

MLOps Pipeline for California Housing Price Prediction

#	Name	BITS Email ID
1	Priyanka Asati	2023ac05700@wilp.bits-pilani.ac.in
2	Achyut Kumar Dwivedi	2023ac05784@wilp.bits-pilani.ac.in
3	Ram Lal Singh	2023ac05814@wilp.bits-pilani.ac.in
4	Shubham Yadav	2023ac05241@wilp.bits-pilani.ac.in

Goal: Build, track, package, deploy & monitor regression models using **DVC, MLflow, FastAPI, Docker, GitHub Actions, SQLite, Prometheus & Grafana**, ensuring reproducibility, automated deployment & basic monitoring.

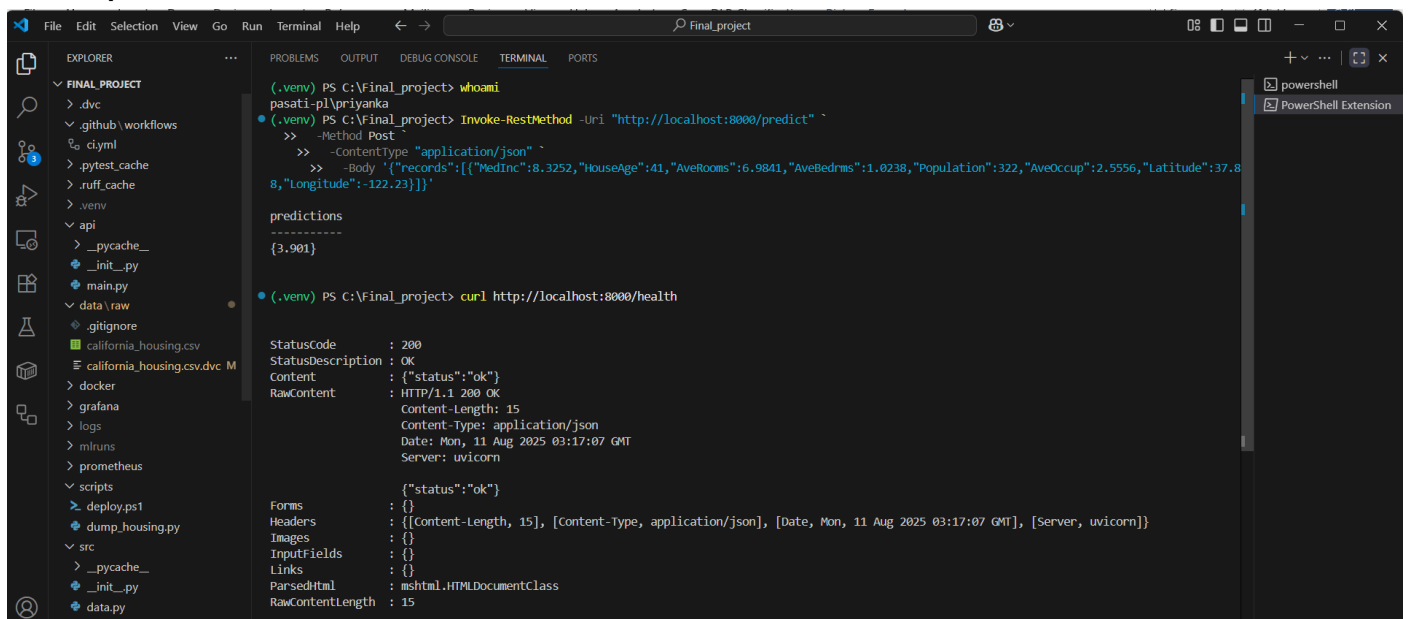
Dataset: sklearn.datasets.fetch_california_housing (saved as data/raw/california_housing.csv)

Component	Tool / Tech	URL
Version Control	Git + GitHub	https://github.com/asati-priyanka/mlops-housing-project
Data Versioning	DVC	mlops-housing-project/blob/main/dvc.yaml
Experiment Tracking	MLflow	http://localhost:5500/#/experiments
Model Registry	MLflow	http://localhost:5500/#/models
API Service	FastAPI	http://api:8000/predict
Containerization	Docker	https://hub.docker.com/repository/docker/asatipriyanka/housing-api/
CI/CD	GitHub Actions	mlops-housing-project/blob/main/.github/workflows/ci.yml
Logging	SQLite	http://127.0.0.1:9090
Monitoring	Grafana	http://localhost:3000/d/california-housing-dashboard
UI	Streamlit	http://localhost:8501

Key Features -

- **Data versioning:** DVC tracks raw CSV; **auto-retrain** on data/code changes via **dvc repro**.
- **Experiment tracking:** MLflow logs params/metrics/artifacts; **best model** registered with alias best.
- **Serving:** FastAPI loads models:/housing_best_model@best; JSON in → prediction out; Streamlit
- **Containers:** docker-compose.yml brings up **mlflow, api, prometheus, Grafana, Streamlit**.
- **CI/CD:** GitHub Actions builds & pushes API image to Docker Hub.
- **Code Quality (Lint)/ Format (Black)/ Unit Test (Pytest)** on Git Push
- **Monitoring:** /metrics/prom for Prometheus; **Grafana** dashboard ready.
- **Logging:** All requests stored in **SQLite** at logs/api.db.

API Output -



```
Final_project
(.venv) PS C:\Final_project> whoami
pasati-pl/priyanka
(.venv) PS C:\Final_project> Invoke-RestMethod -Uri "http://localhost:8000/predict" -
    >> -Method Post
    >> -ContentType "application/json"
    >> -Body '{"records":[{"MedInc":8.3252,"HouseAge":41,"AveRooms":6.9841,"AveBedrms":1.0238,"Population":322,"AveOccup":2.5556,"Latitude":37.8
8,"Longitude":-122.23}]}'

predictions
-----
{3.901}

(.venv) PS C:\Final_project> curl http://localhost:8000/health

StatusCode      : 200
StatusDescription : OK
Content         : {"status":"ok"}
RawContent      : HTTP/1.1 200 OK
                  Content-Length: 15
                  Content-Type: application/json
                  Date: Mon, 11 Aug 2025 03:17:07 GMT
                  Server: uvicorn

Forms           : {"status":"ok"}
Headers         : {[Content-Length, 15], [Content-Type, application/json], [Date, Mon, 11 Aug 2025 03:17:07 GMT], [Server, uvicorn]}
Images          : {}
InputFields     : {}
Links           : {}
ParsedHtml      : mshtml.HTMLDocumentClass
RawContentLength : 15
```