

GIT URL: <https://github.com/maheshesh/project-ml-microservice-kubernetes>

Task 1: Complete the Dockerfile

Lint works perfectly console output as below

```
Cloud DevOps Engli... Student Hub - Uda... AWSCloud 101 - Ga... Linux - Install Ubuntu
3 import logging
4
5 import pandas as pd
6 from sklearn.externals import joblib
7 from sklearn.preprocessing import StandardScaler
8
9 app = Flask(__name__)
10 LOG = create_logger(app)
11 LOG.setLevel(logging.INFO)
12
13
14 def scale(payload):
15     """Scales Payload"""
16
17     LOG.info("Scaling Payload: \n %s ", payload)
18     scaler = StandardScaler().fit(payload.astype(float))
19     scaled_adhoc_predict = scaler.transform(payload.astype(float))
20     return scaled_adhoc_predict
21
22 @app.route("/")
23 def home():
24     html = f"<h3>Sklearn Prediction Home</h3>"
25     return html.format(format)
26
27 @app.route("/predict", methods=['POST'])
28 def predict():
29     """Performs an sklearn prediction
30
31     input looks like:
32     {
33     "CHAS":{
34         "0":0
35     },
36     "RM":{
```

```
make: *** [lint] Error 4
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ vi app.py
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ make lint
# See local hadolint install instructions: https://github.com/hadolint/hadolint
# This is linter for Dockerfiles
hadolint Dockerfile
# This is a linter for Python source code linter: https://www.pyLint.org/
# This should be run from inside a virtualenv
pylint --disable=R,C,W1203 app.py
***** Module app
app.py:16:4: W1202: Use % formatting in logging functions and pass the % parameters as arguments!
app.py:58:4: W1202: Use % formatting in logging functions and pass the % parameters as arguments!
app.py:60:4: W1202: Use % formatting in logging functions and pass the % parameters as arguments!

Your code has been rated at 8.93/10 (previous run: 8.93/10, +0.00)

make: *** [lint] Error 4
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ vi app.py
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pylint --disable=R,C,W1203 app.py
***** Module app
app.py:58:4: W1202: Use % formatting in logging functions and pass the % parameters as arguments!
app.py:60:4: W1202: Use % formatting in logging functions and pass the % parameters as arguments!

Your code has been rated at 9.29/10 (previous run: 8.93/10, +0.36)

make: *** [lint] Error 4
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# See local hadolint install instructions: https://github.com/hadolint/hadolint
# This is linter for Dockerfiles
hadolint Dockerfile
# This is a linter for Python source code linter: https://www.pyLint.org/
# This should be run from inside a virtualenv
pylint --disable=R,C,W1203 app.py

Your code has been rated at 10.00/10 (previous run: 9.29/10, +0.71)

(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ make lint
```

