

```
Last login: Thu Apr  9 20:48:48 on ttys001
Run-Mac:~ mac$ cd ~/.ssh
Run-Mac:~.ssh mac$ ssh -i "Runzhe.pem" ubuntu@ec2-18-215-188-148.compute-1.amazonaws.com
Warning: Permanently added the ED25519 host key for IP address '18.215.188.148' to the list of known hosts.
```

```
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1060-aws x86_64)
```

```
* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage
```

```
System information as of Fri Apr 10 00:51:08 UTC 2020
```

```
System load:  1.25           Processes:           824
Usage of /:   28.0% of 30.96GB Users logged in:     0
Memory usage: 0%           IP address for ens5: 172.31.12.182
Swap usage:   0%
```

```
* Kubernetes 1.18 GA is now available! See https://microk8s.io for docs or
install it with:
```

```
sudo snap install microk8s --channel=1.18 --classic
```

```
* Multipass 1.1 adds proxy support for developers behind enterprise
firewalls. Rapid prototyping for cloud operations just got easier.
```

```
https://multipass.run/
```

```
* Canonical Livepatch is available for installation.
- Reduce system reboots and improve kernel security. Activate at:
https://ubuntu.com/livepatch
```

```
89 packages can be updated.
39 updates are security updates.
```

```
Last login: Fri Apr  3 19:45:17 2020 from 107.13.161.147
```

```
ubuntu@ip-172-31-12-182:~$
ubuntu@ip-172-31-12-182:~$ ssh -i "Runzhe.pem" ubuntu@ec2-18-215-188-148.compute-1.amazonaws.com
Warning: Identity file Runzhe.pem not accessible: No such file or directory.
The authenticity of host 'ec2-18-215-188-148.compute-1.amazonaws.com (18.215.188.148)' can't be established.
ECDSA key fingerprint is SHA256:HPPPDtPU3YwQCBa7vf7GVMcv1jIR03dYAIhaP34edSY.
Are you sure you want to continue connecting (yes/no)? ^C
ubuntu@ip-172-31-12-182:~$ ssh -i "Runzhe.pem" ubuntu@ec2-18-215-188-148.compute-1.amazonaws.com
Warning: Identity file Runzhe.pem not accessible: No such file or directory.
The authenticity of host 'ec2-18-215-188-148.compute-1.amazonaws.com (18.215.188.148)' can't be established.
ECDSA key fingerprint is SHA256:HPPPDtPU3YwQCBa7vf7GVMcv1jIR03dYAIhaP34edSY.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-18-215-188-148.compute-1.amazonaws.com,18.215.188.148' (ECDSA) to the list of known hosts.
ubuntu@ec2-18-215-188-148.compute-1.amazonaws.com: Permission denied (publickey).
ubuntu@ip-172-31-12-182:~$ export openblas_num_threads=1; export OMP_NUM_THREADS=1; python EC2.py
20:53, 04/09; num of cores:96
```

```
Basic setting:[rep_times, sd_0, sd_D, sd_u_0, w_0, w_A, u_0_u_D, sd_R_range, t_func] = [96, None, None, 20, 0.5, 1, 0, [30, 40, 50], None]
```

```
-----
[pattern_seed, day, sd_R] = [2, 7, 30]
```

```
max(u_0) = 145.8
0_threshold = 100
number of reward locations: 9
0_threshold = 105
number of reward locations: 7
0_threshold = 110
number of reward locations: 6
0_threshold = 115
number of reward locations: 3
target 1 in 4 DONE!
target 2 in 4 DONE!
target 3 in 4 DONE!
target 4 in 4 DONE!
```

```
-----
Value of Behaviour policy:64.904
