08_compile_results_for_report

January 23, 2026

1 08_compile_results_for_report

This notebook consolidates key outputs from the full analysis pipeline into a single, report-ready location and generates combined tables for inclusion in the final write-up. **This notebook does not train models or generate new datasets. It performs file management, aggregates previously generated tables, displays saved figures for consolidated inspection, and prints LaTeX code for report inclusion. Some displayed plots/tables are exploratory or intermediate and may not appear in the final report.** The main steps are:

- Defining a set of target result files (CSV tables and PNG plots) produced by earlier notebooks, covering:
  - EDA word-frequency summaries
  - emotion model outputs (both models, all vs negative subsets)
  - BERTopic topic summaries (negative reviews, sadness-only negative reviews, and Falcon-derived topics)
  - LDA topic summaries (negative reviews and sadness-only negative reviews)
  - LLM topic extraction outputs (filtered)
- Searching the project output directories recursively to locate these files and copying them into two dedicated report folders:
  - `output/tables_report/` for tables used in the report
  - `output/plots_report/` for figures used in the report
- Loading copied tables to validate shapes and contents and to support additional compilation steps.
- Creating combined, report-ready tables, including:
  - a wide-format emotion count comparison table across models and subsets (all vs negative), exported as CSV and rendered as LaTeX
  - aligned topic comparison tables across modelling approaches (BERTopic, BERTopic sadness-only, LDA, LDA sadness-only, and BERTopic over Falcon-extracted topics), exported as LaTeX both as a single combined table and as one table per topic
- Collecting and renaming selected PNG figures so filenames match report conventions (e.g., standardising Falcon-related figure names), and displaying them for quick visual checking within the notebook.

[1]:
```
from pathlib import Path
import sys
from configparser import ConfigParser
import warnings
import shutil
from IPython.display import Image, display

import numpy as np
import pandas as pd

warnings.filterwarnings("ignore", category=DeprecationWarning)

# Resolve project root as the parent of the folder the notebook is currently in
CWD = Path.cwd().resolve()
PROJECT_ROOT = CWD.parent

# Safety fallback
if not (PROJECT_ROOT / "config.ini").exists():
    PROJECT_ROOT = next((p for p in (CWD, *CWD.parents) if (p / "config.ini").
 ↪exists()), None)
    if PROJECT_ROOT is None:
        raise FileNotFoundError("Could not locate 'config.ini' in the current␣
 ↪directory or its parents.")

if str(PROJECT_ROOT) not in sys.path:
    sys.path.insert(0, str(PROJECT_ROOT))

CONFIG = ConfigParser()
CONFIG.read(PROJECT_ROOT / "config.ini")

print("CONFIG used:")
for section in CONFIG.sections():
    print(f"\n[{section}]")
    for key, value in CONFIG[section].items():
        print(f"{key} = {value}")
```

```
CONFIG used:

[DATA]
data_dir = data
raw_filename = PureGym Customer Reviews.csv
raw_filename_filtered = PureGym Customer Reviews_raw_filtered.csv
preprocessed_filename = PureGym Customer Reviews_preprocessed.csv
preprocessed_filename_sentiment = PureGym Customer
Reviews_preprocessed_sentiment.csv
preprocessed_filename_negative = PureGym Customer
Reviews_preprocessed_negative.csv
preprocessed_filename_non_negative = PureGym Customer
```

```
Reviews_preprocessed_non_negative.csv
preprocessed_filename_emotion = PureGym Customer
Reviews_preprocessed_emotion.csv
preprocessed_filename_negative_emotion = PureGym Customer
Reviews_preprocessed_negative_emotion.csv
preprocessed_filename_non_negative_emotion = PureGym Customer
Reviews_preprocessed_non_negative_emotion.csv

[OUTPUT]
plot_dir = output/plots
table_dir = output/tables
model_dir = output/models

[FILTERING]
selected_cols = ["Rating", "Date Experienced", "Review Title", "Review"]
country_code = GB
text_col = Review
detect_language = en
negative_ratings = [1, 2]
emotion_col = Dominant Emotion

[ANALYSIS_DATES]
start_date = 2022-12-17
end_date = 2023-12-17
date_col = Date Experienced

[REPRODUCIBILITY]
seed = 901

[MODELS]
bertopic_negative = bertopic_negative
bertopic_non_negative = bertopic_non_negative
bertopic_emotion_negative_anger = bertopic_emotion_negative_anger
bertopic_emotion_negative_sadness = bertopic_emotion_negative_sad
bertopic_emotion_negative_joy = bertopic_emotion_negative_joy
bertopic_llm_topics_negative = bertopic_llm_topics_negative
bertopic_negative_reviews_llm_filtered = bertopic_negative_reviews_llm_filtered
```

[2]:
```python
# REPRODUCIBILITY
SEED = CONFIG["REPRODUCIBILITY"].getint("SEED")
np.random.seed(SEED)

# OUTPUT
PLOT_DIR = PROJECT_ROOT / CONFIG["OUTPUT"]["PLOT_DIR"]
TABLE_DIR = PROJECT_ROOT / CONFIG["OUTPUT"]["TABLE_DIR"]

PLOT_DIR.mkdir(parents=True, exist_ok=True)
```

```
TABLE_DIR.mkdir(parents=True, exist_ok=True)
```

1.1 Report Tables

[3]:
```
# Report table filenames
FILES = {
    "BERTOPIC_EMO_NEG_SAD_TOP": "bertopic_emotion_negative_sadness_top_topics.
 ↪csv",
    "BERTOPIC_EMO_NEG_SAD_INFO": "bertopic_emotion_negative_sadness_topic_info.
 ↪csv",
    "BERTOPIC_NEG_TOP": "bertopic_negative_top_topics.csv",
    "BERTOPIC_NEG_INFO": "bertopic_negative_topic_info.csv",
    "EMO_ALL_BSAVANI":␣
 ↪"emotion_counts_all_reviews_bhadresh_savani_bert_base_uncased_emotion.csv",
    "EMO_ALL_JHART":␣
 ↪"emotion_counts_all_reviews_j_hartmann_emotion_english_distilroberta_base.
 ↪csv",
    "EMO_NEG_BSAVANI":␣
 ↪"emotion_counts_negative_reviews_bhadresh_savani_bert_base_uncased_emotion.
 ↪csv",
    "EMO_NEG_JHART":␣
 ↪"emotion_counts_negative_reviews_j_hartmann_emotion_english_distilroberta_base.
 ↪csv",
    "LDA_NEG_EMO_SAD":␣
 ↪"lda_preprocessed_negative_emotion_sadness_gensim_lda_topics.csv",
    "LDA_NEG": "lda_preprocessed_negative_gensim_lda_topics.csv",
    "LLM_TOPICS_FILTERED": "llm_topics_negative_unprocessed_filtered.csv",
    "TOP10_NEG": "trustpilot_negative_top10_words.csv",
    "TOP10_NON": "trustpilot_non_negative_top10_words.csv",
    "BERTOPIC_LLM_TOP": "bertopic_llm_topics_negative_top_topics.csv",
    "BERTOPIC_LLM_INFO": "bertopic_llm_topics_negative_topic_info.csv",
}
```

[4]:
```
# Collect key output tables into a single folder for reporting
REPORT_TABLES_DIR = PROJECT_ROOT/"output/tables_report"
REPORT_TABLES_DIR.mkdir(parents=True, exist_ok=True)

TARGET_FILENAMES = set(FILES.values())
all_csvs = [p for p in TABLE_DIR.rglob("*.csv") if REPORT_TABLES_DIR not in p.
 ↪parents]
matches = {p.name: p for p in all_csvs if p.name in TARGET_FILENAMES}

copied = []
for fname in sorted(TARGET_FILENAMES):
    src = matches.get(fname)
    if src is None:
```

```
        continue
    dst = REPORT_TABLES_DIR / fname
    shutil.copy2(src, dst)
    copied.append(dst)

missing = sorted(TARGET_FILENAMES - set(matches.keys()))
print("Report tables folder:", REPORT_TABLES_DIR)
print(f"Copied {len(copied)} file(s).")
if missing:
    print("Missing (not found anywhere under TABLE_DIR):")
    for m in missing:
        print("-", m)
else:
    print("All target files were found and copied.")
```

```
Report tables folder: /Users/Joshua.Dixon/Documents/8_uni/8 Unstructured Data
Analysis/PureGym-NLP-UDA/output/tables_report
Copied 14 file(s).
Missing (not found anywhere under TABLE_DIR):
- llm_topics_negative_unprocessed_filtered.csv
```