Task 2: Run a Container & Make a Prediction

Note the Successfully built message

```
project-ml-microservice-kubernetes — docker - run_docker.sh — 181x48
...evOps_Microservices/project-ml-microservice-kubernetes — -bash
...vOps_Microservices/project-ml-microservice-kubernetes — -bash
.../project-ml-microservice-kubernetes — docker -
Downloading https://files.pythonhosted.org/packages/98/7b/ff284bd8c80654e471b769062a9b43cc5d03e7a615048d96f4619df8d420/MarkupSafe-1.1.1-cp37-cp37m-manylinux1_x86_64.whl
Collecting six>=1.5
Downloading https://files.pythonhosted.org/packages/73/fb/00a976f728d0d1fecfe898238ce23f502a721c0ac0ecfedb80e0d88c64e9/six-1.12.0-py2.py3-none-any.whl
Collecting wrapt==1.11.*
Downloading https://files.pythonhosted.org/packages/23/84/323c2415280bc4fc880ac5050dddfb3c8062c2552b34c2e512eb4aa68f79/wrapt-1.11.2.tar.gz
Collecting typed-ast<1.5,>=1.4.0; implementation_name == "cpython" and python_version < "3.8"
Downloading https://files.pythonhosted.org/packages/fb/56/dd4e168a0009da85c78c6cfe91f5b2df2c7bbed60f3ba778c4a71289e6fb/typed_ast-1.4.0-cp37-cp37m-manylinux1_x86_64.whl
Collecting lazy-object-proxy==1.4.*
Downloading https://files.pythonhosted.org/packages/23/f8/69df5a663b59512eb9f9b84e7f203c48c7a933e460316e9ebf4db2871ae0/lazy_object_proxy-1.4.3-cp37-cp37m-manylinux1_x86_64.whl
Building wheels for collected packages: wrapt
Building wheel for wrapt (setup.py): started
Building wheel for wrapt (setup.py): finished with status 'done'
Created wheel for wrapt: filename=wrapt-1.11.2-cp37-cp37m-linux_x86_64.whl size=71296 sha256=6e937fe4e96567bee112d6ec61339dcdeeb61a53a1bbf767dca7bba24911641
Stored in directory: /root/.cache/pip/wheels/d7/de/2e/efa132238792efb6459a96e85916ef8597fcb3d2ae51590dfd
Successfully built wrapt
Installing collected packages: MarkupSafe, Jinja2, Werkzeug, itsdangerous, click, Flask, numpy, pytz, six, python-dateutil, pandas, scipy, scikit-learn, wrapt, type
t-proxy, astroid, mccabe, isort, pylint
Successfully installed Flask-1.1.1 Jinja2-2.10.3 MarkupSafe-1.1.1 Werkzeug-0.16.0 astroid-2.3.2 click-7.0 isort-4.3.21 itsdangerous-1.1.0 lazy-object-proxy-1.4.3 mc
1.17.3 pandas-0.25.3 pylint-2.4.3 python-dateutil-2.8.1 pytz-2019.3 scikit-learn-0.20.2 scipy-1.3.1 six-1.12.0 typed-ast-1.4.0 wrapt-1.11.2
Removing intermediate container b009023d943e
----> 87574149796b
Step 7/8 : EXPOSE 80
----> Running in 1879ac712205
Removing intermediate container 1879ac712205
----> 1e99465854dd
Step 8/8 : CMD ["python", "/app/app.py"]
----> Running in 8d7d37eeae3
Removing intermediate container 8d7d37eeae3
----> 17a1088ea91d
Successfully built 17a1088ea91d
Successfully tagged simple_flask:dockerfile
```

Making predictions

Note the prediction is printed in the last line

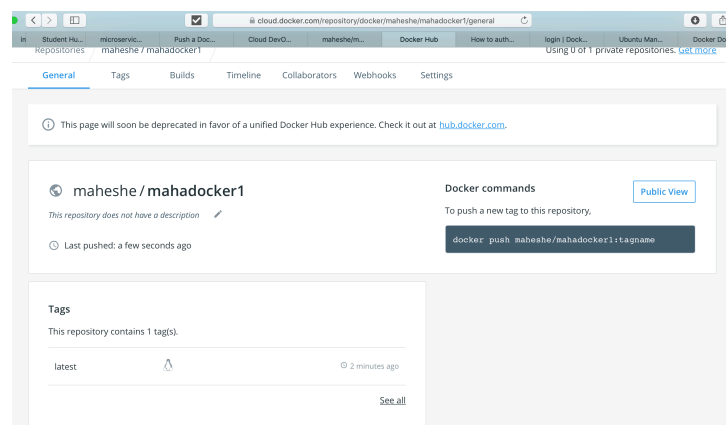
```
Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ ./make_prediction.sh
Port: 8000
{
  "prediction": [
    20.35373177134412
  ]
}
Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$
```

Task 3: Improve Logging & Save Output

Added the additional log info in app.py for showing prediction and copied the logs into `docker_out.txt` “https://github.com/maheshesh/project-ml-microservice-kubernetes/blob/master/output_txt_files/docker_out.txt”

