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

July 21, 2025

1 Reusable And Extensible Python Functions For Financial Data Analysis

1.1 Python Imports

[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
```

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

1.2 Add Directories To Path

[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

QUANT_FINANCE_RESEARCH_BASE_DIR = config("QUANT_FINANCE_RESEARCH_BASE_DIR")
sys.path.append(str(Path(QUANT_FINANCE_RESEARCH_BASE_DIR))) if␣
 ↪str(Path(QUANT_FINANCE_RESEARCH_BASE_DIR)) not in sys.path else None

QUANT_FINANCE_RESEARCH_SOURCE_DIR = config("QUANT_FINANCE_RESEARCH_SOURCE_DIR")
sys.path.append(str(Path(QUANT_FINANCE_RESEARCH_SOURCE_DIR))) if␣
 ↪str(Path(QUANT_FINANCE_RESEARCH_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
6: /home/jared/Cloud_Storage/Dropbox/Quant_Finance_Research
7: /home/jared/Cloud_Storage/Dropbox/Quant_Finance_Research/src
```

1.3 Track Index Dependencies

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

from export_track_md_deps import export_track_md_deps
```

1.4 Python Functions

[4]:
```
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
```

[5]:
```
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
```

[6]:
```
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
```

[7]:
```
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
```

[8]:
```python
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
```

[9]:
```python
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
```

[10]:
```python
from load_api_keys import load_api_keys
code = Path(SOURCE_DIR / "load_api_keys.py").read_text()
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
```

[11]:
```python
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
```

[12]:
```python
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
```

[13]:
```python
from plot_price import plot_price
code = Path(SOURCE_DIR / "plot_price.py").read_text()
md_code_block = f"```python\n{code}\n```"
```

```
# Copy this <!-- INSERT_plot_price_HERE --> to index_temp.md
export_track_md_deps(dep_file=dep_file, md_filename="plot_price.md",␣
 ↪content=md_code_block)
```

```
Exported and tracked: plot_price.md
```

[14]:
```
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
```

[15]:
```
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
```

[16]:
```
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
```

[17]:
```
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
```

[18]:
```
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
```