RL agent Donor agnostic new penalty only ua4 ua141

DQN without recurring neural network

Dilution penalty is applied when experiment ends prematurely

format shortG

seed = 0

seed =

0

allmodelfoldincs = readmatrix("allmodelfoldincs.txt")

allmodelfoldincs = 6×132

1 1 1 1 1 1 ⋯

1 1 1 1 1 1

6.6308 6.6213 6.6118 6.6023 6.5929 6.5835

5.7066 5.6616 5.6173 5.5739 5.5313 5.4894

3.2195 3.1525 3.0894 3.0299 2.9736 2.9204

1.4817 1.4605 1.441 1.4231 1.4066 1.3914

modelinitcons = readmatrix("modelinitcons.txt")

modelinitcons = 1×11

400000 420000 440000 460000 480000 500000 ⋯

rawfoldincs = readmatrix("rawfoldincs.txt")

rawfoldincs = 6×37

1 1 1 1 1 1 ⋯

1.078 1.53 1.358 1.548 1.052 1.052

6.1224 4.6158 4.2724 6.3406 5.555 5.555

5.4756 4.7525 3.882 3.027 4.5 4.5

NaN 2.3012 1.6283 1.3062 2.5181 2.5181

NaN NaN 1.3772 1.2429 NaN 1.1327

rawinitcons = readmatrix("rawinitcons.txt")

rawinitcons = 1×37

500000 500000 500000 500000 500000 500000 ⋯

truecon = readtable("true con.xlsx");

truecon(:,1)=[];

rawdonornames = truecon.Properties.VariableNames;

rawdonornames = string(rawdonornames);

rawdonornames = strrep(rawdonornames,"\_","-")

rawdonornames = 1×37 string

"T054-1" "T046-1" "T051-1" "T062-1" "T031-1" "T031-2" ⋯

% rawdonornames = ["T054","T046","T051","T062","T031","T031","T052","T038","T036","T036","T036","T066","T066","T066","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA4","UA141","UA141","UA141","UA141","UA141","UA6","UA6","UA6","UA6","UA6"]

donorlist = ["T054","T046","T051","T062","T031","T052","T038","T036","T066","UA4","UA141","UA6"]

donorlist = 1×12 string

"T054" "T046" "T051" "T062" "T031" "T052" ⋯

donoridxmap = {1,2,3,4,5:6,7,8,9:11,12:14,15:27,28:32,33:37}

donoridxmap = 1×12 cell

|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **⋯** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | 1 | 2 | 3 | 4 | [5,6] | 7 | 8 |  |

Run training and validation

Randomization:

just donor ua4 and donor ua141

numdonors = 2

All validation set printed

initializedatasets(seed,allmodelfoldincs,modelinitcons,rawfoldincs,rawinitcons,rawdonornames,donoridxmap,donorlist);

trainingset = 1×2 string

"UA4" "UA141"

trialmodelfoldincs = 6×22

1 1 1 1 1 1 ⋯

1 1 1 1 1 1

4.1176 4.1152 4.1129 4.1105 4.1081 4.1058

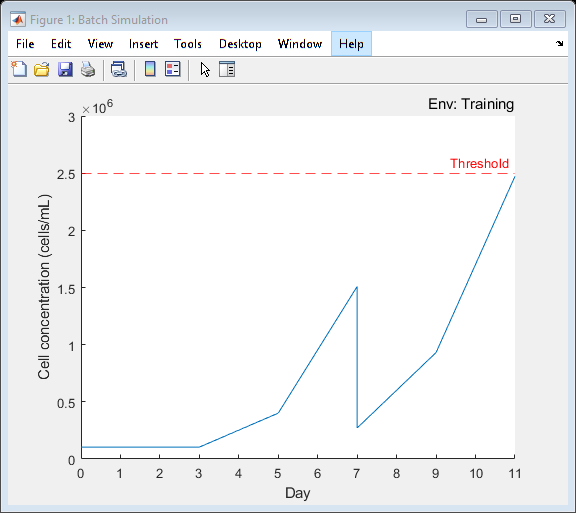
3.9746 3.9656 3.9567 3.9478 3.9389 3.9302

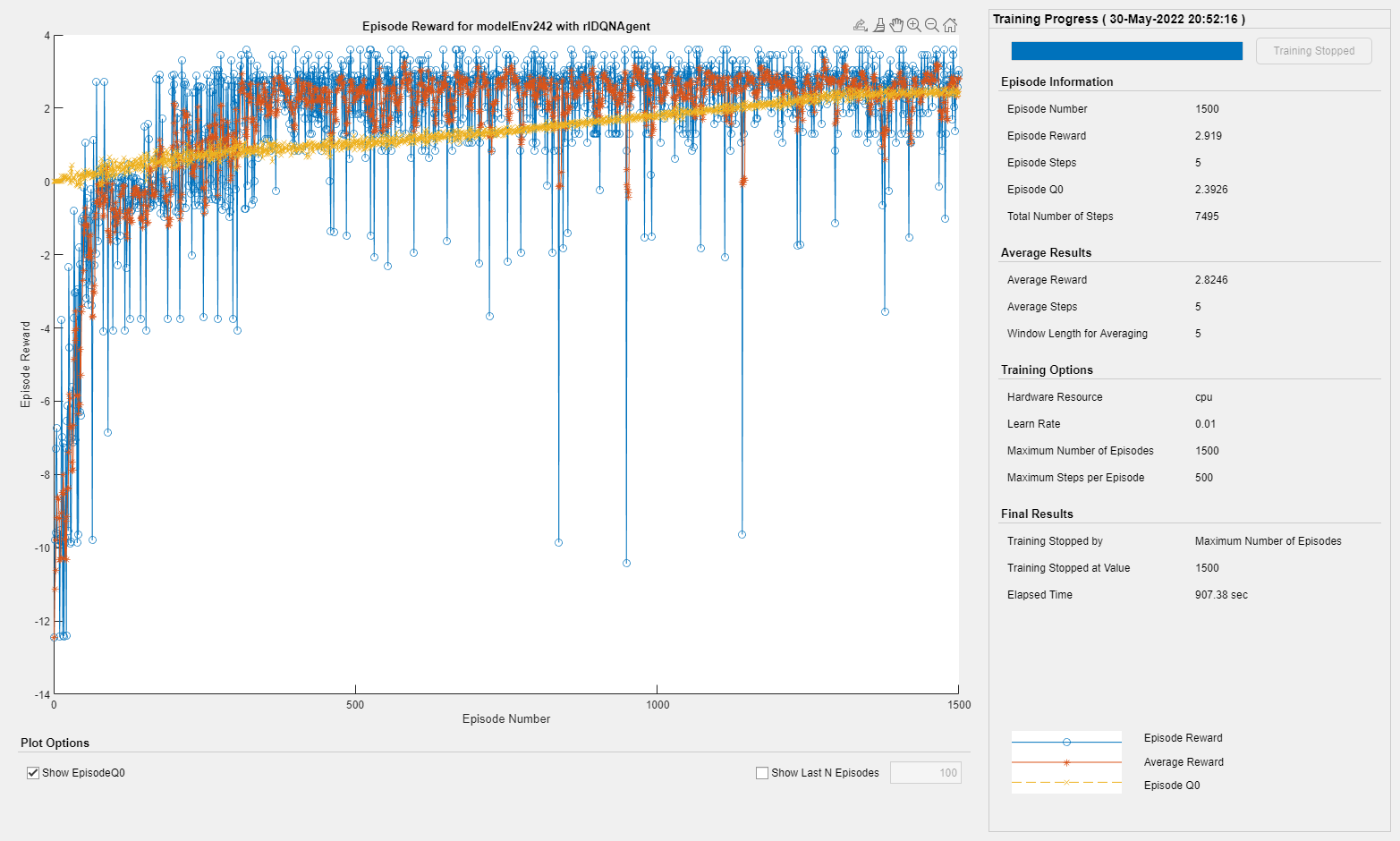
3.4973 3.4711 3.4455 3.4203 3.3957 3.3716