[5]:
```
# Load copied report tables and display heads
report_files = [REPORT_TABLES_DIR / f for f in sorted(TARGET_FILENAMES) if␣
 ↪(REPORT_TABLES_DIR / f).exists()]
print(f"Files in tables_report: {len(report_files)}")

for p in report_files:
    df_tmp = pd.read_csv(p)
    print("\nFile:", p.name, "| shape:", df_tmp.shape)
    display(df_tmp)
```

```
Files in tables_report: 14

File: bertopic_emotion_negative_sadness_top_topics.csv | shape: (4, 3)
```

	Topic	Count	TopWords
0	0	152	membership, cancel, email, customer, service, …
1	1	66	machine, weight, bench, go, press, space, one,…
2	2	62	shower, cold, water, temperature, dirty, go, h…
3	3	55	class, book, cancel, get, time, attend, staff,…

```
File: bertopic_emotion_negative_sadness_topic_info.csv | shape: (7, 5)
```

	Topic	Count	Name	\
0	-1	304	-1_machine_time_class_get	
1	0	152	0_membership_cancel_email_customer	
2	1	66	1_machine_weight_bench_go	
3	2	62	2_shower_cold_water_temperature	
4	3	55	3_class_book_cancel_get	

```
5      4     47          4_clean_change_use_machine
6      5     26        5_air_condition_aircon_heat

                                    Representation  \
0  ['machine', 'time', 'class', 'get', 'member', …
1  ['membership', 'cancel', 'email', 'customer', …
2  ['machine', 'weight', 'bench', 'go', 'press', …
3  ['shower', 'cold', 'water', 'temperature', 'di…
4  ['class', 'book', 'cancel', 'get', 'time', 'at…
5  ['clean', 'change', 'use', 'machine', 'toilet'…
6  ['air', 'condition', 'aircon', 'heat', 'work',…

                                 Representative_Docs
0  ['two year go get bad time get well look new g…
1  ['hello join bedford nearly three month ago fi…
2  ['edinburgh craigleith lack far busy weight ma…
3  ['change room facility unpleasant especially c…
4  ['arrived class morning one show take class ca…
5  ['recently ask submit feedback follow recent v…
6  ['great portland st actually cavendish mew unb…
```

File: bertopic_llm_topics_negative_top_topics.csv | shape: (4, 3)

```
   Topic  Count                                          TopWords
0      0    248  membership, customer, service, fee, bad, issue…
1      1     85  shower, water, cold, room, locker, hot, temper…
2      2     81  toilet, smell, smelly, room, changing, dirty, …
3      3     79  equipment, space, staff, weight, cardio, machi…
```

File: bertopic_llm_topics_negative_topic_info.csv | shape: (10, 5)

```
   Topic  Count                                  Name  \
0     -1    342     -1_machine_equipment_parking_broken
1      0    248       0_membership_customer_service_fee
2      1     85                1_shower_water_cold_room
3      2     81             2_toilet_smell_smelly_room
4      3     79          3_equipment_space_staff_weight
5      4     61           4_staff_member_bad_experience
6      5     52       5_air_conditioning_problem_aircon
7      6     52  6_cleaning_hygiene_station_cleanliness
8      7     46       7_class_instructor_cancelled_bike
9      8     36         8_equipment_rusty_suitable_good

                                    Representation  \
0  ['machine', 'equipment', 'parking', 'broken', …
1  ['membership', 'customer', 'service', 'fee', '…
2  ['shower', 'water', 'cold', 'room', 'locker', …
3  ['toilet', 'smell', 'smelly', 'room', 'changin…
```

```
4  ['equipment', 'space', 'staff', 'weight', 'car…
5  ['staff', 'member', 'bad', 'experience', 'rude…
6  ['air', 'conditioning', 'problem', 'aircon', '…
7  ['cleaning', 'hygiene', 'station', 'cleanlines…
8  ['class', 'instructor', 'cancelled', 'bike', '…
9  ['equipment', 'rusty', 'suitable', 'good', 'be…

                                Representative_Docs
0  ['equipment broken changing room dirty need', …
1  ['bad customer service', 'bad customer service…
2  ['shower cold staff', 'shower cold', 'shower b…
3  ['changing room dirty smell bad cleaning poor'…
4  ['space good maintenance bad broken equipment'…
5  ['bad experience bad manager unfair treatment'…
6  ['air conditioning service', 'air conditioning…
7  ['equipment staff hygiene', 'staff cleanliness…
8                        ['class', 'class', 'class']
9           ['equipment', 'equipment', 'equipment']
```

File: bertopic_negative_top_topics.csv | shape: (4, 3)

```
   Topic  Count                                              TopWords
0      0    512  shower, toilet, room, dirty, cleaning, changin…
1      1    337  membership, email, cancel, customer, service, …
2      2    223  machine, weight, bench, one, space, need, card…
3      3    132  class, instructor, cancelled, booked, booking,…
```

File: bertopic_negative_topic_info.csv | shape: (11, 5)

```
    Topic  Count                                  Name  \
0      -1    717         -1_machine_time_staff_people
1       0    512           0_shower_toilet_room_dirty
2       1    337   1_membership_email_cancel_customer
3       2    223           2_machine_weight_bench_one
4       3    132  3_class_instructor_cancelled_booked
5       4    101            4_member_staff_manager_pt
6       5     99           5_hour_opening_open_closed
7       6     91       6_air_conditioning_hot_working
8       7     65              7_parking_car_park_fine
9       8     48         8_music_loud_class_headphone
10      9     43            9_locker_stolen_cctv_room

                                     Representation  \
0   ['machine', 'time', 'staff', 'people', 'member…
1   ['shower', 'toilet', 'room', 'dirty', 'cleanin…
2   ['membership', 'email', 'cancel', 'customer', …
3   ['machine', 'weight', 'bench', 'one', 'space',…
4   ['class', 'instructor', 'cancelled', 'booked',…
```

```
5   ['member', 'staff', 'manager', 'pt', 'manageme…
6   ['hour', 'opening', 'open', 'closed', 'pm', 't…
7   ['air', 'conditioning', 'hot', 'working', 'con…
8   ['parking', 'car', 'park', 'fine', 'ticket', '…
9   ['music', 'loud', 'class', 'headphone', 'volum…
10  ['locker', 'stolen', 'cctv', 'room', 'car', 's…

                                Representative_Docs
0   ['hi happy actually time remodelling supposed …
1   ['good locker room shower need better cleaning…
2   ['great shop floor staff company morally bankr…
3   ['going month sadly going downhill know sugges…
4   ['forgot mobile staff let cycle class notified…
5   ['london wall site morning th aug hr working d…
6   ['brag open changed opening hour one used come…
7   ['review air conditioning problem trainer clas…
8   ['unfortunately expensive ever paying parking …
9   ['clean music good thinking go different time …
10  ['locker broken changing room dirty', 'enterin…
```

File: emotion_counts_all_reviews_bhadresh_savani_bert_base_uncased_emotion.csv | shape: (6, 2)

	Emotion	Count
0	joy	8163
1	anger	1402
2	sadness	1027
3	love	356
4	fear	287
5	surprise	65

File: emotion_counts_all_reviews_j_hartmann_emotion_english_distilroberta_base.csv | shape: (7, 2)

	Emotion	Count
0	joy	4289
1	neutral	3691
2	sadness	1458
3	fear	554
4	surprise	490
5	anger	477
6	disgust	341

File: emotion_counts_negative_reviews_bhadresh_savani_bert_base_uncased_emotion.csv | shape: (6, 2)

```
    Emotion  Count
0       joy    868
1     anger    720
2   sadness    580
3      fear    121
4      love     61
5  surprise     18
```

File: emotion_counts_negative_reviews_j_hartmann_emotion_english_distilroberta_base.csv | shape: (7, 2)

```
    Emotion  Count
0   sadness    712
1   neutral    604
2     anger    271
3      fear    243
4   disgust    205
5  surprise    183
6       joy    150
```

File: lda_preprocessed_negative_emotion_sadness_gensim_lda_topics.csv | shape: (3, 6)

```
   Topic  TopicId  Count                  TopWords_lambda_1_0  \
0      1        1    429     shower, change, go, time, member
1      2        3    182  machine, open, weight, since, space
2      3        2    101  cancel, class, membership, get, pay

                           TopWords_lambda_0_1  Coherence_c_v
0              shower, order, clean, bad, leave       0.398338
1           weight, space, press, free, workout       0.398338
2  cancel, membership, subscription, freeze, say       0.398338
```

