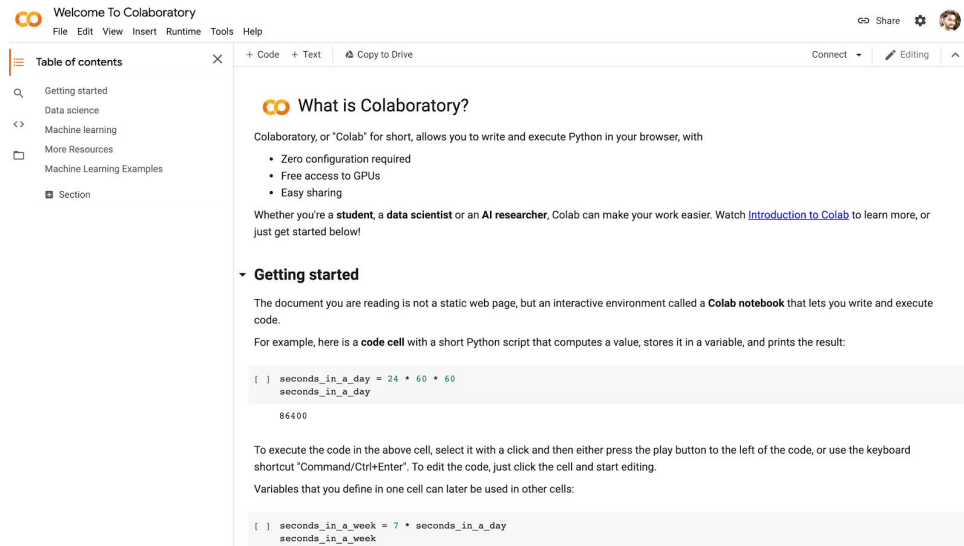
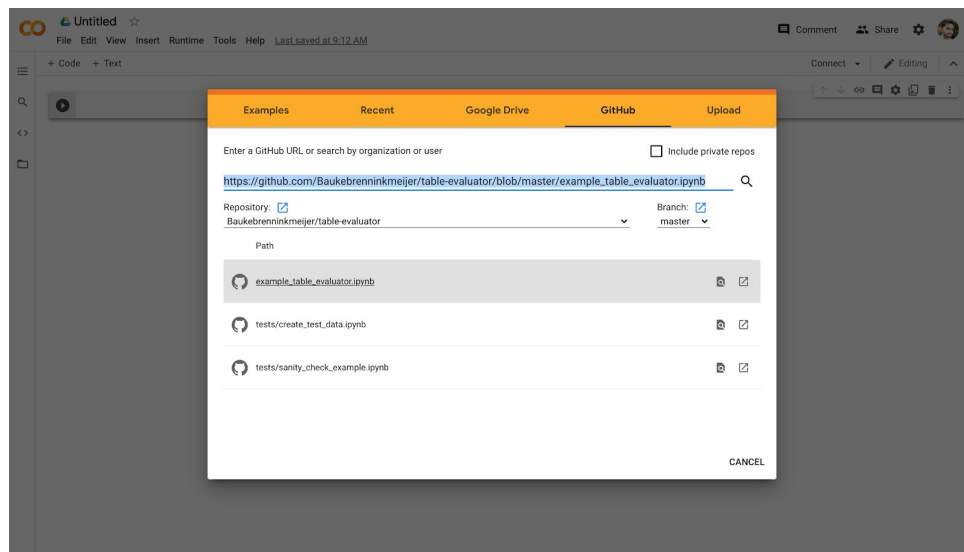


Please go through the following steps to produce table evaluator graphs,

- 1) Go to <https://colab.research.google.com/notebooks/intro.ipynb>. A page appears similar to the below shown screen shot.