2.4968 2.4583 2.4216 2.3867 2.3535 2.3218

numdonors = 2;

dqnagent = dqninittraining(seed,numdonors);





save("agent\_2.4.6.1","dqnagent")

[simulationPlots,simulationResults] = simwithset(rawfoldincs,rawinitcons,rawdonornames,dqnagent);

env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T054-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

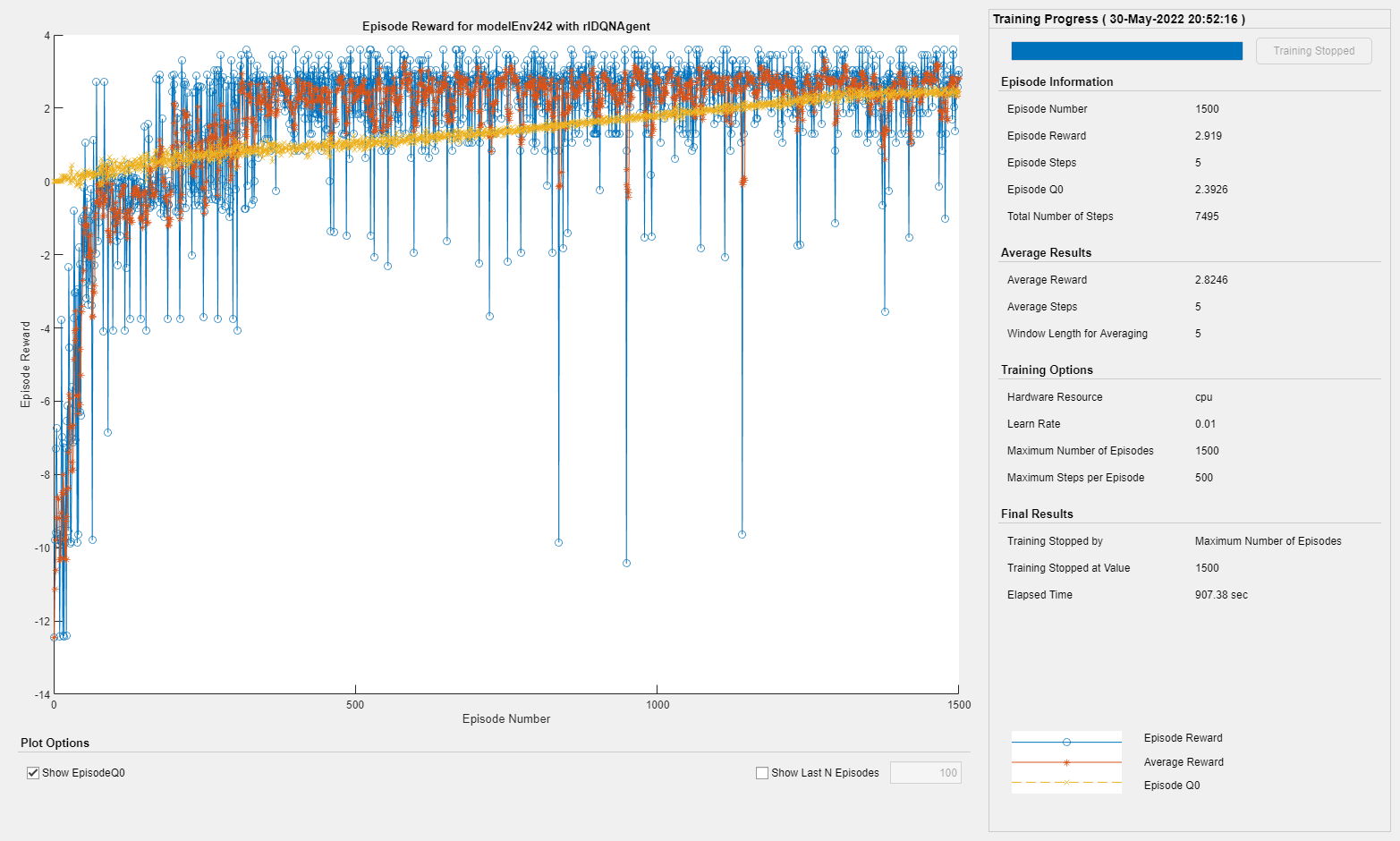
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T046-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [5×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

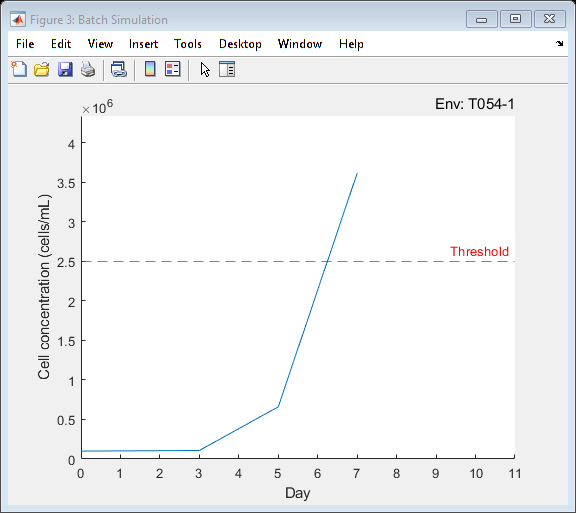
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T051-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