File: lda_preprocessed_negative_gensim_lda_topics.csv | shape: (5, 6)

```
   Topic  TopicId  Count                          TopWords_lambda_1_0  \
0      1        1   1150              time, member, room, people, one
1      2        2    558           staff, member, shower, water, like
2      3        5    460               class, hour, time, spin, early
3      4        3    166  membership, customer, email, service, month
4      5        4     34           machine, weight, area, space, busy

                     TopWords_lambda_0_1  Coherence_c_v
0    room, changing, toilet, locker, open       0.403075
1           water, air, hot, access, cold       0.403075
2     class, spin, early, min, instructor       0.403075
3  membership, email, cancel, £, cancelled       0.403075
4  weight, space, amount, cleaned, machine       0.403075
```

```
File: trustpilot_negative_top10_words.csv | shape: (10, 2)

         word  count
0        time    763
1     machine    738
2      member    710
3       staff    608
4       class    608
5         one    603
6         get    541
7      people    535
8  membership    502
9      shower    494


File: trustpilot_non_negative_top10_words.csv | shape: (10, 2)

       word  count
0     great   3239
1      good   3174
2     class   3043
3     staff   2845
4  friendly   2312
5     clean   2171
6    always   1536
7   machine   1511
8      time   1426
9    really   1234
```

1.1.1 Combine Tables

[6]:
```python
# One combined table with topic sections
N_TOPICS = 4
LAMBDA_WORDS_COL = "TopWords_lambda_0_1"

def top5(words: str) -> str:
    if not isinstance(words, str):
        return ""
    return ", ".join([w.strip() for w in words.split(",")[:5]])

def load_top_topics(
    path: Path,
    *,
    topic_min: int,
    n: int,
    words_col: str = "TopWords",
    has_count: bool = True,
) -> pd.DataFrame:
```

```
    df = pd.read_csv(path).copy()
    df = df[df["Topic"] >= topic_min].head(n).copy()

    if words_col not in df.columns:
        available = [c for c in df.columns if c.lower().startswith("topwords")]
        raise KeyError(
            f"Column '{words_col}' not found in {path.name}. "
            f"Available TopWords-like columns: {available}"
        )

    df["TopWords"] = df[words_col].apply(top5)

    if has_count and "Count" in df.columns:
        df["Count"] = pd.to_numeric(df["Count"], errors="coerce").round(0).
↪astype("Int64")
    else:
        df["Count"] = pd.Series([pd.NA] * len(df), dtype="Int64")

    return df[["Topic", "Count", "TopWords"]]

def method_frame(df: pd.DataFrame, method: str) -> pd.DataFrame:
    out = df.copy()
    out["Method"] = method
    return out

# Load tables
df_bt = load_top_topics(
    REPORT_TABLES_DIR / FILES["BERTOPIC_NEG_TOP"],
    topic_min=0,
    n=N_TOPICS,
    words_col="TopWords",
    has_count=True,
)

df_bt_sad = load_top_topics(
    REPORT_TABLES_DIR / FILES["BERTOPIC_EMO_NEG_SAD_TOP"],
    topic_min=0,
    n=N_TOPICS,
    words_col="TopWords",
    has_count=True,
)

# LDA now WITH counts, and using TopWords_lambda_0_1 only
df_lda = load_top_topics(
    REPORT_TABLES_DIR / FILES["LDA_NEG"],
    topic_min=1,
    n=N_TOPICS,
```

```
    words_col=LAMBDA_WORDS_COL,
    has_count=True,
)

df_lda_sad = load_top_topics(
    REPORT_TABLES_DIR / FILES["LDA_NEG_EMO_SAD"],
    topic_min=1,
    n=N_TOPICS,
    words_col=LAMBDA_WORDS_COL,
    has_count=True,
)

df_bt_falcon = load_top_topics(
    REPORT_TABLES_DIR / FILES["BERTOPIC_LLM_TOP"],
    topic_min=0,
    n=N_TOPICS,
    words_col="TopWords",
    has_count=True,
)

df_long = pd.concat(
    [
        method_frame(df_bt, "BERTopic"),
        method_frame(df_bt_sad, "BERTopic (Sad only)"),
        method_frame(df_lda, "LDA"),
        method_frame(df_lda_sad, "LDA (Sad only)"),
        method_frame(df_bt_falcon, "BERTopic (Falcon)"),
    ],
    ignore_index=True,
)

# Remap LDA topic numbers for alignment to Topic 0..N-1 (Topic 1→0, 2→1, ...)
mask_lda = df_long["Method"].str.startswith("LDA")
df_long.loc[mask_lda, "Topic"] = df_long.loc[mask_lda, "Topic"] - 1

# Build one display table (keeps a Topic column for the notebook view only)
df_display = (
    df_long[df_long["Topic"].between(0, N_TOPICS - 1)]
    .loc[:, ["Topic", "Method", "Count", "TopWords"]]
    .sort_values(["Topic", "Method"])
    .reset_index(drop=True)
)
display(df_display)

# Build LaTeX with topic section headers and rules
methods_order = ["BERTopic", "BERTopic (Sad only)", "LDA", "LDA (Sad only)",␣
 ↪"BERTopic (Falcon)"]
```

	Topic	Method	Count	TopWords
0	0	BERTopic	512	shower, toilet, room, dirty, cleaning
1	0	BERTopic (Falcon)	248	membership, customer, service, fee, bad
2	0	BERTopic (Sad only)	152	membership, cancel, email, customer, service
3	0	LDA	1150	room, changing, toilet, locker, open
4	0	LDA (Sad only)	429	shower, order, clean, bad, leave
5	1	BERTopic	337	membership, email, cancel, customer, service
6	1	BERTopic (Falcon)	85	shower, water, cold, room, locker
7	1	BERTopic (Sad only)	66	machine, weight, bench, go, press
8	1	LDA	558	water, air, hot, access, cold
9	1	LDA (Sad only)	182	weight, space, press, free, workout
10	2	BERTopic	223	machine, weight, bench, one, space
11	2	BERTopic (Falcon)	81	toilet, smell, smelly, room, changing
12	2	BERTopic (Sad only)	62	shower, cold, water, temperature, dirty
13	2	LDA	460	class, spin, early, min, instructor
14	2	LDA (Sad only)	101	cancel, membership, subscription, freeze, say
15	3	BERTopic	132	class, instructor, cancelled, booked, booking
16	3	BERTopic (Falcon)	79	equipment, space, staff, weight, cardio
17	3	BERTopic (Sad only)	55	class, book, cancel, get, time
18	3	LDA	166	membership, email, cancel, £, cancelled