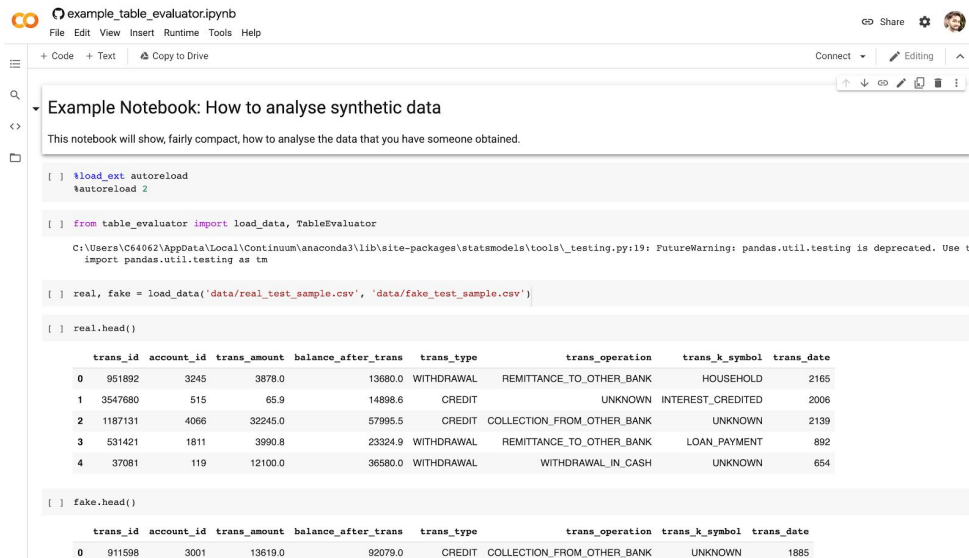


- 2) Click on the **'file tab'** on top left and click on the **'new notebook'**.
- 3) Again go to the file tab and click on **'open notebook'**.
- 4) Select the **'Github'** tab.
- 5) Paste the link https://github.com/Baukebrennkmeijer/table-evaluator/blob/master/example_table_evaluator.ipynb in the tab and search for repositories.



- 6) Click on **'example_table_evaluator.ipynb'** and the repository will open.

7) The repository will open and the codes will appear as shown.



The screenshot shows a Jupyter Notebook titled "example_table_evaluator.ipynb". The first cell contains the following code:

```
%load_ext autoreload
%autoreload 2

from table_evaluator import load_data, TableEvaluator

C:\Users\C64062\AppData\Local\Continuum\anaconda3\lib\site-packages\statsmodels\tools\testing.py:19: FutureWarning: pandas.util.testing is deprecated. Use t
import pandas.util.testing as tm

real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')

real.head()
```

The output of the `real.head()` command is displayed as a table:

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	951892	3245	3878.0	13680.0	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	HOUSEHOLD	2165
1	3547680	515	65.9	14898.6	CREDIT	UNKNOWN	INTEREST_CREDITED	2006
2	1187131	4066	32245.0	57995.5	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	2139
3	531421	1811	3990.8	23324.9	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	LOAN_PAYMENT	892
4	37081	119	12100.0	36580.0	WITHDRAWAL	WITHDRAWAL_IN_CASH	UNKNOWN	654

