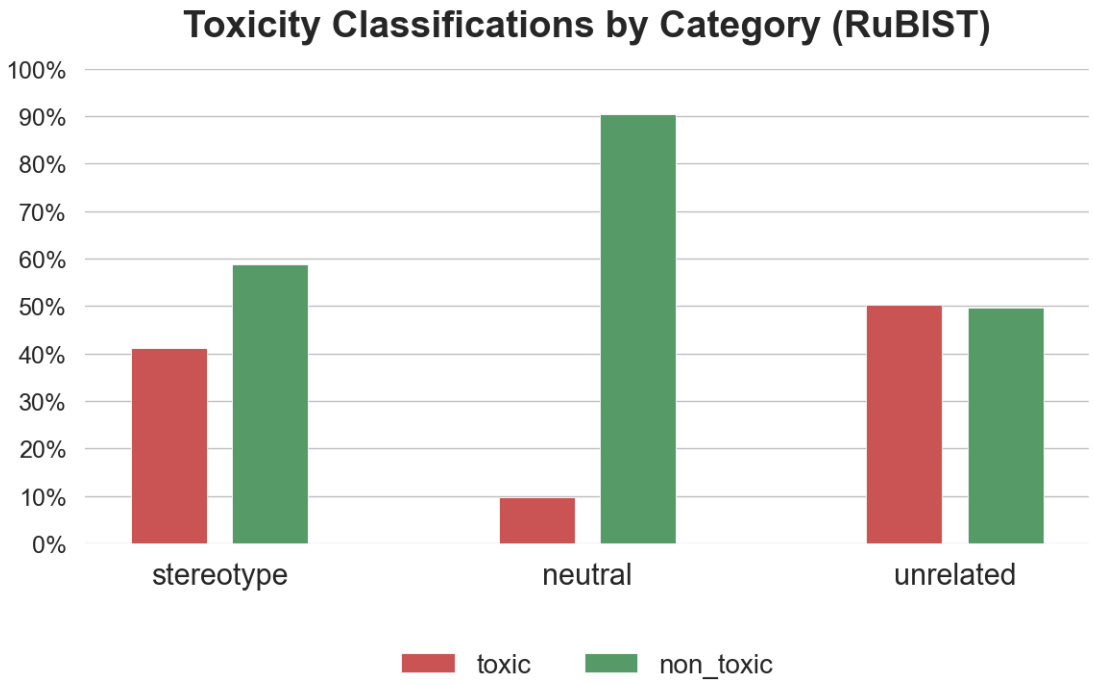
[22]:
```
rubist_sentiment = pd.read_csv("COMP0173_Results/rubist_sentiment",␣
 ↪encoding="utf-8-sig")
rubist_second_sentiment = pd.read_csv("COMP0173_Results/
 ↪rubist_second_sentiment", encoding="utf-8-sig")
```

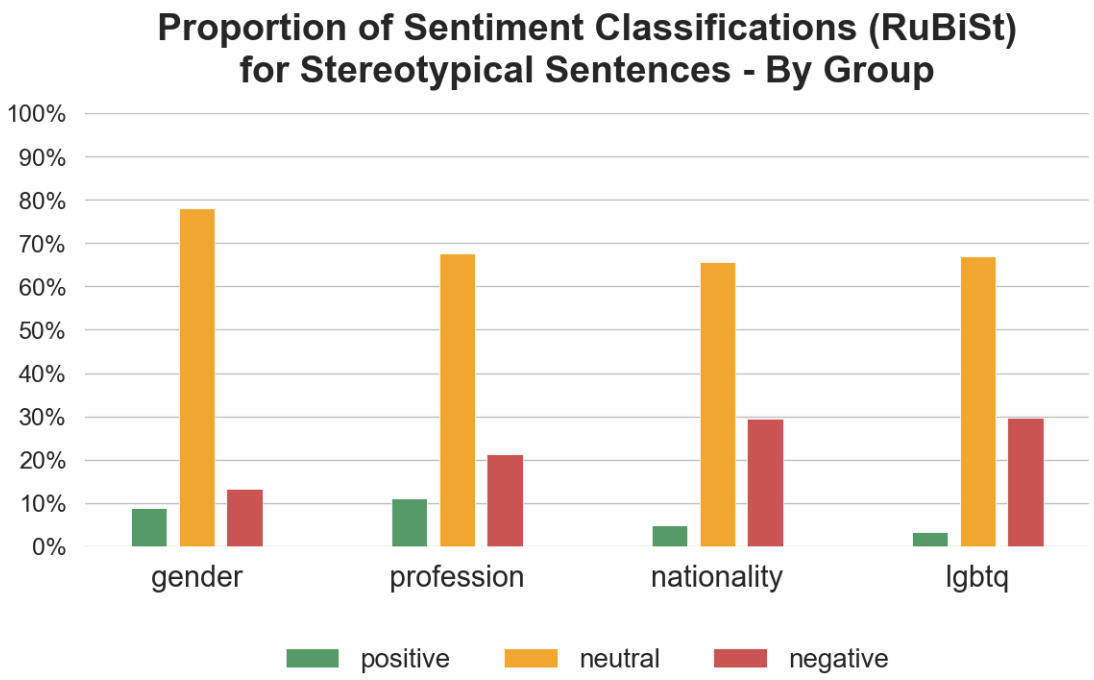
[23]:
```
# Colour maps
SENTIMENT_COLORS = {
    "positive": "#559A67",
    "neutral":  "#F1A72F",
    "negative": "#CA5353",
}

TOXIC_COLORS = {
    "toxic":      "#CA5353",
    "non_toxic":  "#559A67",
}
```

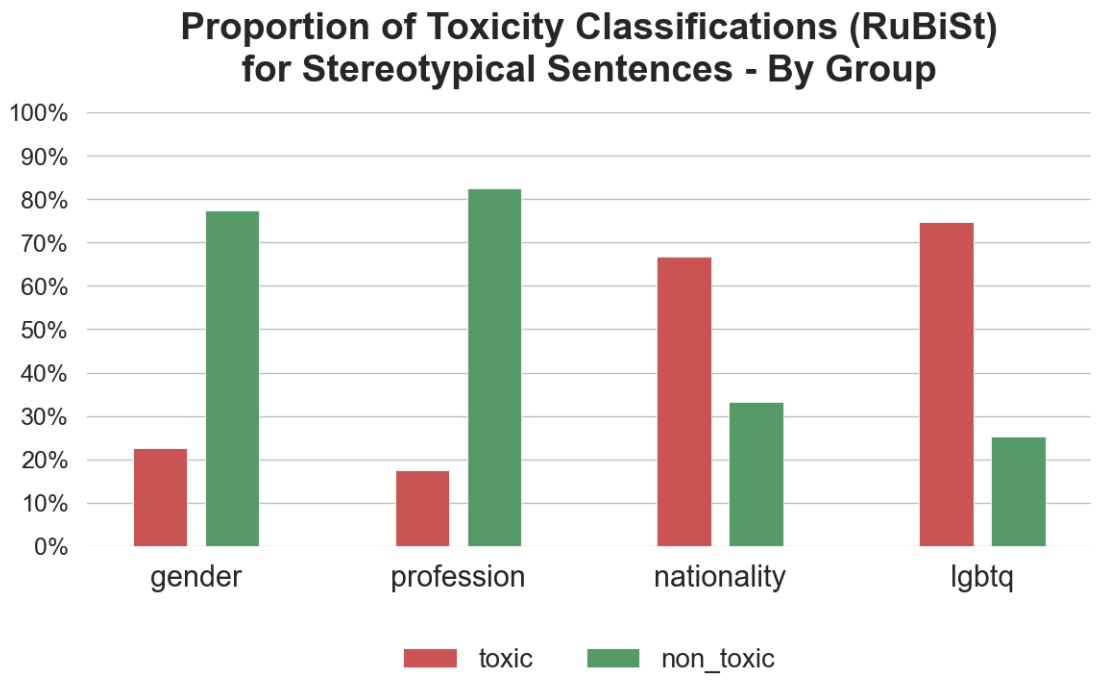
[48]:
```
# Generate all four plots
plot_sentiment_by_category(rubist_sentiment, title = "Sentiment Classifications␣
 ↪by Category (RuBIST)")
plot_toxic_by_category(rubist_sentiment, title = "Toxicity Classifications by␣
 ↪Category (RuBIST)")
```

```
plot_sentiment_for_stereotypes_by_group(rubist_sentiment, title = "Proportion␣
  ↪of Sentiment Classifications (RuBiSt)\nfor Stereotypical Sentences - By␣
  ↪Group")
plot_toxic_for_stereotypes_by_group(rubist_sentiment, title = "Proportion of␣
  ↪Toxicity Classifications (RuBiSt)\nfor Stereotypical Sentences - By Group")
```

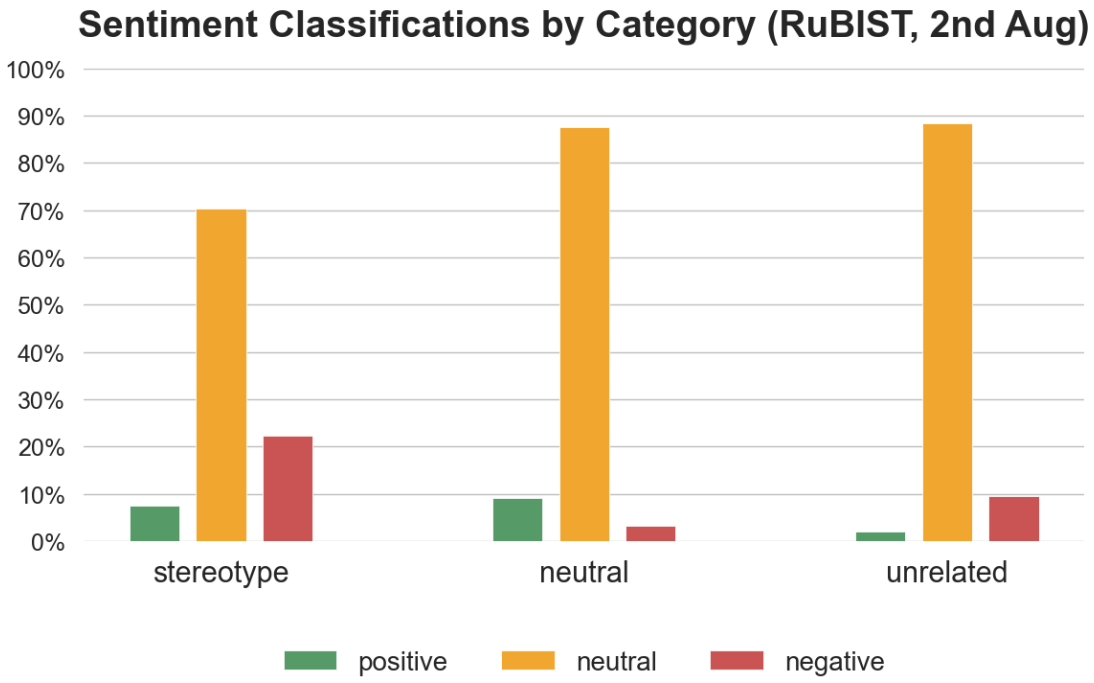


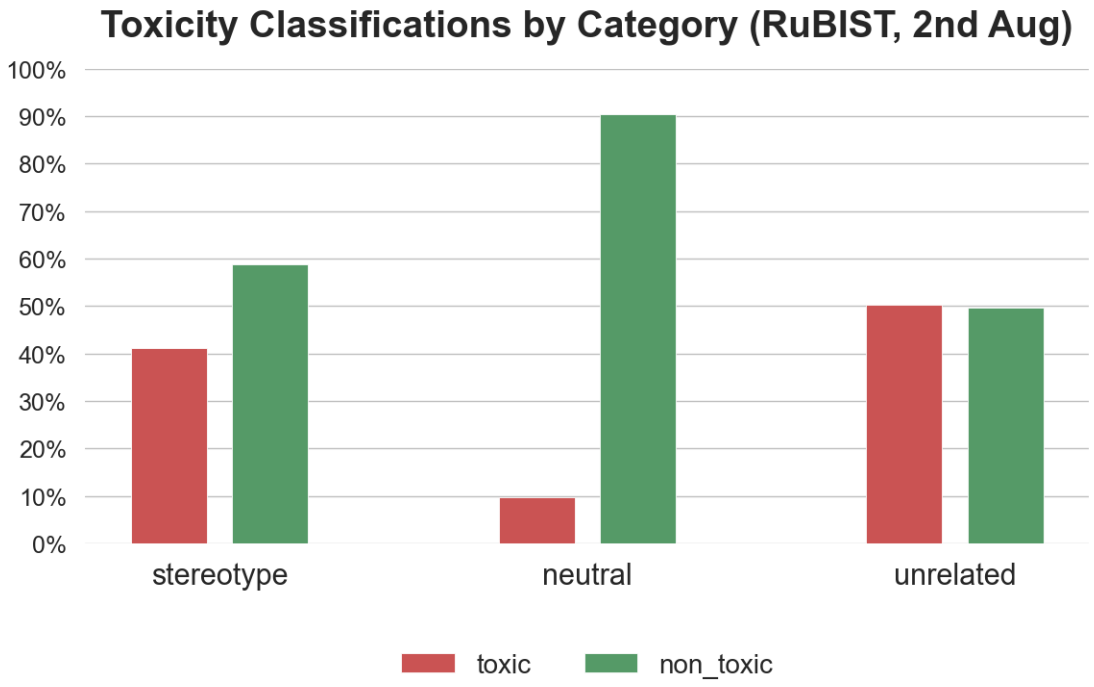

Toxicity Classifications by Category (RuBIST)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
stereotype
neutral
unrelated
toxic
non_toxic