[7]:
```
# Coherence (c_v) for LDA runs and LaTeX table generation
def read_first_coherence_cv(path: Path, col: str = "Coherence_c_v") -> float |␣
↪None:
    """Return the first numeric c_v value from a CSV, or None if missing/
↪unreadable."""
```

```
    if not path.exists():
        return None
    df = pd.read_csv(path)
    if col not in df.columns:
        return None
    s = pd.to_numeric(df[col], errors="coerce").dropna()
    return float(s.iloc[0]) if not s.empty else None


def escape_latex(text: str) -> str:
    """Minimal LaTeX escaping for table cells."""
    return (
        str(text)
        .replace("\\", r"\textbackslash{}")
        .replace("&", r"\&")
        .replace("%", r"\%")
        .replace("#", r"\#")
        .replace("_", r"\_")
    )


def format_method(method: str, coherence_by_method: dict[str, float | None],␣
 ↪lam: float = 0.1) -> str:
    """Add lambda and (optionally) c_v for LDA-based rows."""
    cv = coherence_by_method.get(method)
    if method.startswith("LDA"):
        if cv is None:
            return rf"{method} ($\lambda={lam}$)"
        return rf"{method} ($\lambda={lam}$, $c_v={cv:.3f}$)"
    return method


# Read coherence once per LDA run
coherence_by_method = {
    "LDA": read_first_coherence_cv(REPORT_TABLES_DIR / FILES["LDA_NEG"]),
    "LDA (Sad only)": read_first_coherence_cv(REPORT_TABLES_DIR /␣
 ↪FILES["LDA_NEG_EMO_SAD"]),
}

methods_order = ["BERTopic", "BERTopic (Sad only)", "LDA", "LDA (Sad only)",␣
 ↪"BERTopic (Falcon)"]

topic_blocks = []
for t in range(N_TOPICS):
    block = (
        df_long.loc[df_long["Topic"] == t, ["Method", "Count", "TopWords"]]
        .copy()
```

```
        .set_index("Method")
        .reindex(methods_order)
        .reset_index()
    )
    topic_blocks.append((t, block))

latex_lines = [
    r"\begin{table}",
    r"\centering",
    r"\caption{Topic comparisons for negative reviews only across topic␣
 ↪modelling approaches. "
    r"For LDA, top words use relevance at $\lambda=0.1$ (as in pyLDAvis), and␣
 ↪$c_v$ coherence is reported. "
    r"LDA topics are indexed from Topic 1 onwards (Topic 0 corresponds to␣
 ↪no-topic filtering). "
    r"All other methods are indexed from Topic 0. Topic $-1$ corresponds to␣
 ↪outliers and is not shown.}",
    r"\label{tab:negative_reviews_topics_combined}",
    r"\begin{tabular}{lrl}",
    r"\toprule",
    r"Method & Count & TopWords \\",
    r"\midrule",
]

for i, (t, block) in enumerate(topic_blocks):
    if i > 0:
        latex_lines.append(r"\midrule")

    latex_lines.extend(
        [
            rf"\multicolumn{{3}}{{l}}{{\textbf{{Topic {t}}}}} \\",
            r"\midrule",
        ]
    )

    for row in block.itertuples(index=False):
        method = format_method(str(row.Method), coherence_by_method, lam=0.1)
        count = "" if pd.isna(row.Count) else str(int(row.Count))
        words = "" if pd.isna(row.TopWords) else escape_latex(row.TopWords)

        latex_lines.append(f"{method} & {count} & {words} \\\\")

latex_lines.extend([r"\bottomrule", r"\end{tabular}", r"\end{table}"])

latex_str = "\n".join(latex_lines)
print(latex_str)
```

```
\begin{table}
\centering
\caption{Topic comparisons for negative reviews only across topic modelling
approaches. For LDA, top words use relevance at $\lambda=0.1$ (as in pyLDAvis),
and $c_v$ coherence is reported. LDA topics are indexed from Topic 1 onwards
(Topic 0 corresponds to no-topic filtering). All other methods are indexed from
Topic 0. Topic $-1$ corresponds to outliers and is not shown.}
\label{tab:negative_reviews_topics_combined}
\begin{tabular}{lrl}
\toprule
Method & Count & TopWords \\
\midrule
\multicolumn{3}{l}{\textbf{Topic 0}} \\
\midrule
BERTopic & 512 & shower, toilet, room, dirty, cleaning \\
BERTopic (Sad only) & 152 & membership, cancel, email, customer, service \\
LDA ($\lambda=0.1$, $c_v=0.403$) & 1150 & room, changing, toilet, locker, open
\\
LDA (Sad only) ($\lambda=0.1$, $c_v=0.398$) & 429 & shower, order, clean, bad,
leave \\
BERTopic (Falcon) & 248 & membership, customer, service, fee, bad \\
\midrule
\multicolumn{3}{l}{\textbf{Topic 1}} \\
\midrule
BERTopic & 337 & membership, email, cancel, customer, service \\
BERTopic (Sad only) & 66 & machine, weight, bench, go, press \\
LDA ($\lambda=0.1$, $c_v=0.403$) & 558 & water, air, hot, access, cold \\
LDA (Sad only) ($\lambda=0.1$, $c_v=0.398$) & 182 & weight, space, press, free,
workout \\
BERTopic (Falcon) & 85 & shower, water, cold, room, locker \\
\midrule
\multicolumn{3}{l}{\textbf{Topic 2}} \\
\midrule
BERTopic & 223 & machine, weight, bench, one, space \\
BERTopic (Sad only) & 62 & shower, cold, water, temperature, dirty \\
LDA ($\lambda=0.1$, $c_v=0.403$) & 460 & class, spin, early, min, instructor \\
LDA (Sad only) ($\lambda=0.1$, $c_v=0.398$) & 101 & cancel, membership,
subscription, freeze, say \\
BERTopic (Falcon) & 81 & toilet, smell, smelly, room, changing \\
\midrule
\multicolumn{3}{l}{\textbf{Topic 3}} \\
\midrule
BERTopic & 132 & class, instructor, cancelled, booked, booking \\
BERTopic (Sad only) & 55 & class, book, cancel, get, time \\
LDA ($\lambda=0.1$, $c_v=0.403$) & 166 & membership, email, cancel, £, cancelled
\\
LDA (Sad only) ($\lambda=0.1$, $c_v=0.398$) &  &  \\
BERTopic (Falcon) & 79 & equipment, space, staff, weight, cardio \\
```

```
\bottomrule
\end{tabular}
\end{table}
```

[8]:
```python
def read_top_words_csv(path: Path, n: int = 10) -> pd.DataFrame:
    """Read a CSV with columns [word, count] and return the top-n rows."""
    df = pd.read_csv(path)
    df.columns = df.columns.str.strip().str.lower()

    df = df.rename(columns={"token": "word", "freq": "count"})
    df = df[["word", "count"]].copy()

    df["word"] = df["word"].astype(str)
    df["count"] = pd.to_numeric(df["count"], errors="coerce").fillna(0).
 ↪astype(int)

    return df.head(n)


def first_existing_path(paths: list[Path]) -> Path:
    """Return the first path that exists, otherwise raise."""
    for p in paths:
        if p.exists():
            return p
    raise FileNotFoundError("None of the expected files exist:\n" + "\n".
 ↪join(map(str, paths)))


def format_cells(df: pd.DataFrame, n: int = 10) -> list[str]:
    """Format rows as 'word (count)' and pad to n cells."""
    df = df.head(n)
    cells = [f"{row.word} ({int(row.count)})" for row in df.
 ↪itertuples(index=False)]
    return cells + [""] * (n - len(cells))


def to_booktabs(latex: str) -> str:
    """Convert pandas \\hline rules to booktabs-style rules."""
    lines = latex.splitlines()
    out = []
    hlines_seen = 0

    for line in lines:
        if line.strip() == r"\hline":
            hlines_seen += 1
            if hlines_seen == 1:
                out.append(r"\toprule")
```

```
            elif hlines_seen == 2:
                out.append(r"\midrule")
            else:
                out.append(r"\bottomrule")
        else:
            out.append(line)

    return "\n".join(out)


# Paths
neg_path = REPORT_TABLES_DIR / "trustpilot_negative_top10_words.csv"
nonneg_path = REPORT_TABLES_DIR / "trustpilot_non_negative_top10_words.csv"

if not neg_path.exists():
    raise FileNotFoundError(f"Missing expected file: {neg_path}")

df_neg = read_top_words_csv(neg_path, n=10)
df_nonneg = read_top_words_csv(nonneg_path, n=10)

cols = [str(i) for i in range(1, 11)]
df_wide = pd.DataFrame(
    [
        ["Negative", *format_cells(df_neg, 10)],
        ["Non-negative", *format_cells(df_nonneg, 10)],
    ],
    columns=["Subset", *cols],
)

# Base LaTeX from pandas
tab = df_wide.to_latex(
    index=False,
    escape=True,
    longtable=False,
    column_format="l" + "l" * 10,
)

tab = to_booktabs(tab)

latex_out = "\n".join(
    [
        r"\begin{table}[H]",
        r"\centering",
        r"\small",
        r"\caption{Top-10 most common tokens by rating subset. Cells show token␣
 ↪(count).}",
        r"\label{tab:top10_words_by_subset}",
```

```
        r"\resizebox{\textwidth}{!}{%",
        tab.strip(),
        r"}",
        r"\end{table}",
    ]
)

display(df_wide)
print(latex_out)
```

```
         Subset             1              2             3             4  \
0      Negative    time (763)  machine (738)  member (710)   staff (608)
1  Non-negative  great (3239)    good (3174)  class (3043)  staff (2845)

                 5             6              7              8  \
0      class (608)     one (603)      get (541)    people (535)
1  friendly (2312)  clean (2171)  always (1536)  machine (1511)

                  9             10
0  membership (502)   shower (494)
1       time (1426)  really (1234)
```

```
\begin{table}[H]
\centering
\small
\caption{Top-10 most common tokens by rating subset. Cells show token (count).}
\label{tab:top10_words_by_subset}
\resizebox{\textwidth}{!}{%
\begin{tabular}{lllllllllll}
\toprule
Subset & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\
\midrule
Negative & time (763) & machine (738) & member (710) & staff (608) & class (608)
& one (603) & get (541) & people (535) & membership (502) & shower (494) \\
Non-negative & great (3239) & good (3174) & class (3043) & staff (2845) &
friendly (2312) & clean (2171) & always (1536) & machine (1511) & time (1426) &
really (1234) \\
\bottomrule
\end{tabular}
}
\end{table}
```