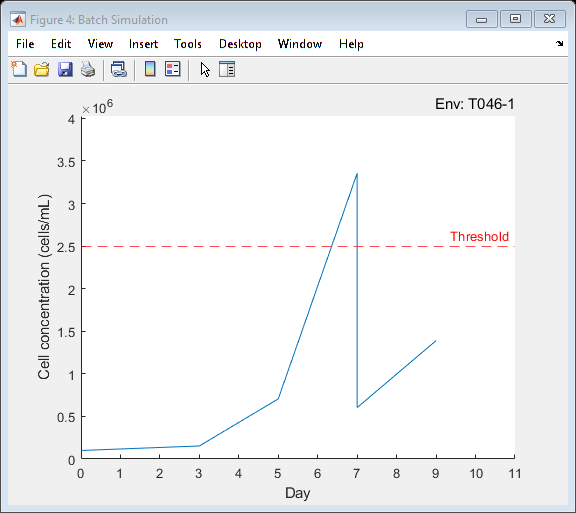
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T062-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

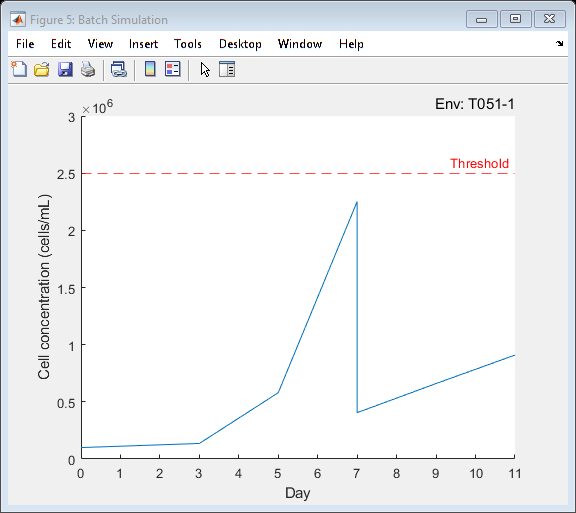
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T031-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [5×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

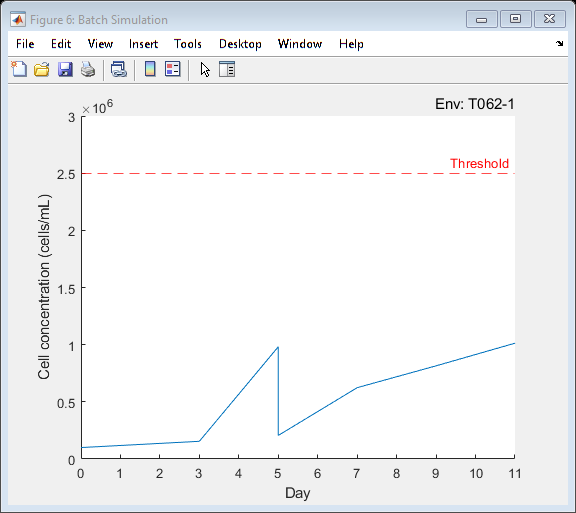
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T031-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

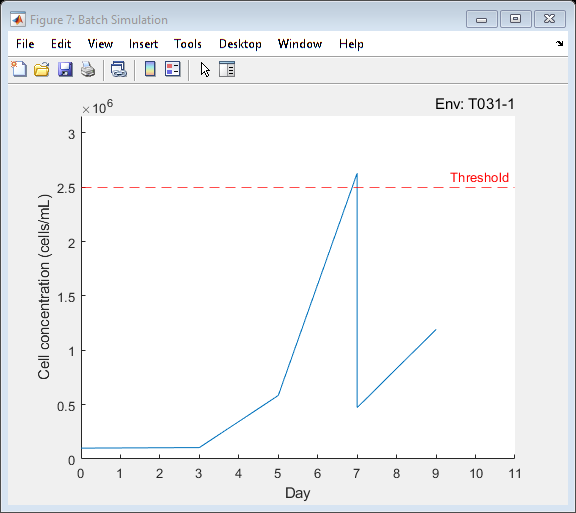
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T052-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

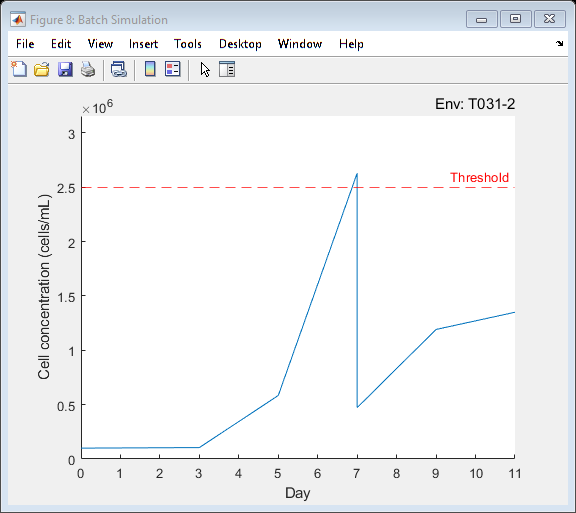
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T038-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

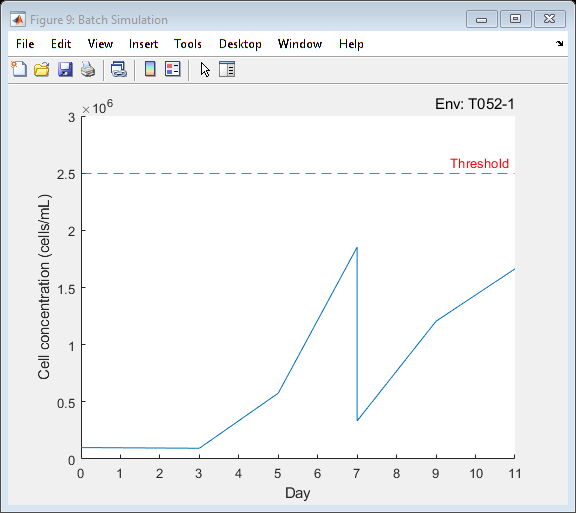
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T036-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

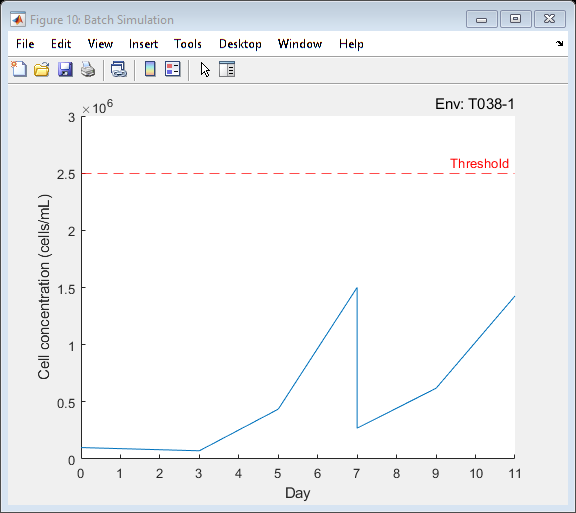
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T036-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

