reusable-extensible-python-functions-financial-data-analysis

November 29, 2025

1 Reusable And Extensible Python Functions For Financial Data Analysis

1.1 Python Imports

```python
[1]: # Standard Library
import datetime
import io
import os
import random
import sys
import warnings

from datetime import datetime, timedelta
from pathlib import Path

# Data Handling
import numpy as np
import pandas as pd

# Data Visualization
import matplotlib.dates as mdates
import matplotlib.pyplot as plt
import matplotlib.ticker as mtick
import seaborn as sns
from matplotlib.ticker import FormatStrFormatter, FuncFormatter, MultipleLocator

# Data Sources
import yfinance as yf

# Statistical Analysis
import statsmodels.api as sm

# Machine Learning
from sklearn.decomposition import PCA
from sklearn.preprocessing import StandardScaler
```

```python
# Suppress warnings
warnings.filterwarnings("ignore")
```

1.2 Add Directories To Path

```python
[2]: # Add the source subdirectory to the system path to allow import config from␣
     ↪settings.py
     current_directory = Path(os.getcwd())
     website_base_directory = current_directory.parent.parent.parent
     src_directory = website_base_directory / "src"
     sys.path.append(str(src_directory)) if str(src_directory) not in sys.path else␣
     ↪None

     # Import settings.py
     from settings import config

     # Add configured directories from config to path
     SOURCE_DIR = config("SOURCE_DIR")
     sys.path.append(str(Path(SOURCE_DIR))) if str(Path(SOURCE_DIR)) not in sys.path␣
     ↪else None

     # Add other configured directories
     BASE_DIR = config("BASE_DIR")
     CONTENT_DIR = config("CONTENT_DIR")
     POSTS_DIR = config("POSTS_DIR")
     PAGES_DIR = config("PAGES_DIR")
     PUBLIC_DIR = config("PUBLIC_DIR")
     SOURCE_DIR = config("SOURCE_DIR")
     DATA_DIR = config("DATA_DIR")
     DATA_MANUAL_DIR = config("DATA_MANUAL_DIR")

     # Print system path
     for i, path in enumerate(sys.path):
         print(f"{i}: {path}")
```

```
0: /usr/lib/python313.zip
1: /usr/lib/python3.13
2: /usr/lib/python3.13/lib-dynload
3:
4: /home/jared/python-virtual-envs/general_313/lib/python3.13/site-packages
5: /home/jared/Cloud_Storage/Dropbox/Websites/jaredszajkowski.github.io/src
```

1.3 Track Index Dependencies

```python
[3]: # Create file to track markdown dependencies
     dep_file = Path("index_dep.txt")
     dep_file.write_text("")
```

```
[3]: 0
```

1.4 Python Functions

```
[4]: from export_track_md_deps import export_track_md_deps
```

```
[5]: from bb_clean_data import bb_clean_data
     code = Path(SOURCE_DIR / "bb_clean_data.py").read_text()
     md_code_block = f"```python\n{code}\n```"
     # Copy this <!-- INSERT_bb_clean_data_HERE --> to index_temp.md
     export_track_md_deps(dep_file=dep_file, md_filename="bb_clean_data.md",␣
      ↪content=md_code_block)
```

      Exported and tracked: bb_clean_data.md

```
[6]: from build_index import build_index
     code = Path(SOURCE_DIR / "build_index.py").read_text()
     md_code_block = f"```python\n{code}\n```"
     # Copy this <!-- INSERT_build_index_HERE --> to index_temp.md
     export_track_md_deps(dep_file=dep_file, md_filename="build_index.md",␣
      ↪content=md_code_block)
```

      Exported and tracked: build_index.md

```
[7]: from calc_vix_trade_pnl import calc_vix_trade_pnl
     code = Path(SOURCE_DIR / "calc_vix_trade_pnl.py").read_text()
     md_code_block = f"```python\n{code}\n```"
     # Copy this <!-- INSERT_calc_vix_trade_pnl_HERE --> to index_temp.md
     export_track_md_deps(dep_file=dep_file, md_filename="calc_vix_trade_pnl.md",␣
      ↪content=md_code_block)
```

      Exported and tracked: calc_vix_trade_pnl.md

```
[8]: from coinbase_fetch_available_products import coinbase_fetch_available_products
     code = Path(SOURCE_DIR / "coinbase_fetch_available_products.py").read_text()
     md_code_block = f"```python\n{code}\n```"
     # Copy this <!-- INSERT_coinbase_fetch_available_products_HERE --> to␣
      ↪index_temp.md
     export_track_md_deps(dep_file=dep_file,␣
      ↪md_filename="coinbase_fetch_available_products.md", content=md_code_block)
```

      Exported and tracked: coinbase_fetch_available_products.md

```
[9]: from coinbase_fetch_full_history import coinbase_fetch_full_history
     code = Path(SOURCE_DIR / "coinbase_fetch_full_history.py").read_text()
     md_code_block = f"```python\n{code}\n```"
     # Copy this <!-- INSERT_coinbase_fetch_full_history_HERE --> to index_temp.md
     export_track_md_deps(dep_file=dep_file,␣
      ↪md_filename="coinbase_fetch_full_history.md", content=md_code_block)
```

