Milestone 9: Cloud Deployment via Render

# Objective

To deploy the containerized PM2.5 prediction API to a public cloud platform, making it accessible for real-time usage and demonstration. Render was selected for its simplicity, GitHub integration, and support for Docker-based deployments.

# Platform: Render

- Website: https://render.com

- Deployment Method: Dockerfile-based web service

- Repository: Connected to GitHub project repo

# Deployment Steps

1. Pushed code to GitHub.

2. Created new Web Service in Render.

3. Selected 'Docker' as deployment method.

4. Connected GitHub repo and selected main branch.

5. Set environment variables in Render's dashboard:

* • `API\_KEY` = <your-secret-key>

6. Render automatically built and deployed the service.

7. Confirmed deployment by sending a `curl` POST request to the live URL.

# Result

The PM2.5 forecast API is now live and publicly accessible on the internet through a secured endpoint. It is deployed as a containerized application with API key protection, automatic builds on git push, and built-in logging support.

# Test Request

curl -X POST https://<your-render-url>/v1/predict/predict \  
 -H "Content-Type: application/json" \  
 -H "x-api-key: your-api-key" \  
 -d '{ "pm25\_lag\_1": 8.5, "pm25\_lag\_2": 8.2, "pm25\_lag\_3": 9.0,  
 "year": 2024, "month": 6, "sin\_month": 0.5, "cos\_month": 0.87 }'

# Conclusion

The deployment process was successfully completed using Render and Docker. This marks the transition of the project from development to a production-ready, hosted machine learning API.