LRNotebook

April 11, 2022

[1]:
```
import sys
import os
finalIndex = os.getcwd().split("/").index("AIfSR_Trajectory_Analysis")
directory =  "/".join(os.getcwd().split("/")[:finalIndex])
sys.path.insert(1, directory)
from AIfSR_Trajectory_Analysis.ml_pipelines.LRPipelineFactory import␣
 ↪LRPipelineFactory
from AIfSR_Trajectory_Analysis.algorithmanalysis.CreateAlgorithmAnalysisMD␣
 ↪import createAnalysisDocument

createAnalysisDocument(LRPipelineFactory(), "LR_V1.0")
```

Accuracy Measurements:

Here is the accuracy of our algorithm when the training set, test set, and cross validation set is passed in

Training Accuracy: 0.9877777777777778
Test Accuracy: 0.9858333333333333
Validation Accuracy: 0.9916666666666667

Inaccurate Trajectories

Here is some more information on the trajectories it predicted incorrectly. It displays the name of the incorrect trajectories, followed by the actual diffusion type and the incorrect predicted diffusion type.

[Ballistic Motion,Confined Diffusion,Random Walk,Very Confinded Diffusion]

Names of incorrect predictions for: Training Data
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1120.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_347.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_920.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4

48.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_5
51.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_9
09.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_6
03.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
305.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
82.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
272.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
19.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
79.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
3.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
52.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
232.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
24.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
03.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_0
.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
163.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
061.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
60.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
66.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_2
88.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
71.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
094.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_5
59.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
105.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7

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50.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
90.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
98.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
266.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
12.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
14.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
289.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
23.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_5
19.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
440.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_2
17.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
49.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
386.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
182.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_5
0.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
53.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
121.tck

Actual Diffusion Types:
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
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[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]

Incorrect predictions:
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
```

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[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]


Names of incorrect predictions for: Testing Data
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
81.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
41.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
398.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
98.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
03.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
42.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
27.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
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088.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
07.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
57.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
96.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
437.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_4
47.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_6
87.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_9
57.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
00.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_8
75.tck

Actual Diffusion Types:
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]

Incorrect predictions:
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
```

```
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[0.0, 0.0, 0.0, 1.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
```

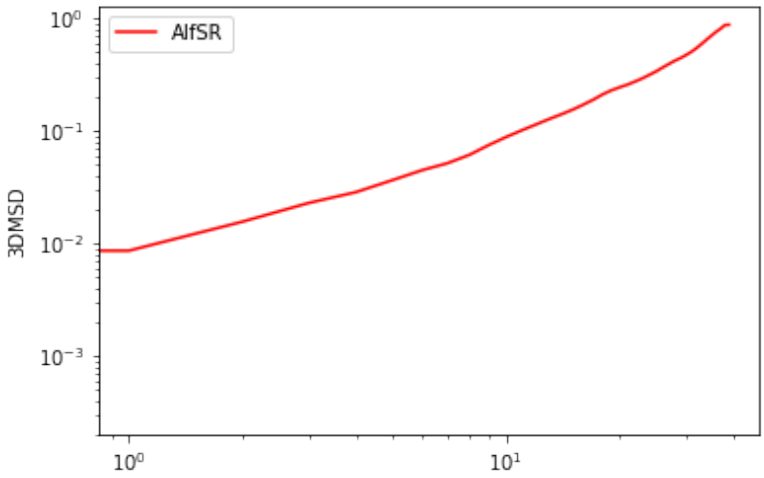
```
Names of incorrect predictions for: CV Data
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
7.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
050.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_6
76.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_3
32.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
261.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
4.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_7
01.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
434.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1
099.tck
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_2
83.tck

Actual Diffusion Types:
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]
[0, 0, 1, 0]

Incorrect predictions:
[1.0, 0.0, 0.0, 0.0]
```

[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]
[1.0, 0.0, 0.0, 0.0]

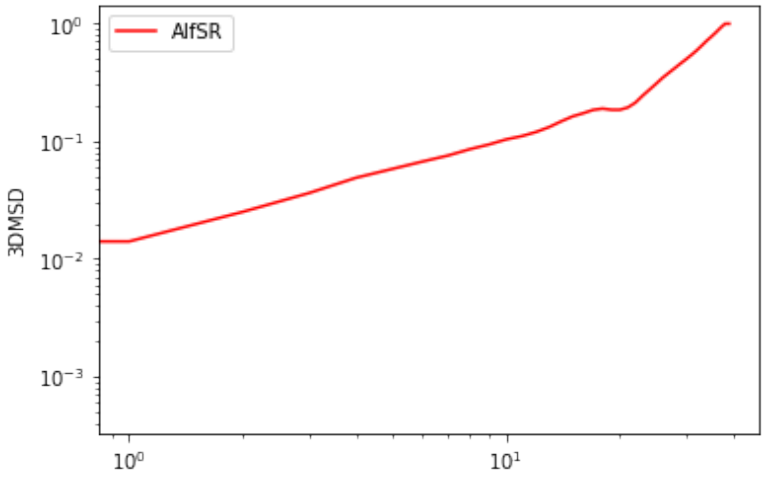
Graphs of Incorrect Trajectories:

Here is the graphs of the trajectories that were predicted incorrectly
There were 71 total occurances predicted incorrectly. Randomly sampling a 8 number of graphs:

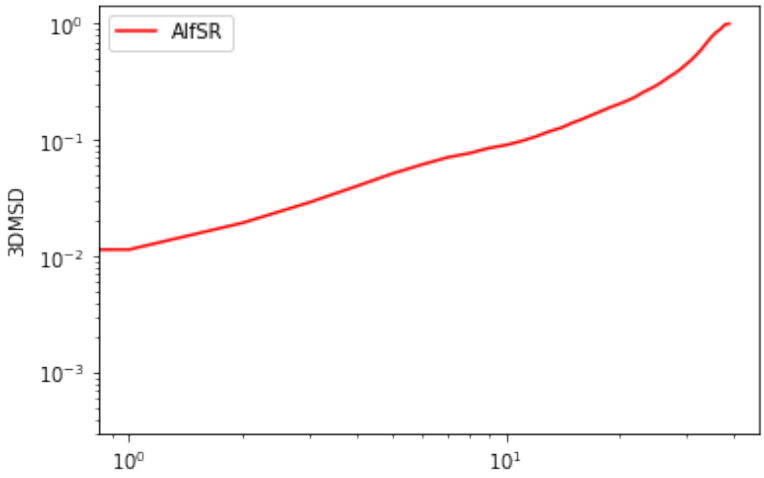
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_920.tck



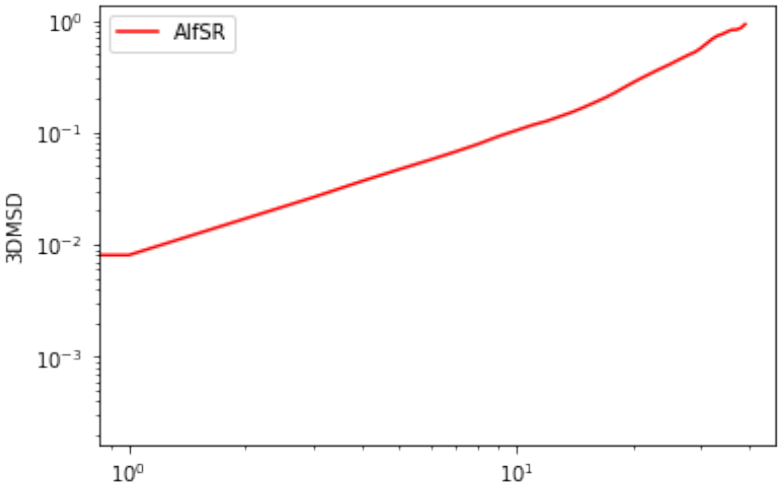
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_687.tck



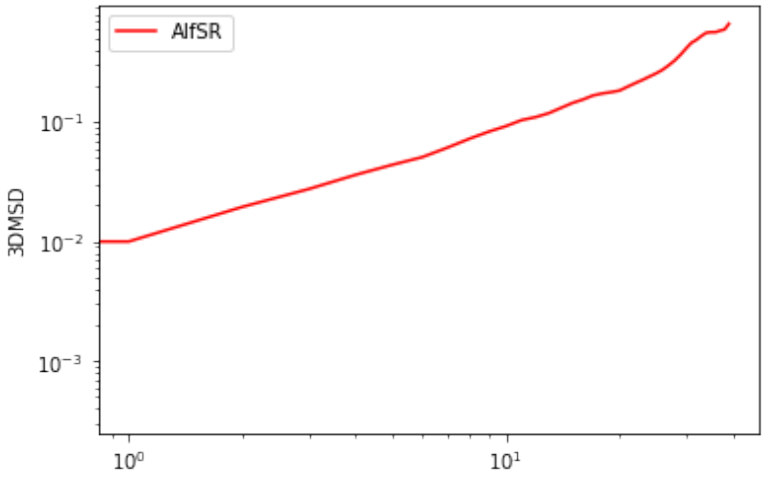
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_842.tck



