1. **Models experimented with**:
    a. Logistic Regression
    b. Decision Tree
    c. Random Forest
    d. XGBoost
    e. Support Vector Classification
2. **Hyperparameters for each model**
    a. Logistic Regression: [{'penalty': ['l2','none'], 'solver': ['newton-cg','lbfgs','saga'], 'C': [10,1.0,0.1,0.01]}]
    b. Decision Tree: [{'criterion': ['gini','entropy'], 'splitter': ['best','random'], 'max_features': ['sqrt','log2']}]
    c. Random Forest: [{'n_estimators': [20,40,60,80], 'criterion': ['gini','entropy'], 'max_features': ['auto','log2']}]
    d. XGBoost: [{'max_depth': [4,6,8,10], 'n_estimators': [20,40,60,80]}]
    e. SVC: [{'kernel': ['linear','poly','sigmoid'], 'gamma': [0.001, 0.0001], 'C': [10,1.0,0.1,0.01]}]
3. **Best parameters from Grid Search**
    a. Logistic Regression: **Accuracy**: 0.9146453311946269 **Param**: {'C': 1.0, 'penalty': 'l2', 'solver': 'saga'}
    b. Decision Tree: **Accuracy**: 0.8381721564820156 **Param**: {'criterion': 'entropy', 'max_features': 'sqrt', 'splitter': 'best'}
    c. Random Forest: **Accuracy**: 0.9045706640777063 **Param**: {'criterion': 'entropy', 'max_features': 'log2', 'n_estimators': 60}
    d. XGBoost: **Accuracy**: 0.904029304029304 **Param**: {'max_depth': 10, 'n_estimators': 80}
    e. SVC: **Accuracy**: 0.9064136567657695 **Param**: {'C': 1.0, 'gamma': 0.001, 'kernel': 'linear'}

- Using Logistic Regression with parameters: {'C': 1.0, 'penalty': 'l2', 'solver': 'saga'}
- **Final Train Accuracy:** 0.914**, Final Test Accuracy**: 0.913

1. SentimentModelSelection.ipynb: Testing different models and choosing best one (This file is only for testing, and is not included in the app)
2. app.py: Implementing the code and developing API endpoint
3. DockerFile: Configurations for Docker Containerization
4. requirements.txt: Package requirements

Building Docker Image

```
C:\New folder\TF>docker build -t sentiment_api .
[+] Building 645.6s (10/10) FINISHED
 => [internal] load build definition from Dockerfile                                                                0.0s
 => => transferring dockerfile: 31B                                                                                 0.0s
 => [internal] load .dockerignore                                                                                   0.0s
 => => transferring context: 2B                                                                                     0.0s
 => [internal] load metadata for docker.io/library/python:3.10                                                      2.6s
 => [auth] library/python:pull token for registry-1.docker.io                                                       0.0s
 => [1/4] FROM docker.io/library/python:3.10@sha256:fe068d8c06a719e26a1388c9d5c7c67d94923b0654ba89b0b7b5e518609e3304  0.0s
 => [internal] load build context                                                                                   0.0s
 => => transferring context: 16.61kB                                                                                0.0s
 => CACHED [2/4] WORKDIR /app                                                                                       0.0s
 => [3/4] COPY . /app/                                                                                              0.0s
 => [4/4] RUN pip install -r requirements.txt                                                                     636.1s
 => exporting to image                                                                                              6.5s
 => => exporting layers                                                                                             5.9s
 => => writing image sha256:336f8f4efd0780518d14af3407142ec147ccc5975f031ee2b72a7c49e5fcab96                        0.1s
 => => naming to docker.io/library/sentiment_api                                                                    0.1s
```

Docker Containerization

```
C:\New folder\TF>docker container run -d -p 8000:8000 sentiment_api
ba472b12b2e865c4024a606f6af77308f0f8306a0ca83e869c01f5754be71885

C:\New folder\TF>docker images
REPOSITORY      TAG       IMAGE ID       CREATED              SIZE
sentiment_api   latest    336f8f4efd07   About a minute ago   1.71GB

C:\New folder\TF>docker ps
CONTAINER ID   IMAGE           COMMAND                  CREATED          STATUS          PORTS                    NAMES
ba472b12b2e8   sentiment_api   "/bin/sh -c 'python …"   18 seconds ago   Up 17 seconds   0.0.0.0:8000->8000/tcp   eloquent_varahamihira
```

Tasks Completed: 1, 2, 3, 4, 5, 6, 7(partially, containerization done but not deployed as public api)