Machine Learning – Assignment 1 – Gustav von Zitzewitz – Mat:03636797

EX1:

a-b)
For k=2 optimal values: p1=5 | p2=3
For k=5 optimal values: p1=4 | p2=1

Learned Parameters (see Code Folder)
For a1,a2,a3 and k=5

par_5{1, 1}

1
-7.2022e...
0.9197
-0.0112
-0.0037
-6.7539e...
0.0156
0.0012
1.3947e-...
0.0054
1.0946e-...
1.7610e-...
-0.0060
-4.6239e...

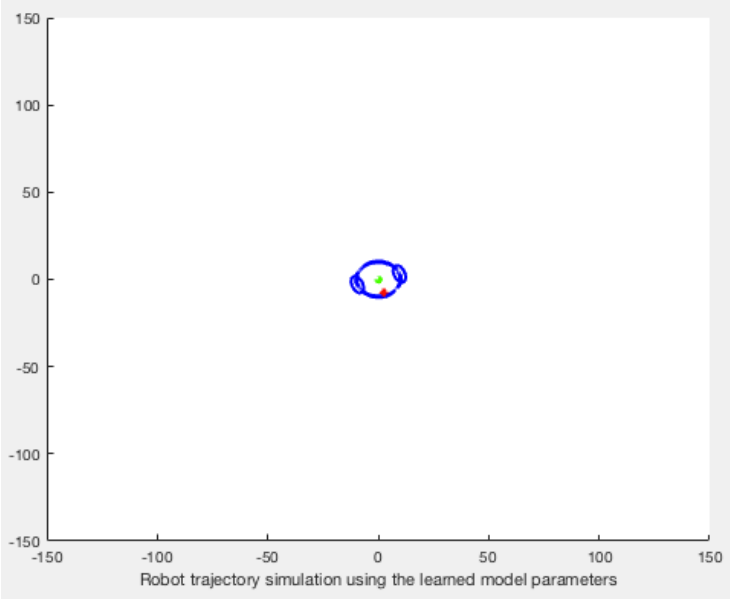
par_5{1, 2}

1
-0.0056
-0.0015
0.0036
0.4677
5.9554e-...
0.0014
-0.0011
5.5027e-...
-0.0025
-6.8193e...
-8.5652e...
0.0034
1.0571e-...

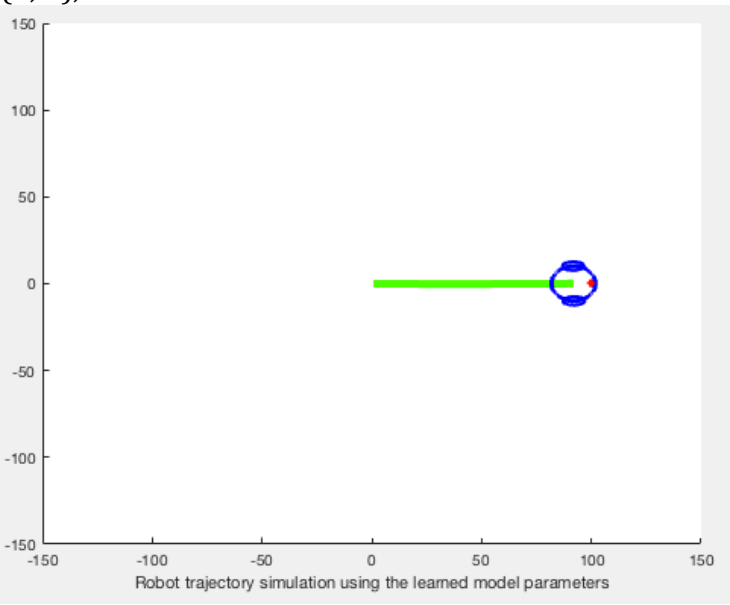
par_5{1, 3}

1
3.1471e-...
-1.4211e...
0.9986
1.7808e-...

