ANA680 Assignment 5: Wine Quality Prediction – Model Deployment

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May 25, 2025

This project demonstrates a machine learning deployment workflow for predicting wine quality using a linear regression model trained on the UCI Wine Quality dataset. The assignment is divided into three parts, each focusing on different deployment strategies and environments.

GitHub Repository

Main Repository: https://github.com/rdarnell55/wine-quality-ml

Part 1: Local Deployment with Heroku

The model is trained and deployed using a Flask web application, with two variations:

- **Without Docker containerization**: https://wine-api-ron-b490ceafb280.herokuapp.com/
- **With Docker containerization**: https://wine-quality-dockered-30b8f3f3c574.herokuapp.com/

Users can test the model directly through a web form where they can enter input values for prediction.

Part 2a: AWS SageMaker Deployment (No Container)

In this part, the model is serialized and deployed using AWS SageMaker's built-in Scikit-learn container.

- **SageMaker Endpoint**: wine-quality-endpoint-1748042764
- Testing is performed in the accompanying Jupyter notebook using test input arrays.

Part 2b: AWS SageMaker Deployment (Custom Container)

The model is containerized using Docker and deployed to AWS SageMaker via Amazon ECR.

- **SageMaker Endpoint**: wine-quality-endpoint-1748125390
- The Custom container includes Flask-based logic for inference.
- The image was built using AWS CodeBuild (with a buildspec.yml) a Docker build and pushed to ECR with a v2, schema-2 manifest to satisfy SageMaker requirements.

The GitHub repository provides clearly organized code, documentation, and deployment instructions for each part of the assignment. The notebooks include testing examples and endpoint verification, ensuring reproducibility and clarity of the deployment process.