0_threshold = 100
MC for this TARGET:[70.823, 0.362]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-0.28, -0.39, -0.95]][[-1.28, -70.82, -5.92]]
std:[[1.32, 1.33, 0.89]][[0.73, 0.0, 0.39]]
MSE:[[1.35, 1.39, 1.3]][[1.47, 70.82, 5.93]]
MSE(-DR):[[0.0, 0.04, -0.05]][[0.12, 69.47, 4.58]]
**
```

```
=====
0_threshold = 105
MC for this TARGET:[71.827, 0.356]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
```

```

bias:[[-2.77, -2.91, -3.46]][[-4.01, -71.83, -6.92]]
std:[1.82, 1.8, 1.07]][[0.7, 0.0, 0.39]]
MSE:[3.31, 3.42, 3.62]][[4.07, 71.83, 6.93]]
MSE(-DR):[0.0, 0.11, 0.31]][[0.76, 68.52, 3.62]]
***
=====
0_threshold = 110
MC for this TARGET:[70.921, 0.356]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-2.87, -2.97, -3.23]][[-4.72, -70.92, -6.02]]
std:[1.83, 1.8, 1.07]][[0.67, 0.0, 0.39]]
MSE:[3.4, 3.47, 3.4]][[4.77, 70.92, 6.03]]
MSE(-DR):[0.0, 0.07, 0.0]][[1.37, 67.52, 2.63]]
***
=====
0_threshold = 115
MC for this TARGET:[71.845, 0.353]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-5.94, -5.97, -5.98]][[-9.6, -71.84, -6.94]]
std:[2.14, 2.13, 1.33]][[0.71, 0.0, 0.39]]
MSE:[6.31, 6.34, 6.13]][[9.63, 71.84, 6.95]]
MSE(-DR):[0.0, 0.03, -0.18]][[3.32, 65.53, 0.64]]
**
=====
[[ 1.35  1.39  1.3   1.47 70.82  5.93]
 [ 3.31  3.42  3.62  4.07 71.83  6.93]
 [ 3.4   3.47  3.4   4.77 70.92  6.03]
 [ 6.31  6.34  6.13  9.63 71.84  6.95]]

time spent until now: 64.6 mins

21:58, 04/09

-----
[pattern_seed, day, sd_R] = [2, 7, 40]

max(u_0) = 145.8
0_threshold = 100
number of reward locations: 9
0_threshold = 105
number of reward locations: 7
0_threshold = 110
number of reward locations: 6
0_threshold = 115
number of reward locations: 3
target 1 in 4 DONE!
target 2 in 4 DONE!
target 3 in 4 DONE!
target 4 in 4 DONE!

-----
Value of Behaviour policy:64.917
0_threshold = 100
MC for this TARGET:[70.839, 0.474]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-0.28, -0.38, -0.94]][[-1.26, -70.84, -5.92]]
std:[1.74, 1.76, 1.16]][[0.95, 0.0, 0.48]]
MSE:[1.76, 1.8, 1.49]][[1.58, 70.84, 5.94]]
MSE(-DR):[0.0, 0.04, -0.27]][[-0.18, 69.08, 4.18]]
=====
0_threshold = 105
MC for this TARGET:[71.843, 0.469]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-2.87, -2.97, -3.57]][[-4.0, -71.84, -6.93]]
std:[2.36, 2.36, 1.33]][[0.91, 0.0, 0.48]]
MSE:[3.72, 3.79, 3.81]][[4.1, 71.84, 6.95]]
MSE(-DR):[0.0, 0.07, 0.09]][[0.38, 68.12, 3.23]]
***
=====
0_threshold = 110
MC for this TARGET:[70.937, 0.469]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-2.94, -3.05, -3.24]][[-4.72, -70.94, -6.02]]
std:[2.39, 2.36, 1.39]][[0.88, 0.0, 0.48]]
MSE:[3.79, 3.86, 3.53]][[4.8, 70.94, 6.04]]
MSE(-DR):[0.0, 0.07, -0.26]][[1.01, 67.15, 2.25]]
**
=====
0_threshold = 115
MC for this TARGET:[71.861, 0.467]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-5.97, -6.02, -6.02]][[-9.59, -71.86, -6.94]]
std:[2.76, 2.76, 1.71]][[0.94, 0.0, 0.48]]
MSE:[6.58, 6.62, 6.26]][[9.64, 71.86, 6.96]]
MSE(-DR):[0.0, 0.04, -0.32]][[3.06, 65.28, 0.38]]
**
=====
[[ 1.35  1.39  1.3   1.47 70.82  5.93]

