```python
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

```python
import pandas as pd
```

```python
# df    = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YMH_Clean_UCI_Power_Consu
# cpi   = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YM_Clean_France_CPI_Elect
# temp  = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YMH_Clean_TempISD.csv")
# cci   = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YM_Clean_CCI.csv")
# gt1   = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YMW_Clean_GoogleTrends1.c
# gt2   = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YMW_Clean_GoogleTrends2.c
# gt3   = pd.read_csv("/content/drive/MyDrive/BDA 696 Project/Datasets/processsed/YMW_Clean_GoogleTrends3.c
```

```python
df    = pd.read_csv("Downloads/processsed/YMH_Clean_UCI_Power_Consumption_Dataset.csv")
cpi   = pd.read_csv("Downloads/processsed/YM_Clean_France_CPI_Electricity.csv")
temp  = pd.read_csv("Downloads/processsed/YMH_Clean_TempISD.csv")
cci   = pd.read_csv("Downloads/processsed/YM_Clean_CCI.csv")
gt1   = pd.read_csv("Downloads/processsed/YMW_Clean_GoogleTrends1.csv")
gt2   = pd.read_csv("Downloads/processsed/YMW_Clean_GoogleTrends2.csv")
gt3   = pd.read_csv("Downloads/processsed/YMW_Clean_GoogleTrends3.csv")
```

C:\Users\vghavate3103\AppData\Local\Temp\ipykernel_15040\2729922107.py:1: DtypeWarning: Columns (2,3,4,5,6,
7) have mixed types. Specify dtype option on import or set low_memory=False.
  df   = pd.read_csv("Downloads/processsed/YMH_Clean_UCI_Power_Consumption_Dataset.csv")
C:\Users\vghavate3103\AppData\Local\Temp\ipykernel_15040\2729922107.py:3: DtypeWarning: Columns (20) have m
ixed types. Specify dtype option on import or set low_memory=False.
  temp = pd.read_csv("Downloads/processsed/YMH_Clean_TempISD.csv")

```python
df['Date'] = pd.to_datetime(df['Date'])
df=df.query('Date.dt.minute==0')# or Date.dt.minute==30')
df=df.replace('?',0.0)
df
```

	Date	Time	Global_active_power	Global_reactive_power	Voltage	Global_intensity	Sub_metering_1	S
0	2007-01-01 00:00:00	00:00:00	2.580	0.136	241.970	10.600	0.000	
60	2007-01-01 01:00:00	01:00:00	2.466	0.000	241.090	10.200	0.000	
120	2007-01-01 02:00:00	02:00:00	2.504	0.088	239.260	10.400	0.000	
180	2007-01-01 03:00:00	03:00:00	2.648	0.254	241.630	11.000	0.000	
240	2007-01-01 04:00:00	04:00:00	2.400	0.000	241.960	9.800	0.000	
...	...	...	...	...	...	...	...	
2053020	2010-11-26 17:00:00	17:00:00	0.898	0.0	237.22	3.8	0.0	
2053080	2010-11-26 18:00:00	18:00:00	1.096	0.142	239.14	4.6	0.0	
2053140	2010-11-26 19:00:00	19:00:00	1.81	0.0	235.59	7.6	0.0	
2053200	2010-11-26 20:00:00	20:00:00	1.456	0.0	238.18	6.2	0.0	
2053260	2010-11-26 21:00:00	21:00:00	0.938	0.0	239.82	3.8	0.0	

34222 rows × 9 columns

In [ ]:
```python
#temp['Date'] = pd.to_datetime(cci['Date'])
#df=pd.merge_asof(df,temp, on='Date')

#df.dtypes

# cpi['Date'] = pd.to_datetime(cpi['Date'])
# df=df.merge(cpi, on='Date', how='left')

# cci['Date'] = pd.to_datetime(cci['Date'])
# df=df.merge(cci, on='Date', how='left')

gt1['Date'] = pd.to_datetime(gt1['Date'])
df=df.merge(gt1, on='Date', how='left')

gt2['Date'] = pd.to_datetime(gt2['Date'])
df=df.merge(gt2, on='Date', how='left')

gt3['Date'] = pd.to_datetime(gt3['Date'])
df=df.merge(gt3, on='Date', how='left')


df['GT1_Hits']=df['GT1_Hits'].fillna(0)
df['GT2_Hits']=df['GT2_Hits'].fillna(0)
df['GT3_Hits']=df['GT3_Hits'].fillna(0)
```

In [ ]:
```python
df.head()
```

	Date	Time	Global_active_power	Global_reactive_power	Voltage	Global_intensity	Sub_metering_1	Sub_met
0	2007-01-01 00:00:00	00:00:00	2.580	0.136	241.970	10.600	0.000	
1	2007-01-01 01:00:00	01:00:00	2.466	0.000	241.090	10.200	0.000	
2	2007-01-01 02:00:00	02:00:00	2.504	0.088	239.260	10.400	0.000	
3	2007-01-01 03:00:00	03:00:00	2.648	0.254	241.630	11.000	0.000	
4	2007-01-01 04:00:00	04:00:00	2.400	0.000	241.960	9.800	0.000	

