Price Optimization

In Retail Industry

Develop an AI system that dynamically adjusts product pricing based on demand, competition, and other market factors to maximize profitability.

2024F-T3_AISC2013_01-**Group C**

Team Members

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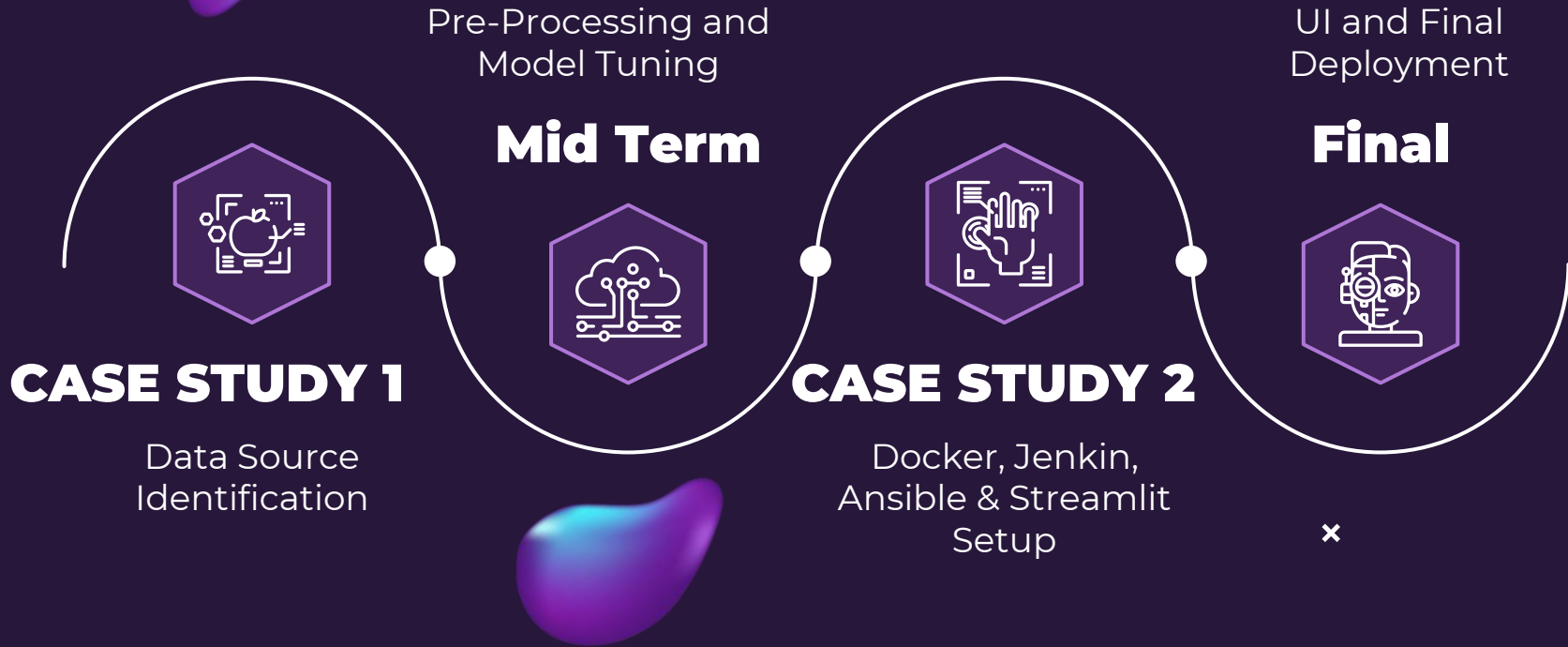
About the Data:

- Our Dataset is a Maven toy store data set with around 800,000 rows and 13 features.

- We have performed initial preprocessing and feature extraction(month & year).

- Added profit feature

- Product cost and product price as our target variables.