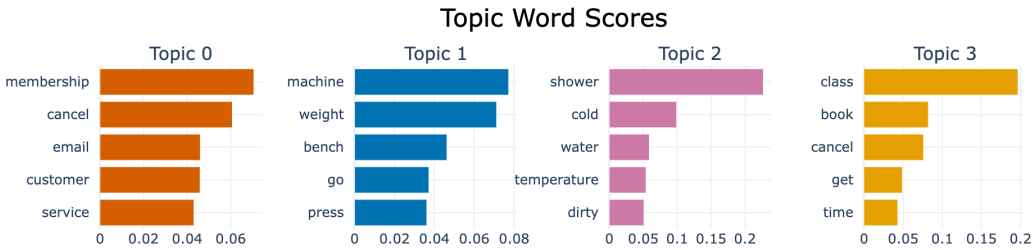
1.2 Report Plots

[9]:
```
# Collect report PNG plots and display them in-notebook
REPORT_PLOTS_DIR = PROJECT_ROOT / "output/plots_report"
REPORT_PLOTS_DIR.mkdir(parents=True, exist_ok=True)
```

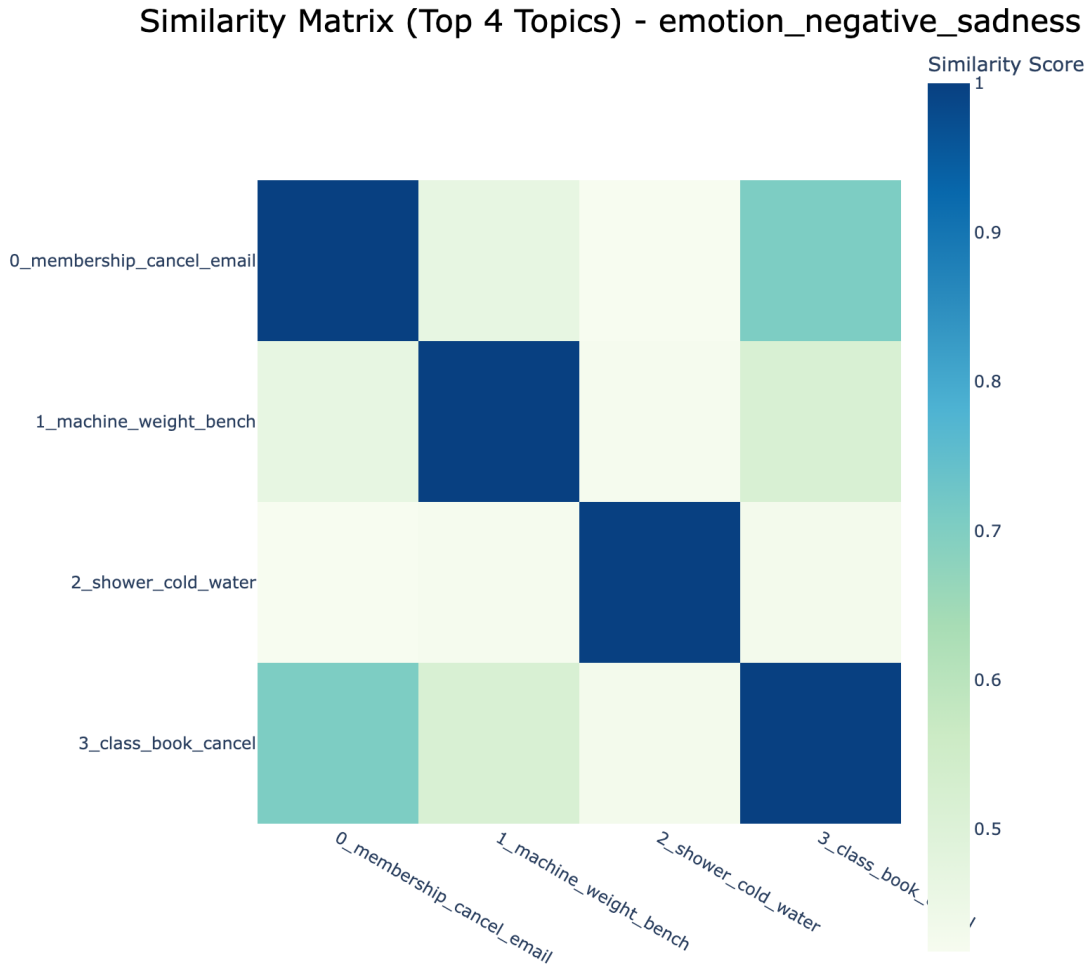
```
TARGET_PNG_FILES = {
    "bertopic_negative_barchart_top4.png",
    "bertopic_emotion_negative_sadness_barchart_top4.png",
    "bertopic_negative_heatmap_top4.png",
    "bertopic_emotion_negative_sadness_heatmap_top4.png",
    "bertopic_llm_topics_negative_barchart_top4.png",
    "bertopic_llm_topics_negative_heatmap_top4.png",
    "trustpilot_top10_words.png",
    "trustpilot_negative_top10_words.png",
    "trustpilot_non_negative_top10_words.png",
    "emotion_distribution_negative_reviews_j_hartmann_emotion_english_distilroberta_base.png",
    "emotion_distribution_negative_reviews_bhadresh_savani_bert_base_uncased_emotion.png",
}

all_pngs = [p for p in PLOT_DIR.rglob("*.png") if REPORT_PLOTS_DIR not in p.parents]
matches = {p.name: p for p in all_pngs if p.name in TARGET_PNG_FILES}

copied = []
for fname in sorted(TARGET_PNG_FILES):
    src = matches.get(fname)
    if src is None:
        continue
    dst = REPORT_PLOTS_DIR / fname
    shutil.copy2(src, dst)
    copied.append(dst)

missing = sorted(TARGET_PNG_FILES - set(matches.keys()))
print("Report plots folder:", REPORT_PLOTS_DIR)
print(f"Copied {len(copied)} PNG file(s).")
if missing:
    print("Missing (not found anywhere under PLOT_DIR):")
    for m in missing:
        print("-", m)

# Display copied PNGs
for p in copied:
    print("\n", p.name)
    display(Image(filename=str(p)))
```

```
Report plots folder: /Users/Joshua.Dixon/Documents/8_uni/8 Unstructured Data Analysis/PureGym-NLP-UDA/output/plots_report
Copied 11 PNG file(s).
```

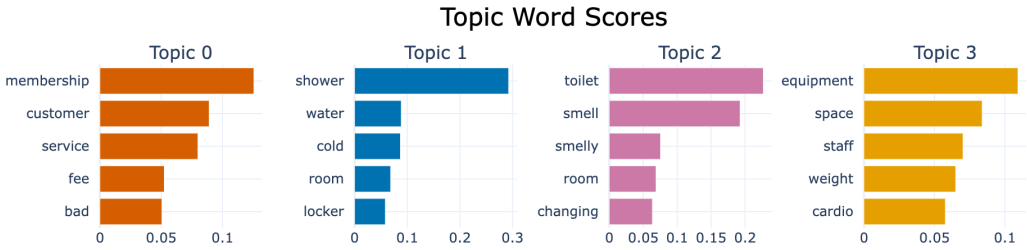
bertopic_emotion_negative_sadness_barchart_top4.png



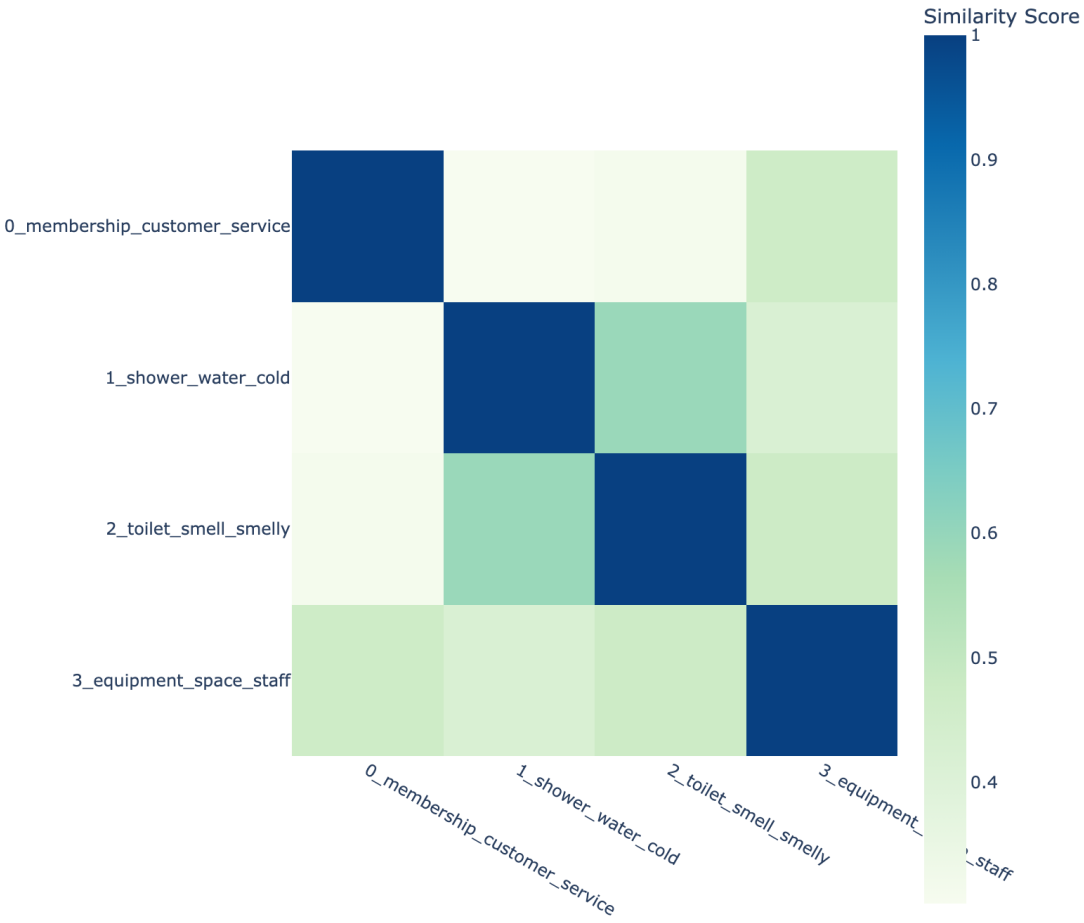
bertopic_emotion_negative_sadness_heatmap_top4.png



