```
!pip install cvxpy
!pip install quantlib
!pip install pyportfolioopt
!pip install qlib
```

```
Requirement already satisfied: cvxpy in /usr/local/lib/python3.12/dist-packages (1.6.7)
Requirement already satisfied: osqp>=0.6.2 in /usr/local/lib/python3.12/dist-packages (from cvxpy) (1.0.5
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Requirement already satisfied: pycparser in /usr/local/lib/python3.12/dist-packages (from cffi->clarabel>
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.12/dist-packages (from jinja2->o
Requirement already satisfied: qlib in /usr/local/lib/python3.12/dist-packages (0.0.2.dev20)
```

```
!pip install pyqlib matplotlib
```

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Requirement already satisfied: pyqlib in /usr/local/lib/python3.12/dist-packages (0.9.7)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.12/dist-packages (3.10.0)
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Requirement already satisfied: numpy in /usr/local/lib/python3.12/dist-packages (from pyqlib) (2.0.2)
Requirement already satisfied: pandas>=0.24 in /usr/local/lib/python3.12/dist-packages (from pyqlib) (2.
Requirement already satisfied: mlflow in /usr/local/lib/python3.12/dist-packages (from pyqlib) (3.5.1)
Requirement already satisfied: filelock>=3.16.0 in /usr/local/lib/python3.12/dist-packages (from pyqlib)
Requirement already satisfied: redis in /usr/local/lib/python3.12/dist-packages (from pyqlib) (7.0.1)
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Requirement already satisfied: tqdm in /usr/local/lib/python3.12/dist-packages (from pyqlib) (4.67.1)
Requirement already satisfied: pymongo in /usr/local/lib/python3.12/dist-packages (from pyqlib) (4.15.3)
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Requirement already satisfied: gym in /usr/local/lib/python3.12/dist-packages (from pyqlib) (0.25.2)
Requirement already satisfied: cvxpy in /usr/local/lib/python3.12/dist-packages (from pyqlib) (1.6.7)
Requirement already satisfied: joblib in /usr/local/lib/python3.12/dist-packages (from pyqlib) (1.5.2)
Requirement already satisfied: jupyter in /usr/local/lib/python3.12/dist-packages (from pyqlib) (1.1.1)
Requirement already satisfied: nbconvert in /usr/local/lib/python3.12/dist-packages (from pyqlib) (7.16.
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Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.12/dist-packages (from pandas>=0.2
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.12/dist-packages (from pandas>=0
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.12/dist-packages (from python-dateutil
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Requirement already satisfied: mlflow-skinny==3.5.1 in /usr/local/lib/python3.12/dist-packages (from mlf
Requirement already satisfied: mlflow-tracing==3.5.1 in /usr/local/lib/python3.12/dist-packages (from ml
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Requirement already satisfied: docker<8,>=4.0.0 in /usr/local/lib/python3.12/dist-packages (from mlflow-
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Requirement already satisfied: gunicorn<24 in /usr/local/lib/python3.12/dist-packages (from mlflow->pyql
Requirement already satisfied: scikit-learn<2 in /usr/local/lib/python3.12/dist-packages (from mlflow->p
```

```python
import qlib
from qlib.data import D
from qlib.contrib.data.handler import Alpha158
from qlib.contrib.model.gbdt import LGBModel
from qlib.contrib.evaluate import risk_analysis
import matplotlib.pyplot as plt
import pandas as pd

# 1. Init environment
qlib.init(provider_uri="~/.qlib/qlib_data/cn_data", region="cn")

# 2. Load features & labels
handler = Alpha158(instruments="csi300", start_time="2018-01-01", end_time="2020-12-31")
dataset = handler.fetch()

# 3. Split data
X = dataset.get_feature()
y = dataset.get_label()
split = int(len(X) * 0.8)
X_train, X_test = X[:split], X[split:]
y_train, y_test = y[:split], y[split:]

# 4. Train model
model = LGBModel()
model.fit(X_train, y_train)

# 5. Predict and evaluate
pred = model.predict(X_test)
report_normal, indicators = risk_analysis(pred, y_test, show_figure=False)
returns = report_normal["daily_return"]

# 6. Compute cumulative returns
cum_return = (1 + returns).cumprod()

# 7. Visualize
plt.figure(figsize=(10,5))
plt.plot(cum_return, label='Cumulative Return', linewidth=2)
plt.title("Qlib Quantitative Backtest – Model-Generated Portfolio Returns")
plt.xlabel("Time")
plt.ylabel("Cumulative Growth")
plt.legend()
plt.grid(True)
plt.show()
```