- Trained the random forest regressor model for initial testing later we will train the Neural Network models.

```
   Product_ID       Product_Name Product_Category Product_Cost Product_Price
0           1       Action Figure             Toys        $9.99        $15.99
1           2      Animal Figures             Toys        $9.99        $12.99
2           3      Barrel O' Slime     Art & Crafts        $1.99         $3.99
3           4     Chutes & Ladders            Games        $9.99        $12.99
4           5     Classic Dominoes            Games        $7.99         $9.99
   Sale_ID         Date  Store_ID  Product_ID  Units
0        1   2022-01-01        24           4      1
1        2   2022-01-01        28           1      1
2        3   2022-01-01         6           8      1
3        4   2022-01-01        48           7      1
4        5   2022-01-01        44          18      1
   Store_ID                 Store_Name  Store_City Store_Location  \
0         1    Maven Toys Guadalajara 1  Guadalajara     Residential
1         2      Maven Toys Monterrey 1    Monterrey     Residential
2         3    Maven Toys Guadalajara 2  Guadalajara      Commercial
3         4      Maven Toys Saltillo 1     Saltillo        Downtown
4         5       Maven Toys La Paz 1       La Paz        Downtown


   Store_Open_Date
0       1992-09-18
1       1995-04-27
2       1999-12-27
3       2000-01-01
4       2001-05-31
```

Docker Setup

```dockerfile
2  WORKDIR /app
   # Comment Code
3  COPY requirements.txt .
   # Comment Code
4  RUN pip install --no-cache-dir -r requirements.txt
   # Comment Code
5  COPY . .
   # Comment Code
6  EXPOSE 8501
   # Comment Code
7  CMD ["streamlit", "run", "main.py", "--server.port=
8
```

OUTPUT   DEBUG CONSOLE   PORTS   JUPYTER   JUPYTER 8

TERMINAL

```
    You can now view your Streamlit app in your browser.

    URL: http://0.0.0.0:8501

    2024-11-29 04:06:50.964
    `st.cache` is deprecated and will be removed soon. Plea
    se use one of Streamlit's new
```

0 ⚠ 8   🔊 0   Live Share   Share Code Link   Blackbox   Search Terminal Output

Containers / amazing_spence

amazing_spe

📦 4c8cc1fb3fef

STATUS
Running (19 minutes ago)

8501:8501 ↗

Logs   Inspect   Bind mounts   Exec   Files   Stats

```
2024-11-28 23:06:18
2024-11-28 23:06:18 Collecting usage statistics. To deactivate, set browse
r.gatherUsageStats to false.
2024-11-28 23:06:18
2024-11-28 23:06:18
2024-11-28 23:06:18     You can now view your Streamlit app in your browser.
2024-11-28 23:06:18
2024-11-28 23:06:18     URL: http://0.0.0.0:8501
2024-11-28 23:06:18
2024-11-28 23:06:50 2024-11-29 04:06:50.964
2024-11-28 23:06:50 `st.cache` is deprecated and will be removed soon. Ple
ase use one of Streamlit's new
2024-11-28 23:06:50 caching commands, `st.cache_data` or `st.cache_resourc
e`. More information
2024-11-28 23:06:50 [in our docs](https://docs.streamlit.io/develop/concep
ts/architecture/caching).
2024-11-28 23:06:50
2024-11-28 23:06:50 **Note**: The behavior of `st.cache` was updated in St
reamlit 1.36 to the new caching
2024-11-28 23:06:50 logic used by `st.cache_data` and `st.cache_resource`.
This might lead to some problems
2024-11-28 23:06:50 or unexpected behavior in certain edge cases.
2024-11-28 23:06:50
2024-11-28 23:07:14 2024-11-29 04:07:14.787
```