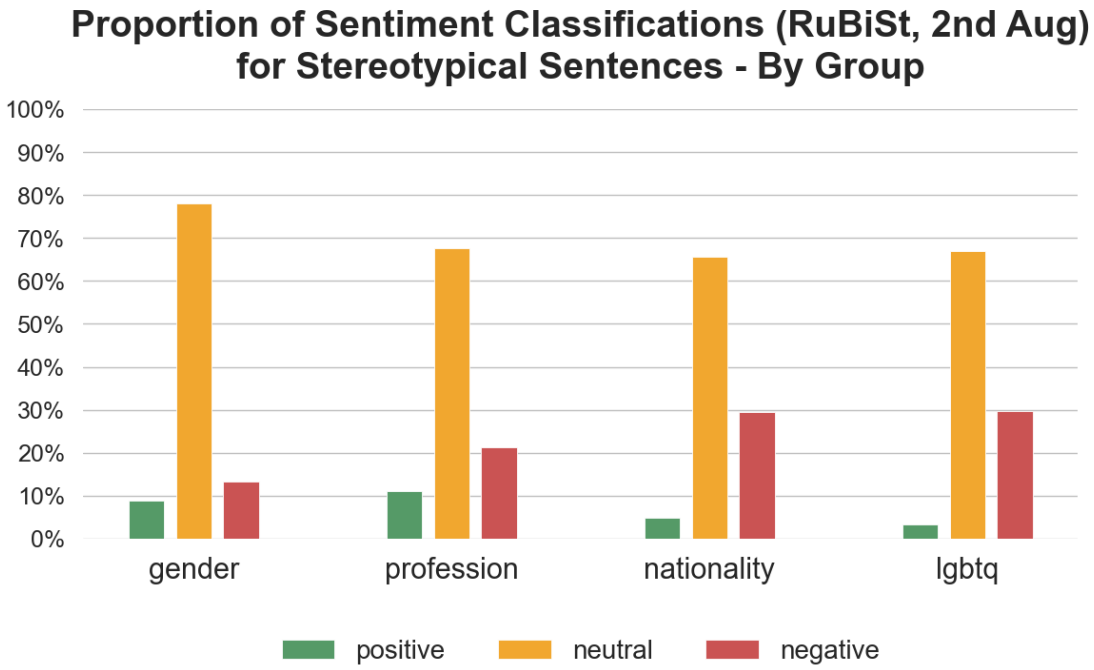

Proportion of Sentiment Classifications (RuBiSt)
for Stereotypical Sentences - By Group
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
gender
profession
nationality
lgbtq
positive
neutral
negative

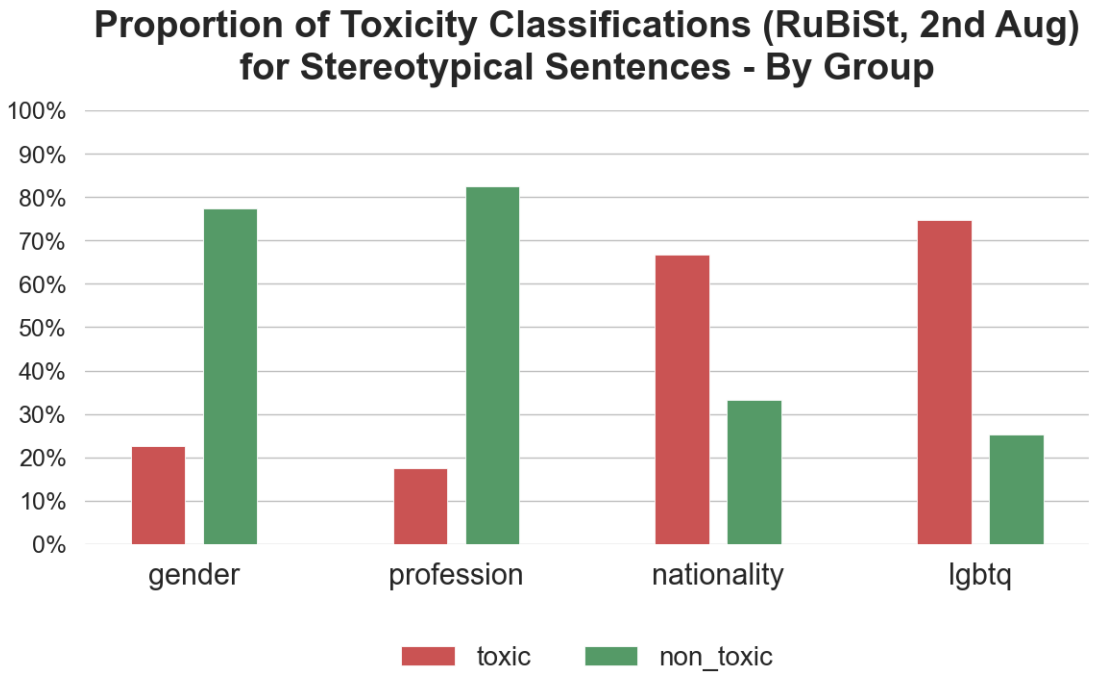


[50]:
```
# Generate all four plots
plot_sentiment_by_category(rubist_second_sentiment, title = "Sentiment␣
 ↪Classifications by Category (RuBIST, 2nd Aug)")
plot_toxic_by_category(rubist_second_sentiment, title = "Toxicity␣
 ↪Classifications by Category (RuBIST, 2nd Aug)")
plot_sentiment_for_stereotypes_by_group(rubist_second_sentiment, title =␣
 ↪"Proportion of Sentiment Classifications (RuBiSt, 2nd Aug)\nfor␣
 ↪Stereotypical Sentences - By Group")
plot_toxic_for_stereotypes_by_group(rubist_second_sentiment, title =␣
 ↪"Proportion of Toxicity Classifications (RuBiSt, 2nd Aug)\nfor Stereotypical␣
 ↪Sentences - By Group")
```


Sentiment Classifications by Category (RuBIST, 2nd Aug)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
stereotype
neutral
unrelated
positive
neutral
negative


Toxicity Classifications by Category (RuBIST, 2nd Aug)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
stereotype
neutral
unrelated
toxic
non_toxic


Proportion of Sentiment Classifications (RuBiSt, 2nd Aug) for Stereotypical Sentences - By Group
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
gender
profession
nationality
lgbtq
positive
neutral
negative


Proportion of Toxicity Classifications (RuBiSt, 2nd Aug) for Stereotypical Sentences - By Group
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
gender
profession
nationality
lgbtq
toxic
non_toxic

3.1.2 *Question 2 :* Document hyperparameter tuning process

Train models - Logistic Regression (Spacy Russian)

[27]:
```
from Logistic_Regression_Russian import (data_loader, train_model,␣
 ↪evaluate_model)

gc.collect()
torch.cuda.empty_cache()

# Load and combine relevant datasets
train_data_rubist, test_data_rubist = data_loader(csv_file_path='COMP0173_Data/
 ↪rubist.csv', labelling_criteria='stereotype', dataset_name='rubist',␣
 ↪sample_size=1000000, num_examples=5)
train_data_rubist_second, test_data_rubist_second =␣
 ↪data_loader(csv_file_path='COMP0173_Data/rubist_second.csv',␣
 ↪labelling_criteria='stereotype', dataset_name='rubist_second',␣
 ↪sample_size=1000000, num_examples=5)


# Execute full pipeline for logistic regression tfidf model
train_model(train_data_rubist, model_output_base_dir='model_output_LR_tfidf',␣
 ↪dataset_name='rubist_trained', feature_type='tfidf', seed=42)
evaluate_model(test_data_rubist, model_output_dir='model_output_LR_tfidf/
 ↪rubist_trained', result_output_base_dir='result_output_LR_tfidf',␣
 ↪dataset_name='rubist', feature_type='tfidf', seed=42)

gc.collect()
torch.cuda.empty_cache()

train_model(train_data_rubist_second,␣
 ↪model_output_base_dir='model_output_LR_tfidf',␣
 ↪dataset_name='rubist_second_trained', feature_type='tfidf', seed=42)
evaluate_model(test_data_rubist_second, model_output_dir='model_output_LR_tfidf/
 ↪rubist_second_trained', result_output_base_dir='result_output_LR_tfidf',␣
 ↪dataset_name='rubist_second', feature_type='tfidf', seed=42)

gc.collect()
torch.cuda.empty_cache()

# Execute full pipeline for logistic regression embedding model
train_model(train_data_rubist,␣
 ↪model_output_base_dir='model_output_LR_embedding',␣
 ↪dataset_name='rubist_trained', feature_type='embedding', seed=42)
evaluate_model(test_data_rubist, model_output_dir='model_output_LR_embedding/
 ↪rubist_trained', result_output_base_dir='result_output_LR_embedding',␣
 ↪dataset_name='rubist', feature_type='embedding', seed=42)
```

```
gc.collect()
torch.cuda.empty_cache()

train_model(train_data_rubist_second,␣
 ↪model_output_base_dir='model_output_LR_embedding',␣
 ↪dataset_name='rubist_second_trained', feature_type='embedding', seed=42)
evaluate_model(test_data_rubist_second,␣
 ↪model_output_dir='model_output_LR_embedding/rubist_second_trained',␣
 ↪result_output_base_dir='result_output_LR_embedding',␣
 ↪dataset_name='rubist_second', feature_type='embedding', seed=42)
```

```
[codecarbon ERROR @ 21:46:39] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:46:39] Another instance of codecarbon is already
running. Exiting.
```

```
First few examples from the training data:
     stereotype_type                                                text  \
168       profession
2883     nationality                                …
2919           lgbtq                                …
3412      profession                                …
732            lgbtq

      category data_name
168          1    rubist
2883         0    rubist
2919         1    rubist
3412         0    rubist
732          1    rubist
First few examples from the testing data:
     stereotype_type                                                text  \
2726      profession                                 …
1066          gender                                …
2547     nationality                                …
1834      profession                                 …
1825     nationality                                …

      category data_name
2726         0    rubist
1066         0    rubist
2547         0    rubist
1834         0    rubist
1825         0    rubist
Train data size: 3372
```

```
Test data size: 844
First few examples from the training data:
     stereotype_type                                          text  category  \
1005          gender                                            1
1001          gender                                          0
2619     nationality                                           0
2213          gender                                    0
934           gender                                     0

          data_name
1005  rubist_second
1001  rubist_second
2619  rubist_second
2213  rubist_second
934   rubist_second
First few examples from the testing data:
     stereotype_type                                               text  \
80        profession
1814          gender
2277      profession                                …
61        profession                                …
755           gender                               …

      category      data_name
80           0  rubist_second
1814         0  rubist_second
2277         0  rubist_second
61           0  rubist_second
755          0  rubist_second
Train data size: 2336
Test data size: 584
Number of unique labels: 2

[codecarbon WARNING @ 21:46:40] Another instance of codecarbon is already
running. Exiting.

Testing C=0.01, penalty=l1 => F1 Score: 0.39785905441570024
Testing C=0.01, penalty=l2 => F1 Score: 0.39785905441570024
Testing C=0.01, penalty=None => F1 Score: 0.9466666666666667
Testing C=0.1, penalty=l1 => F1 Score: 0.6326957285464712
Testing C=0.1, penalty=l2 => F1 Score: 0.6120484633882092
Testing C=0.1, penalty=None => F1 Score: 0.9466666666666667
Testing C=1, penalty=l1 => F1 Score: 0.8929148318366249
Testing C=1, penalty=l2 => F1 Score: 0.8824924844557498
Testing C=1, penalty=None => F1 Score: 0.9466666666666667
Best model parameters: {'C': 0.01, 'penalty': None}
Model and vectorizer saved to model_output_LR_tfidf/rubist_trained
Estimated total emissions: None kg CO2
Number of unique labels: 2
```

```
[codecarbon ERROR @ 21:46:41] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:46:41] Another instance of codecarbon is already
running. Exiting.

Number of unique labels: 2

[codecarbon WARNING @ 21:46:42] Another instance of codecarbon is already
running. Exiting.

Testing C=0.01, penalty=l1 => F1 Score: 0.4
Testing C=0.01, penalty=l2 => F1 Score: 0.4
Testing C=0.01, penalty=None => F1 Score: 0.5407413941385317
Testing C=0.1, penalty=l1 => F1 Score: 0.4
Testing C=0.1, penalty=l2 => F1 Score: 0.4
Testing C=0.1, penalty=None => F1 Score: 0.5407413941385317
Testing C=1, penalty=l1 => F1 Score: 0.46003885576472164
Testing C=1, penalty=l2 => F1 Score: 0.42689732142857145
Testing C=1, penalty=None => F1 Score: 0.5407413941385317
Best model parameters: {'C': 0.01, 'penalty': None}
Model and vectorizer saved to model_output_LR_tfidf/rubist_second_trained
Estimated total emissions: None kg CO2
Number of unique labels: 2

[codecarbon ERROR @ 21:46:43] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:46:43] Another instance of codecarbon is already
running. Exiting.

Number of unique labels: 2

Computing embeddings: 100%|      | 3372/3372 [00:08<00:00, 394.61it/s]

Testing C=0.01, penalty=l1 => F1 Score: 0.39785905441570024
Testing C=0.01, penalty=l2 => F1 Score: 0.8377403846153846
Testing C=0.01, penalty=None => F1 Score: 0.9196396682408032
Testing C=0.1, penalty=l1 => F1 Score: 0.8833912566306933
Testing C=0.1, penalty=l2 => F1 Score: 0.894211324570273
Testing C=0.1, penalty=None => F1 Score: 0.9196396682408032
Testing C=1, penalty=l1 => F1 Score: 0.9212241604072258
Testing C=1, penalty=l2 => F1 Score: 0.9172978203631145

[codecarbon WARNING @ 21:46:54] Another instance of codecarbon is already
running. Exiting.

Testing C=1, penalty=None => F1 Score: 0.9196396682408032
```

```
Best model parameters: {'C': 1, 'penalty': 'l1'}
Model and vectorizer saved to model_output_LR_embedding/rubist_trained
Estimated total emissions: None kg CO2
Number of unique labels: 2

Computing embeddings: 100%|      | 844/844 [00:02<00:00, 384.55it/s]
[codecarbon ERROR @ 21:46:57] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:46:57] Another instance of codecarbon is already
running. Exiting.

Number of unique labels: 2

Computing embeddings: 100%|      | 2336/2336 [00:05<00:00, 465.27it/s]

Testing C=0.01, penalty=l1 => F1 Score: 0.4
Testing C=0.01, penalty=l2 => F1 Score: 0.4068829055705911
Testing C=0.01, penalty=None => F1 Score: 0.627725258253562
Testing C=0.1, penalty=l1 => F1 Score: 0.4052597071464996
Testing C=0.1, penalty=l2 => F1 Score: 0.5424300867888139
Testing C=0.1, penalty=None => F1 Score: 0.627725258253562
Testing C=1, penalty=l1 => F1 Score: 0.6112426035502958
Testing C=1, penalty=l2 => F1 Score: 0.6005917159763313

[codecarbon WARNING @ 21:47:04] Another instance of codecarbon is already
running. Exiting.

Testing C=1, penalty=None => F1 Score: 0.627725258253562
Best model parameters: {'C': 0.01, 'penalty': None}
Model and vectorizer saved to model_output_LR_embedding/rubist_second_trained
Estimated total emissions: None kg CO2
Number of unique labels: 2

Computing embeddings: 100%|      | 584/584 [00:01<00:00, 449.44it/s]
```

