

Name: Johnson Millil

Date: May 3, 2025

Deployment

Flight Delay Model Deployment

Deployment Process

- Developed a FastAPI application (app.py) to serve a machine learning model (finalized_model.pkl) for predicting flight delays.
- Created a Dockerfile using python:3.12-slim as the base image, installing dependencies (curl, gfortran) and copying required files (requirements.txt, app.py, finalized_model.pkl, label_conversion.json, test_api.py).
- Configured requirements.txt with scipy==1.15.2, pydantic==2.8.2, fastapi==0.112.2, uvicorn==0.32.1, and other libraries.
- Set up a GitLab CI/CD pipeline with .gitlab-ci.yml to run tests (pytest) and build the Docker image using Kaniko.
- Pushed changes to the task3-work branch and verified the pipeline at <https://gitlab.com/wgu-gitlab-environment/student-repos/jmillil/d602-deployment-task-3/pipelines>.

Technical Decisions

- Chose python:3.12-slim to align with local Python 3.12.7 and support scipy==1.15.2, resolving compatibility issues with the previous python:3.9-slim.
- Added a health check (curl -f http://localhost:8000/) to monitor container readiness.
- Used uvicorn to host the API on port 8000, accessible via http://localhost:8000/.

Challenges and Solutions

- Initial Kaniko build failed with python:3.9-slim due to scipy==1.15.2 requiring Python >=3.10. Updated the Dockerfile to python:3.12-slim.
- Local installation issues with older scipy versions (e.g., 1.11.4, 1.13.1) were resolved by sticking with scipy==1.15.2 after aligning the Docker image.
- Managed Anaconda3 environment conflicts by deactivating it during Docker builds.

Testing

- Tested locally with docker build and docker run, verifying API endpoints (/ and /predict/delays) with curl.
- Ran pytest inside the container, achieving 5 passed tests with 1 warning.
- Pulled the container from the GitLab registry and confirmed functionality.

Submission

- Repository URL: <https://gitlab.com/wgu-gitlab-environment/student-repos/jmillil/d602-deployment-task-3>
- Attached Files: Task3_Explanation.docx, app.py, test_api.py, Dockerfile, requirements.txt, .gitlab-ci.yml, branch_history_screenshot_task3.png, api_demonstration.mp4

Conclusion The deployment successfully hosts the API, meeting all functional requirements with a robust CI/CD pipeline.