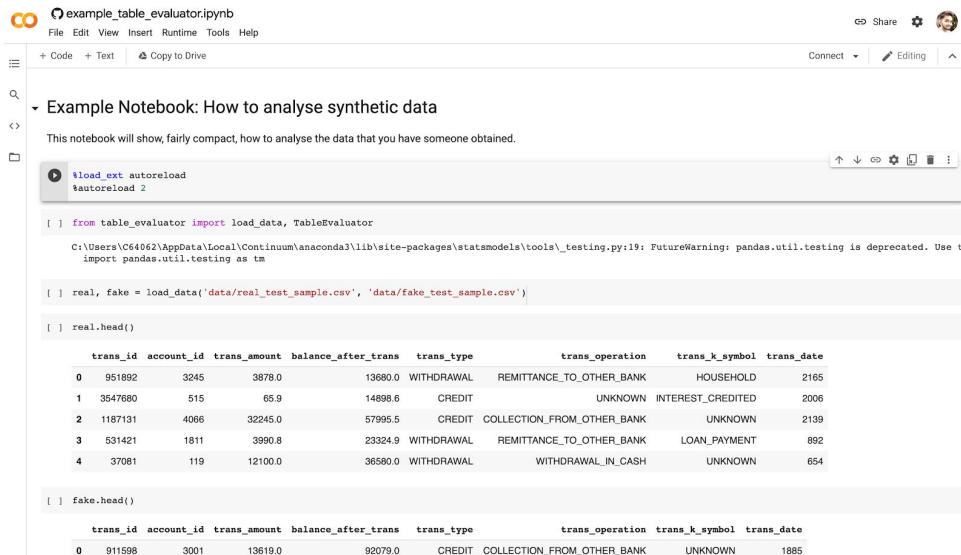
The second cell contains the following code:

```
fake.head()
```

The output of the `fake.head()` command is displayed as a table:

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	911598	3001	13619.0	92079.0	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	1885

8) Run the first cell by clicking on the play button.



The screenshot shows the same Jupyter Notebook interface, but the first cell is now executed. The code is the same as in the previous screenshot. The output of the `real.head()` command is displayed as a table:

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	951892	3245	3878.0	13680.0	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	HOUSEHOLD	2165
1	3547680	515	65.9	14898.6	CREDIT	UNKNOWN	INTEREST_CREDITED	2006
2	1187131	4066	32245.0	57995.5	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	2139
3	531421	1811	3990.8	23324.9	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	LOAN_PAYMENT	892
4	37081	119	12100.0	36580.0	WITHDRAWAL	WITHDRAWAL_IN_CASH	UNKNOWN	654

The output of the `fake.head()` command is displayed as a table:

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	911598	3001	13619.0	92079.0	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	1885

9) Click on Run anyway if prompted.

10) After running, click on the first tab and then select **'+code'** on the top left of the screen.
This will create a new cell to add code.

11) A new code-cell window appears as shown

```

[1] %load_ext autoreload
%autoreload 2

[ ] from table_evaluator import load_data, TableEvaluator

C:\Users\C64062\AppData\Local\Continuum\anaconda3\lib\site-packages\statsmodels\tools\_testing.py:19: FutureWarning: pandas.util.testing is deprecated. Use t
import pandas.util.testing as tm

[ ] real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')

[ ] real.head()

```

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	951892	3245	3878.0	13680.0	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	HOUSEHOLD	2165
1	3547680	515	65.9	14898.6	CREDIT	UNKNOWN	INTEREST_CREDITED	2006
2	1187131	4066	32245.0	57995.5	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	2139
3	531421	1811	3990.8	23324.9	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	LOAN_PAYMENT	892
4	37081	119	12100.0	36580.0	WITHDRAWAL	WITHDRAWAL_IN_CASH	UNKNOWN	654

```

[ ] fake.head()

```

12) Paste the following code on the new tab that appears.

```

try:
import google.colab
!pip install table_evaluator
except:
pass

```

After pasting Colab must look as shown,

```

[ ] %load_ext autoreload
%autoreload 2

[ ] try:
import google.colab
!pip install table_evaluator
except:
pass

[ ] from table_evaluator import load_data, TableEvaluator

C:\Users\C64062\AppData\Local\Continuum\anaconda3\lib\site-packages\statsmodels\tools\_testing.py:19: FutureWarning: pandas.util.testing is deprecated. Use t
import pandas.util.testing as tm

[ ] real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')

[ ] real.head()