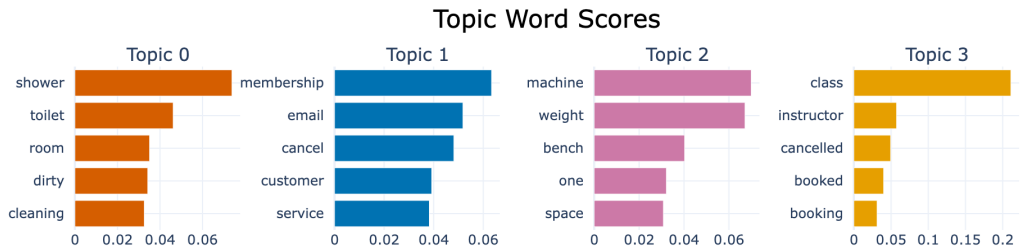
bertopic_llm_topics_negative_barchart_top4.png



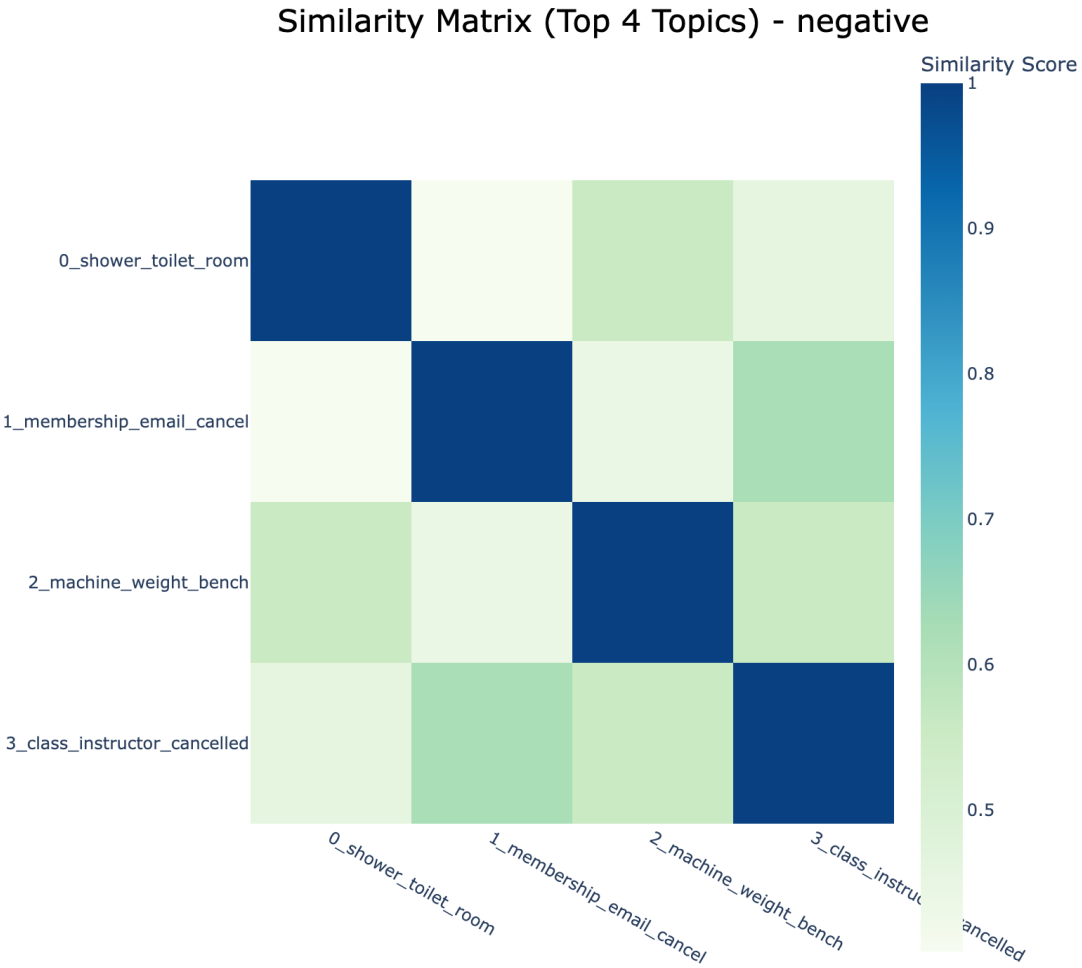
bertopic_llm_topics_negative_heatmap_top4.png