[27]:

	precision	recall	f1-score	support
0	0.763547	0.796915	0.779874	389.000000
1	0.556180	0.507692	0.530831	195.000000
accuracy	0.700342	0.700342	0.700342	0.700342
macro avg	0.659863	0.652304	0.655353	584.000000
weighted avg	0.694306	0.700342	0.696718	584.000000

Train models - DeepPavlov_rubert

[28]:
```python
import os
os.environ["HF_HOME"] = "/tmp/hf"
os.environ["TRANSFORMERS_CACHE"] = "/tmp/hf"
os.makedirs("/tmp/hf", exist_ok=True)
```

[29]:
```
from BERT_Models_Fine_Tuning_Russian import (data_loader, train_model,␣
 ↪evaluate_model)

gc.collect()
torch.cuda.empty_cache()

# Load and combine relevant datasets
train_data_rubist, test_data_rubist = data_loader(csv_file_path='COMP0173_Data/
 ↪rubist.csv', labelling_criteria='stereotype', dataset_name='rubist',␣
 ↪sample_size=1000000, num_examples=5)
train_data_rubist_second, test_data_rubist_second =␣
 ↪data_loader(csv_file_path='COMP0173_Data/rubist_second.csv',␣
 ↪labelling_criteria='stereotype', dataset_name='rubist_second',␣
 ↪sample_size=1000000, num_examples=5)

# Execute full pipeline for Deepavlov model
train_model(train_data_rubist, model_path='DeepPavlov/rubert-base-cased',␣
 ↪batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_deeppavlov_rubert',␣
 ↪dataset_name='rubist_trained', seed=42)
evaluate_model(test_data_rubist,␣
 ↪model_output_dir='model_output_deeppavlov_rubert/rubist_trained',␣
 ↪result_output_base_dir='result_output_deeppavlov_rubert',␣
 ↪dataset_name='rubist_trained', seed=42)

gc.collect()
torch.cuda.empty_cache()

train_model(train_data_rubist_second, model_path='DeepPavlov/
 ↪rubert-base-cased', batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_deeppavlov_rubert',␣
 ↪dataset_name='rubist_second_trained', seed=42)
evaluate_model(test_data_rubist_second,␣
 ↪model_output_dir='model_output_deeppavlov_rubert/rubist_second_trained',␣
 ↪result_output_base_dir='result_output_deeppavlov_rubert',␣
 ↪dataset_name='rubist_second_trained', seed=42)
```

```
[codecarbon ERROR @ 21:47:06] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:47:06] Another instance of codecarbon is already
running. Exiting.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
```

```
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}


First few examples from the training data:
     stereotype_type                                                text  \
168       profession
2883     nationality                                …
2919           lgbtq                                …
3412      profession                                …
732            lgbtq

      category data_name
168          1    rubist
2883         0    rubist
2919         1    rubist
3412         0    rubist
732          1    rubist
First few examples from the testing data:
```

```
     stereotype_type                                                text  \
2726      profession                                …
1066          gender                                …
2547     nationality                                …
1834      profession                                …
1825     nationality                                …

      category data_name
2726         0    rubist
1066         0    rubist
2547         0    rubist
1834         0    rubist
1825         0    rubist
Train data size: 3372
Test data size: 844
First few examples from the training data:
     stereotype_type                                          text  category  \
1005          gender                                            1
1001          gender                                          0
2619     nationality                                           0
2213          gender                                     0
934           gender                                      0

          data_name
1005  rubist_second
1001  rubist_second
2619  rubist_second
2213  rubist_second
934   rubist_second
First few examples from the testing data:
     stereotype_type                                                text  \
80        profession
1814          gender
2277      profession                                …
61        profession                                …
755           gender                                …

      category      data_name
80           0  rubist_second
1814         0  rubist_second
2277         0  rubist_second
61           0  rubist_second
755          0  rubist_second
Train data size: 2336
Test data size: 584
Number of unique labels: 2

loading weights file pytorch_model.bin from cache at
```

```
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/pytorch_model.bin
Attempting to create safetensors variant
Attempting to convert .bin model on the fly to safetensors.
Some weights of the model checkpoint at DeepPavlov/rubert-base-cased were not
used when initializing BertForSequenceClassification: ['cls.predictions.bias',
'cls.predictions.decoder.bias', 'cls.predictions.decoder.weight',
'cls.predictions.transform.LayerNorm.bias',
'cls.predictions.transform.LayerNorm.weight',
'cls.predictions.transform.dense.bias',
'cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias',
'cls.seq_relationship.weight']
- This IS expected if you are initializing BertForSequenceClassification from
the checkpoint of a model trained on another task or with another architecture
(e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing BertForSequenceClassification
from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a
BertForSequenceClassification model).
Some weights of BertForSequenceClassification were not initialized from the
model checkpoint at DeepPavlov/rubert-base-cased and are newly initialized:
['classifier.bias', 'classifier.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
```

```
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading file vocab.txt from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/vocab.txt
loading file tokenizer.json from cache at None
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/special_tokens_map.json
loading file tokenizer_config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/tokenizer_config.json
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
```

```
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

Map: 100%|      | 2697/2697 [00:00<00:00, 25271.24 examples/s]
Map: 100%|      | 2697/2697 [00:00<00:00, 40092.85 examples/s]
```

```
Sample tokenized input from train: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[101, 12528, 23558, 29466, 12938, 21264, 57041, 869, 1516, 33165, 27585, 9210,
102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 675/675 [00:00<00:00, 26544.49 examples/s]
Map: 100%|      | 675/675 [00:00<00:00, 34342.01 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[101, 12528, 23558, 29466, 12938, 21264, 57041, 869, 1516, 33165, 27585, 9210,
102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 21:47:09] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.
***** Running training *****
  Num examples = 2,697
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
  Gradient Accumulation steps = 1
  Total optimization steps = 258
  Number of trainable parameters = 177,854,978
[codecarbon WARNING @ 21:47:09] Another instance of codecarbon is already
running. Exiting.
 17%|         | 43/258 [00:21<02:17,  1.57it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
```

```
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.3709, 'grad_norm': 10.015257835388184, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 43/258 [00:22<02:17,  1.57it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-43
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-43/config.json

{'eval_loss': 0.16910791397094727, 'eval_precision': 0.925984812529663,
'eval_recall': 0.9422561444310857, 'eval_f1': 0.9331536270950631, 'eval_balanced
accuracy': 0.9422561444310857, 'eval_runtime': 1.4625,
'eval_samples_per_second': 461.531, 'eval_steps_per_second': 7.521, 'epoch':
1.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-43/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-43/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-43/special_tokens_map.json
 33%|        | 86/258 [00:45<01:08,  2.50it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.1098, 'grad_norm': 1.2975772619247437, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}


 33%|        | 86/258 [00:46<01:08,  2.50it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-86
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-86/config.json

{'eval_loss': 0.10560111701488495, 'eval_precision': 0.9720860566448801,
'eval_recall': 0.9612462305615231, 'eval_f1': 0.966362349751829, 'eval_balanced
```

```
accuracy': 0.9612462305615231, 'eval_runtime': 1.2687,
'eval_samples_per_second': 532.024, 'eval_steps_per_second': 8.67, 'epoch': 2.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-86/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-86/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-86/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_trained/checkpoint-43] due to
args.save_total_limit
 50%|        | 129/258 [01:08<00:49,  2.60it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0464, 'grad_norm': 3.4971156120300293, 'learning_rate': 1e-05,
'epoch': 3.0}


 50%|        | 129/258 [01:10<00:49,  2.60it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-129
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-129/config.json

{'eval_loss': 0.08520327508449554, 'eval_precision': 0.9625255781630053,
'eval_recall': 0.9722342669058084, 'eval_f1': 0.967093717093717, 'eval_balanced
accuracy': 0.9722342669058084, 'eval_runtime': 1.258, 'eval_samples_per_second':
536.57, 'eval_steps_per_second': 8.744, 'epoch': 3.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-129/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-129/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-129/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_trained/checkpoint-86] due to
args.save_total_limit
 67%|       | 172/258 [01:31<00:33,  2.58it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
```

```
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0221, 'grad_norm': 0.046991780400276184, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 172/258 [01:32<00:33,  2.58it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-172
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-172/config.json

{'eval_loss': 0.08270730823278427, 'eval_precision': 0.9715192965315096,
'eval_recall': 0.9755898062557896, 'eval_f1': 0.9735075944895797, 'eval_balanced
accuracy': 0.9755898062557896, 'eval_runtime': 1.2368,
'eval_samples_per_second': 545.761, 'eval_steps_per_second': 8.894, 'epoch':
4.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-172/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-172/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-172/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_trained/checkpoint-129] due to
args.save_total_limit
 83%|      | 215/258 [01:54<00:20,  2.14it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0099, 'grad_norm': 0.03969481959939003, 'learning_rate':
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 215/258 [01:55<00:20,  2.14it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-215
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-215/config.json
```

```
{'eval_loss': 0.11624868959188461, 'eval_precision': 0.9720929538810333,
'eval_recall': 0.9678686165914422, 'eval_f1': 0.9699328872347166, 'eval_balanced
accuracy': 0.9678686165914422, 'eval_runtime': 1.2842,
'eval_samples_per_second': 525.609, 'eval_steps_per_second': 8.565, 'epoch':
5.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-215/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-215/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-215/special_tokens_map.json
100%|      | 258/258 [02:17<00:00,  2.58it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258/config.json
Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-258/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-258/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_trained/checkpoint-215] due to
args.save_total_limit
100%|      | 258/258 [02:21<00:00,  2.58it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.004, 'grad_norm': 0.08230621367692947, 'learning_rate': 0.0, 'epoch':
6.0}


100%|      | 258/258 [02:22<00:00,  2.58it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258
Configuration saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258/config.json

{'eval_loss': 0.12002488970756531, 'eval_precision': 0.9720929538810333,
'eval_recall': 0.9678686165914422, 'eval_f1': 0.9699328872347166, 'eval_balanced
accuracy': 0.9678686165914422, 'eval_runtime': 1.2919,
'eval_samples_per_second': 522.496, 'eval_steps_per_second': 8.515, 'epoch':
6.0}
```

```
Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_trained/che
ckpoint-258/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_trained/check
point-258/special_tokens_map.json


Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from
model_output_deeppavlov_rubert/rubist_trained/checkpoint-172 (score:
0.08270730823278427).
100%|      | 258/258 [02:25<00:00,  2.58it/s]Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_trained/checkpoint-258] due to
args.save_total_limit
[codecarbon WARNING @ 21:49:34] Another instance of codecarbon is already
running. Exiting.
100%|      | 258/258 [02:25<00:00,  1.78it/s]
Saving model checkpoint to model_output_deeppavlov_rubert/rubist_trained
Configuration saved in model_output_deeppavlov_rubert/rubist_trained/config.json

{'train_runtime': 145.0454, 'train_samples_per_second': 111.565,
'train_steps_per_second': 1.779, 'train_loss': 0.09383537868658702, 'epoch':