```

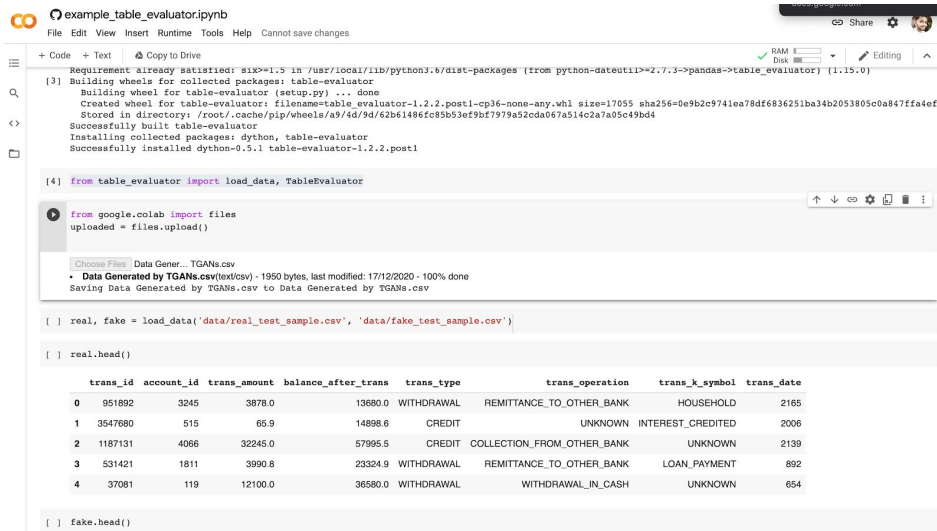
	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	951892	3245	3878.0	13680.0	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	HOUSEHOLD	2165
1	3547680	515	65.9	14898.6	CREDIT	UNKNOWN	INTEREST_CREDITED	2006
2	1187131	4066	32245.0	57995.5	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	2139
3	531421	1811	3990.8	23324.9	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	LOAN_PAYMENT	892
4	37081	119	12100.0	36580.0	WITHDRAWAL	WITHDRAWAL_IN_CASH	UNKNOWN	654

13) Run the second and third cell respectively. (DO NOT run the 4th cell -(real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')))

14) After running the above cells, add another cell by using '+ code', paste the following code and run the tab

from google.colab import files
uploaded = files.upload()

- 15) A page appears as shown below, click on '**choose files**' and select the csv file provided separately with these codes. Here we upload the data generated by the generator separately for three different algorithms, i.e, TGANs, RBMs and VAEs. Please select any of the three files(one at a time) in the tab and run it.



```
[3] Requirement already satisfied: six>=1.10 in /usr/local/lib/python3.8/dist-packages (from python-dateutil>=2.7.3->pandas->table-evaluator) (1.15.0)
[3] Building wheels for collected packages: table-evaluator
[3] Building wheel for table-evaluator (setup.py) ... done
[3] Created wheel for table-evaluator: filename=table_evaluator-1.2.2.post1-cp36-none-any.whl size=17055 sha256=0e9b2c9741ea78df6836251ba34b2053805c0a847ffa4ef
[3] Stored in directory: /root/.cache/pip/wheels/a9/4d/9d/42b61486fc85b53ef9bf7979a52cda067a514c2a7a05c49bd4
[3] Successfully built table-evaluator
[3] Installing collected packages: dython, table-evaluator
[3] Successfully installed dython-0.5.1 table-evaluator-1.2.2.post1

[4] from table_evaluator import load_data, TableEvaluator

from google.colab import files
uploaded = files.upload()

Choose File: Data Gener... TGANs.csv
• Data Generated by TGANs.csv(text/csv) - 1950 bytes, last modified: 17/12/2020 - 100% done
Saving Data Generated by TGANs.csv to Data Generated by TGANs.csv

[ ] real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')

[ ] real.head()
```

	trans_id	account_id	trans_amount	balance_after_trans	trans_type	trans_operation	trans_k_symbol	trans_date
0	951892	3245	3878.0	13680.0	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	HOUSEHOLD	2165
1	3547680	515	65.9	14898.6	CREDIT	UNKNOWN	INTEREST_CREDITED	2006
2	1187131	4066	32245.0	57995.5	CREDIT	COLLECTION_FROM_OTHER_BANK	UNKNOWN	2139
3	531421	1811	3990.8	23324.9	WITHDRAWAL	REMITTANCE_TO_OTHER_BANK	LOAN_PAYMENT	892
4	37081	119	12100.0	36580.0	WITHDRAWAL	WITHDRAWAL_IN_CASH	UNKNOWN	654

