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 Stats Model Baseline

[3]:
```
books = sb.read_notebooks("./BaseLine_Model_Output")
baseLine_data = []
for nb in books.notebooks:
    nbList=[nb.scraps['Stats Model MSE'].data]
    baseLine_data.append(nbList)
df = pd.DataFrame(baseLine_data, columns = ["Stats Model"])
baseLine_data = np.reshape(baseLine_data,(1,10))[0]
display(df)
mse = mean(baseLine_data)
print("Average MSE (Stats Model): "+ str(mse))
```

	Stats Model
0	0.158972
1	0.215402
2	0.286906
3	0.303555
4	0.250427
5	0.145924
6	0.402069
7	0.166245
8	0.080123
9	0.554056

```
Average MSE (Stats Model): 0.2563678098564642
```

2 ABC_GAN Analysis

2.1 ABC Pre-generator

1. Prior Model is Catboost Model
2. ABC Pre-generator is Catboost Model with gaussian noise -> N(0,variance) where variance : 1, 0.1, 0.01

[4]:
```
book = sb.read_notebooks("./ABC_GAN")
paramVal = [1,0.1,0.01]
abc_mse = [[] for i in range(3)]
abc_mse_skip = [[] for i in range(3)]
abc_mse_mean = [[] for i in range(3)]
abc_mse_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:
    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_mse_skip[i].append(metrics3[0,j])
            abc_weights[i].append(nb.scraps['Skip Connection Weight'].data)
            prior_model[i].append(nb.scraps['Prior Model MSE'].data)
            abc_pre_generator[i].append(nb.scraps['ABC Pre-generator MSE'].data)
            abc_mse_skip_mean[i].append(mean(metrics3[0,:]))
```

[5]:
```
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_mse_skip_mean[i][j]])

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

	Variance	Prior Model MSE	ABC pre-generator MSE	Skip Node weight	\
0	1	0.21420	1.11535	0.87261	
1	1	0.31053	1.91895	1.00000	

```
2         1          0.22895                1.12984           0.87767
3         1          0.12928                1.81542           0.99491
4         1          0.41861                1.19099           0.88944
5         1          0.37451                1.69803           1.00000
6         1          0.45988                2.22228           1.00000
7         1          0.24887                1.72158           0.99831
8         1          0.35893                1.54957           0.82752
9         1          0.21841                1.36830           0.98614

   ABC_GAN MSE (skip connection)
0                        0.03649
1                        0.20951
2                        0.02077
3                        0.07560
4                        0.05095
5                        0.12139
6                        0.11837
7                        0.09448
8                        0.05199
9                        0.08879

Variance                          1.000000
Prior Model MSE                   0.296218
ABC pre-generator MSE             1.573032
Skip Node weight                  0.944660
ABC_GAN MSE (skip connection)     0.086834
dtype: float64
------------------------------------------------------------

   Variance  Prior Model MSE  ABC pre-generator MSE  Skip Node weight  \
0       0.1          0.21013                0.23330           0.17974
1       0.1          0.21227                0.28901           0.20071
2       0.1          0.18305                0.19285           0.16517
3       0.1          0.14183                0.16579           0.13577
4       0.1          0.23220                0.23097           0.17506
5       0.1          0.17654                0.22144           0.23090
6       0.1          0.12845                0.12256           0.26761
7       0.1          0.42705                0.38261           0.14938
8       0.1          0.12339                0.11731           0.19761
9       0.1          0.20507                0.21478           0.13164

   ABC_GAN MSE (skip connection)
0                   4.655000e-02
1                   6.709293e+07
2                   3.840258e+05
3                   1.934409e+05
4                   2.337131e+05
5                   2.949000e-02
6                   3.462000e-02
```

```
7                   1.158700e-01
8                   4.078000e-02
9                   1.403158e+05

Variance                          1.000000e-01
Prior Model MSE                   2.039983e-01
ABC pre-generator MSE             2.170608e-01
Skip Node weight                  1.833588e-01
ABC_GAN MSE (skip connection)     6.804443e+06
dtype: float64
------------------------------------------------------------

   Variance  Prior Model MSE  ABC pre-generator MSE  Skip Node weight  \
0      0.01          0.44935                0.44589           0.14497
1      0.01          0.43759                0.43275           0.14602
2      0.01          0.28489                0.28580           0.16282
3      0.01          0.19685                0.19664           0.24201
4      0.01          0.34975                0.35261           0.09930
5      0.01          0.25540                0.25564           0.17013
6      0.01          0.10328                0.10352           0.14963
7      0.01          0.27335                0.27205           0.12871
8      0.01          0.22949                0.22985           0.18751
9      0.01          0.34034                0.34481           0.11861

   ABC_GAN MSE (skip connection)
0                        0.31058
1                     1022.02744
2                        0.03856
3                     3273.39710
4                     1425.82059
5                     1623.54608
6                     8233.70198
7                        0.24707
8                    15933.95604
9                        0.14153

Variance                            0.010000
Prior Model MSE                     0.292029
ABC pre-generator MSE               0.291958
Skip Node weight                    0.154971
ABC_GAN MSE (skip connection)    3151.318698
dtype: float64
------------------------------------------------------------
```