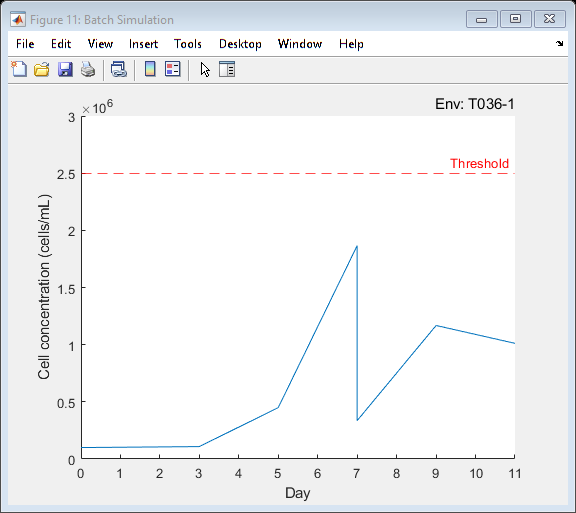
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T036-3"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

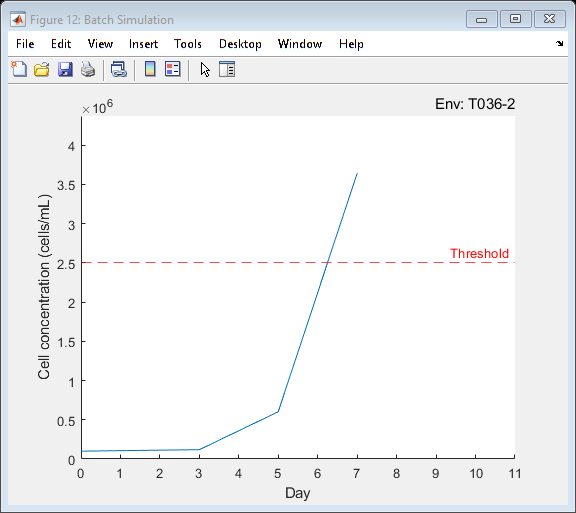
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T066-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

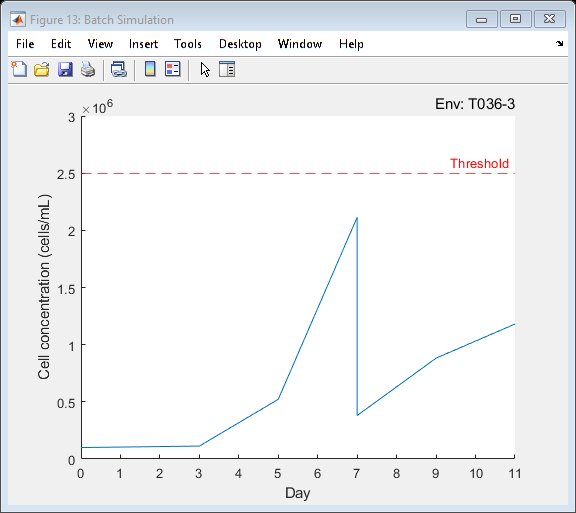
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T066-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

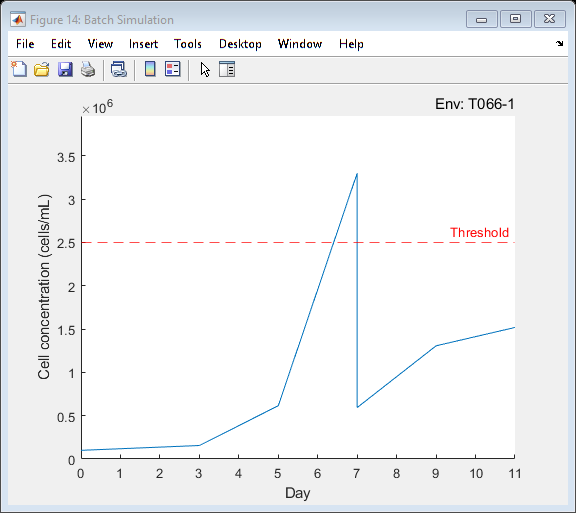
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "T066-3"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

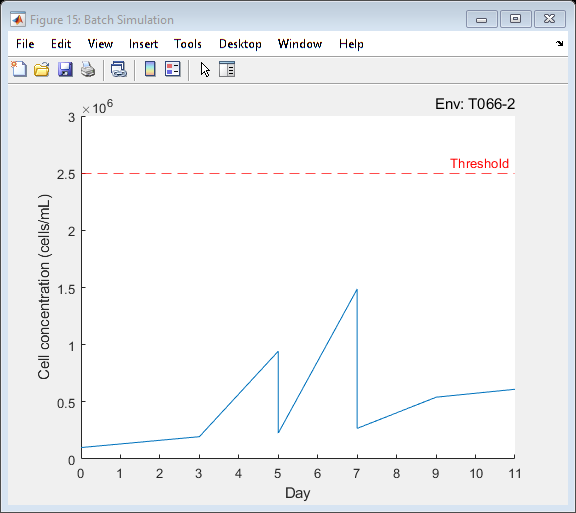
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

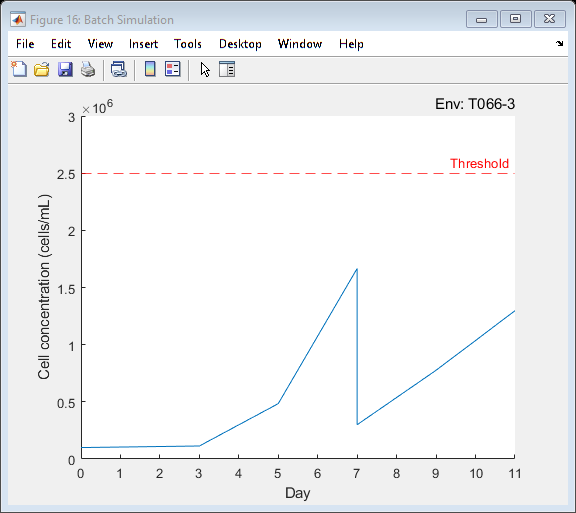
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

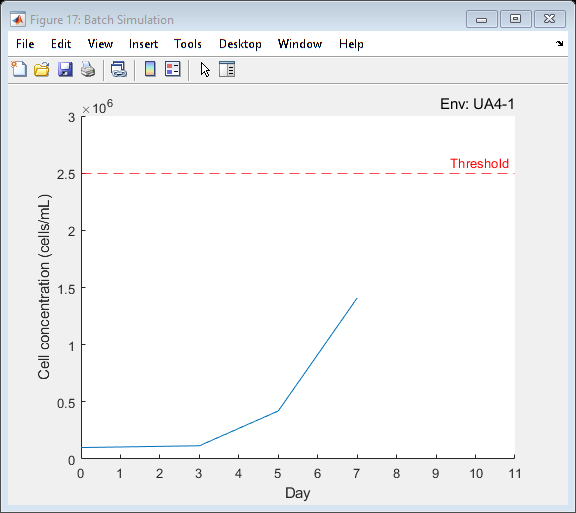
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-3"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

