

Analysis_Out

February 13, 2022

```
[1]: import warnings
warnings.filterwarnings('ignore')
```

```
[2]: import scrapbook as sb
import pandas as pd
import numpy as np
import seaborn as sns
import numpy as np
from statistics import mean
import matplotlib.pyplot as plt
```

1 Baseline

```
[3]: books = sb.read_notebooks("./BaseLine_Model_Output")
baseLine_data = []
for nb in books.notebooks:
    nbList=[nb.scrap['Stats Model MAE'].data,nb.scrap['Catboost MAE'].data]
    baseLine_data.append(nbList)
df = pd.DataFrame(baseLine_data, columns = ["Stats Model","Catboost"])
#baseLine_data = np.reshape(baseLine_data,(2,10))
display(df)
print(df.mean())
```

	Stats Model	Catboost
0	0.394439	0.156707
1	0.368530	0.130645
2	0.353290	0.073173
3	0.497611	0.146667
4	0.456710	0.141902
5	0.362967	0.089064
6	0.372887	0.325105
7	0.323525	0.079777
8	0.358416	0.146612
9	0.569174	0.225214

Stats Model 0.405755

Catboost 0.151487

dtype: float64

2 GAN Model

```
[4]: book = sb.read_notebooks("./GAN_Output")
gan_data = []
gan_mse = []
for nb in book.notebooks:
    metrics = nb.scrapes['GAN_1 Metrics'].data
    for i in range(1000):
        gan_mse.append(metrics[0][i])
    nbList = [nb.scrapes['GAN Model MSE'].data,
              nb.scrapes['GAN Model MAE'].data,
              nb.scrapes['GAN Model Euclidean distance'].data,
              nb.scrapes['GAN Model Manhattan Distance'].data]
    gan_data.append(nbList)

df = pd.DataFrame(gan_data, columns = ['MSE', 'MAE', 'Euclidean_
↳Distance', 'Manhattan Distance'])
display(df.style)
print("MEAN:")
print(df.mean(axis = 0))
gan_data = np.array(gan_data)
```

<pandas.io.formats.style.Styler at 0x7f98b8399760>

MEAN:

MSE 0.090416

MAE 0.197483

Euclidean Distance 1.297779

Manhattan Distance 3.949660

dtype: float64

3 ABC_GAN Analysis

3.1 ABC Pre-generator - Catboost

```
[5]: book = sb.read_notebooks("./ABC_GAN_Catboost")
paramVal = [1,0.1,0.01]
abc_mae = [[] for i in range(3)]
abc_mae_skip = [[] for i in range(3)]
abc_mae_mean = [[] for i in range(3)]
abc_mae_skip_mean = [[] for i in range(3)]
abc_weights = [[] for i in range(3)]
prior_model = [[] for i in range(3)]
abc_pre_generator = [[] for i in range(3)]

for nb in book.notebooks:
    metrics1 = np.array(nb.scrapes['ABC_GAN_1 Metrics'].data)
    metrics3 = np.array(nb.scrapes['ABC_GAN_3 Metrics'].data)
```

```

paramVar = float(nb.papermill_dataframe.iloc[0]['value'])

#Divide data according to parameters
for i in range(3):
    if paramVar == paramVal[i]:
        for j in range(100):
            abc_mae[i].append(metrics1[1,j])
            abc_mae_skip[i].append(metrics3[1,j])
        abc_weights[i].append(nb.scrap['Skip Connection Weight'].data)
        prior_model[i].append(nb.scrap['Prior Model MSE'].data)
        abc_pre_generator[i].append(nb.scrap['ABC Pre-generator MSE'].data)
        abc_mae_skip_mean[i].append(mean(metrics3[1,:]))
        abc_mae_mean[i].append(mean(metrics1[1,:]))

```

```

[6]: for i in range(3):
    data = []
    for j in range(len(abc_weights[i])):
        data.append([paramVal[i],prior_model[i][j],
            ↵
↪abc_pre_generator[i][j],abc_weights[i][j],abc_mae_mean[i][j],abc_mae_skip_mean[i][j]])

    df = pd.DataFrame(data, columns = ['Variance','Prior Model MAE',
            'ABC pre-generator MAE','Skip Node_
↪weight','ABC GAN MAE','ABC_GAN MAE (skip connection)'])
    display(df.round(5))
    print(df.mean(axis=0))
    print("-----")