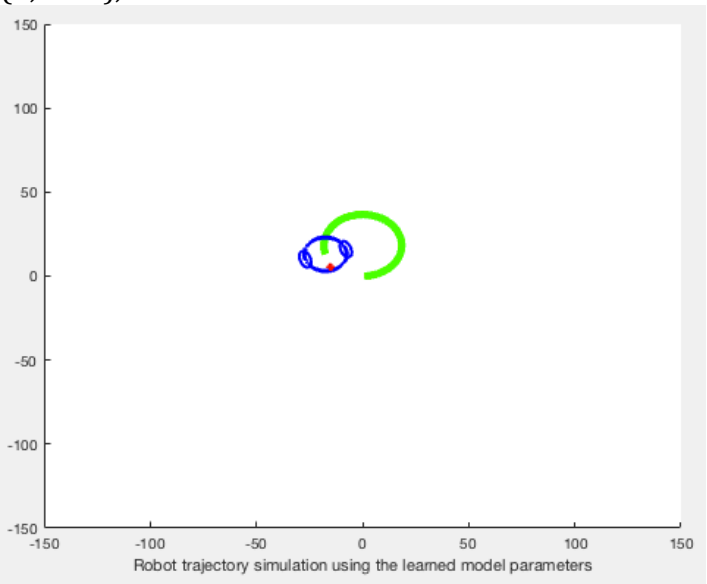
c)
Plots for (v,w) values of (0, 0.05),



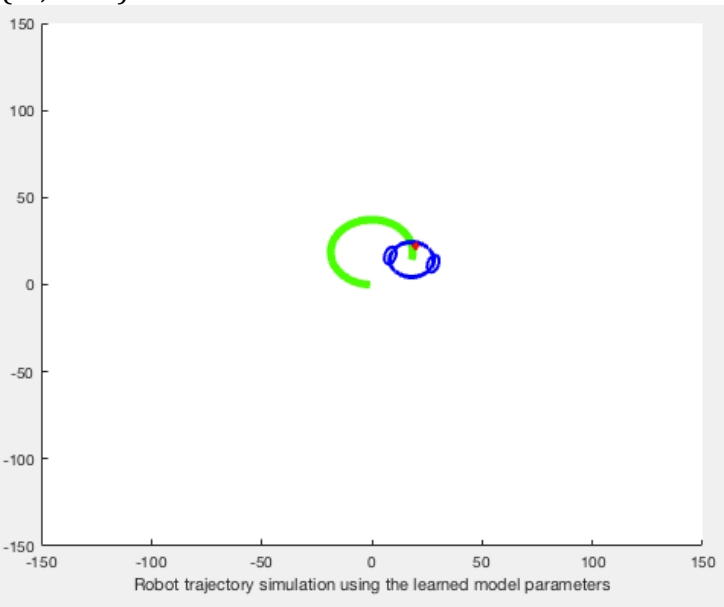
(1, 0),


150
100
50
0
-50
-100
-150
-150
-100
-50
0
50
100
150
Robot trajectory simulation using the learned model parameters

(1, 0.05),


150
100
50
0
-50
-100
-150
-150
-100
-50
0
50
100
150
Robot trajectory simulation using the learned model parameters

(-1,-0.05)

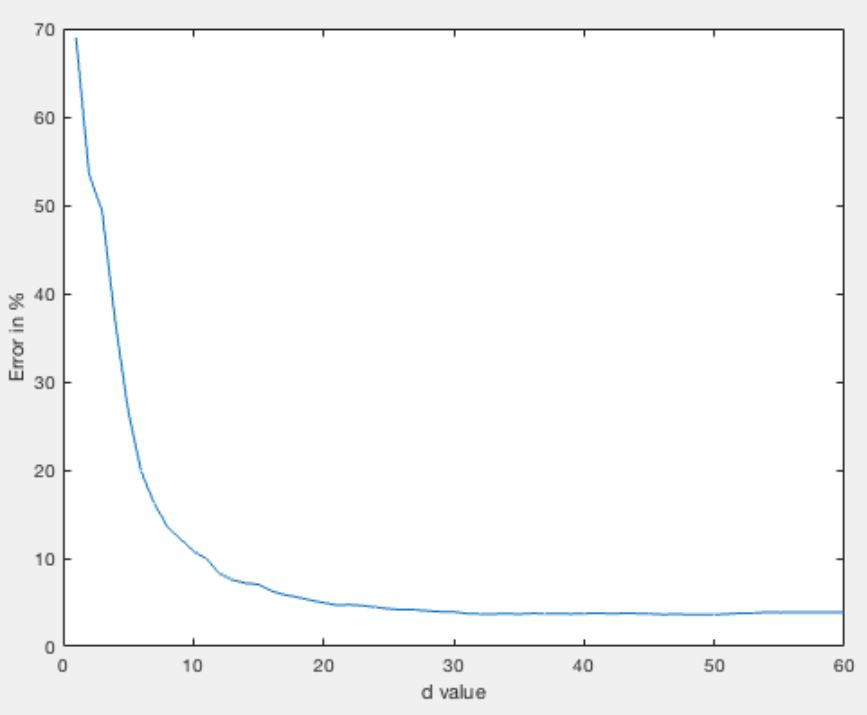

150
100
50
0
-50
-100
-150
-150
-100
-50
0
50
100
150
Robot trajectory simulation using the learned model parameters