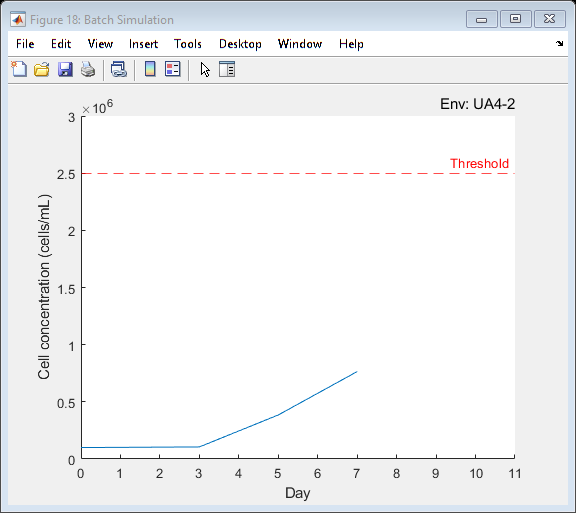
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-4"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

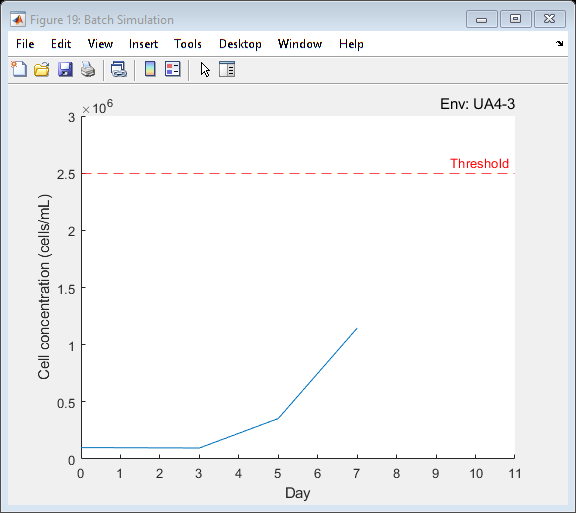
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-5"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

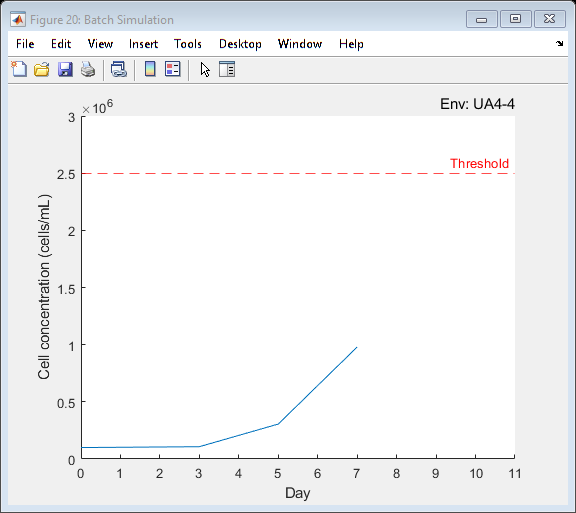
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-6"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

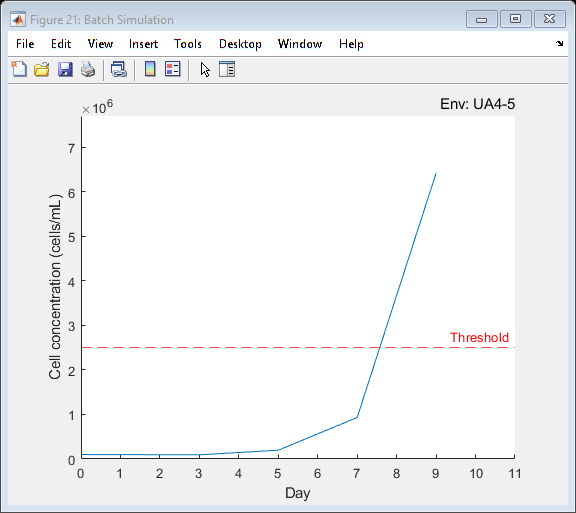
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-7"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

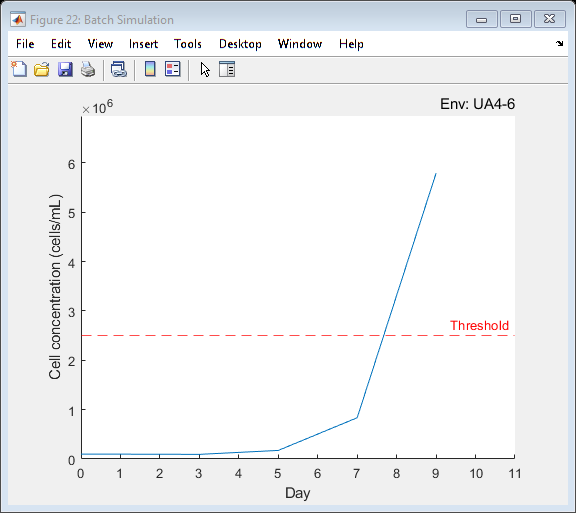
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-8"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

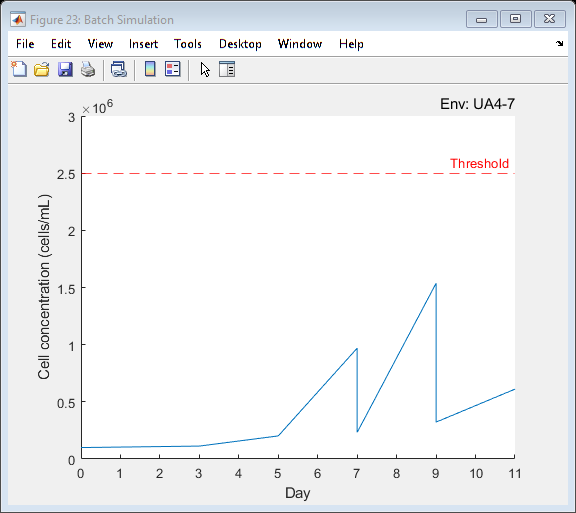
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-9"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

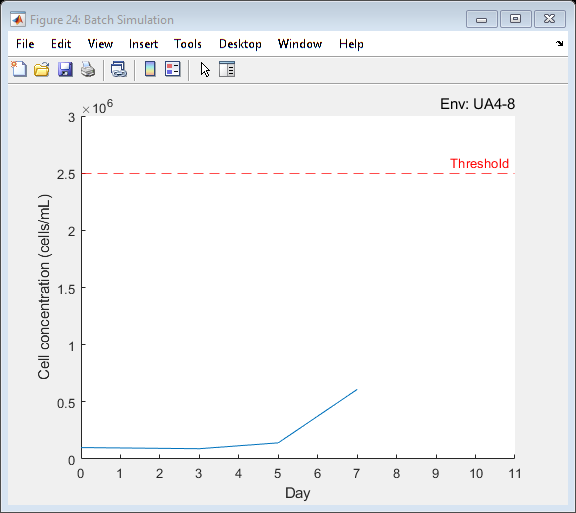
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-10"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