RAM 1.44 GB   CPU 0.00%

Jenkins Setup

Java Error

Activities   🦊 Firefox   Dec 4 00:56

Dashboard > Data Analytics CI-CD > #48

```
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsFlowExecution$6.onSuccess(CpsFlowExecution.java:1246)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsFlowExecution$6.onSuccess(CpsFlowExecution.java:1235)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsFlowExecution$4$1.run(CpsFlowExecution.java:995)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsVmExecutorService.lambda$wrap$2(CpsVmExecutorService.java:85)
                    at java.base/java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:539)
                    at java.base/java.util.concurrent.FutureTask.run(FutureTask.java:264)
                    at hudson.remoting.SingleLaneExecutorService$1.run(SingleLaneExecutorService.java:139)
                    at jenkins.util.ContextResettingExecutorService$1.run(ContextResettingExecutorService.java:28)
                    at jenkins.security.ImpersonatingExecutorService$1.run(ImpersonatingExecutorService.java:68)
                    at jenkins.util.ErrorLoggingExecutorService.lambda$wrap$0(ErrorLoggingExecutorService.java:51)
                    at java.base/java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:539)
                    at java.base/java.util.concurrent.FutureTask.run(FutureTask.java:264)
                    at java.base/java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1136)
                    at java.base/java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:635)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsVmExecutorService$1.call(CpsVmExecutorService.java:53)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsVmExecutorService$1.call(CpsVmExecutorService.java:50)
                    at
org.codehaus.groovy.runtime.GroovyCategorySupport$ThreadCategoryInfo.use(GroovyCategorySupport.java:136)
                    at org.codehaus.groovy.runtime.GroovyCategorySupport.use(GroovyCategorySupport.java:275)
                    at PluginClassLoader for workflow-cps//
org.jenkinsci.plugins.workflow.cps.CpsVmExecutorService.lambda$categoryThreadFactory$0(CpsVmExecutorService.ja
va:50)
                    at java.base/java.lang.Thread.run(Thread.java:840)
org.jenkinsci.plugins.workflow.actions.ErrorAction$ErrorId: 09b2ebd5-4e58-4a8f-b0fe-9060e8c3547a
Finished: ABORTED
```

Docker Permission Issue

```
[Pipeline] sh
+ docker build -t data-analytics-app .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: P
%2Fvar%2Frun%2Fdocker.sock/v1.24/build?
buildargs=%7B%7D&cachefrom=%5B%5D&cgroupparent=&cpuperiod=0&cpuquota=0&cpusetcpus=&cpusetmems=&cpushare
labels=%7B%7D&memory=0&memswap=0&networkmode=default&rm=1&shmsize=0&t=data-analytics-app&target=&ulimit
unix /var/run/docker.sock: connect: permission denied
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to Minikube)
Stage "Deploy to Minikube" skipped due to earlier failure(s)
[Pipeline] getContext
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
```

Solution

```
# Create a non-root user with Docker permissions
RUN groupadd -f docker && \
    useradd -r -m -s /bin/bash -G docker dockeruser || echo "User already exists"


# Allow the user to use sudo without a password
RUN echo "dockeruser ALL=(ALL) NOPASSWD:ALL" >> /etc/sudoers


# Set the environment variable for Docker CLI
ENV DOCKER_HOST=unix:///var/run/docker.sock
```