Exported and tracked: coinbase_fetch_full_history.md

```python
[10]: from coinbase_fetch_historical_candles import coinbase_fetch_historical_candles
      code = Path(SOURCE_DIR / "coinbase_fetch_historical_candles.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_coinbase_fetch_historical_candles_HERE --> to
      →index_temp.md
      export_track_md_deps(dep_file=dep_file,
      →md_filename="coinbase_fetch_historical_candles.md", content=md_code_block)
```

Exported and tracked: coinbase_fetch_historical_candles.md

```python
[11]: from coinbase_pull_data import coinbase_pull_data
      code = Path(SOURCE_DIR / "coinbase_pull_data.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_coinbase_pull_data_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="coinbase_pull_data.md",
      →content=md_code_block)
```

Exported and tracked: coinbase_pull_data.md

```python
[12]: from df_info import df_info
      code = Path(SOURCE_DIR / "df_info.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_df_info_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="df_info.md",
      →content=md_code_block)
```

Exported and tracked: df_info.md

```python
[13]: from df_info_markdown import df_info_markdown
      code = Path(SOURCE_DIR / "df_info_markdown.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_df_info_markdown_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="df_info_markdown.md",
      →content=md_code_block)
```

Exported and tracked: df_info_markdown.md

```python
[14]: from export_track_md_deps import export_track_md_deps
      code = Path(SOURCE_DIR / "export_track_md_deps.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_export_track_md_deps_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="export_track_md_deps.md",
      →content=md_code_block)
```

Exported and tracked: export_track_md_deps.md

```python
[15]: from load_api_keys import load_api_keys
      code = Path(SOURCE_DIR / "load_api_keys.py").read_text()
```

```python
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_load_api_keys_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="load_api_keys.md",
    ↪content=md_code_block)
```

Exported and tracked: load_api_keys.md

```python
[16]: from load_data import load_data
code = Path(SOURCE_DIR / "load_data.py").read_text()
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_load_data_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="load_data.md",
    ↪content=md_code_block)
```

Exported and tracked: load_data.md

```python
[17]: from pandas_set_decimal_places import pandas_set_decimal_places
code = Path(SOURCE_DIR / "pandas_set_decimal_places.py").read_text()
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_pandas_set_decimal_places_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="pandas_set_decimal_places.
    ↪md", content=md_code_block)
```

Exported and tracked: pandas_set_decimal_places.md

```python
[18]: from plot_timeseries import plot_timeseries
code = Path(SOURCE_DIR / "plot_timeseries.py").read_text()
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_plot_timeseries_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="plot_timerseries.md",
    ↪content=md_code_block)
```

Exported and tracked: plot_timerseries.md

```python
[19]: from plot_stats import plot_stats
code = Path(SOURCE_DIR / "plot_stats.py").read_text()
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_plot_stats_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="plot_stats.md",
    ↪content=md_code_block)
```

Exported and tracked: plot_stats.md

```python
[20]: from plot_vix_with_trades import plot_vix_with_trades
code = Path(SOURCE_DIR / "plot_vix_with_trades.py").read_text()
md_code_block = f"```python\n{code}\n```"
# Copy this <!-- INSERT_plot_vix_with_trades_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="plot_vix_with_trades.md",
    ↪content=md_code_block)
```

Exported and tracked: plot_vix_with_trades.md

```python
[21]: from polygon_fetch_full_history import polygon_fetch_full_history
      code = Path(SOURCE_DIR / "polygon_fetch_full_history.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_polygon_fetch_full_history_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="polygon_fetch_full_history.
       ↪md", content=md_code_block)
```

Exported and tracked: polygon_fetch_full_history.md

```python
[22]: from polygon_pull_data import polygon_pull_data
      code = Path(SOURCE_DIR / "polygon_pull_data.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_polygon_pull_data_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="polygon_pull_data.md",␣
       ↪content=md_code_block)
```

Exported and tracked: polygon_pull_data.md

```python
[23]: from strategy_harry_brown_perm_port import strategy_harry_brown_perm_port
      code = Path(SOURCE_DIR / "strategy_harry_brown_perm_port.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_strategy_harry_brown_perm_port_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file,␣
       ↪md_filename="strategy_harry_brown_perm_port.md", content=md_code_block)
```

Exported and tracked: strategy_harry_brown_perm_port.md

```python
[24]: from summary_stats import summary_stats
      code = Path(SOURCE_DIR / "summary_stats.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_summary_stats_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="summary_stats.md",␣
       ↪content=md_code_block)
```

Exported and tracked: summary_stats.md

```python
[25]: from yf_pull_data import yf_pull_data
      code = Path(SOURCE_DIR / "yf_pull_data.py").read_text()
      md_code_block = f"```python\n{code}\n```"
      # Copy this <!-- INSERT_yf_pull_data_HERE --> to index_temp.md
      export_track_md_deps(dep_file=dep_file, md_filename="yf_pull_data.md",␣
       ↪content=md_code_block)
```

Exported and tracked: yf_pull_data.md