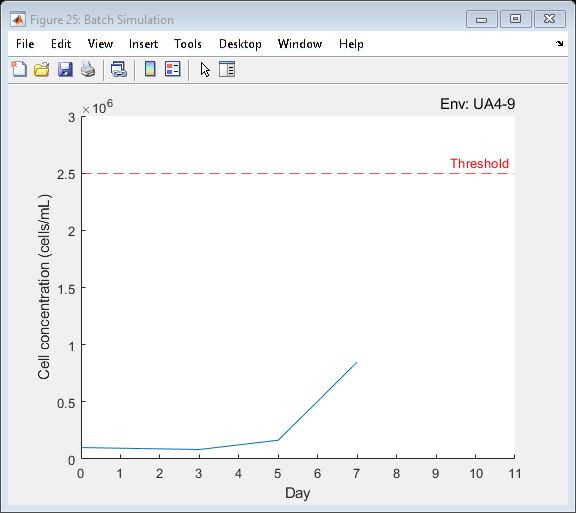
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-11"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

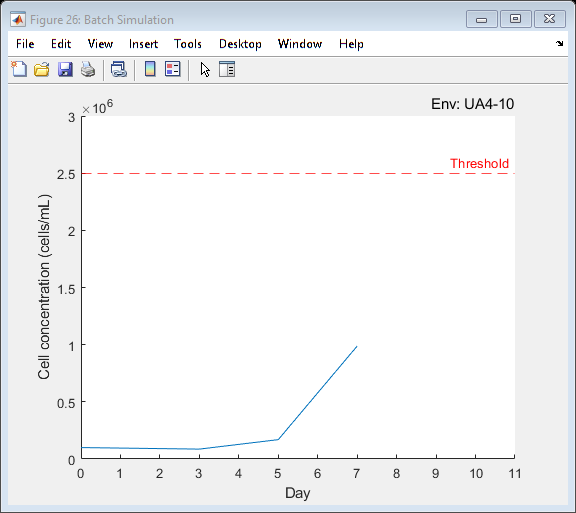
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-12"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

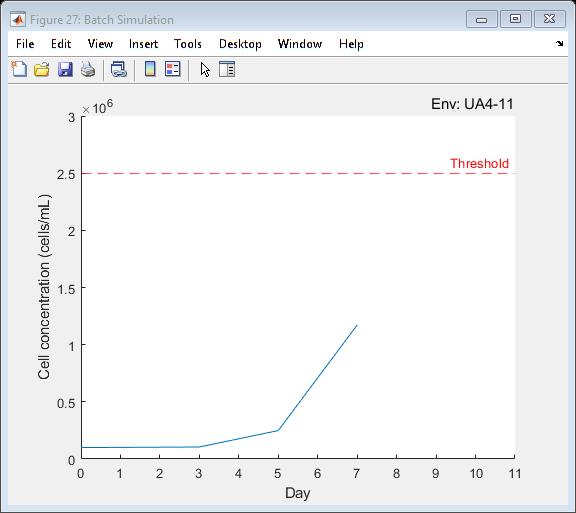
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA4-13"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

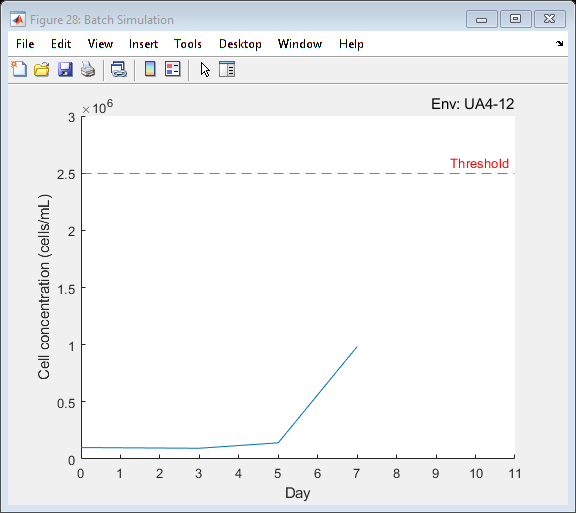
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA141-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [5×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

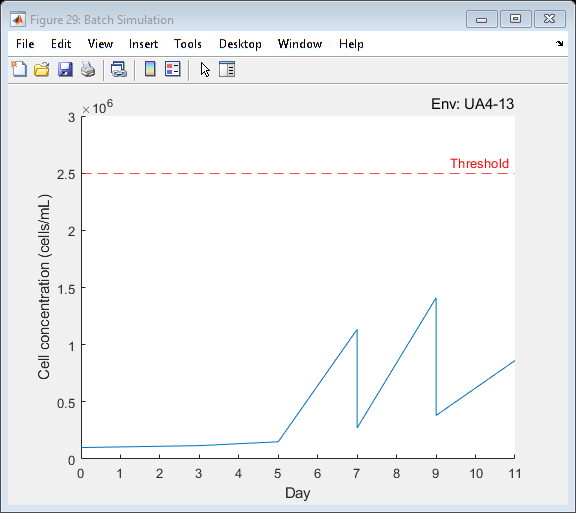
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA141-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

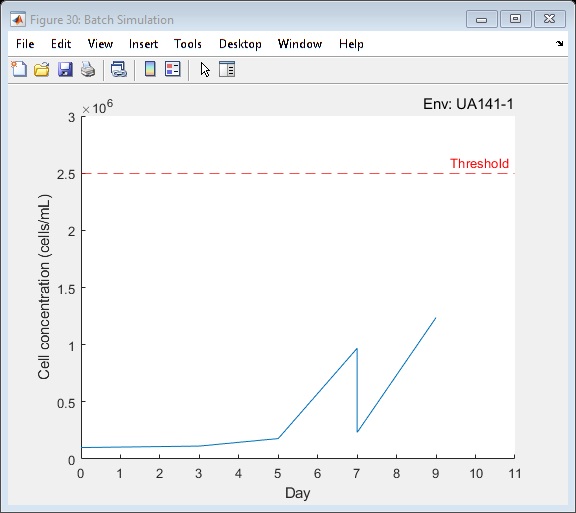
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA141-3"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