Jenkin Issue

```
[Pipeline] withEnv
[Pipeline] {
[Pipeline] isUnix
[Pipeline] withEnv
[Pipeline] {
[Pipeline] sh
+ docker inspect -f . docker:24.0.7
.
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] withDockerContainer
Jenkins does not seem to be running inside a container
$ docker run -t -d -u 129:138 --privileged -v /var/run/docker.sock:/var/run/docker.sock -v $WORKSPACE/.docker:/root/.docker -w "/
var/lib/jenkins/workspace/Data Analytics CI-CD" -v "/var/lib/jenkins/workspace/Data Analytics CI-CD:/var/lib/jenkins/workspace/
Data Analytics CI-CD:rw,z" -v "/var/lib/jenkins/workspace/Data Analytics CI-CD@tmp:/var/lib/jenkins/workspace/Data Analytics CI-
CD@tmp:rw,z" -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e
******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ********
-e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ******** -e ********
docker:24.0.7 cat
$ docker top 24af2fffa94d649126179ccbe06063fc04f2929a252273ecace6a00b0a26bf25 -eo pid,comm
[Pipeline] {
```
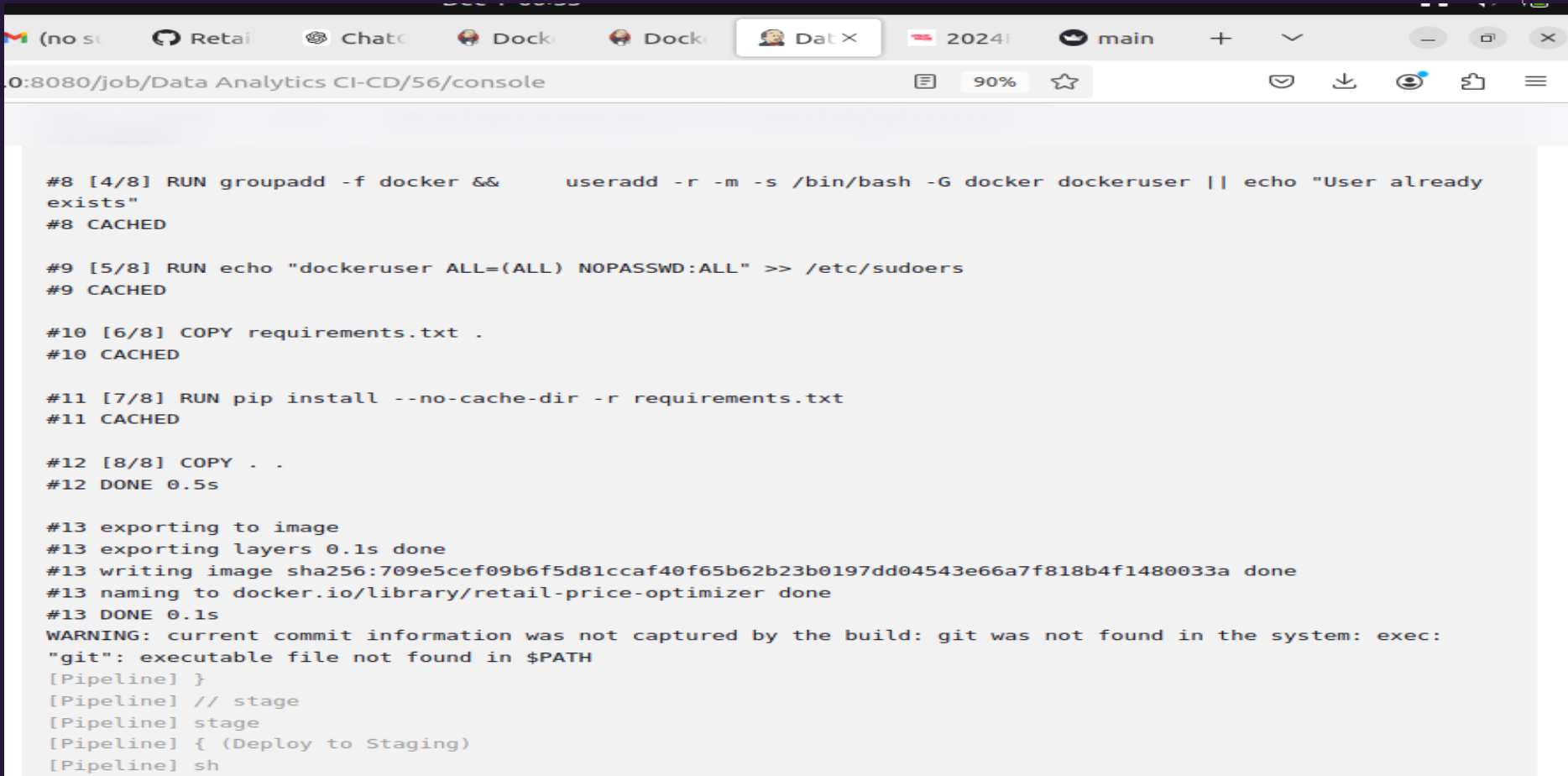
Solution

```
pipeline {
    agent {
        docker {
            image 'docker:24.0.7'
            args '--privileged -v /var/run/docker.sock:/var/run/docker.sock -v $WORKSPACE/.docker:/root/.docker'
        }
    }


    environment {
        DOCKER_IMAGE = "retail-price-optimizer"
        REPO_URL = "https://github.com/rkdhakal/Retail-Industry-Project"
        DOCKER_CONFIG = "$WORKSPACE/.docker"
    }
```