```

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	1	0.36519	0.82244	0.85718
1	1	0.25950	0.96037	0.96353
2	1	0.27777	1.09340	0.12461
3	1	0.38670	1.02542	0.13763
4	1	0.38725	0.80040	0.43624
5	1	0.39898	0.91363	0.13002
6	1	0.35769	0.70796	0.87333
7	1	0.39044	1.05778	0.17070
8	1	0.24689	0.67001	0.16942
9	1	0.40308	1.18803	0.80421

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.18133	0.24190
1	0.24056	0.24025
2	0.12237	0.14317
3	0.23180	0.19890
4	0.16629	0.14163
5	0.18368	0.15765
6	0.31402	0.24247

7	0.24552	0.25973
8	0.23309	0.21876
9	0.13265	0.17569

Variance	1.000000
Prior Model MAE	0.347349
ABC pre-generator MAE	0.923944
Skip Node weight	0.466687
ABC GAN MAE	0.205131
ABC_GAN MAE (skip connection)	0.202014

dtype: float64

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	0.1	0.33976	0.35797	0.11676
1	0.1	0.25730	0.28768	0.20480
2	0.1	0.38077	0.37640	0.12946
3	0.1	0.33442	0.34717	0.68735
4	0.1	0.50919	0.54836	0.59553
5	0.1	0.41282	0.45876	0.72519
6	0.1	0.42055	0.43933	0.21397
7	0.1	0.31617	0.33700	0.28144
8	0.1	0.31767	0.33774	0.45530
9	0.1	0.27939	0.29228	0.17107

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.31875	0.27006
1	0.21887	0.24233
2	0.27418	0.29809
3	0.25758	0.31091
4	0.38490	0.29446
5	0.35048	0.35649
6	0.30466	0.26079
7	0.27400	0.31562
8	0.25659	0.26754
9	0.15543	0.19037

Variance	0.100000
Prior Model MAE	0.356803
ABC pre-generator MAE	0.378268
Skip Node weight	0.358087
ABC GAN MAE	0.279542
ABC_GAN MAE (skip connection)	0.280665

dtype: float64

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	0.01	0.41982	0.42283	0.02881
1	0.01	0.27806	0.27762	0.02157
2	0.01	0.25623	0.25844	0.00000

3	0.01	0.31094	0.31209	0.04464
4	0.01	0.33483	0.33391	0.45408
5	0.01	0.19979	0.20244	0.02696
6	0.01	0.25448	0.25198	0.24304
7	0.01	0.38354	0.38191	0.33916
8	0.01	0.32563	0.32444	0.00000
9	0.01	0.30432	0.30493	0.00000

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.37347	0.38408
1	0.26744	0.27102
2	0.21213	0.25667
3	0.30470	0.30846
4	0.30495	0.31293
5	0.20053	0.19677
6	0.25751	0.24670
7	0.37152	0.38785
8	0.26165	0.32574
9	0.26269	0.30470

Variance	0.010000
Prior Model MAE	0.306765
ABC pre-generator MAE	0.307060
Skip Node weight	0.115826
ABC GAN MAE	0.281659
ABC_GAN MAE (skip connection)	0.299491
dtype: float64	

3.2 ABC Pre-generator - Stats

```
[7]: book = sb.read_notebooks("./ABC_GAN_Stats")
paramVal = [1,0.1,0.01]
abc_mae = [[] for i in range(3)]
abc_mae_skip = [[] for i in range(3)]
abc_mae_mean = [[] for i in range(3)]
abc_mae_skip_mean = [[] for i in range(3)]
abc_weights = [[] for i in range(3)]
prior_model = [[] for i in range(3)]
abc_pre_generator = [[] for i in range(3)]

for nb in book.notebooks:
    metrics1 = np.array(nb.scraps['ABC_GAN_1 Metrics'].data)
    metrics3 = np.array(nb.scraps['ABC_GAN_3 Metrics'].data)
    paramVar = float(nb.papermill_dataframe.iloc[0]['value'])

    #Divide data according to parameters
    for i in range(3):
```

```

if paramVar == paramVal[i]:
    for j in range(100):
        abc_mae[i].append(metrics1[1,j])
        abc_mae_skip[i].append(metrics3[1,j])
        abc_weights[i].append(nb.scrap['Skip Connection Weight'].data)
        prior_model[i].append(nb.scrap['Prior Model MSE'].data)
        abc_pre_generator[i].append(nb.scrap['ABC Pre-generator MSE'].data)
        abc_mae_skip_mean[i].append(mean(metrics3[1,:]))
        abc_mae_mean[i].append(mean(metrics1[1,:]))