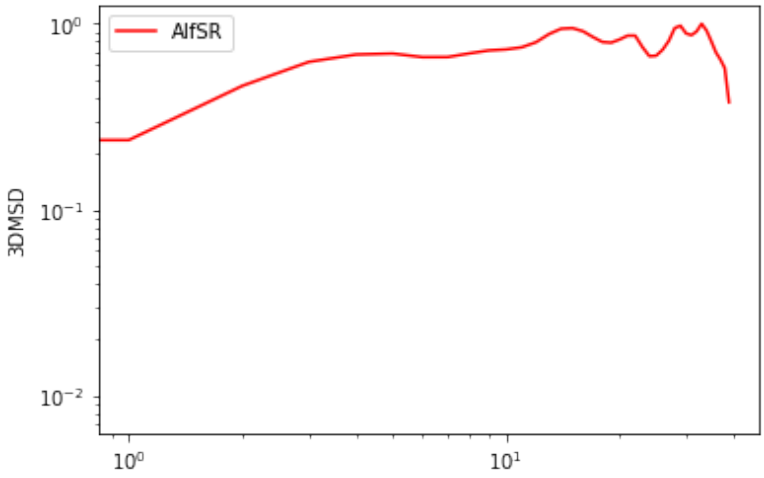
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_0.tck



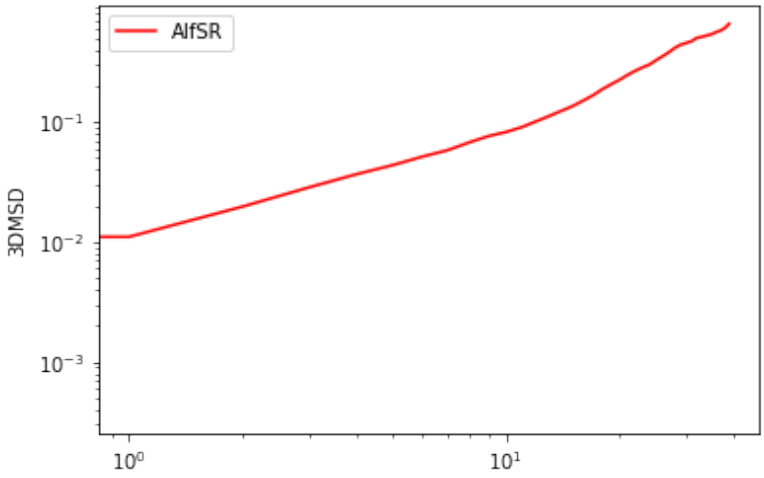
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_447.tck



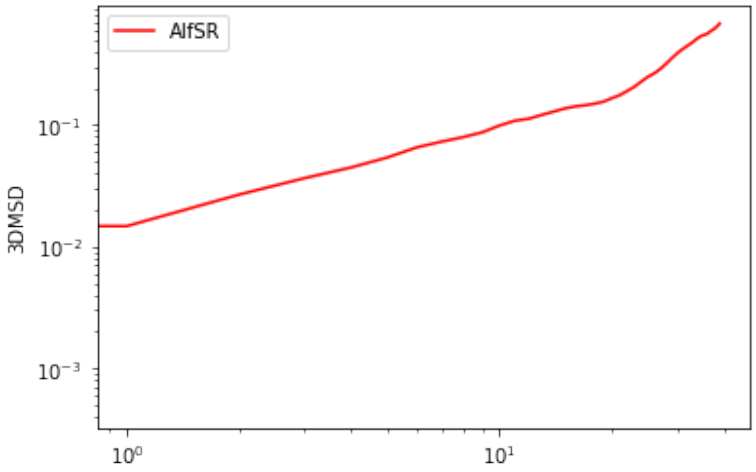
data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_957.tck



data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_890.tck



data/02_01_Simulated_trajectories/Simple_cases/Random_walk/trajectories/random_1434.tck



Analytics of Predictions:

Here is some percentages and information derived from the predictions of the algorithm

M0:	bal: 26.667%	cd: 0.000%	rw: 73.333%	vcd: 0.000%
M1:	bal: 17.647%	cd: 0.000%	rw: 82.353%	vcd: 0.000%
M2:	bal: 5.263%	cd: 0.000%	rw: 94.737%	vcd: 0.000%
Ovr:	bal: 15.686%	cd: 0.000%	rw: 84.314%	vcd: 0.000%