```
[23514:MainThread](2025-11-02 09:54:53,804) INFO - qlib.Initialization - [config.py:452] - default_conf:
[23514:MainThread](2025-11-02 09:54:53,807) WARNING - qlib.Initialization - [__init__.py:65] - auto_path
[23514:MainThread](2025-11-02 09:54:53,810) INFO - qlib.Initialization - [__init__.py:75] - qlib successf
[23514:MainThread](2025-11-02 09:54:53,812) INFO - qlib.Initialization - [__init__.py:77] - data_path={'_
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/usr/local/lib/python3.12/dist-packages/qlib/data/data.py in features(self, instruments, fields,
start_time, end_time, freq, disk_cache, inst_processors)
   1185         try:
-> 1186             return DatasetD.dataset(
   1187                 instruments, fields, start_time, end_time, freq, disk_cache,
inst_processors=inst_processors

TypeError: LocalDatasetProvider.dataset() got multiple values for argument 'inst_processors'

During handling of the above exception, another exception occurred:

ValueError                                Traceback (most recent call last)
                                15 frames
/usr/local/lib/python3.12/dist-packages/qlib/data/storage/file_storage.py in uri(self)
     60     def uri(self) -> Path:
     61         if self.freq not in self.support_freq:
---> 62             raise ValueError(f"{self.storage_name}: {self.provider_uri} does not contain data for
{self.freq}")
     63         return self.dpm.get_data_uri(self.freq).joinpath(f"{self.storage_name}s", self.file_name)
     64
```

```
!pip install quantstats
```

```
Collecting quantstats
  Downloading quantstats-0.0.77-py2.py3-none-any.whl.metadata (9.1 kB)
Requirement already satisfied: pandas<3.0.0,>=1.5.0 in /usr/local/lib/python3.12/dist-packages (from quan
Requirement already satisfied: numpy>=1.21.0 in /usr/local/lib/python3.12/dist-packages (from quantstats)
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.12/dist-packages (from quantstat
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Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from
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Requirement already satisfied: pycparser in /usr/local/lib/python3.12/dist-packages (from cffi>=1.12.0->c
Downloading quantstats-0.0.77-py2.py3-none-any.whl (81 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 81.4/81.4 kB 2.7 MB/s eta 0:00:00
Installing collected packages: quantstats
Successfully installed quantstats-0.0.77
```

Quantstats

```
%matplotlib inline
import quantstats as qs

qs.extend_pandas()
stock = qs.utils.download_returns('META')
qs.stats.sharpe(stock)
stock.sharpe()
```

```
np.float64(0.7292953910535441)
```

```
display(stock.head())
display(stock.info())
```

	Strategy
Date	
2012-05-18	0.000000
2012-05-21	-0.109861
2012-05-22	-0.089039
2012-05-23	0.032258
2012-05-24	0.032187

dtype: float64

```
<class 'pandas.core.series.Series'>
DatetimeIndex: 3384 entries, 2012-05-18 to 2025-10-31
Series name: Strategy
Non-Null Count  Dtype
--------------  -----
3384 non-null   float64
dtypes: float64(1)
memory usage: 52.9 KB
None
```

```
import warnings
warnings.filterwarnings("ignore", category=UserWarning, module="matplotlib")

qs.reports.html(stock, "SPY", output='quantstats_report.html')
```

```
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
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WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
```

```
ors = ['GOOGL', 'SNAP', 'PINS', 'X', 'TCEHY']
for orz in ors:
  try:
    stock = qs.utils.download_returns(orz)
    qs.stats.sharpe(stock)
    stock.sharpe()
    display(stock.head())
    display(stock.info())
    qs.reports.html(stock, "SPY", output=f'{orz}_Qreport.html')
  except:
    continue
```

Date	Close
2004-08-19	0.000000
2004-08-20	0.079430
2004-08-23	0.010064
2004-08-24	-0.041408
2004-08-25	0.010775

dtype: float64

```
<class 'pandas.core.series.Series'>
DatetimeIndex: 5336 entries, 2004-08-19 to 2025-10-31
Series name: Close
Non-Null Count  Dtype
--------------  -----
5336 non-null   float64
dtypes: float64(1)
memory usage: 83.4 KB
None
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
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```

Date	Close
2017-03-02	0.000000
2017-03-03	0.106618
2017-03-06	-0.122554
2017-03-07	-0.098023
2017-03-08	0.063899

dtype: float64

```
<class 'pandas.core.series.Series'>
DatetimeIndex: 2181 entries, 2017-03-02 to 2025-10-31
Series name: Close
```

```
Series name: Close
Non-Null Count  Dtype
--------------  -----
2181 non-null   float64
dtypes: float64(1)
memory usage: 34.1 KB
None
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
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```

Date	Close
2019-04-18	0.000000
2019-04-22	0.024180
2019-04-23	0.034414
2019-04-24	0.036750
2019-04-25	0.074627

dtype: float64

```
<class 'pandas.core.series.Series'>
DatetimeIndex: 1645 entries, 2019-04-18 to 2025-10-31
Series name: Close
Non-Null Count  Dtype
--------------  -----
1645 non-null   float64
dtypes: float64(1)
memory usage: 25.7 KB
None
WARNING:matplotlib.font_manager:findfont: Font family 'Arial' not found.
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