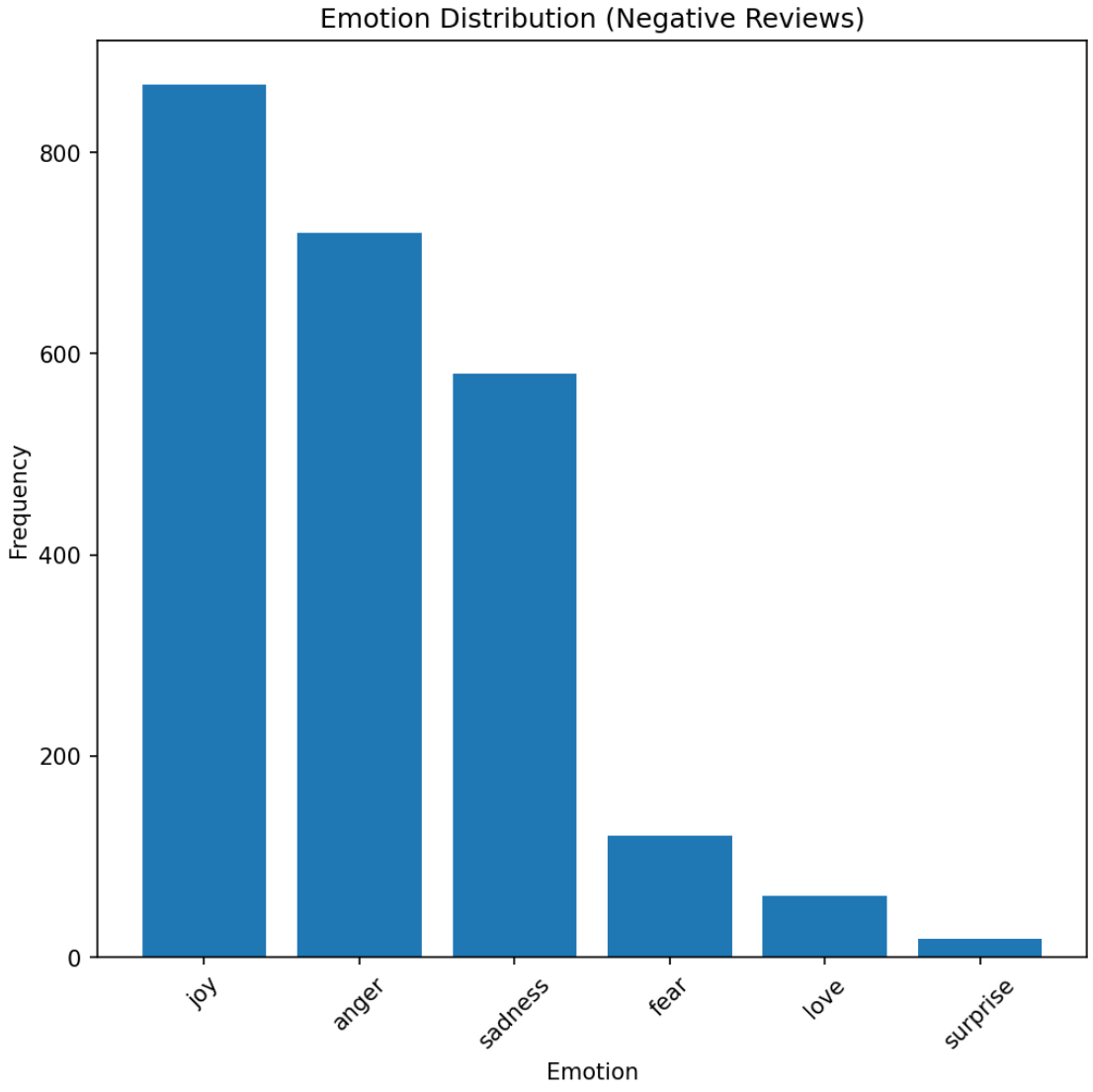
bertopic_negative_barchart_top4.png



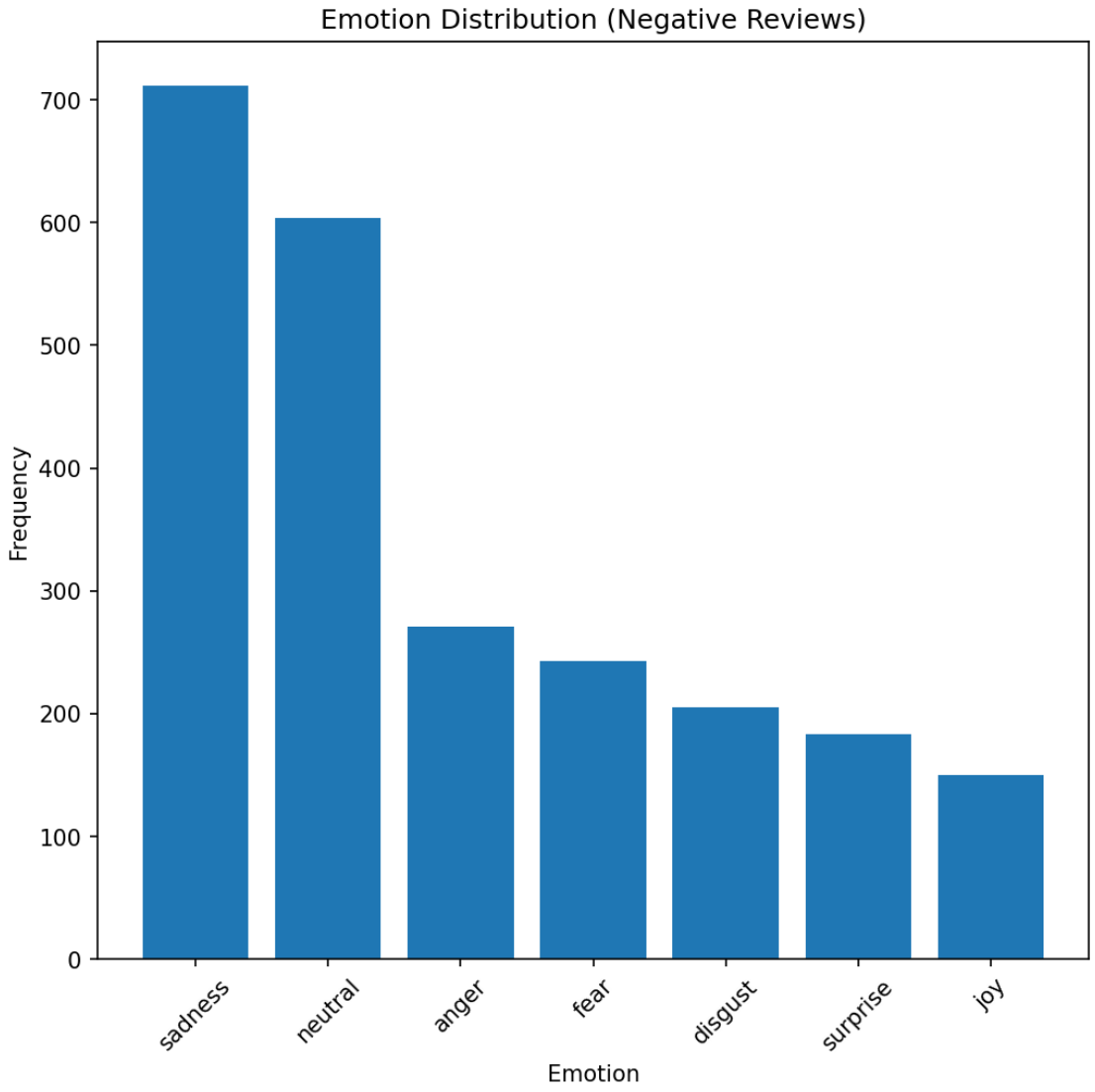
`bertopic_negative_heatmap_top4.png`



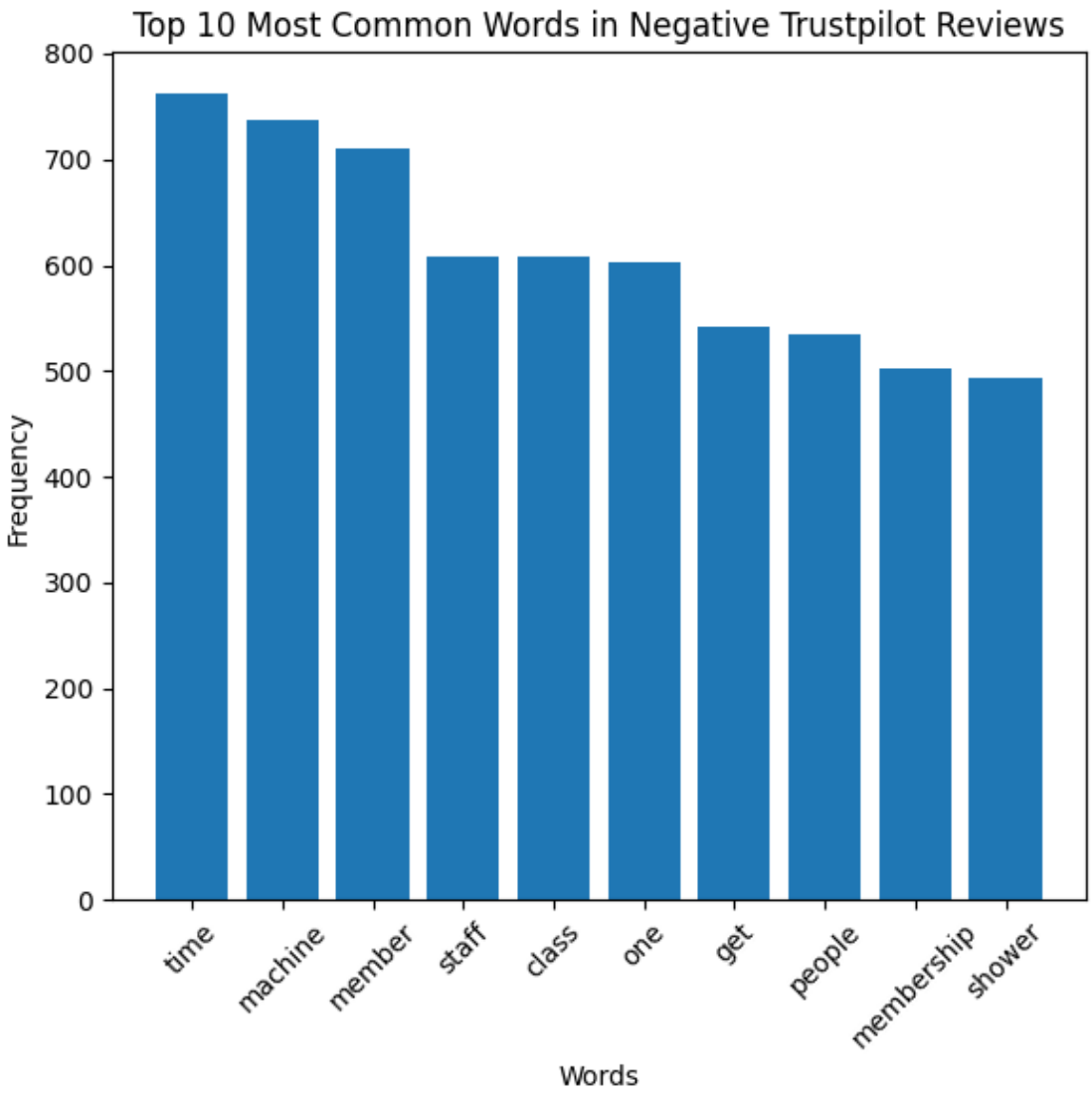
emotion_distribution_negative_reviews_bhadresh_savani_bert_base_uncased_emotion.png