6.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_trained/model.safetensors
tokenizer config file saved in
model_output_deeppavlov_rubert/rubist_trained/tokenizer_config.json
Special tokens file saved in
model_output_deeppavlov_rubert/rubist_trained/special_tokens_map.json
[codecarbon WARNING @ 21:49:35] Another instance of codecarbon is already
running. Exiting.
loading configuration file
model_output_deeppavlov_rubert/rubist_trained/config.json
Model config BertConfig {
  "_name_or_path": "model_output_deeppavlov_rubert/rubist_trained",
  "architectures": [
    "BertForSequenceClassification"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
```

```
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading weights file
model_output_deeppavlov_rubert/rubist_trained/model.safetensors

Estimated total emissions: None kg CO2
Number of unique labels: 2

All model checkpoint weights were used when initializing
BertForSequenceClassification.

All the weights of BertForSequenceClassification were initialized from the model
checkpoint at model_output_deeppavlov_rubert/rubist_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use BertForSequenceClassification for predictions without
further training.
loading file vocab.txt
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|     | 844/844 [00:00<00:00, 14782.12 examples/s]
Map: 100%|     | 844/844 [00:00<00:00, 36831.57 examples/s]

Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                                    ', 'category': 0,
'data_name': 'rubist', '__index_level_0__': 2726, 'input_ids': [101, 94818,
11894, 38663, 13904, 2010, 54564, 851, 84652, 868, 10508, 1703, 13158, 23726,
```

```
102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 21:50:05] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:50:05] Another instance of codecarbon is already
running. Exiting.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}


Number of unique labels: 2
```

```
loading weights file pytorch_model.bin from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/pytorch_model.bin
Attempting to create safetensors variant
Attempting to convert .bin model on the fly to safetensors.
Some weights of the model checkpoint at DeepPavlov/rubert-base-cased were not
used when initializing BertForSequenceClassification: ['cls.predictions.bias',
'cls.predictions.decoder.bias', 'cls.predictions.decoder.weight',
'cls.predictions.transform.LayerNorm.bias',
'cls.predictions.transform.LayerNorm.weight',
'cls.predictions.transform.dense.bias',
'cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias',
'cls.seq_relationship.weight']
- This IS expected if you are initializing BertForSequenceClassification from
the checkpoint of a model trained on another task or with another architecture
(e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing BertForSequenceClassification
from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a
BertForSequenceClassification model).
Some weights of BertForSequenceClassification were not initialized from the
model checkpoint at DeepPavlov/rubert-base-cased and are newly initialized:
['classifier.bias', 'classifier.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
```

```
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading file vocab.txt from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/vocab.txt
loading file tokenizer.json from cache at None
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/special_tokens_map.json
loading file tokenizer_config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/tokenizer_config.json
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
```

```
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--DeepPavlov--rubert-base-
cased/snapshots/4036cab694767a299f2b9e6492909664d9414229/config.json
Model config BertConfig {
  "_name_or_path": "DeepPavlov/rubert-base-cased",
  "architectures": [
    "BertModel"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

Map: 100%|      | 1868/1868 [00:00<00:00, 30562.81 examples/s]
Map: 100%|      | 1868/1868 [00:00<00:00, 37058.39 examples/s]
```

```
Sample tokenized input from train: {'stereotype_type': 'nationality', 'text':
'                ', 'category': 0, 'data_name': 'rubist_second',
'__index_level_0__': 1567, 'input_ids': [101, 4752, 92660, 4402, 7805, 14741,
23939, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 468/468 [00:00<00:00, 29367.22 examples/s]
Map: 100%|      | 468/468 [00:00<00:00, 30080.98 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'nationality',
'text': '                ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 1567, 'input_ids': [101, 4752, 92660,
4402, 7805, 14741, 23939, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0], 'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1,
1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels':
0}

[codecarbon ERROR @ 21:50:08] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.
***** Running training *****
  Num examples = 1,868
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
  Gradient Accumulation steps = 1
  Total optimization steps = 180
  Number of trainable parameters = 177,854,978
[codecarbon WARNING @ 21:50:08] Another instance of codecarbon is already
running. Exiting.
 17%|         | 30/180 [00:14<01:18,  1.91it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
```

```
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.6411, 'grad_norm': 6.413757801055908, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 30/180 [00:15<01:18,  1.91it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-30
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-30/config.json

{'eval_loss': 0.6272999048233032, 'eval_precision': 0.6567433822951849,
'eval_recall': 0.5394906097247234, 'eval_f1': 0.4875585119487559, 'eval_balanced
accuracy': 0.5394906097247234, 'eval_runtime': 0.9133,
'eval_samples_per_second': 512.415, 'eval_steps_per_second': 8.759, 'epoch':
1.0}

Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-30/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-30/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-30/special_tokens_map.json
 33%|        | 60/180 [00:32<00:48,  2.48it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.5509, 'grad_norm': 19.458295822143555, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}


 33%|        | 60/180 [00:32<00:48,  2.48it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-60
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-60/config.json

{'eval_loss': 0.5725044012069702, 'eval_precision': 0.6757306282956475,
'eval_recall': 0.6556470285567275, 'eval_f1': 0.6608324339542959, 'eval_balanced
accuracy': 0.6556470285567275, 'eval_runtime': 0.6956,
```

```
'eval_samples_per_second': 672.774, 'eval_steps_per_second': 11.5, 'epoch': 2.0}

Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-60/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-60/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-60/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-30] due to
args.save_total_limit
 50%|        | 90/180 [00:49<00:35,  2.54it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.4264, 'grad_norm': 14.432291030883789, 'learning_rate': 1e-05,
'epoch': 3.0}


 50%|        | 90/180 [00:50<00:35,  2.54it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-90
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-90/config.json

{'eval_loss': 0.5320208668708801, 'eval_precision': 0.7316204051012754,
'eval_recall': 0.6955235400051454, 'eval_f1': 0.7043933354211009, 'eval_balanced
accuracy': 0.6955235400051454, 'eval_runtime': 0.6889,
'eval_samples_per_second': 679.309, 'eval_steps_per_second': 11.612, 'epoch':
3.0}

Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-90/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-90/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-90/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-60] due to
args.save_total_limit
 67%|       | 120/180 [01:07<00:25,  2.33it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
```

```
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.3419, 'grad_norm': 15.026641845703125, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 120/180 [01:07<00:25,  2.33it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-120
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-120/config.json

{'eval_loss': 0.5071310997009277, 'eval_precision': 0.7437499999999999,
'eval_recall': 0.7500643169539492, 'eval_f1': 0.7464256600752698, 'eval_balanced
accuracy': 0.7500643169539492, 'eval_runtime': 0.6964,
'eval_samples_per_second': 672.042, 'eval_steps_per_second': 11.488, 'epoch':
4.0}

Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-120/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-120/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-120/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-90] due to
args.save_total_limit
 83%|      | 150/180 [01:24<00:11,  2.55it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.2746, 'grad_norm': 11.936842918395996, 'learning_rate':
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 150/180 [01:24<00:11,  2.55it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-150
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-150/config.json
```

```
{'eval_loss': 0.5292905569076538, 'eval_precision': 0.7569815686587409,
'eval_recall': 0.7549524054540777, 'eval_f1': 0.7559291727717485, 'eval_balanced
accuracy': 0.7549524054540777, 'eval_runtime': 0.6852,
'eval_samples_per_second': 683.056, 'eval_steps_per_second': 11.676, 'epoch':
5.0}

Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-150/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-150/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-150/special_tokens_map.json
100%|      | 180/180 [01:41<00:00,  2.50it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-180/config.json
Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-180/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-180/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-180/special_tokens_map.json
Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-150] due to
args.save_total_limit
100%|      | 180/180 [01:44<00:00,  2.50it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.2441, 'grad_norm': 26.797395706176758, 'learning_rate': 0.0, 'epoch':
6.0}


100%|      | 180/180 [01:44<00:00,  2.50it/s]Saving model checkpoint to
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-180/config.json

{'eval_loss': 0.5395951271057129, 'eval_precision': 0.7592655221119223,
'eval_recall': 0.7579109853357344, 'eval_f1': 0.7585714285714286, 'eval_balanced
accuracy': 0.7579109853357344, 'eval_runtime': 0.7239,
'eval_samples_per_second': 646.495, 'eval_steps_per_second': 11.051, 'epoch':
6.0}
```

```
Model weights saved in model_output_deeppavlov_rubert/rubist_second_trained/chec
kpoint-180/model.safetensors
tokenizer config file saved in model_output_deeppavlov_rubert/rubist_second_trai
ned/checkpoint-180/tokenizer_config.json
Special tokens file saved in model_output_deeppavlov_rubert/rubist_second_traine
d/checkpoint-180/special_tokens_map.json


Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from
model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-120 (score:
0.5071310997009277).
100%|     | 180/180 [01:47<00:00,  2.50it/s]Deleting older checkpoint
[model_output_deeppavlov_rubert/rubist_second_trained/checkpoint-180] due to
args.save_total_limit
[codecarbon WARNING @ 21:51:55] Another instance of codecarbon is already
running. Exiting.
100%|     | 180/180 [01:47<00:00,  1.67it/s]
Saving model checkpoint to model_output_deeppavlov_rubert/rubist_second_trained
Configuration saved in
model_output_deeppavlov_rubert/rubist_second_trained/config.json

{'train_runtime': 107.4525, 'train_samples_per_second': 104.307,
'train_steps_per_second': 1.675, 'train_loss': 0.41316156917148167, 'epoch':
6.0}

Model weights saved in
model_output_deeppavlov_rubert/rubist_second_trained/model.safetensors
tokenizer config file saved in
model_output_deeppavlov_rubert/rubist_second_trained/tokenizer_config.json
Special tokens file saved in
model_output_deeppavlov_rubert/rubist_second_trained/special_tokens_map.json
[codecarbon WARNING @ 21:51:56] Another instance of codecarbon is already
running. Exiting.
loading configuration file
model_output_deeppavlov_rubert/rubist_second_trained/config.json
Model config BertConfig {
  "_name_or_path": "model_output_deeppavlov_rubert/rubist_second_trained",
  "architectures": [
    "BertForSequenceClassification"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
```

```
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 119547
}

loading weights file
model_output_deeppavlov_rubert/rubist_second_trained/model.safetensors

Estimated total emissions: None kg CO2
Number of unique labels: 2

All model checkpoint weights were used when initializing
BertForSequenceClassification.

All the weights of BertForSequenceClassification were initialized from the model
checkpoint at model_output_deeppavlov_rubert/rubist_second_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use BertForSequenceClassification for predictions without
further training.
loading file vocab.txt
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|     | 584/584 [00:00<00:00, 28965.23 examples/s]
Map: 100%|     | 584/584 [00:00<00:00, 29694.55 examples/s]

Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                      ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 80, 'input_ids': [101, 5247, 6345, 44670,
```

```
15411, 16038, 74989, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0], 'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}
```