Docker Instantiated

```
#8 [4/8] RUN groupadd -f docker &&       useradd -r -m -s /bin/bash -G docker dockeruser || echo "User already
exists"
#8 CACHED

#9 [5/8] RUN echo "dockeruser ALL=(ALL) NOPASSWD:ALL" >> /etc/sudoers
#9 CACHED

#10 [6/8] COPY requirements.txt .
#10 CACHED

#11 [7/8] RUN pip install --no-cache-dir -r requirements.txt
#11 CACHED

#12 [8/8] COPY . .
#12 DONE 0.5s

#13 exporting to image
#13 exporting layers 0.1s done
#13 writing image sha256:709e5cef09b6f5d81ccaf40f65b62b23b0197dd04543e66a7f818b4f1480033a done
#13 naming to docker.io/library/retail-price-optimizer done
#13 DONE 0.1s
WARNING: current commit information was not captured by the build: git was not found in the system: exec:
"git": executable file not found in $PATH
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to Staging)
[Pipeline] sh
```

Deploying To Staging

Dashboard > Data Analytics CI-CD > #36

```
Deploying to Staging...
+ docker run --rm -v '/var/lib/jenkins/workspace/Data Analytics CI-CD:/app' -w /app -v '/var/lib/jenkins/
workspace/Data Analytics CI-CD/.docker:/root/.docker' retail-price-optimizer bash -c 'ansible-playbook -i
ansible/inventory ansible/deploy_model.yml'
[WARNING]: Found both group and host with same name: localhost

PLAY [Deploy the Retail Pricing System] ********************************************************

TASK [Gathering Facts] *************************************************************************
ok: [localhost]

TASK [Ensure required packages are installed] **********************************************
ok: [localhost] => (item=docker.io)
ok: [localhost] => (item=python3)
changed: [localhost] => (item=python3-pip)

TASK [Start Docker service] ****************************************************************
fatal: [localhost]: FAILED! => {"changed": false, "msg": "mkdir: cannot create directory 'cpuset': Read-only
file system\n"}

PLAY RECAP ***********************************************************************************
localhost                  : ok=2    changed=1    unreachable=0    failed=1    skipped=0    rescued=0
ignored=0

[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to Production)
Stage "Deploy to Production" skipped due to earlier failure(s)
[Pipeline] getContext
[Pipeline] }
```