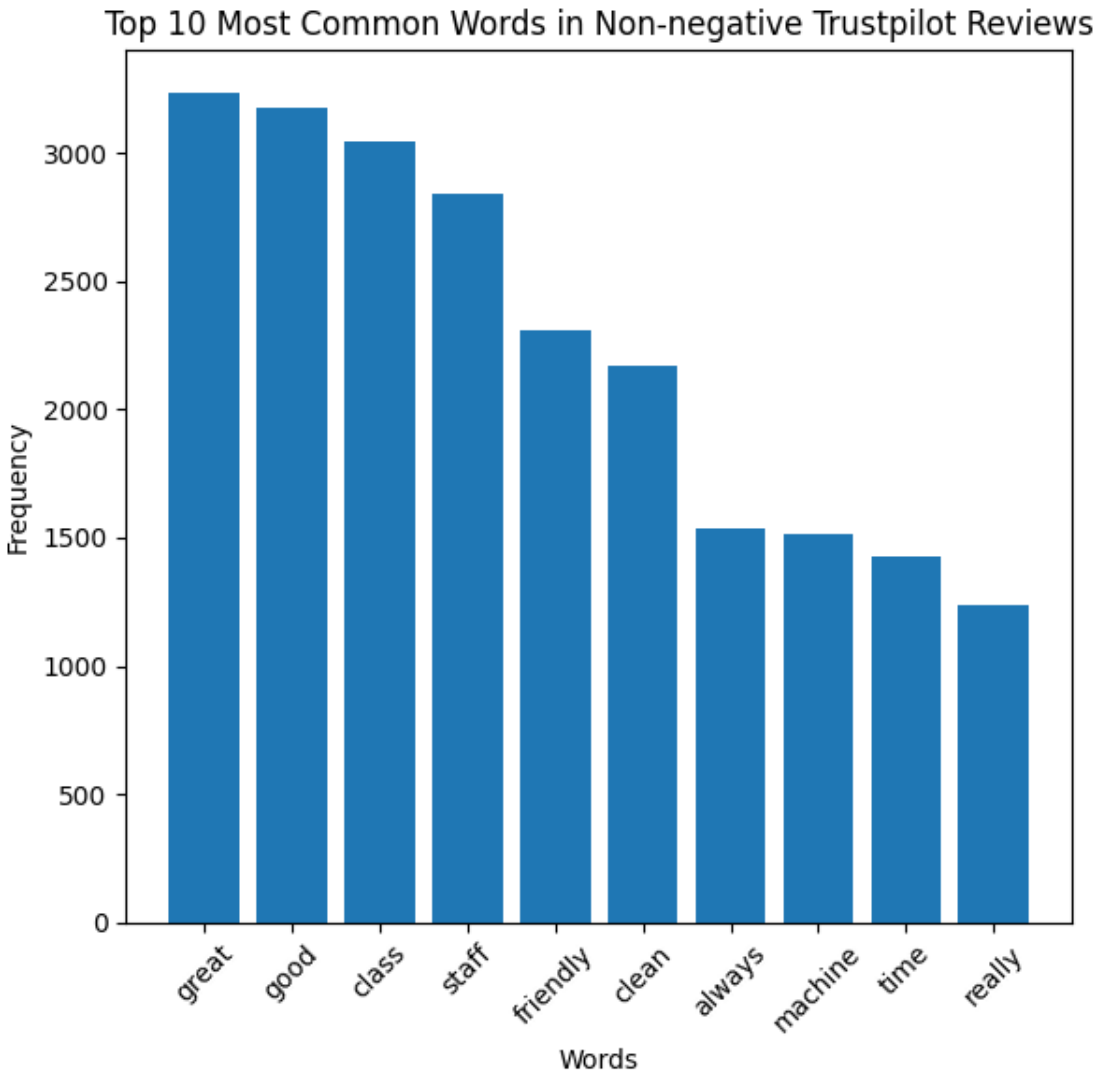
emotion_distribution_negative_reviews_j_hartmann_emotion_english_distilroberta_base.png



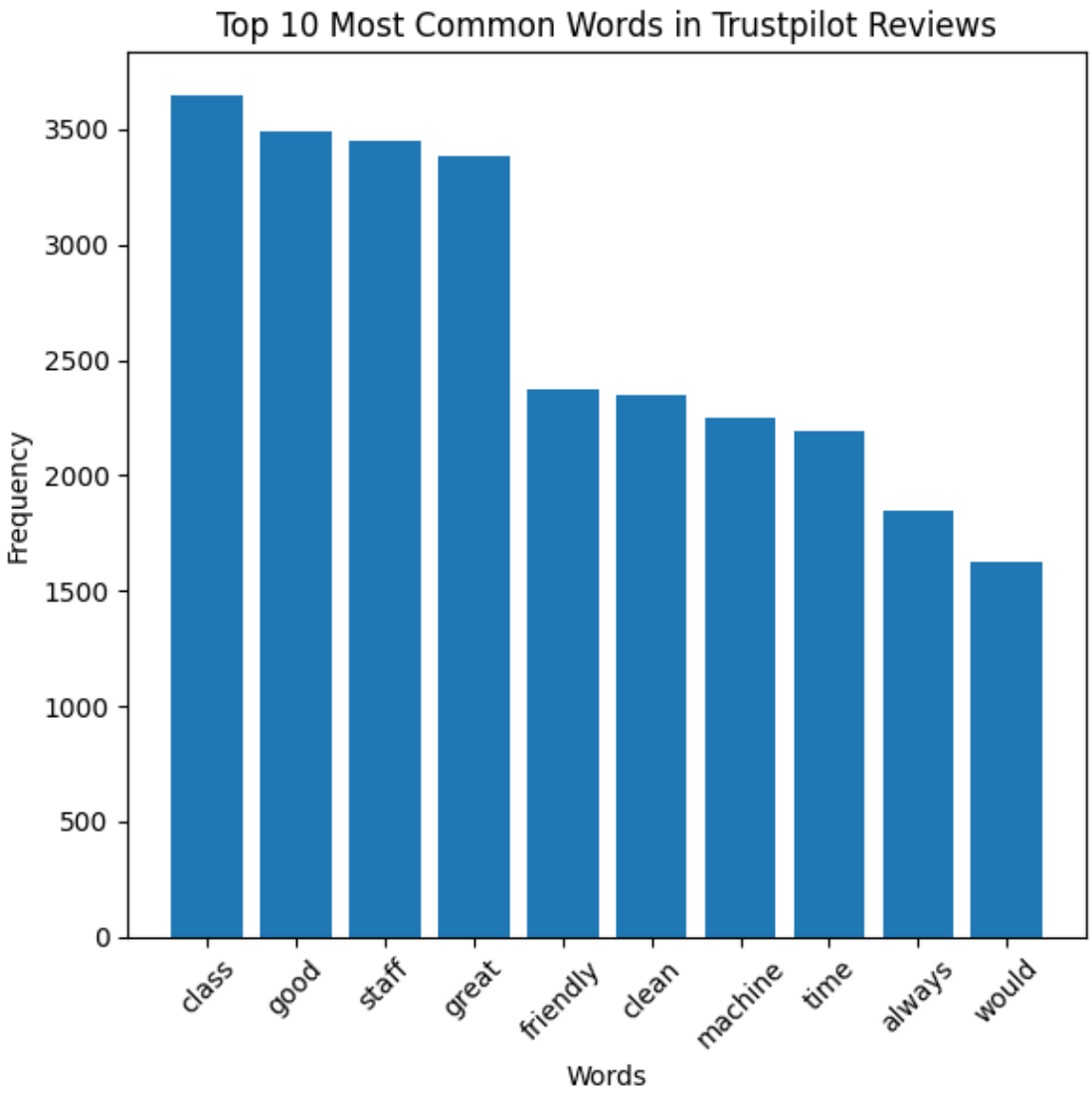
`trustpilot_negative_top10_words.png`



`trustpilot_non_negative_top10_words.png`



`trustpilot_top10_words.png`


Top 10 Most Common Words in Trustpilot Reviews
Frequency
0
500
1000
1500
2000
2500
3000
3500
class
good
staff
great
friendly
clean
machine
time
always
would
Words