Task 4: Upload the Docker Image

```
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ ./upload_docker.sh
Docker ID and Image:
Docker ID and Image Authenticate Now: maheshe/simple_flask:dockerfile
WARNING! Using --password via the CLI is insecure. Use --password-stdin.
Error response from daemon: Get https://registry-1.docker.io/v2/: unauthorized: incorrect username or password
Now docker tagging
Now pushing to dockerHub
The push refers to repository [docker.io/maheshe/mahadocker1]
c4ad7560a617: Pushed
fc431c202884: Pushed
c838bf349fc4: Pushed
61fc2186ba04: Pushed
67c78d67b6c4: Pushed
799a7872c8c7: Mounted from library/python
715450468940: Mounted from library/python
c9d608035aef: Mounted from library/python
bb9c02680a15: Mounted from library/python
a637c551a0da: Mounted from library/python
2c8d31157b81: Mounted from library/python
7b76d801397d: Mounted from library/python
f32868cde90b: Mounted from library/python
0db06dff9d9a: Mounted from library/python
latest: digest: sha256:c8be0e148ff4a943d918d9b630c8a5734b33c76f58af60719235ef75b394e4fb size: 3261
Now push done
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$
```



<https://cloud.docker.com/repository/docker/maheshe/mahadocker1/general>

Task 5: Configure Kubernetes to Run Locally

```
Terminal  Shell  Edit  View  Window  Help  project-ml-microservice-kubernetes — -bash — 157x46
...icroservices/project-ml-microservice-kubernetes — -bash  ...oservices/project-ml-microservice-kubernetes — -bash  ...ervices/project-ml-microservice-kubernetes — -bash

To list all files that would be deleted:
brew link --overwrite --dry-run kubernetes-cli
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ brew link --overwrite kubernetes-cli

Linking /usr/local/Cellar/kubernetes-cli/1.16.2... 227 symlinks created
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ minikube stop
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ minikube start
minikube v1.5.1 on Darwin 18.14.6
Tip: Use 'minikube start -p <name>' to create a new cluster, or 'minikube delete' to delete this one.
Starting existing hyperkit VM for "minikube" ...
Waiting for the host to be provisioned ...
Preparing Kubernetes v1.16.2 on Docker 18.09.9 ...
Relaunching Kubernetes using kubeadm ...
Waiting for: apiserver
Done! kubectl is now configured to use "minikube"
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ kubectl api-version

[Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ kubectl config view
apiVersion: v1
clusters:
- cluster:
  certificate-authority: /Users/richamahesh/.minikube/ca.crt
  server: https://192.168.64.2:8443
  name: minikube
contexts:
- context:
  cluster: minikube
  user: minikube
  name: minikube
current-context: minikube
kind: Config
preferences: {}
users:
- name: minikube
  user:
    client-certificate: /Users/richamahesh/.minikube/client.crt
    client-key: /Users/richamahesh/.minikube/client.key
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$
```