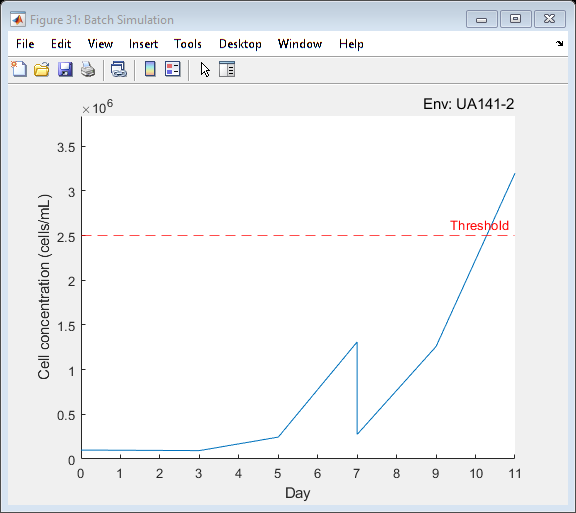
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA141-4"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

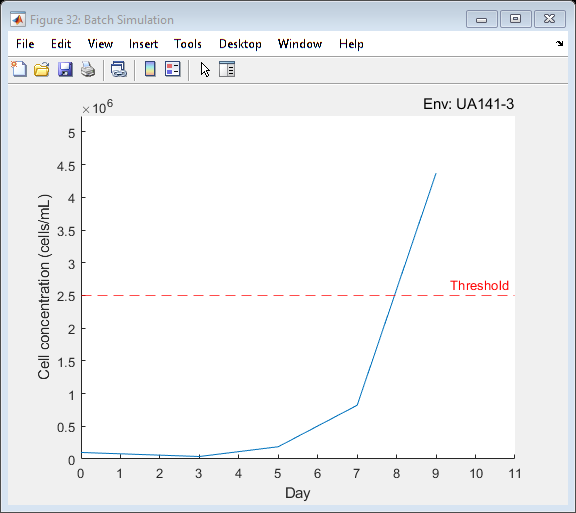
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA141-5"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [6×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

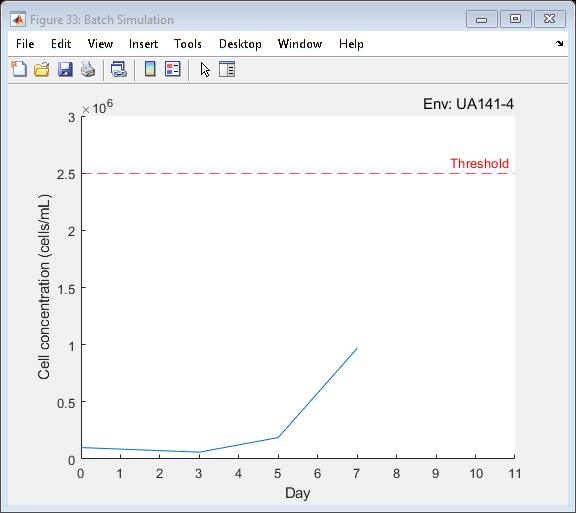
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA6-1"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

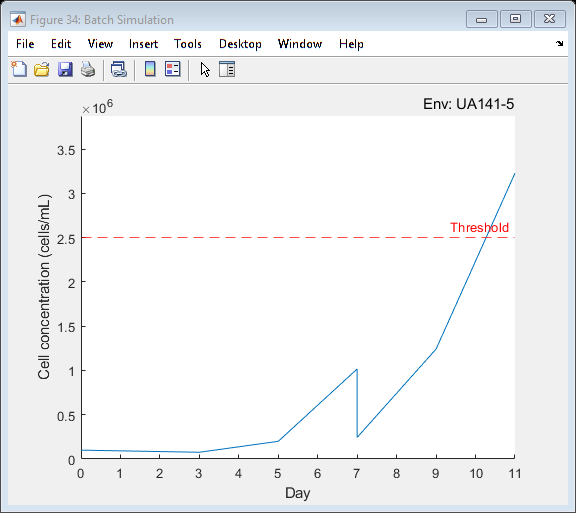
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA6-2"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

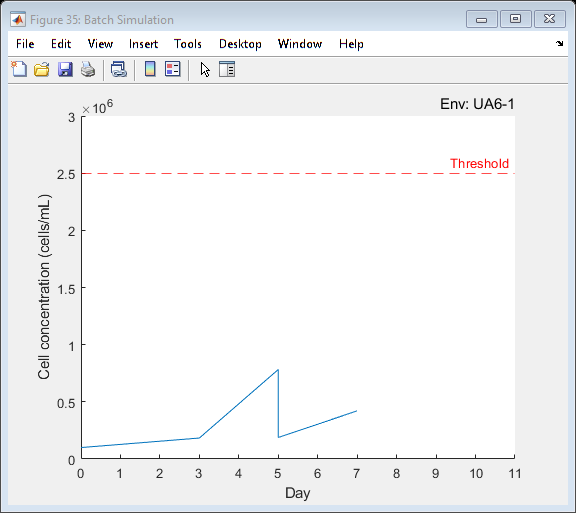
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA6-3"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

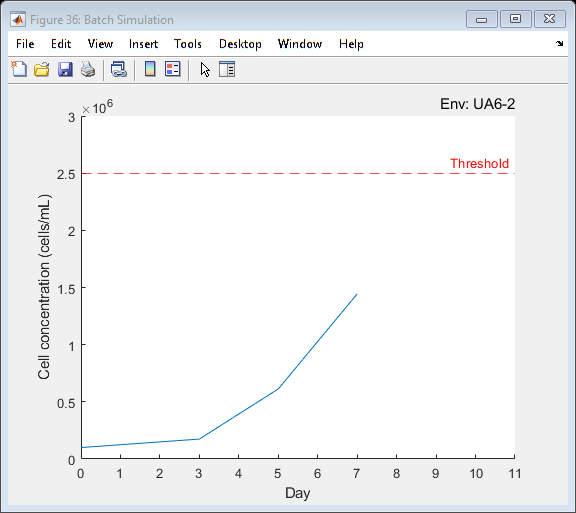
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA6-4"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

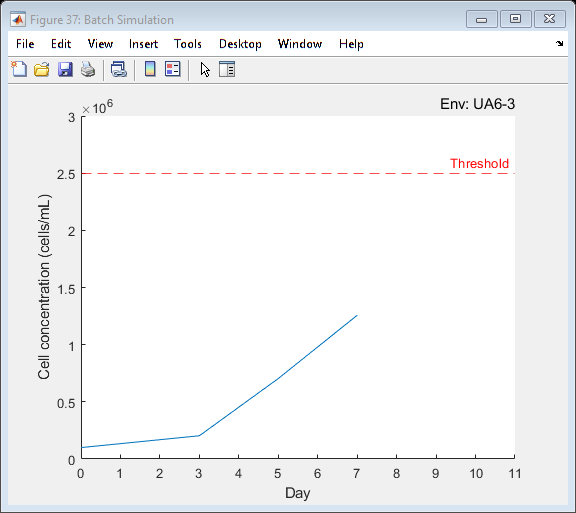
Figure: []

ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0



env3 =

modelEnv242 with properties:

useCustom: 1

expLen: 6

modelInfo: "UA6-5"

initcon: [400000 420000 440000 460000 480000 500000 520000 540000 560000 580000 600000]

foldExModel: [6×22 double]

numdonors: 8

foldExMap: [4×1 double]

initialState: [0.1 1]

concentrationThreshold: 2.5

concentrationStopThreshold: 3.5

Reward1: 1

Penalty1: -2.5

timeStepStart: 0

timeStep: 0

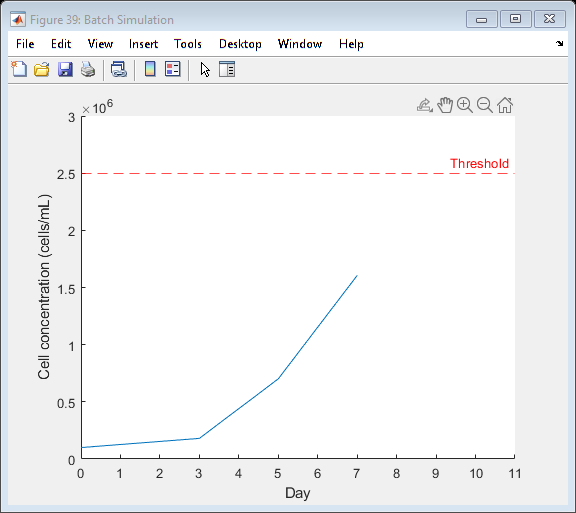
Figure: []

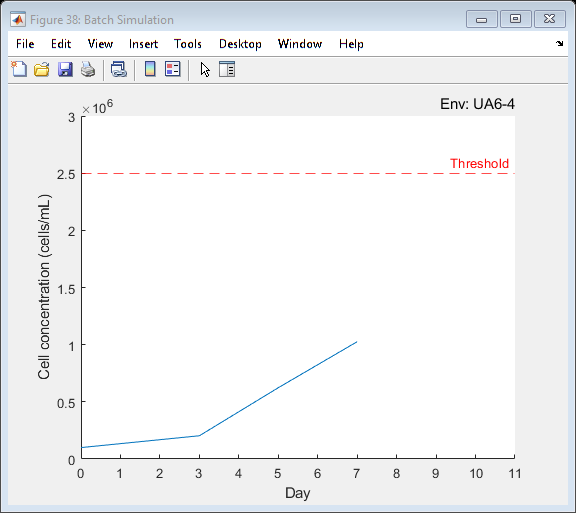
ConcentrationPlot: []

State: [0.5 1]

diluted: 0

overthreshold: 0





[rewardMatrix,totalRewards,totalReward,averageReward] = calculatescore(6,simulationResults)

rewardMatrix = 5×38

0 0.1078 0.153 0.1358 0.1548 0.1052 ⋯

1 0.66 0.70622 0.58019 0.98152 0.58439

2 -4.4556 -0.92524 2.2523 -1.8761 1.9809

3 0 4.4389 -1.8399 0.81494 5.2322

4 0 0 0.90915 1.0129 0

totalRewards = 1×37

-3.6878 4.3729 2.0376 1.0881 7.9027 15.002 ⋯

totalReward =

28.474

averageReward =

0.76957

function [trialfoldincs, trialinitcons, trialdonornames] = initializedatasets(seed,allmodelfoldincs,modelinitcons,rawfoldincs,rawinitcons,rawdonornames,donoridxmap,donorlist)

rng(seed);

trainingset = ["UA4","UA141"]

trialmodelfoldincs = [allmodelfoldincs(:,(numel(modelinitcons)\*9+1):(numel(modelinitcons)\*11))]

writematrix(trialmodelfoldincs, "modelfoldincs.txt")

trialfoldincs = [];

trialinitcons = [];

end

function dqnagent = dqninittraining(seed,numdonors)

rng(0);

% create first environment

env = modelEnv242;

env.useCustom = false;

env.numdonors = numdonors;

obs = getObservationInfo(env);

acts = getActionInfo(env);

validateEnvironment(env)

% hyperparameters

discountFactor = 1;

epsilon = 1;

initOpts = rlAgentInitializationOptions;

initOpts.NumHiddenUnit = 64;

initOpts.UseRNN = false;

dqnagentoptions = rlDQNAgentOptions;

dqnagentoptions.DiscountFactor = discountFactor;

dqnagentoptions.EpsilonGreedyExploration.Epsilon = epsilon;

dqnagentoptions.SequenceLength = 1;

dqnagentoptions.UseDoubleDQN = false;

dqnagent = rlDQNAgent(obs,acts,initOpts,dqnagentoptions);

% plot(layerGraph(getModel(getCritic(dqnagent)).Layers));

trainopts = rlTrainingOptions;

trainopts.MaxEpisodes = 1500;

% trainopts.StopTrainingCriteria = "EpisodeCount";

% trainopts.StopTrainingValue = 300;

trainopts.StopTrainingCriteria = "AverageReward";

trainopts.StopTrainingValue = 13.5;

%trainopts.Plots = 'none';

%trainopts.Verbose = true;

plot(env)

results = train(dqnagent,env,trainopts);

end

function [plots,experiences] = simwithset(foldExMaps,day3cons,donornames,sarsaagent3)

plots = cell(size(foldExMaps,2),1);

experiences = cell(size(foldExMaps,2),1);

for i=1:size(foldExMaps,2)

%creating foldexmap

foldExMap1 = foldExMaps(:,i);

foldExMap1 = foldExMap1(~isnan(foldExMap1));

idx = foldExMap1==1;

idx(1) = false;

foldExMap1(idx) = [];

%creating new env

env3 = modelEnv242;

env3.useCustom = true;

env3.foldExMap = foldExMap1;

%NORMALIZED INIT CONS

%

env3.initialState = [100000/1000000,1];

env3.modelInfo = donornames(i)

validateEnvironment(env3)

% plot now

plot(env3);

experiences{i} = sim(sarsaagent3,env3);

plots{i} = env3.Figure;

end

end

function [rewardMatrix,totalRewards,totalReward,averageReward] = calculatescore(maxSeriesLength,simulationResults)

maxSeriesLength = 5;

rewardMatrix = [0:(maxSeriesLength-1)]';

for i=1:size(simulationResults,1)

seriesRewards = simulationResults{i}.Reward.Data;

if size(seriesRewards,1)<maxSeriesLength

numZeros = maxSeriesLength - size(seriesRewards,1);

for j=1:numZeros

seriesRewards = [seriesRewards; 0];

end

end

rewardMatrix = [rewardMatrix seriesRewards];

end

totalRewards = [];

for i=2:size(rewardMatrix,2)

totalRewards = [totalRewards sum(rewardMatrix(:,i))];

end

totalReward = sum(totalRewards);

averageReward = mean(totalRewards);

end