```
!pip install lightning
!pip install pytorch_forecasting
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: lightning in c:\users\vghavate3103\appdata\roaming\python\python311\site-pac
kages (2.1.2)
Requirement already satisfied: PyYAML<8.0,>=5.4 in c:\programdata\anaconda3\lib\site-packages (from lightni
ng) (6.0)
Requirement already satisfied: fsspec[http]<2025.0,>2021.06.0 in c:\programdata\anaconda3\lib\site-packages
(from lightning) (2023.4.0)
Requirement already satisfied: lightning-utilities<2.0,>=0.8.0 in c:\users\vghavate3103\appdata\roaming\pyt
hon\python311\site-packages (from lightning) (0.10.0)
Requirement already satisfied: numpy<3.0,>=1.17.2 in c:\programdata\anaconda3\lib\site-packages (from light
ning) (1.24.3)
Requirement already satisfied: packaging<25.0,>=20.0 in c:\programdata\anaconda3\lib\site-packages (from li
ghtning) (23.1)
Requirement already satisfied: torch<4.0,>=1.12.0 in c:\users\vghavate3103\appdata\roaming\python\python311
\site-packages (from lightning) (2.1.1)
Requirement already satisfied: torchmetrics<3.0,>=0.7.0 in c:\users\vghavate3103\appdata\roaming\python\pyt
hon311\site-packages (from lightning) (1.2.1)
Requirement already satisfied: tqdm<6.0,>=4.57.0 in c:\programdata\anaconda3\lib\site-packages (from lightn
ing) (4.65.0)
Requirement already satisfied: typing-extensions<6.0,>=4.0.0 in c:\programdata\anaconda3\lib\site-packages
(from lightning) (4.7.1)
Requirement already satisfied: pytorch-lightning in c:\users\vghavate3103\appdata\roaming\python\python311
\site-packages (from lightning) (2.1.2)
Requirement already satisfied: requests in c:\programdata\anaconda3\lib\site-packages (from fsspec[http]<20
25.0,>2021.06.0->lightning) (2.31.0)
Requirement already satisfied: aiohttp!=4.0.0a0,!=4.0.0a1 in c:\programdata\anaconda3\lib\site-packages (fr
om fsspec[http]<2025.0,>2021.06.0->lightning) (3.8.5)
Requirement already satisfied: setuptools in c:\programdata\anaconda3\lib\site-packages (from lightning-uti
lities<2.0,>=0.8.0->lightning) (68.0.0)
Requirement already satisfied: filelock in c:\programdata\anaconda3\lib\site-packages (from torch<4.0,>=1.1
2.0->lightning) (3.9.0)
Requirement already satisfied: sympy in c:\programdata\anaconda3\lib\site-packages (from torch<4.0,>=1.12.0
->lightning) (1.11.1)
Requirement already satisfied: networkx in c:\programdata\anaconda3\lib\site-packages (from torch<4.0,>=1.1
2.0->lightning) (3.1)
Requirement already satisfied: jinja2 in c:\programdata\anaconda3\lib\site-packages (from torch<4.0,>=1.12.
0->lightning) (3.1.2)
Requirement already satisfied: colorama in c:\programdata\anaconda3\lib\site-packages (from tqdm<6.0,>=4.5
7.0->lightning) (0.4.6)
Requirement already satisfied: attrs>=17.3.0 in c:\programdata\anaconda3\lib\site-packages (from aiohttp!=
4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (22.1.0)
Requirement already satisfied: charset-normalizer<4.0,>=2.0 in c:\programdata\anaconda3\lib\site-packages
(from aiohttp!=4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (2.0.4)
Requirement already satisfied: multidict<7.0,>=4.5 in c:\programdata\anaconda3\lib\site-packages (from aioh
ttp!=4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (6.0.2)
Requirement already satisfied: async-timeout<5.0,>=4.0.0a3 in c:\programdata\anaconda3\lib\site-packages (f
rom aiohttp!=4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (4.0.2)
Requirement already satisfied: yarl<2.0,>=1.0 in c:\programdata\anaconda3\lib\site-packages (from aiohttp!=
4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (1.8.1)
Requirement already satisfied: frozenlist>=1.1.1 in c:\programdata\anaconda3\lib\site-packages (from aiohtt
p!=4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (1.3.3)
Requirement already satisfied: aiosignal>=1.1.2 in c:\programdata\anaconda3\lib\site-packages (from aiohtt
p!=4.0.0a0,!=4.0.0a1->fsspec[http]<2025.0,>2021.06.0->lightning) (1.2.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\programdata\anaconda3\lib\site-packages (from jinja2->
torch<4.0,>=1.12.0->lightning) (2.1.1)
Requirement already satisfied: idna<4,>=2.5 in c:\programdata\anaconda3\lib\site-packages (from requests->f
sspec[http]<2025.0,>2021.06.0->lightning) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\programdata\anaconda3\lib\site-packages (from reque
sts->fsspec[http]<2025.0,>2021.06.0->lightning) (1.26.16)
Requirement already satisfied: certifi>=2017.4.17 in c:\programdata\anaconda3\lib\site-packages (from reque
sts->fsspec[http]<2025.0,>2021.06.0->lightning) (2023.7.22)
Requirement already satisfied: mpmath>=0.19 in c:\programdata\anaconda3\lib\site-packages (from sympy->torc
h<4.0,>=1.12.0->lightning) (1.3.0)
Defaulting to user installation because normal site-packages is not writeable
Collecting pytorch_forecasting
  Using cached pytorch_forecasting-0.10.1-py3-none-any.whl (127 kB)
Requirement already satisfied: matplotlib in c:\programdata\anaconda3\lib\site-packages (from pytorch_forec
asting) (3.7.2)
Collecting optuna<3.0.0,>=2.3.0 (from pytorch_forecasting)
  Using cached optuna-2.10.1-py3-none-any.whl (308 kB)
Collecting pandas<2.0.0,>=1.3.0 (from pytorch_forecasting)
  Using cached pandas-1.5.3-cp311-cp311-win_amd64.whl (10.3 MB)
Collecting pytorch-lightning<2.0.0,>=1.2.4 (from pytorch_forecasting)
  Using cached pytorch_lightning-1.9.5-py3-none-any.whl (829 kB)
Collecting scikit-learn<1.1,>=0.24 (from pytorch_forecasting)
```