[29]:

	precision	recall	f1-score	support
0	0.821333	0.791774	0.806283	389.000000
1	0.612440	0.656410	0.633663	195.000000
accuracy	0.746575	0.746575	0.746575	0.746575
macro avg	0.716887	0.724092	0.719973	584.000000
weighted avg	0.751583	0.746575	0.748644	584.000000

Train models - roberta_base

[30]:
```
from BERT_Models_Fine_Tuning_Russian import (data_loader, train_model,␣
 ↪evaluate_model)

gc.collect()
torch.cuda.empty_cache()

# Load and combine relevant datasets
train_data_rubist, test_data_rubist = data_loader(csv_file_path='COMP0173_Data/
 ↪rubist.csv', labelling_criteria='stereotype', dataset_name='rubist',␣
 ↪sample_size=1000000, num_examples=5)
train_data_rubist_second, test_data_rubist_second =␣
 ↪data_loader(csv_file_path='COMP0173_Data/rubist_second.csv',␣
 ↪labelling_criteria='stereotype', dataset_name='rubist_second',␣
 ↪sample_size=1000000, num_examples=5)

# Execute full pipeline for Deepavlov model
train_model(train_data_rubist, model_path='ai-forever/ruBert-base',␣
 ↪batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_ruberta_base',␣
 ↪dataset_name='rubist_trained', seed=42)
evaluate_model(test_data_rubist, model_output_dir='model_output_ruberta_base/
 ↪rubist_trained', result_output_base_dir='result_output_ruberta_base',␣
 ↪dataset_name='rubist_trained', seed=42)

gc.collect()
torch.cuda.empty_cache()

train_model(train_data_rubist_second, model_path='ai-forever/ruBert-base',␣
 ↪batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_ruberta_base',␣
 ↪dataset_name='rubist_second_trained', seed=42)
```

```
evaluate_model(test_data_rubist_second,␣
 ↪model_output_dir='model_output_ruberta_base/rubist_second_trained',␣
 ↪result_output_base_dir='result_output_ruberta_base',␣
 ↪dataset_name='rubist_second_trained', seed=42)
```

```
[codecarbon ERROR @ 21:52:16] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:52:16] Another instance of codecarbon is already
running. Exiting.
```

```
First few examples from the training data:
     stereotype_type                                                text  \
168       profession
2883     nationality                                …
2919           lgbtq                                …
3412      profession                                …
732            lgbtq

      category data_name
168          1    rubist
2883         0    rubist
2919         1    rubist
3412         0    rubist
732          1    rubist
First few examples from the testing data:
     stereotype_type                                                text  \
2726      profession                                …
1066          gender                                …
2547     nationality                                …
1834      profession                                …
1825     nationality                                …

      category data_name
2726         0    rubist
1066         0    rubist
2547         0    rubist
1834         0    rubist
1825         0    rubist
Train data size: 3372
Test data size: 844
First few examples from the training data:
     stereotype_type                                          text  category  \
1005          gender                                            1
1001          gender                                       0
2619     nationality                                        0
```

```
2213          gender                                          0
934           gender                                           0

          data_name
1005  rubist_second
1001  rubist_second
2619  rubist_second
2213  rubist_second
934   rubist_second
First few examples from the testing data:
     stereotype_type                                                  text  \
80        profession
1814          gender
2277      profession                                 …
61        profession                                 …
755           gender                                …

      category      data_name
80           0  rubist_second
1814         0  rubist_second
2277         0  rubist_second
61           0  rubist_second
755          0  rubist_second
Train data size: 2336
Test data size: 584
Number of unique labels: 2

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
```

```
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

loading weights file pytorch_model.bin from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/pytorch_model.bin
Attempting to create safetensors variant
Attempting to convert .bin model on the fly to safetensors.
Some weights of the model checkpoint at ai-forever/ruBert-base were not used
when initializing BertForSequenceClassification: ['cls.predictions.bias',
'cls.predictions.decoder.bias', 'cls.predictions.decoder.weight',
'cls.predictions.transform.LayerNorm.bias',
'cls.predictions.transform.LayerNorm.weight',
'cls.predictions.transform.dense.bias',
'cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias',
'cls.seq_relationship.weight']
- This IS expected if you are initializing BertForSequenceClassification from
the checkpoint of a model trained on another task or with another architecture
(e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing BertForSequenceClassification
from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a
BertForSequenceClassification model).
Some weights of BertForSequenceClassification were not initialized from the
model checkpoint at ai-forever/ruBert-base and are newly initialized:
['classifier.bias', 'classifier.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
Could not locate the tokenizer configuration file, will try to use the model
config instead.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
```

```
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

loading file vocab.txt from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/vocab.txt
loading file tokenizer.json from cache at None
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at None
loading file tokenizer_config.json from cache at None
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
```

```
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
```

```
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

Map: 100%|      | 2697/2697 [00:00<00:00, 24055.22 examples/s]
Map: 100%|      | 2697/2697 [00:00<00:00, 37324.10 examples/s]

Sample tokenized input from train: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[101, 4269, 12924, 15663, 3822, 16375, 52066, 699, 110, 102821, 5897, 921,
82766, 1306, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 675/675 [00:00<00:00, 22772.58 examples/s]
Map: 100%|      | 675/675 [00:00<00:00, 33659.35 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[101, 4269, 12924, 15663, 3822, 16375, 52066, 699, 110, 102821, 5897, 921,
82766, 1306, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 21:53:56] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.
***** Running training *****
  Num examples = 2,697
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
```

```
  Gradient Accumulation steps = 1
  Total optimization steps = 258
  Number of trainable parameters = 178,308,866
[codecarbon WARNING @ 21:53:56] Another instance of codecarbon is already
running. Exiting.
 17%|         | 43/258 [00:21<01:49,  1.97it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.2959, 'grad_norm': 3.8145382404327393, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 43/258 [00:23<01:49,  1.97it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-43
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-43/config.json

{'eval_loss': 0.08393458276987076, 'eval_precision': 0.9563186813186813,
'eval_recall': 0.9501399373238465, 'eval_f1': 0.9531231398071351, 'eval_balanced
accuracy': 0.9501399373238465, 'eval_runtime': 1.486, 'eval_samples_per_second':
454.237, 'eval_steps_per_second': 7.402, 'epoch': 1.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-43/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-43/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-43/special_tokens_map.json
 33%|        | 86/258 [00:46<01:10,  2.46it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0561, 'grad_norm': 4.915772914886475, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}
```

```
 33%|        | 86/258 [00:47<01:10,  2.46it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-86
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-86/config.json

{'eval_loss': 0.0658872127532959, 'eval_precision': 0.9730943659515088,
'eval_recall': 0.9811133886512802, 'eval_f1': 0.9769174401563263, 'eval_balanced
accuracy': 0.9811133886512802, 'eval_runtime': 1.385, 'eval_samples_per_second':
487.35, 'eval_steps_per_second': 7.942, 'epoch': 2.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-86/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-86/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-86/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_trained/checkpoint-43] due to
args.save_total_limit
 50%|        | 129/258 [01:11<00:55,  2.31it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0166, 'grad_norm': 0.13193808495998383, 'learning_rate': 1e-05,
'epoch': 3.0}


 50%|        | 129/258 [01:13<00:55,  2.31it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-129
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-129/config.json

{'eval_loss': 0.07603797316551208, 'eval_precision': 0.9754265801490026,
'eval_recall': 0.9678833987031161, 'eval_f1': 0.9715066112111241, 'eval_balanced
accuracy': 0.9678833987031161, 'eval_runtime': 1.4184,
'eval_samples_per_second': 475.897, 'eval_steps_per_second': 7.755, 'epoch':
3.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-129/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-129/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-129/special_tokens_map.json
```

```
 67%|       | 172/258 [01:36<00:36,  2.32it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0098, 'grad_norm': 0.03334636613726616, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 172/258 [01:37<00:36,  2.32it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-172
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-172/config.json

{'eval_loss': 0.07533005625009537, 'eval_precision': 0.9754489588926676,
'eval_recall': 0.9711945917180755, 'eval_f1': 0.9732736775419703, 'eval_balanced
accuracy': 0.9711945917180755, 'eval_runtime': 1.4163,
'eval_samples_per_second': 476.589, 'eval_steps_per_second': 7.767, 'epoch':
4.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-172/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-172/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-172/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_trained/checkpoint-129] due to
args.save_total_limit
 83%|      | 215/258 [02:00<00:18,  2.36it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0043, 'grad_norm': 0.03415057808160782, 'learning_rate':
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 215/258 [02:02<00:18,  2.36it/s]Saving model checkpoint to
```

```
model_output_ruberta_base/rubist_trained/checkpoint-215
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-215/config.json

{'eval_loss': 0.07625529170036316, 'eval_precision': 0.9790562816437066,
'eval_recall': 0.981142952874628, 'eval_f1': 0.9800877123977345, 'eval_balanced
accuracy': 0.981142952874628, 'eval_runtime': 1.4638, 'eval_samples_per_second':
461.129, 'eval_steps_per_second': 7.515, 'epoch': 5.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-215/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-215/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-215/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_trained/checkpoint-172] due to
args.save_total_limit
100%|     | 258/258 [02:26<00:00,  2.37it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-258
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/config.json
Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_trained/checkpoint-215] due to
args.save_total_limit
100%|     | 258/258 [02:28<00:00,  2.37it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0036, 'grad_norm': 0.031562238931655884, 'learning_rate': 0.0,
'epoch': 6.0}


100%|     | 258/258 [02:29<00:00,  2.37it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_trained/checkpoint-258
Configuration saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/config.json
```

```
{'eval_loss': 0.07891009002923965, 'eval_precision': 0.9755555555555555,
'eval_recall': 0.9745057847330351, 'eval_f1': 0.9750276853562347, 'eval_balanced
accuracy': 0.9745057847330351, 'eval_runtime': 1.4785,
'eval_samples_per_second': 456.555, 'eval_steps_per_second': 7.44, 'epoch': 6.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/checkpoint-258/special_tokens_map.json


Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from model_output_ruberta_base/rubist_trained/checkpoint-86
(score: 0.0658872127532959).
100%|     | 258/258 [02:32<00:00,  2.37it/s]Deleting older checkpoint
[model_output_ruberta_base/rubist_trained/checkpoint-258] due to
args.save_total_limit
[codecarbon WARNING @ 21:56:28] Another instance of codecarbon is already
running. Exiting.
100%|     | 258/258 [02:32<00:00,  1.70it/s]
Saving model checkpoint to model_output_ruberta_base/rubist_trained
Configuration saved in model_output_ruberta_base/rubist_trained/config.json

{'train_runtime': 152.1394, 'train_samples_per_second': 106.363,
'train_steps_per_second': 1.696, 'train_loss': 0.06437857656977898, 'epoch':
6.0}

Model weights saved in
model_output_ruberta_base/rubist_trained/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_trained/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_trained/special_tokens_map.json
[codecarbon WARNING @ 21:56:29] Another instance of codecarbon is already
running. Exiting.
loading configuration file model_output_ruberta_base/rubist_trained/config.json
Model config BertConfig {
  "_name_or_path": "model_output_ruberta_base/rubist_trained",
  "architectures": [
    "BertForSequenceClassification"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
```

```
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}
```


```
loading weights file model_output_ruberta_base/rubist_trained/model.safetensors
```

```
Estimated total emissions: None kg CO2