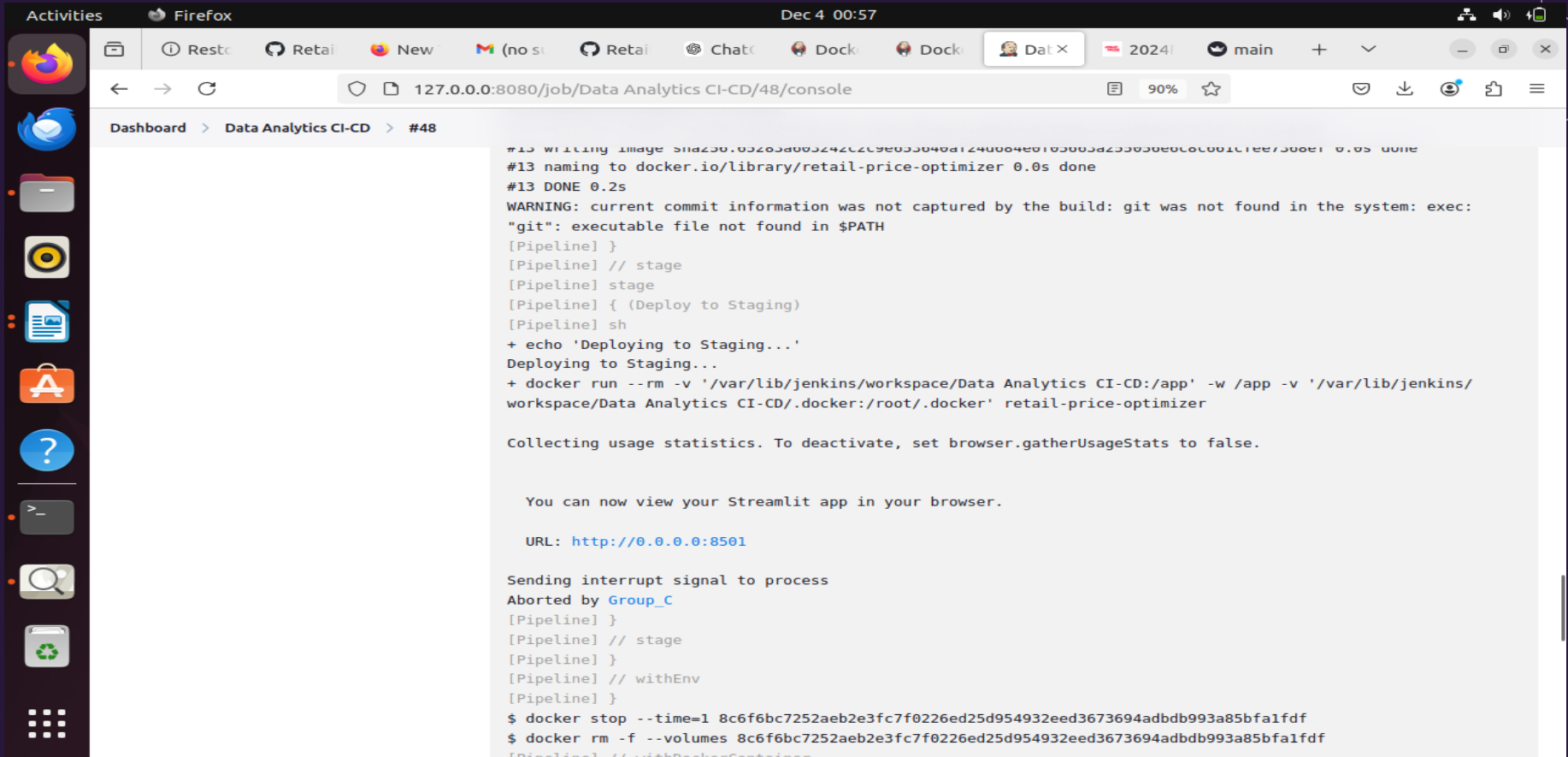
Deploying to Production

```
[Pipeline] stage
[Pipeline] { (Deploy to Staging)
[Pipeline] sh
+ echo 'Deploying to Staging...'
Deploying to Staging...
+ docker rm -f retail-pricing-system
retail-pricing-system
+ docker run -d --name retail-pricing-system -p 8501:8501 retail-price-optimizer
9e770a9c82bd6982e5164983fd4e8f61307a52e4fd779189780e5a6fc594048f
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to Production)
[Pipeline] sh
+ echo 'Deploying to Production...'
Deploying to Production...
+ docker rm -f retail-pricing-system-production
Error response from daemon: No such container: retail-pricing-system-production
+ docker run -d --name retail-pricing-system-production -p 8502:8501 retail-price-optimizer bash -c 'ansible-
playbook -i ansible/inventory ansible/deploy_model.yml --extra-vars '"'"'env=production'"'"'
72d6edb04683a7c33b85051dbe8f7b737c03de988d163a7f55a8b4a4ab9dc8a0
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] echo
Pipeline executed successfully!
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
```

Output

Dashboard > Data Analytics CI-CD > #48

```
#13 writing image sha256.6528..........................................................done
#13 naming to docker.io/library/retail-price-optimizer 0.0s done
#13 DONE 0.2s
WARNING: current commit information was not captured by the build: git was not found in the system: exec:
"git": executable file not found in $PATH
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to Staging)
[Pipeline] sh
+ echo 'Deploying to Staging...'
Deploying to Staging...
+ docker run --rm -v '/var/lib/jenkins/workspace/Data Analytics CI-CD:/app' -w /app -v '/var/lib/jenkins/
workspace/Data Analytics CI-CD/.docker:/root/.docker' retail-price-optimizer


Collecting usage statistics. To deactivate, set browser.gatherUsageStats to false.


  You can now view your Streamlit app in your browser.

  URL: http://0.0.0.0:8501

Sending interrupt signal to process
Aborted by Group_C
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
$ docker stop --time=1 8c6f6bc7252aeb2e3fc7f0226ed25d954932eed3673694adbdb993a85bfa1fdf
$ docker rm -f --volumes 8c6f6bc7252aeb2e3fc7f0226ed25d954932eed3673694adbdb993a85bfa1fdf
[Pipeline] // withDockerContainer
```