```
Using cached scikit-learn-1.0.2.tar.gz (6.7 MB)
Installing build dependencies: started
Installing build dependencies: finished with status 'done'
Getting requirements to build wheel: started
Getting requirements to build wheel: finished with status 'done'
Preparing metadata (pyproject.toml): started
Preparing metadata (pyproject.toml): finished with status 'error'
```

```
  error: subprocess-exited-with-error

  Preparing metadata (pyproject.toml) did not run successfully.
  exit code: 1

  [66 lines of output]
  Partial import of sklearn during the build process.
  setup.py:128: DeprecationWarning:

    `numpy.distutils` is deprecated since NumPy 1.23.0, as a result
    of the deprecation of `distutils` itself. It will be removed for
    Python >= 3.12. For older Python versions it will remain present.
    It is recommended to use `setuptools < 60.0` for those Python versions.
    For more details, see:
      https://numpy.org/devdocs/reference/distutils_status_migration.html


    from numpy.distutils.command.build_ext import build_ext  # noqa
  INFO: No module named 'numpy.distutils._msvccompiler' in numpy.distutils; trying from distutils
  Traceback (most recent call last):
    File "C:\ProgramData\anaconda3\Lib\site-packages\pip\_vendor\pyproject_hooks\_in_process\_in_process.p
y", line 353, in <module>
      main()
    File "C:\ProgramData\anaconda3\Lib\site-packages\pip\_vendor\pyproject_hooks\_in_process\_in_process.p
y", line 335, in main
      json_out['return_val'] = hook(**hook_input['kwargs'])
                               ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\ProgramData\anaconda3\Lib\site-packages\pip\_vendor\pyproject_hooks\_in_process\_in_process.p
y", line 149, in prepare_metadata_for_build_wheel
      return hook(metadata_directory, config_settings)
             ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\build_meta.py", line 174, in prepare_metadata_for_build_wheel
      self.run_setup()
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\build_meta.py", line 268, in run_setup
      self).run_setup(setup_script=setup_script)
            ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\build_meta.py", line 158, in run_setup
      exec(compile(code, __file__, 'exec'), locals())
    File "setup.py", line 319, in <module>
      setup_package()
    File "setup.py", line 315, in setup_package
      setup(**metadata)
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\numpy\d
istutils\core.py", line 135, in setup
      config = configuration()
               ^^^^^^^^^^^^^^^
    File "setup.py", line 201, in configuration
      config.add_subpackage("sklearn")
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\numpy\d
istutils\misc_util.py", line 1050, in add_subpackage
      config_list = self.get_subpackage(subpackage_name, subpackage_path,
                    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\numpy\d
istutils\misc_util.py", line 1016, in get_subpackage
      config = self._get_configuration_from_setup_py(
               ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\numpy\d
istutils\misc_util.py", line 958, in _get_configuration_from_setup_py
      config = setup_module.configuration(*args)
               ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-install-vz5byaae\scikit-learn_8388def4b00a47b99534f7
99919104e2\sklearn\setup.py", line 85, in configuration
      cythonize_extensions(top_path, config)
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-install-vz5byaae\scikit-learn_8388def4b00a47b99534f7
99919104e2\sklearn\_build_utils\__init__.py", line 47, in cythonize_extensions
      basic_check_build()