Number of unique labels: 2
```

```
All model checkpoint weights were used when initializing
BertForSequenceClassification.

All the weights of BertForSequenceClassification were initialized from the model
checkpoint at model_output_ruberta_base/rubist_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use BertForSequenceClassification for predictions without
further training.
loading file vocab.txt
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|     | 844/844 [00:00<00:00, 13881.78 examples/s]
Map: 100%|     | 844/844 [00:00<00:00, 32068.35 examples/s]
```


```
Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                                  ', 'category': 0,
'data_name': 'rubist', '__index_level_0__': 2726, 'input_ids': [101, 42890,
```

```
1950, 47937, 10088, 815, 16465, 107, 84625, 18777, 734, 74394, 102, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1,
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'labels': 0}

[codecarbon ERROR @ 21:56:59] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 21:56:59] Another instance of codecarbon is already
running. Exiting.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}


Number of unique labels: 2
```

```
loading weights file pytorch_model.bin from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/pytorch_model.bin
Attempting to create safetensors variant
Attempting to convert .bin model on the fly to safetensors.
Some weights of the model checkpoint at ai-forever/ruBert-base were not used
when initializing BertForSequenceClassification: ['cls.predictions.bias',
'cls.predictions.decoder.bias', 'cls.predictions.decoder.weight',
'cls.predictions.transform.LayerNorm.bias',
'cls.predictions.transform.LayerNorm.weight',
'cls.predictions.transform.dense.bias',
'cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias',
'cls.seq_relationship.weight']
- This IS expected if you are initializing BertForSequenceClassification from
the checkpoint of a model trained on another task or with another architecture
(e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing BertForSequenceClassification
from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a
BertForSequenceClassification model).
Some weights of BertForSequenceClassification were not initialized from the
model checkpoint at ai-forever/ruBert-base and are newly initialized:
['classifier.bias', 'classifier.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
Could not locate the tokenizer configuration file, will try to use the model
config instead.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
```

```
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}
```


```
loading file vocab.txt from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/vocab.txt
loading file tokenizer.json from cache at None
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at None
loading file tokenizer_config.json from cache at None
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
```

```
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--ai-forever--ruBert-
base/snapshots/05f37a2ca9e333fd18f30cd0c96c68d274793c69/config.json
Model config BertConfig {
  "_name_or_path": "ai-forever/ruBert-base",
  "architectures": [
    "BertForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

Map: 100%|      | 1868/1868 [00:00<00:00, 26594.16 examples/s]
Map: 100%|      | 1868/1868 [00:00<00:00, 33852.22 examples/s]

Sample tokenized input from train: {'stereotype_type': 'nationality', 'text':
'                ', 'category': 0, 'data_name': 'rubist_second',
'__index_level_0__': 1567, 'input_ids': [101, 780, 34330, 1048, 1179, 94517,
102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
```

```
'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 468/468 [00:00<00:00, 23063.23 examples/s]
Map: 100%|      | 468/468 [00:00<00:00, 30534.40 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'nationality',
'text': '               ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 1567, 'input_ids': [101, 780, 34330, 1048,
1179, 94517, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 21:57:02] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.
***** Running training *****
  Num examples = 1,868
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
  Gradient Accumulation steps = 1
  Total optimization steps = 180
  Number of trainable parameters = 178,308,866
[codecarbon WARNING @ 21:57:02] Another instance of codecarbon is already
running. Exiting.
 17%|         | 30/180 [00:14<01:18,  1.91it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
```

```
  Batch size = 64

{'loss': 0.6243, 'grad_norm': 5.661255836486816, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 30/180 [00:15<01:18,  1.91it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-30
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-30/config.json

{'eval_loss': 0.5886918306350708, 'eval_precision': 0.7438852605967474,
'eval_recall': 0.6130692050424492, 'eval_f1': 0.6033403963604637, 'eval_balanced
accuracy': 0.6130692050424492, 'eval_runtime': 0.9638,
'eval_samples_per_second': 485.572, 'eval_steps_per_second': 8.3, 'epoch': 1.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-30/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-30/tokenizer_config.json
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-30/special_tokens_map.json
 33%|        | 60/180 [00:31<00:48,  2.47it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.488, 'grad_norm': 14.586087226867676, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}


 33%|        | 60/180 [00:31<00:48,  2.47it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-60
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-60/config.json

{'eval_loss': 0.459627240896225, 'eval_precision': 0.7525417574437182,
'eval_recall': 0.7477489066117828, 'eval_f1': 0.7499388279943073, 'eval_balanced
accuracy': 0.7477489066117828, 'eval_runtime': 0.7523,
'eval_samples_per_second': 622.052, 'eval_steps_per_second': 10.633, 'epoch':
2.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-60/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-60/tokenizer_config.json
```

```
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-60/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_second_trained/checkpoint-30] due to
args.save_total_limit
 50%|        | 90/180 [00:48<00:35,  2.50it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.3037, 'grad_norm': 14.871849060058594, 'learning_rate': 1e-05,
'epoch': 3.0}


 50%|        | 90/180 [00:49<00:35,  2.50it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-90
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-90/config.json

{'eval_loss': 0.45848748087882996, 'eval_precision': 0.7938829787234043,
'eval_recall': 0.8061487007975303, 'eval_f1': 0.7984934906605129, 'eval_balanced
accuracy': 0.8061487007975303, 'eval_runtime': 0.7533,
'eval_samples_per_second': 621.252, 'eval_steps_per_second': 10.62, 'epoch':
3.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-90/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-90/tokenizer_config.json
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-90/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_second_trained/checkpoint-60] due to
args.save_total_limit
 67%|       | 120/180 [01:05<00:24,  2.40it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64
```

```
{'loss': 0.2171, 'grad_norm': 16.810762405395508, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 120/180 [01:05<00:24,  2.40it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-120
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-120/config.json

{'eval_loss': 0.515616238117218, 'eval_precision': 0.7862770108043218,
'eval_recall': 0.8020324157447903, 'eval_f1': 0.7911666626682341, 'eval_balanced
accuracy': 0.8020324157447903, 'eval_runtime': 0.7574,
'eval_samples_per_second': 617.894, 'eval_steps_per_second': 10.562, 'epoch':
4.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-120/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-120/tokenizer_config.json
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-120/special_tokens_map.json
 83%|      | 150/180 [01:21<00:11,  2.62it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.1587, 'grad_norm': 8.610406875610352, 'learning_rate':
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 150/180 [01:22<00:11,  2.62it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-150
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-150/config.json

{'eval_loss': 0.5159018039703369, 'eval_precision': 0.7980882007975604,
'eval_recall': 0.8017751479289941, 'eval_f1': 0.7998220246903869, 'eval_balanced
accuracy': 0.8017751479289941, 'eval_runtime': 0.7525,
'eval_samples_per_second': 621.946, 'eval_steps_per_second': 10.632, 'epoch':
5.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-150/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-150/tokenizer_config.json
```

```
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-150/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_second_trained/checkpoint-120] due to
args.save_total_limit
100%|     | 180/180 [01:38<00:00,  2.51it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-180/config.json
Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-180/model.safetensors
tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-180/tokenizer_config.json
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-180/special_tokens_map.json
Deleting older checkpoint
[model_output_ruberta_base/rubist_second_trained/checkpoint-150] due to
args.save_total_limit
100%|     | 180/180 [01:40<00:00,  2.51it/s]The following columns in the
evaluation set don't have a corresponding argument in
`BertForSequenceClassification.forward` and have been ignored: stereotype_type,
data_name, text, __index_level_0__, category. If stereotype_type, data_name,
text, __index_level_0__, category are not expected by
`BertForSequenceClassification.forward`,  you can safely ignore this message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.1281, 'grad_norm': 12.326067924499512, 'learning_rate': 0.0, 'epoch':
6.0}


100%|     | 180/180 [01:41<00:00,  2.51it/s]Saving model checkpoint to
model_output_ruberta_base/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-180/config.json
Model weights saved in
model_output_ruberta_base/rubist_second_trained/checkpoint-180/model.safetensors

{'eval_loss': 0.5239155888557434, 'eval_precision': 0.8008747105737073,
'eval_recall': 0.8008747105737073, 'eval_f1': 0.8008747105737073, 'eval_balanced
accuracy': 0.8008747105737073, 'eval_runtime': 0.7883,
'eval_samples_per_second': 593.706, 'eval_steps_per_second': 10.149, 'epoch':
6.0}

tokenizer config file saved in model_output_ruberta_base/rubist_second_trained/c
heckpoint-180/tokenizer_config.json
Special tokens file saved in model_output_ruberta_base/rubist_second_trained/che
ckpoint-180/special_tokens_map.json
```

```
Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from
model_output_ruberta_base/rubist_second_trained/checkpoint-90 (score:
0.45848748087882996).
100%|      | 180/180 [01:43<00:00,  2.51it/s]Deleting older checkpoint
[model_output_ruberta_base/rubist_second_trained/checkpoint-180] due to
args.save_total_limit
[codecarbon WARNING @ 21:58:46] Another instance of codecarbon is already
running. Exiting.
100%|      | 180/180 [01:43<00:00,  1.73it/s]
Saving model checkpoint to model_output_ruberta_base/rubist_second_trained
Configuration saved in
model_output_ruberta_base/rubist_second_trained/config.json

{'train_runtime': 103.8717, 'train_samples_per_second': 107.902,
'train_steps_per_second': 1.733, 'train_loss': 0.319994236363305, 'epoch': 6.0}

Model weights saved in
model_output_ruberta_base/rubist_second_trained/model.safetensors
tokenizer config file saved in
model_output_ruberta_base/rubist_second_trained/tokenizer_config.json
Special tokens file saved in
model_output_ruberta_base/rubist_second_trained/special_tokens_map.json
[codecarbon WARNING @ 21:58:46] Another instance of codecarbon is already
running. Exiting.
loading configuration file
model_output_ruberta_base/rubist_second_trained/config.json
Model config BertConfig {
  "_name_or_path": "model_output_ruberta_base/rubist_second_trained",
  "architectures": [
    "BertForSequenceClassification"
  ],
  "attention_probs_dropout_prob": 0.1,
  "classifier_dropout": null,
  "directionality": "bidi",
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-12,
  "max_position_embeddings": 512,
  "model_type": "bert",
  "num_attention_heads": 12,
```

```
  "num_hidden_layers": 12,
  "pad_token_id": 0,
  "pooler_fc_size": 768,
  "pooler_num_attention_heads": 12,
  "pooler_num_fc_layers": 3,
  "pooler_size_per_head": 128,
  "pooler_type": "first_token_transform",
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 2,
  "use_cache": true,
  "vocab_size": 120138
}

loading weights file
model_output_ruberta_base/rubist_second_trained/model.safetensors

Estimated total emissions: None kg CO2
Number of unique labels: 2

All model checkpoint weights were used when initializing
BertForSequenceClassification.

All the weights of BertForSequenceClassification were initialized from the model
checkpoint at model_output_ruberta_base/rubist_second_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use BertForSequenceClassification for predictions without
further training.
loading file vocab.txt
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|      | 584/584 [00:00<00:00, 8228.46 examples/s]
Map: 100%|      | 584/584 [00:00<00:00, 29469.48 examples/s]

Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                      ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 80, 'input_ids': [101, 1015, 1202, 61810,
1885, 4821, 22860, 102, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0], 'token_type_ids': [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}
```

[30]:

	precision	recall	f1-score	support
0	0.823529	0.863753	0.843162	389.000000
1	0.698864	0.630769	0.663073	195.000000

accuracy	0.785959	0.785959	0.785959	0.785959
macro avg	0.761197	0.747261	0.753117	584.000000
weighted avg	0.781903	0.785959	0.783029	584.000000