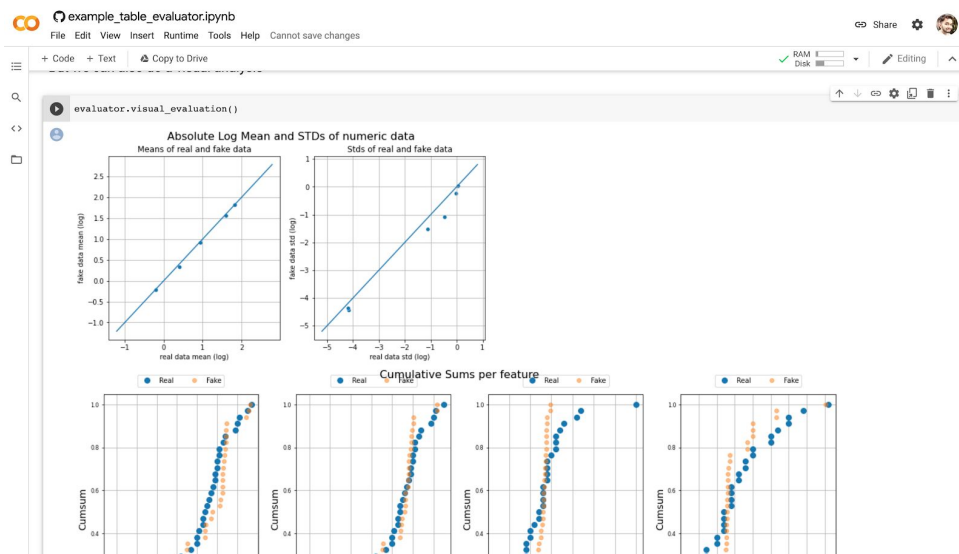
```
[ ] fake.head()
```

- 16) Again click on '**+ code**' and copy the same code from step 14. Upload the file separately, and this time upload the file '**Real Data.csv**' into the code and run it.
- 17) After uploading, replace the code in the next cell (`real, fake = load_data('data/real_test_sample.csv', 'data/fake_test_sample.csv')`) with code (`real, fake = load_data('Real Data.csv', 'Data Generated by TGANs.csv')`) and run it.

Note:- Everytime you re-run the cell for any different data like the '**Data generated by VAEs**'(as given separately with this code). Please change the code that you will paste in step 17 by using '**Data generated by VAEs.csv**' in place of '**Data Generated by TGANs.csv**'. Please do the same for RBMs.

- 18) Run the next two codes (`real.head()` and `fake.head()`)
- 19) Avoid the next column and don't run it. (`cat_cols = ['trans_type', 'trans_operation', 'trans_k_symbol']`)
- 20) Directly go to the next code (`evaluator = TableEvaluator(real, fake, cat_cols=cat_cols)`) and replace it with (`evaluator = TableEvaluator(real, fake)`) and run it.
- 21) Avoid the next code and don't run it (`evaluator.evaluate(target_col='trans_type')`)

- 22) Run the next code as it as (`evaluator.visual_evaluation()`)
- 23) The graphs that are used the manuscript will be generated and will be obtained there.



- 24) Please look for graphs that are pasted below and not other graphs. Also, run the code separately for each dataset in a similar manner by just uploading the different dataset provided along with this code document.