Task 6: Deploy with Kubernetes and Save Output Logs

```
((.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ minikube start
minikube v1.5.1 on Darwin 10.14.6
Automatically selected the 'hyperkit' driver (alternates: [virtualbox])
Creating hyperkit VM (CPUs=2, Memory=2000MB, Disk=20000MB) ...
Preparing Kubernetes v1.16.2 on Docker 18.09.9 ...
Pulling images ...
Launching Kubernetes ...
Waiting for: apiserver
Done! kubectl is now configured to use "minikube"
((.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ ./run_kubernetes.sh
Docker ID and Image Authenticate Now: maheshe/mahadocker1:latest
WARNING! Using --password via the CLI is insecure. Use --password-stdin.
Login Succeeded
pod/mahadocker1 created
NAME          READY   STATUS             RESTARTS   AGE
mahadocker1   0/1     ContainerCreating   0           0s
sleep for 60 seconds while waiting for pod
Forwarding from 127.0.0.1:8000 -> 80
Forwarding from [::1]:8000 -> 80
Handling connection for 8000
```

```
project-ml-microservice-kubernetes — kubectl logs mahadocker1 -f — 157x46
...icroservices/project-ml-microservice-kubernetes — -bash
...icroservice-kubernetes — kubectl logs mahadocker1 -f
...roservice-kubernetes — kubectl - run_kubernetes.

NAME          READY   STATUS             RESTARTS   AGE
mahadocker1   1/1     Running            0           2m41s
richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ ./make_prediction.sh
Port: 8000
{
  "prediction": [
    20.35373177134412
  ]
}
richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ kubectl get pods
NAME          READY   STATUS             RESTARTS   AGE
mahadocker1   1/1     Running            0           5m49s
richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ kubectl logs mahadocker1 -f
* Serving Flask app "app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: on
/usr/local/lib/python3.7/site-packages/sklearn/base.py:251: UserWarning: Trying to unpickle estimator DecisionTreeRegressor from version 0.20.3 when
rsion 0.20.2. This might lead to breaking code or invalid results. Use at your own risk.
  UserWarning)
/usr/local/lib/python3.7/site-packages/sklearn/base.py:251: UserWarning: Trying to unpickle estimator GradientBoostingRegressor from version 0.20.3
version 0.20.2. This might lead to breaking code or invalid results. Use at your own risk.
  UserWarning)
* Running on http://0.0.0.0:80/ (Press CTRL+C to quit)
* Restarting with stat
/usr/local/lib/python3.7/site-packages/sklearn/base.py:251: UserWarning: Trying to unpickle estimator DecisionTreeRegressor from version 0.20.3 when
rsion 0.20.2. This might lead to breaking code or invalid results. Use at your own risk.
  UserWarning)
/usr/local/lib/python3.7/site-packages/sklearn/base.py:251: UserWarning: Trying to unpickle estimator GradientBoostingRegressor from version 0.20.3
version 0.20.2. This might lead to breaking code or invalid results. Use at your own risk.
  UserWarning)
* Debugger is active!
* Debugger PIN: 231-779-307
[2019-11-13 02:10:42,305] INFO in app: JSON payload:
{'CHAS': {'0': 0}, 'RM': {'0': 6.575}, 'TAX': {'0': 296.0}, 'PTRATIO': {'0': 15.3}, 'B': {'0': 396.9}, 'LSTAT': {'0': 4.98}}
[2019-11-13 02:10:42,310] INFO in app: Inference payload DataFrame:
   CHAS   RM   TAX  PTRATIO   B  LSTAT
0    0  6.575 296.0   15.3  396.9   4.98
[2019-11-13 02:10:42,346] INFO in app: Scaling Payload:
   CHAS   RM   TAX  PTRATIO   B  LSTAT
0    0  6.575 296.0   15.3  396.9   4.98
[2019-11-13 02:10:42,375] INFO in app: Output prediction value:
[20.35373177134412]
127.0.0.1 - - [13/Nov/2019 02:10:42] "POST /predict HTTP/1.1" 200 -
```

Copied the text output after calling `run_kubernetes.sh` and paste it into a file `kubernetes_out.txt` in git https://github.com/maheshesh/project-ml-microservice-kubernetes/blob/master/output_txt_files/kubernetes_out.txt

Task 7: [Important] Delete Cluster

```
Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ minikube stop
```

👉 Stopping "minikube" in hyperkit ...

🛑 "minikube" stopped.

```
(.devops) Richas-MacBook-Pro:project-ml-microservice-kubernetes richamahesh$ minikube delete
```

🔥 Deleting "minikube" in hyperkit ...

💔 The "minikube" cluster has been deleted.

🔥 Successfully deleted profile "minikube"

Task 8: CircleCI Integration

The screenshot displays the CircleCI web interface. At the top, a navigation bar shows the user 'maheshesh' and the CircleCI logo. Below this, a sidebar on the left contains icons for Jobs, Workflows, Insights, Add Projects, Team, and Settings. The main content area shows a job titled 'Jobs » maheshesh » project-ml-microservice-kubernetes » master » 4 (build)'. The job status is 'SUCCESS', with a completion time of '3 min ago (00:28)'. The interface includes a 'Rerun workflow' button and a 'Set Up Test Summary' button. Below the job details, there is a section for 'COMMITTS (1)' showing a commit by 'Mahesh E' on 'GitHub' with the message 'Update README.md'. The bottom part of the screenshot shows the 'Settings » maheshesh » project-ml-microservice-kubernetes' page, specifically the 'Status Badges' section, which provides instructions on how to use the status badges for a project's README or wiki. The 'Branch' is set to 'Default' and the 'API Token' is 'None'. A preview shows a 'PASSED' status badge.

Task 9: README.md

[![CircleCI](https://circleci.com/gh/maheshesh/project-ml-microservice-kubernetes.svg?style=svg)](https://circleci.com/gh/maheshesh/project-ml-microservice-kubernetes)