Train models - FacebookAI/xlm-roberta-base

[31]:
```
from BERT_Models_Fine_Tuning_Russian import (data_loader, train_model,␣
 ↪evaluate_model)

gc.collect()
torch.cuda.empty_cache()

# Load and combine relevant datasets
train_data_rubist, test_data_rubist = data_loader(csv_file_path='COMP0173_Data/
 ↪rubist.csv', labelling_criteria='stereotype', dataset_name='rubist',␣
 ↪sample_size=1000000, num_examples=5)
train_data_rubist_second, test_data_rubist_second =␣
 ↪data_loader(csv_file_path='COMP0173_Data/rubist_second.csv',␣
 ↪labelling_criteria='stereotype', dataset_name='rubist_second',␣
 ↪sample_size=1000000, num_examples=5)

# Execute full pipeline for Deepavlov model
train_model(train_data_rubist, model_path='FacebookAI/xlm-roberta-base',␣
 ↪batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_xlm_roberta_base',␣
 ↪dataset_name='rubist_trained', seed=42)
evaluate_model(test_data_rubist,␣
 ↪model_output_dir='model_output_xlm_roberta_base/rubist_trained',␣
 ↪result_output_base_dir='result_output_xlm_roberta_base',␣
 ↪dataset_name='rubist_trained', seed=42)

gc.collect()
torch.cuda.empty_cache()

train_model(train_data_rubist_second, model_path='FacebookAI/xlm-roberta-base',␣
 ↪batch_size=64, epoch=6, learning_rate=2e-5,␣
 ↪model_output_base_dir='model_output_xlm_roberta_base',␣
 ↪dataset_name='rubist_second_trained', seed=42)
evaluate_model(test_data_rubist_second,␣
 ↪model_output_dir='model_output_xlm_roberta_base/rubist_second_trained',␣
 ↪result_output_base_dir='result_output_xlm_roberta_base',␣
 ↪dataset_name='rubist_second_trained', seed=42)
```

```
[codecarbon ERROR @ 21:59:08] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
```

```
[codecarbon WARNING @ 21:59:08] Another instance of codecarbon is already
running. Exiting.
First few examples from the training data:
     stereotype_type                                                text  \
168       profession
2883     nationality                                …
2919           lgbtq                                …
3412      profession                                …
732            lgbtq

      category data_name
168          1    rubist
2883         0    rubist
2919         1    rubist
3412         0    rubist
732          1    rubist
First few examples from the testing data:
     stereotype_type                                                text  \
2726      profession                                 …
1066          gender                                …
2547     nationality                                …
1834      profession                                 …
1825     nationality                                …

      category data_name
2726         0    rubist
1066         0    rubist
2547         0    rubist
1834         0    rubist
1825         0    rubist
Train data size: 3372
Test data size: 844
First few examples from the training data:
     stereotype_type                                          text  category  \
1005          gender                                            1
1001          gender                                          0
2619     nationality                                           0
2213          gender                                     0
934           gender                                      0

          data_name
1005  rubist_second
1001  rubist_second
2619  rubist_second
2213  rubist_second
934   rubist_second
First few examples from the testing data:
```

```
     stereotype_type                                                  text  \
80         profession
1814           gender
2277       profession                                 …
61         profession                                 …
755            gender                                …

      category      data_name
80           0  rubist_second
1814         0  rubist_second
2277         0  rubist_second
61           0  rubist_second
755          0  rubist_second
Train data size: 2336
Test data size: 584
Number of unique labels: 2

loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}
```

```
loading weights file model.safetensors from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/model.safetensors
Some weights of the model checkpoint at FacebookAI/xlm-roberta-base were not
used when initializing XLMRobertaForSequenceClassification: ['lm_head.bias',
'lm_head.dense.bias', 'lm_head.dense.weight', 'lm_head.layer_norm.bias',
'lm_head.layer_norm.weight', 'roberta.pooler.dense.bias',
'roberta.pooler.dense.weight']
- This IS expected if you are initializing XLMRobertaForSequenceClassification
from the checkpoint of a model trained on another task or with another
architecture (e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing
XLMRobertaForSequenceClassification from the checkpoint of a model that you
expect to be exactly identical (initializing a BertForSequenceClassification
model from a BertForSequenceClassification model).
Some weights of XLMRobertaForSequenceClassification were not initialized from
the model checkpoint at FacebookAI/xlm-roberta-base and are newly initialized:
['classifier.dense.bias', 'classifier.dense.weight', 'classifier.out_proj.bias',
'classifier.out_proj.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
```

```
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

loading file sentencepiece.bpe.model from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/sentencepiece.bpe.model
loading file tokenizer.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/tokenizer.json
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at None
loading file tokenizer_config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/tokenizer_config.json
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

Map: 100%|      | 2697/2697 [00:00<00:00, 17561.65 examples/s]
```

```
Map: 100%|      | 2697/2697 [00:00<00:00, 33829.69 examples/s]

Sample tokenized input from train: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[0, 81939, 440, 14276, 4684, 92354, 103, 19816, 2791, 42678, 174783, 4401, 135,
129, 104335, 55533, 86783, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 1, 1], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 675/675 [00:00<00:00, 18120.78 examples/s]
Map: 100%|      | 675/675 [00:00<00:00, 37338.51 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'gender', 'text':
'                                          ',
'category': 0, 'data_name': 'rubist', '__index_level_0__': 1317, 'input_ids':
[0, 81939, 440, 14276, 4684, 92354, 103, 19816, 2791, 42678, 174783, 4401, 135,
129, 104335, 55533, 86783, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 1, 1], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 22:01:41] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.
***** Running training *****
  Num examples = 2,697
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
  Gradient Accumulation steps = 1
  Total optimization steps = 258
  Number of trainable parameters = 278,045,186
[codecarbon WARNING @ 22:01:41] Another instance of codecarbon is already
running. Exiting.
 17%|         | 43/258 [00:34<03:35,  1.00s/it]The following columns in the
```

```
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.5796, 'grad_norm': 13.293757438659668, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 43/258 [00:36<03:35,  1.00s/it]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-43
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-43/config.json

{'eval_loss': 0.29654622077941895, 'eval_precision': 0.9232256216887023,
'eval_recall': 0.8495279579005459, 'eval_f1': 0.8737980769230769, 'eval_balanced
accuracy': 0.8495279579005459, 'eval_runtime': 2.0892,
'eval_samples_per_second': 323.091, 'eval_steps_per_second': 5.265, 'epoch':
1.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-43/model.safetensors
tokenizer config file saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-43/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-43/special_tokens_map.json
 33%|        | 86/258 [01:11<01:48,  1.59it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.2143, 'grad_norm': 18.479469299316406, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}


 33%|        | 86/258 [01:13<01:48,  1.59it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-86
Configuration saved in
```

```
model_output_xlm_roberta_base/rubist_trained/checkpoint-86/config.json

{'eval_loss': 0.11306682229042053, 'eval_precision': 0.9724270353302611,
'eval_recall': 0.9546238445316042, 'eval_f1': 0.9627356312609159, 'eval_balanced
accuracy': 0.9546238445316042, 'eval_runtime': 1.7613,
'eval_samples_per_second': 383.233, 'eval_steps_per_second': 6.245, 'epoch':
2.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-86/model.safetensors
tokenizer config file saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-86/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-86/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_trained/checkpoint-43] due to
args.save_total_limit
 50%|        | 129/258 [01:48<01:21,  1.58it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.103, 'grad_norm': 8.253131866455078, 'learning_rate': 1e-05, 'epoch':
3.0}


 50%|        | 129/258 [01:49<01:21,  1.58it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-129
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-129/config.json

{'eval_loss': 0.11099749803543091, 'eval_precision': 0.9700471890831835,
'eval_recall': 0.9535102587855018, 'eval_f1': 0.961088372629273, 'eval_balanced
accuracy': 0.9535102587855018, 'eval_runtime': 1.804, 'eval_samples_per_second':
374.17, 'eval_steps_per_second': 6.098, 'epoch': 3.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-129/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_trained/chec
kpoint-129/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-129/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_trained/checkpoint-86] due to
```

```
args.save_total_limit
 67%|       | 172/258 [02:24<00:55,  1.55it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0684, 'grad_norm': 0.22670234739780426, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 172/258 [02:26<00:55,  1.55it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-172
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-172/config.json

{'eval_loss': 0.09345293045043945, 'eval_precision': 0.9720860566448801,
'eval_recall': 0.9612462305615231, 'eval_f1': 0.966362349751829, 'eval_balanced
accuracy': 0.9612462305615231, 'eval_runtime': 1.7775,
'eval_samples_per_second': 379.747, 'eval_steps_per_second': 6.188, 'epoch':
4.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-172/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_trained/chec
kpoint-172/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-172/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_trained/checkpoint-129] due to
args.save_total_limit
 83%|      | 215/258 [03:00<00:26,  1.61it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0402, 'grad_norm': 1.1675723791122437, 'learning_rate':
```

```
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 215/258 [03:02<00:26,  1.61it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-215
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-215/config.json

{'eval_loss': 0.07935919612646103, 'eval_precision': 0.9722222222222222,
'eval_recall': 0.9711798096064017, 'eval_f1': 0.9716980434037326, 'eval_balanced
accuracy': 0.9711798096064017, 'eval_runtime': 1.7443,
'eval_samples_per_second': 386.969, 'eval_steps_per_second': 6.306, 'epoch':
5.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-215/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_trained/chec
kpoint-215/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-215/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_trained/checkpoint-172] due to
args.save_total_limit
100%|      | 258/258 [03:35<00:00,  1.59it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_trained/checkpoint-258
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-258/config.json
Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_trained/chec
kpoint-258/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-258/special_tokens_map.json
100%|      | 258/258 [03:39<00:00,  1.59it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 675
  Batch size = 64

{'loss': 0.0278, 'grad_norm': 2.070859670639038, 'learning_rate': 0.0, 'epoch':
6.0}


100%|      | 258/258 [03:41<00:00,  1.59it/s]Saving model checkpoint to
```

```
model_output_xlm_roberta_base/rubist_trained/checkpoint-258
Configuration saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-258/config.json

{'eval_loss': 0.08117496967315674, 'eval_precision': 0.9799396801460376,
'eval_recall': 0.9767329562252399, 'eval_f1': 0.9783091788633762, 'eval_balanced
accuracy': 0.9767329562252399, 'eval_runtime': 1.7911,
'eval_samples_per_second': 376.865, 'eval_steps_per_second': 6.142, 'epoch':
6.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/checkpoint-258/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_trained/chec
kpoint-258/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_trained/checkp
oint-258/special_tokens_map.json


Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from
model_output_xlm_roberta_base/rubist_trained/checkpoint-215 (score:
0.07935919612646103).
100%|     | 258/258 [03:44<00:00,  1.59it/s]Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_trained/checkpoint-258] due to
args.save_total_limit
[codecarbon WARNING @ 22:05:26] Another instance of codecarbon is already
running. Exiting.
100%|     | 258/258 [03:44<00:00,  1.15it/s]
Saving model checkpoint to model_output_xlm_roberta_base/rubist_trained
Configuration saved in model_output_xlm_roberta_base/rubist_trained/config.json

{'train_runtime': 224.5773, 'train_samples_per_second': 72.055,
'train_steps_per_second': 1.149, 'train_loss': 0.17222191058388053, 'epoch':
6.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_trained/model.safetensors
tokenizer config file saved in
model_output_xlm_roberta_base/rubist_trained/tokenizer_config.json
Special tokens file saved in
model_output_xlm_roberta_base/rubist_trained/special_tokens_map.json
[codecarbon WARNING @ 22:05:26] Another instance of codecarbon is already
running. Exiting.
loading configuration file
model_output_xlm_roberta_base/rubist_trained/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "model_output_xlm_roberta_base/rubist_trained",
```

```
  "architectures": [
    "XLMRobertaForSequenceClassification"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

loading weights file
model_output_xlm_roberta_base/rubist_trained/model.safetensors

Estimated total emissions: None kg CO2
Number of unique labels: 2

All model checkpoint weights were used when initializing
XLMRobertaForSequenceClassification.

All the weights of XLMRobertaForSequenceClassification were initialized from the
model checkpoint at model_output_xlm_roberta_base/rubist_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use XLMRobertaForSequenceClassification for predictions without
further training.
loading file sentencepiece.bpe.model
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|     | 844/844 [00:00<00:00, 10103.81 examples/s]