EX2

Minimal Error: 3.62% at optimal d = 48

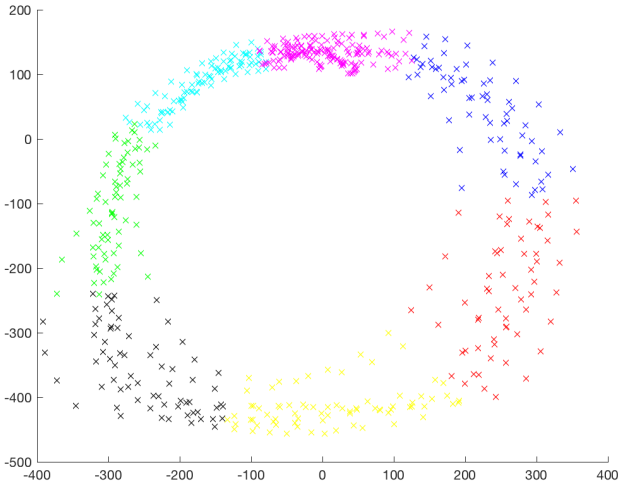
```
Result:
Minimal error: 3.62 %
with optimal parameter d = 48
with ConfusionMatrix for optimal d:
```

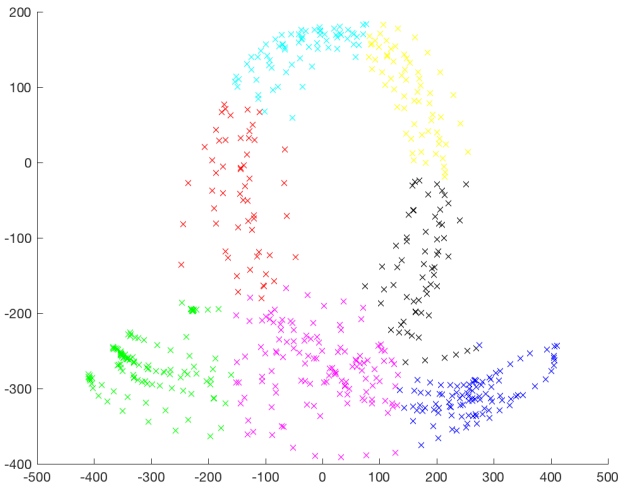
digit	0	1	2	3	4	5	6	7	8	9
0	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
1	0.00	0.97	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00
2	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.02	0.00
3	0.00	0.00	0.01	0.96	0.00	0.00	0.00	0.00	0.02	0.00
4	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.01
5	0.00	0.00	0.00	0.02	0.00	0.96	0.00	0.00	0.01	0.00
6	0.01	0.00	0.00	0.00	0.00	0.01	0.96	0.00	0.01	0.00
7	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.93	0.01	0.02
8	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.97	0.01
9	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.94

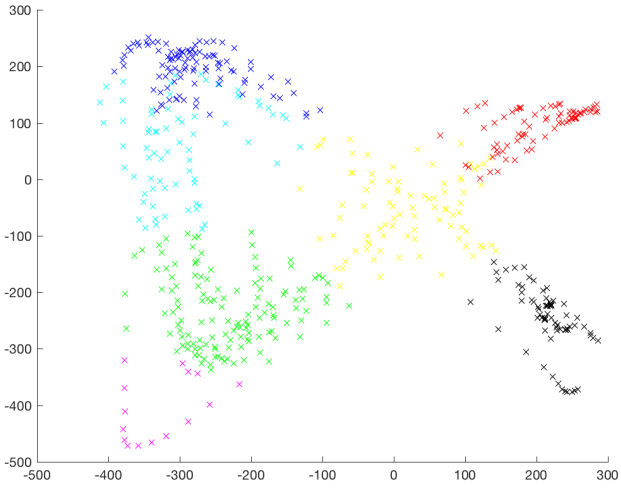


EX3

K-Means Plots







Nu-Bsplit Plots