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-install-vz5byaae\scikit-learn_8388def4b00a47b99534f7
99919104e2\sklearn\_build_utils\pre_build_helpers.py", line 114, in basic_check_build
      compile_test_program(code)
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-install-vz5byaae\scikit-learn_8388def4b00a47b99534f7
99919104e2\sklearn\_build_utils\pre_build_helpers.py", line 70, in compile_test_program
      ccompiler.compile(
```

```
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\_distutils\_msvccompiler.py", line 327, in compile
        self.initialize()
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\_distutils\_msvccompiler.py", line 224, in initialize
        vc_env = _get_vc_env(plat_spec)
                 ^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\msvc.py", line 316, in msvc14_get_vc_env
        return _msvc14_get_vc_env(plat_spec)
               ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    File "C:\Users\vghavate3103\AppData\Local\Temp\pip-build-env-5kpyzdik\overlay\Lib\site-packages\setupto
ols\msvc.py", line 270, in _msvc14_get_vc_env
        raise distutils.errors.DistutilsPlatformError(
  distutils.errors.DistutilsPlatformError: Microsoft Visual C++ 14.0 or greater is required. Get it with "M
icrosoft C++ Build Tools": https://visualstudio.microsoft.com/visual-cpp-build-tools/
  [end of output]

  note: This error originates from a subprocess, and is likely not a problem with pip.
error: metadata-generation-failed

Encountered error while generating package metadata.

See above for output.

note: This is an issue with the package mentioned above, not pip.
hint: See above for details.
```

```python
import lightning.pytorch as pl
from lightning.pytorch.callbacks import EarlyStopping, LearningRateMonitor
from lightning.pytorch.loggers import TensorBoardLogger
import numpy as np
import pandas as pd
import torch

from pytorch_forecasting import Baseline, TemporalFusionTransformer, TimeSeriesDataSet
from pytorch_forecasting.data import GroupNormalizer
from pytorch_forecasting.metrics import MAE, SMAPE, PoissonLoss, QuantileLoss
from pytorch_forecasting.models.temporal_fusion_transformer.tuning import optimize_hyperparameters
```

```
---------------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
Cell In[13], line 8
      5 import pandas as pd
      6 import torch
----> 8 from pytorch_forecasting import Baseline, TemporalFusionTransformer, TimeSeriesDataSet
      9 from pytorch_forecasting.data import GroupNormalizer
     10 from pytorch_forecasting.metrics import MAE, SMAPE, PoissonLoss, QuantileLoss

ModuleNotFoundError: No module named 'pytorch_forecasting'
```

```python
earliest_time= df['Date'].min()
```

```python
df["day_of_week"] = df['Date'].dt.dayofweek.astype(str).astype("int")  # categories have be strings
df["week_of_year"] = df['Date'].dt.isocalendar().week.astype(str).astype("int")  # categories have be strin
df["month"] = df['Date'].dt.month.astype(str).astype("int")
df['hour'] = df['Date'].dt.hour.astype(str).astype("int")
df['day'] = df['Date'].dt.day.astype(str).astype("int")
#df['minute'] = df['Date'].dt.minute.astype(str).astype("int")
df['time_idx']=df.index
df['hours_from_start'] = (df['Date'] - earliest_time).dt.seconds / 60 / 60 + (df['Date'] - earliest_time).d
df['hours_from_start'] = df['hours_from_start'].astype('int')
df['days_from_start'] = (df['Date'] - earliest_time).dt.days
df['group']=0
df['Global_active_power']=df['Global_active_power'].astype("float64")
time_df = df[[
    'Global_active_power'
,'GT1_Hits'
,'GT2_Hits'
,'GT3_Hits'
,'day_of_week'
,'week_of_year'
,'month'
,'hour'
,'day'
```