Map: 100%|     | 844/844 [00:00<00:00, 30037.61 examples/s]
```

```
Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                                    ', 'category': 0,
'data_name': 'rubist', '__index_level_0__': 2726, 'input_ids': [0, 36553, 1874,
9542, 29558, 8941, 100257, 2151, 8802, 419, 35, 30068, 1343, 86112, 424, 50570,
3281, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1], 'attention_mask':
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 22:05:56] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
[codecarbon WARNING @ 22:05:56] Another instance of codecarbon is already
running. Exiting.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

loading weights file model.safetensors from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
```

```
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/model.safetensors

Number of unique labels: 2

Some weights of the model checkpoint at FacebookAI/xlm-roberta-base were not
used when initializing XLMRobertaForSequenceClassification: ['lm_head.bias',
'lm_head.dense.bias', 'lm_head.dense.weight', 'lm_head.layer_norm.bias',
'lm_head.layer_norm.weight', 'roberta.pooler.dense.bias',
'roberta.pooler.dense.weight']
- This IS expected if you are initializing XLMRobertaForSequenceClassification
from the checkpoint of a model trained on another task or with another
architecture (e.g. initializing a BertForSequenceClassification model from a
BertForPreTraining model).
- This IS NOT expected if you are initializing
XLMRobertaForSequenceClassification from the checkpoint of a model that you
expect to be exactly identical (initializing a BertForSequenceClassification
model from a BertForSequenceClassification model).
Some weights of XLMRobertaForSequenceClassification were not initialized from
the model checkpoint at FacebookAI/xlm-roberta-base and are newly initialized:
['classifier.dense.bias', 'classifier.dense.weight', 'classifier.out_proj.bias',
'classifier.out_proj.weight']
You should probably TRAIN this model on a down-stream task to be able to use it
for predictions and inference.
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
```

```
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

loading file sentencepiece.bpe.model from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/sentencepiece.bpe.model
loading file tokenizer.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/tokenizer.json
loading file added_tokens.json from cache at None
loading file special_tokens_map.json from cache at None
loading file tokenizer_config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/tokenizer_config.json
loading configuration file config.json from cache at
/Users/rinlobachevskii/.cache/huggingface/hub/models--FacebookAI--xlm-roberta-
base/snapshots/e73636d4f797dec63c3081bb6ed5c7b0bb3f2089/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "FacebookAI/xlm-roberta-base",
  "architectures": [
    "XLMRobertaForMaskedLM"
  ],
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

Map: 100%|      | 1868/1868 [00:00<00:00, 22948.96 examples/s]
```

```
Map: 100%|      | 1868/1868 [00:00<00:00, 40749.35 examples/s]

Sample tokenized input from train: {'stereotype_type': 'nationality', 'text':
'                ', 'category': 0, 'data_name': 'rubist_second',
'__index_level_0__': 1567, 'input_ids': [0, 1203, 28640, 328, 90832, 4296,
76797, 145158, 103, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

Map: 100%|      | 468/468 [00:00<00:00, 22279.23 examples/s]
Map: 100%|      | 468/468 [00:00<00:00, 35119.50 examples/s]
PyTorch: setting up devices
The default value for the training argument `--report_to` will change in v5
(from all installed integrations to none). In v5, you will need to use
`--report_to all` to get the same behavior as now. You should start updating
your code and make this info disappear :-).

Sample tokenized input from validation: {'stereotype_type': 'nationality',
'text': '                ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 1567, 'input_ids': [0, 1203, 28640, 328,
90832, 4296, 76797, 145158, 103, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1, 1], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}

[codecarbon ERROR @ 22:06:01] Error: Another instance of codecarbon is probably
running as we find
`/var/folders/gh/yk4tzw4x1656bcjnlyx8mlmh0000gn/T/.codecarbon.lock`. Turn off
the other instance to be able to run this one or use `allow_multiple_runs` or
delete the file. Exiting.
The following columns in the training set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.
***** Running training *****
  Num examples = 1,868
  Num Epochs = 6
  Instantaneous batch size per device = 64
  Total train batch size (w. parallel, distributed & accumulation) = 64
  Gradient Accumulation steps = 1
  Total optimization steps = 180
  Number of trainable parameters = 278,045,186
[codecarbon WARNING @ 22:06:01] Another instance of codecarbon is already
running. Exiting.
 17%|         | 30/180 [00:18<01:40,  1.49it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
```

```
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.6391, 'grad_norm': 4.394711494445801, 'learning_rate':
1.6666666666666667e-05, 'epoch': 1.0}


 17%|         | 30/180 [00:19<01:40,  1.49it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-30
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-30/config.json

{'eval_loss': 0.6530691981315613, 'eval_precision': 0.3194444444444444,
'eval_recall': 0.5, 'eval_f1': 0.3898305084745763, 'eval_balanced accuracy':
0.5, 'eval_runtime': 1.2506, 'eval_samples_per_second': 374.219,
'eval_steps_per_second': 6.397, 'epoch': 1.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-30/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-30/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-30/special_tokens_map.json
 33%|        | 60/180 [00:43<01:19,  1.51it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.637, 'grad_norm': 14.016798973083496, 'learning_rate':
1.3333333333333333e-05, 'epoch': 2.0}


 33%|        | 60/180 [00:44<01:19,  1.51it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-60
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-60/config.json

{'eval_loss': 0.6345716714859009, 'eval_precision': 0.3194444444444444,
'eval_recall': 0.5, 'eval_f1': 0.3898305084745763, 'eval_balanced accuracy':
0.5, 'eval_runtime': 1.1687, 'eval_samples_per_second': 400.455,
```

```
'eval_steps_per_second': 6.845, 'epoch': 2.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-60/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-60/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-60/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_second_trained/checkpoint-30] due to
args.save_total_limit
 50%|        | 90/180 [01:07<00:50,  1.79it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.5625, 'grad_norm': 10.857259750366211, 'learning_rate': 1e-05,
'epoch': 3.0}


 50%|        | 90/180 [01:08<00:50,  1.79it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-90
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-90/config.json

{'eval_loss': 0.5220487713813782, 'eval_precision': 0.7727047146401985,
'eval_recall': 0.6413686647800361, 'eval_f1': 0.641025641025641, 'eval_balanced
accuracy': 0.6413686647800361, 'eval_runtime': 1.038, 'eval_samples_per_second':
450.872, 'eval_steps_per_second': 7.707, 'epoch': 3.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-90/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-90/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-90/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_second_trained/checkpoint-60] due to
args.save_total_limit
 67%|       | 120/180 [01:31<00:32,  1.87it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
```

```
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.4799, 'grad_norm': 12.498452186584473, 'learning_rate':
6.666666666666667e-06, 'epoch': 4.0}


 67%|       | 120/180 [01:32<00:32,  1.87it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-120
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-120/config.json

{'eval_loss': 0.467654287815094, 'eval_precision': 0.7649707447448894,
'eval_recall': 0.7177772060715204, 'eval_f1': 0.7291666666666667, 'eval_balanced
accuracy': 0.7177772060715204, 'eval_runtime': 1.0269,
'eval_samples_per_second': 455.746, 'eval_steps_per_second': 7.791, 'epoch':
4.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-120/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-120/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-120/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_second_trained/checkpoint-90] due to
args.save_total_limit
 83%|      | 150/180 [01:53<00:15,  1.88it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.433, 'grad_norm': 17.39902114868164, 'learning_rate':
3.3333333333333333e-06, 'epoch': 5.0}


 83%|      | 150/180 [01:54<00:15,  1.88it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-150
Configuration saved in
```

```
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-150/config.json

{'eval_loss': 0.43977901339530945, 'eval_precision': 0.7607338963988797,
'eval_recall': 0.7339850784666838, 'eval_f1': 0.7426704014939309, 'eval_balanced
accuracy': 0.7339850784666838, 'eval_runtime': 1.0038,
'eval_samples_per_second': 466.213, 'eval_steps_per_second': 7.969, 'epoch':
5.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-150/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-150/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-150/special_tokens_map.json
Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_second_trained/checkpoint-120] due to
args.save_total_limit
100%|      | 180/180 [02:15<00:00,  1.88it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-180/config.json
Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-180/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-180/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-180/special_tokens_map.json
100%|      | 180/180 [02:18<00:00,  1.88it/s]The following columns in the
evaluation set don't have a corresponding argument in
`XLMRobertaForSequenceClassification.forward` and have been ignored:
stereotype_type, data_name, text, __index_level_0__, category. If
stereotype_type, data_name, text, __index_level_0__, category are not expected
by `XLMRobertaForSequenceClassification.forward`,  you can safely ignore this
message.

***** Running Evaluation *****
  Num examples = 468
  Batch size = 64

{'loss': 0.3981, 'grad_norm': 28.39149284362793, 'learning_rate': 0.0, 'epoch':
6.0}


100%|      | 180/180 [02:19<00:00,  1.88it/s]Saving model checkpoint to
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-180
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-180/config.json

{'eval_loss': 0.4492458701133728, 'eval_precision': 0.7854963680387409,
'eval_recall': 0.7333419089271932, 'eval_f1': 0.7462297933567053, 'eval_balanced
```

```
accuracy': 0.7333419089271932, 'eval_runtime': 1.0435,
'eval_samples_per_second': 448.505, 'eval_steps_per_second': 7.667, 'epoch':
6.0}

Model weights saved in model_output_xlm_roberta_base/rubist_second_trained/check
point-180/model.safetensors
tokenizer config file saved in model_output_xlm_roberta_base/rubist_second_train
ed/checkpoint-180/tokenizer_config.json
Special tokens file saved in model_output_xlm_roberta_base/rubist_second_trained
/checkpoint-180/special_tokens_map.json


Training completed. Do not forget to share your model on huggingface.co/models
=)


Loading best model from
model_output_xlm_roberta_base/rubist_second_trained/checkpoint-150 (score:
0.43977901339530945).
100%|     | 180/180 [02:23<00:00,  1.88it/s]Deleting older checkpoint
[model_output_xlm_roberta_base/rubist_second_trained/checkpoint-180] due to
args.save_total_limit
[codecarbon WARNING @ 22:08:24] Another instance of codecarbon is already
running. Exiting.
100%|     | 180/180 [02:23<00:00,  1.26it/s]
Saving model checkpoint to model_output_xlm_roberta_base/rubist_second_trained
Configuration saved in
model_output_xlm_roberta_base/rubist_second_trained/config.json

{'train_runtime': 143.3491, 'train_samples_per_second': 78.187,
'train_steps_per_second': 1.256, 'train_loss': 0.5249358283148872, 'epoch': 6.0}

Model weights saved in
model_output_xlm_roberta_base/rubist_second_trained/model.safetensors
tokenizer config file saved in
model_output_xlm_roberta_base/rubist_second_trained/tokenizer_config.json
Special tokens file saved in
model_output_xlm_roberta_base/rubist_second_trained/special_tokens_map.json
[codecarbon WARNING @ 22:08:25] Another instance of codecarbon is already
running. Exiting.

Estimated total emissions: None kg CO2

loading configuration file
model_output_xlm_roberta_base/rubist_second_trained/config.json
Model config XLMRobertaConfig {
  "_name_or_path": "model_output_xlm_roberta_base/rubist_second_trained",
  "architectures": [
    "XLMRobertaForSequenceClassification"
  ],
```

```
  "attention_probs_dropout_prob": 0.1,
  "bos_token_id": 0,
  "classifier_dropout": null,
  "eos_token_id": 2,
  "hidden_act": "gelu",
  "hidden_dropout_prob": 0.1,
  "hidden_size": 768,
  "initializer_range": 0.02,
  "intermediate_size": 3072,
  "layer_norm_eps": 1e-05,
  "max_position_embeddings": 514,
  "model_type": "xlm-roberta",
  "num_attention_heads": 12,
  "num_hidden_layers": 12,
  "output_past": true,
  "pad_token_id": 1,
  "position_embedding_type": "absolute",
  "problem_type": "single_label_classification",
  "torch_dtype": "float32",
  "transformers_version": "4.46.3",
  "type_vocab_size": 1,
  "use_cache": true,
  "vocab_size": 250002
}

loading weights file
model_output_xlm_roberta_base/rubist_second_trained/model.safetensors

Number of unique labels: 2

All model checkpoint weights were used when initializing
XLMRobertaForSequenceClassification.

All the weights of XLMRobertaForSequenceClassification were initialized from the
model checkpoint at model_output_xlm_roberta_base/rubist_second_trained.
If your task is similar to the task the model of the checkpoint was trained on,
you can already use XLMRobertaForSequenceClassification for predictions without
further training.
loading file sentencepiece.bpe.model
loading file tokenizer.json
loading file added_tokens.json
loading file special_tokens_map.json
loading file tokenizer_config.json
Map: 100%|     | 584/584 [00:00<00:00, 2541.83 examples/s]
Map: 100%|     | 584/584 [00:00<00:00, 18186.95 examples/s]

Sample tokenized input from test: {'stereotype_type': 'profession', 'text':
'                      ', 'category': 0, 'data_name':
'rubist_second', '__index_level_0__': 80, 'input_ids': [0, 3077, 3505, 216045,
```

```
419, 6944, 47525, 198433, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
1, 1, 1, 1, 1, 1], 'attention_mask': [1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], 'labels': 0}
```

[31]:

	precision	recall	f1-score	support
0	0.797297	0.910026	0.849940	389.000000
1	0.750000	0.538462	0.626866	195.000000
accuracy	0.785959	0.785959	0.785959	0.785959
macro avg	0.773649	0.724244	0.738403	584.000000
weighted avg	0.781505	0.785959	0.775455	584.000000