```

```

[8]: for i in range(3):
    data = []
    for j in range(len(abc_weights[i])):
        data.append([paramVal[i],prior_model[i][j],
                    ↵
                    ↪abc_pre_generator[i][j],abc_weights[i][j],abc_mae_mean[i][j],abc_mae_skip_mean[i][j]])

    df = pd.DataFrame(data, columns = ['Variance','Prior Model MAE',
                                       'ABC pre-generator MAE','Skip Node
                    ↵
                    ↪weight','ABC GAN MAE','ABC_GAN MAE (skip connection)'])
    display(df.round(5))
    print(df.mean(axis=0))
    print("-----")

```

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	1	0.50891	0.95473	0.99317
1	1	0.55453	0.98361	0.94769
2	1	0.41843	0.67262	0.99496
3	1	0.52749	0.82503	1.00000
4	1	0.37072	0.75668	0.92180
5	1	0.46808	0.97237	0.99569
6	1	0.26985	1.00872	0.96113
7	1	0.32584	0.80817	0.89217
8	1	0.38052	1.05728	0.97678
9	1	0.39524	0.91350	0.86179

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.32740	0.21742
1	0.28913	0.16422
2	0.31799	0.21815
3	0.27268	0.24384
4	0.26260	0.15983
5	0.26564	0.29963
6	0.20930	0.19894
7	0.26428	0.20468
8	0.28408	0.30569
9	0.37848	0.12205

```

Variance                1.000000
Prior Model MAE          0.421961
ABC pre-generator MAE    0.895271
Skip Node weight         0.954519
ABC GAN MAE              0.287158
ABC_GAN MAE (skip connection) 0.213444
dtype: float64

```

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	0.1	0.43601	0.42392	0.23762
1	0.1	0.45853	0.46924	0.26108
2	0.1	0.43518	0.48480	0.18357
3	0.1	0.37966	0.43818	0.17162
4	0.1	0.33140	0.30998	0.17233
5	0.1	0.36843	0.34918	0.14877
6	0.1	0.38729	0.38222	0.17439
7	0.1	0.36265	0.33042	0.25029
8	0.1	0.34082	0.33334	0.18623
9	0.1	0.38228	0.44806	0.20840

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.40460	5170.38506
1	0.23921	0.18820
2	0.29470	0.22892
3	0.30856	0.14591
4	0.25911	0.18143
5	0.20677	0.19369
6	0.30862	0.16367
7	0.25403	0.12171
8	0.24730	0.19920
9	0.29567	0.16809

```

Variance                0.100000
Prior Model MAE          0.388225
ABC pre-generator MAE    0.396933
Skip Node weight         0.199429
ABC GAN MAE              0.281856
ABC_GAN MAE (skip connection) 517.197587
dtype: float64

```

	Variance	Prior Model MAE	ABC pre-generator MAE	Skip Node weight \
0	0.01	0.34018	0.33796	0.15675
1	0.01	0.58179	0.58131	0.17463
2	0.01	0.38415	0.38487	0.14793
3	0.01	0.39787	0.39692	0.10145
4	0.01	0.41789	0.41517	0.14969
5	0.01	0.34601	0.34534	0.16624

6	0.01	0.35317	0.35217	0.15335
7	0.01	0.33657	0.33382	0.10982
8	0.01	0.36806	0.36829	0.08112
9	0.01	0.38586	0.38620	0.00000

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.22513	80.73940
1	0.37683	0.33590
2	0.28391	0.22742
3	0.19094	0.19563
4	0.30512	103.85069
5	0.25881	0.26452
6	0.30854	0.19807
7	0.19203	0.16317
8	0.31559	39.94542
9	0.34596	0.38660

Variance	0.010000
Prior Model MAE	0.391156
ABC pre-generator MAE	0.390206
Skip Node weight	0.124099
ABC GAN MAE	0.280284
ABC_GAN MAE (skip connection)	22.630680
dtype: float64	