```
        ,'time_idx'
        ,'hours_from_start'
        ,'days_from_start'
        ,'group'
        ]]
        df.dtypes
```

```
time_df.isna().values.sum()
```

```python
#Hyperparameters
#batch size=64
#number heads=4, hidden sizes=160, lr=0.001, gr_clip=0.1

max_prediction_length = 24
max_encoder_length = 7*24
training_cutoff = time_df["hours_from_start"].max() - max_prediction_length

training = TimeSeriesDataSet(
    time_df[lambda x: x.hours_from_start <= training_cutoff],
    time_idx="hours_from_start",
    target="Global_active_power",
    group_ids=['group'],
    min_encoder_length=max_encoder_length // 2,
    max_encoder_length=max_encoder_length,
    min_prediction_length=1,
    max_prediction_length=max_prediction_length,
    #static_categoricals=["consumer_id"],
    time_varying_known_reals=["hours_from_start","day","day_of_week", "month", 'hour'],
    time_varying_unknown_reals=['Global_active_power'],
    target_normalizer=GroupNormalizer(
        groups=["group"], transformation="softplus"
    ),  # we normalize by group
    add_relative_time_idx=True,
    add_target_scales=True,
    add_encoder_length=True,
    allow_missing_timesteps=True
)


validation = TimeSeriesDataSet.from_dataset(training, time_df, predict=True, stop_randomization=True)

# create dataloaders for  our model
batch_size = 64
# if you have a strong GPU, feel free to increase the number of workers
train_dataloader = training.to_dataloader(train=True, batch_size=batch_size, num_workers=5)
val_dataloader = validation.to_dataloader(train=False, batch_size=batch_size * 10, num_workers=5)
```

```python
early_stop_callback = EarlyStopping(monitor="val_loss", min_delta=1e-4, patience=5, verbose=True, mode="mi
lr_logger = LearningRateMonitor()
logger = TensorBoardLogger("lightning_logs")

trainer = pl.Trainer(
    max_epochs=45,
    accelerator='auto',
    devices=1,
    enable_model_summary=True,
    gradient_clip_val=0.1,
    callbacks=[lr_logger, early_stop_callback],
    logger=logger)

tft = TemporalFusionTransformer.from_dataset(
    training,
    learning_rate=0.01,
    hidden_size=160,
    attention_head_size=4,
    dropout=1,
    hidden_continuous_size=160,
    output_size=7,  # there are 7 quantiles by default: [0.02, 0.1, 0.25, 0.5, 0.75, 0.9, 0.98]
    loss=QuantileLoss(),
    log_interval=10,
    reduce_on_plateau_patience=4)

trainer.fit(
    tft,
```

```
        train_dataloaders=train_dataloader,
        val_dataloaders=val_dataloader)
```

```
best_model_path = trainer.checkpoint_callback.best_model_path
print(best_model_path)
best_tft = TemporalFusionTransformer.load_from_checkpoint(best_model_path)
```

```
#Take a look at what the raw_predictions variable contains

raw_predictions = best_tft.predict(val_dataloader, mode="raw", return_x=True)
print(raw_predictions._fields)
#('output', 'x', 'index', 'decoder_lengths', 'y')

print('\n')
print(raw_predictions.output._fields)
# ('prediction',
# 'encoder_attention',
# 'decoder_attention',
# 'static_variables',
# 'encoder_variables',
# 'decoder_variables',
# 'decoder_lengths',
# 'encoder_lengths')

print('\n')
print(raw_predictions.output.prediction.shape)
#torch.Size([5, 24, 7])

# We get predictions of 5 time-series for 24 days.
# For each day we get 7 predictions - these are the 7 quantiles:
#[0.02, 0.1, 0.25, 0.5, 0.75, 0.9, 0.98]
# We are mostly interested in the 4th quantile which represents, let's say, the 'median loss'
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```

```
import matplotlib.pyplot as plt
for idx in range(5):  # plot all 5 consumers
    fig, ax = plt.subplots(figsize=(10, 4))
    best_tft.plot_prediction(raw_predictions.x, raw_predictions.output, idx=idx, add_loss_to_title=Quantile
```

```
raw_predictions= best_tft.predict(val_dataloader, mode="raw", return_x=True)
interpretation = best_tft.interpret_output(raw_predictions.output, reduction="sum")
best_tft.plot_interpretation(interpretation)
```