```

```
[ 3.31  3.42  3.62  4.07 71.83  6.93]
[ 3.4   3.47  3.4   4.77 70.92  6.03]
[ 6.31  6.34  6.13  9.63 71.84  6.95]]
```

```
[[ 1.76  1.8   1.49  1.58 70.84  5.94]
 [ 3.72  3.79  3.81  4.1   71.84  6.95]
 [ 3.79  3.86  3.53  4.8   70.94  6.04]
 [ 6.58  6.62  6.26  9.64 71.86  6.96]]
```

time spent until now: 129.4 mins

23:02, 04/09

-----  
[pattern\_seed, day, sd\_R] = [2, 7, 50]

```
max(u_0) = 145.8
0_threshold = 100
number of reward locations: 9
0_threshold = 105
number of reward locations: 7
0_threshold = 110
number of reward locations: 6
0_threshold = 115
number of reward locations: 3
target 1 in 4 DONE!
target 2 in 4 DONE!
target 3 in 4 DONE!
target 4 in 4 DONE!
```

-----  
Value of Behaviour policy:64.93  
0\_threshold = 100  
MC for this TARGET:[70.855, 0.587]  
[DR/QV/IS]; [DR\_NO\_MARL, DR\_NO\_MF, V\_behav]  
bias:[[-0.26, -0.37, -0.95]][[-1.24, -70.86, -5.92]]  
std:[2.18, 2.18, 1.46]][[1.17, 0.0, 0.58]]  
MSE:[2.2, 2.21, 1.74]][[1.7, 70.86, 5.95]]  
MSE(-DR):[0.0, 0.01, -0.46]][[-0.5, 68.66, 3.75]]

=====

```
0_threshold = 105
MC for this TARGET:[71.859, 0.582]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-2.87, -3.01, -3.59]][[-3.98, -71.86, -6.93]]
std:[2.92, 2.89, 1.68]][[1.13, 0.0, 0.58]]
MSE:[4.09, 4.17, 3.96]][[4.14, 71.86, 6.95]]
MSE(-DR):[0.0, 0.08, -0.13]][[0.05, 67.77, 2.86]]
```

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=====

```
0_threshold = 110
MC for this TARGET:[70.952, 0.583]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-3.0, -3.1, -3.28]][[-4.71, -70.95, -6.02]]
std:[2.92, 2.89, 1.71]][[1.09, 0.0, 0.58]]
MSE:[4.19, 4.24, 3.7]][[4.83, 70.95, 6.05]]
MSE(-DR):[0.0, 0.05, -0.49]][[0.64, 66.76, 1.86]]
```

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=====

```
0_threshold = 115
MC for this TARGET:[71.876, 0.581]
[DR/QV/IS]; [DR_NO_MARL, DR_NO_MF, V_behav]
bias:[[-5.99, -6.04, -6.09]][[-9.58, -71.88, -6.95]]
std:[3.39, 3.39, 2.13]][[1.18, 0.0, 0.58]]
MSE:[6.88, 6.93, 6.45]][[9.65, 71.88, 6.97]]
MSE(-DR):[0.0, 0.05, -0.43]][[2.77, 65.0, 0.09]]
```

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=====

```
[[ 1.35  1.39  1.3   1.47 70.82  5.93]
 [ 3.31  3.42  3.62  4.07 71.83  6.93]
 [ 3.4   3.47  3.4   4.77 70.92  6.03]
 [ 6.31  6.34  6.13  9.63 71.84  6.95]]
```

```
[[ 1.76  1.8   1.49  1.58 70.84  5.94]
 [ 3.72  3.79  3.81  4.1   71.84  6.95]
 [ 3.79  3.86  3.53  4.8   70.94  6.04]
 [ 6.58  6.62  6.26  9.64 71.86  6.96]]
```

```
[[ 2.2   2.21  1.74  1.7   70.86  5.95]
 [ 4.09  4.17  3.96  4.14 71.86  6.95]
 [ 4.19  4.24  3.7   4.83 70.95  6.05]
 [ 6.88  6.93  6.45  9.65 71.88  6.97]]
```

time spent until now: 193.8 mins