Docker Image

```
vboxuser@ram:~$ ^C
vboxuser@ram:~$ docker ps
CONTAINER ID   IMAGE       COMMAND      CREATED      STATUS       PORTS        NAMES
vboxuser@ram:~$ sudo systemctl restart jenkins
[sudo] password for vboxuser:
vboxuser@ram:~$ sudo systemctl restart docker
vboxuser@ram:~$ docker ps
CONTAINER ID   IMAGE                   COMMAND              CREATED         STATUS         PORTS
              NAMES
097c4d50720c   retail-price-optimizer  "streamlit run main.…"  20 seconds ago  Up 18 seconds  0.0.0.0:8501->8501/tcp, :::8501->8
501/tcp    retail-pricing-system
vboxuser@ram:~$ sudo systemctl restart jenkins
[sudo] password for vboxuser:
Sorry, try again.
[sudo] password for vboxuser:
vboxuser@ram:~$ sudo systemctl restart docker
vboxuser@ram:~$ docker ps
CONTAINER ID   IMAGE       COMMAND      CREATED      STATUS       PORTS        NAMES
vboxuser@ram:~$ docker ps
CONTAINER ID   IMAGE                   COMMAND              CREATED         STATUS         PORTS
              NAMES
72d6edb04683   retail-price-optimizer  "bash -c 'ansible-pl…"  11 seconds ago  Up 10 seconds  0.0.0.0:8502->8501/tcp, :::8502->8
501/tcp    retail-pricing-system-production
9e770a9c82bd   retail-price-optimizer  "streamlit run main.…"  14 seconds ago  Up 12 seconds  0.0.0.0:8501->8501/tcp, :::8501->8
501/tcp    retail-pricing-system
vboxuser@ram:~$
```

Frontend

Upload Dataset

Upload a CSV file

Drag and drop file here
Limit 200MB per file • CSV

Browse files

Deploy

st.cache is deprecated and will be removed soon. Please use one of Streamlit's new caching commands, st.cache_data or st.cache_resource. More information in our docs.

Note: The behavior of st.cache was updated in Streamlit 1.36 to the new caching logic used by st.cache_data and st.cache_resource. This might lead to some problems or unexpected behavior in certain edge cases.

Retail Price Optimization Dashboard

Use this dashboard to explore and optimize product pricing.

Retail-Industry-Project/   Data Analytics CI-CD [Je

127.0.0.0:8080/job/Data Analytics CI-CD/   90%

Jenkins

Search (CTRL+K)   Group_C   log out

Dashboard > Data Analytics CI-CD >

Status

</> Changes

▷ Build Now

⊙ Configure

🗑 Delete Pipeline

☆ Favorite

◉ Open Blue Ocean

⊗ Stages

✎ Rename

⊙ Pipeline Syntax
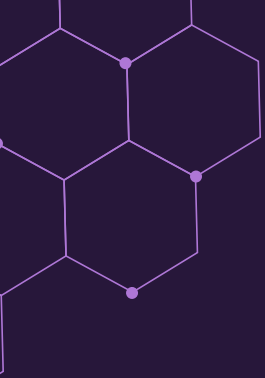
⊘ Data Analytics CI-CD

✎ Add description

Permalinks

- Last build (#58), 22 sec ago
- Last stable build (#56), 20 min ago
- Last successful build (#56), 20 min ago
- Last failed build (#54), 38 min ago
- Last unsuccessful build (#58), 22 sec ago
- Last completed build (#58), 22 sec ago

Builds

🔍 Filter

Today

⊘ #58   1:01 AM

⊘ #57   1:00 AM

Github Link

https://github.com/rkdhakal/Retail-Industry-Project

Report

THANK YOU

[Git Hub](Git Hub)