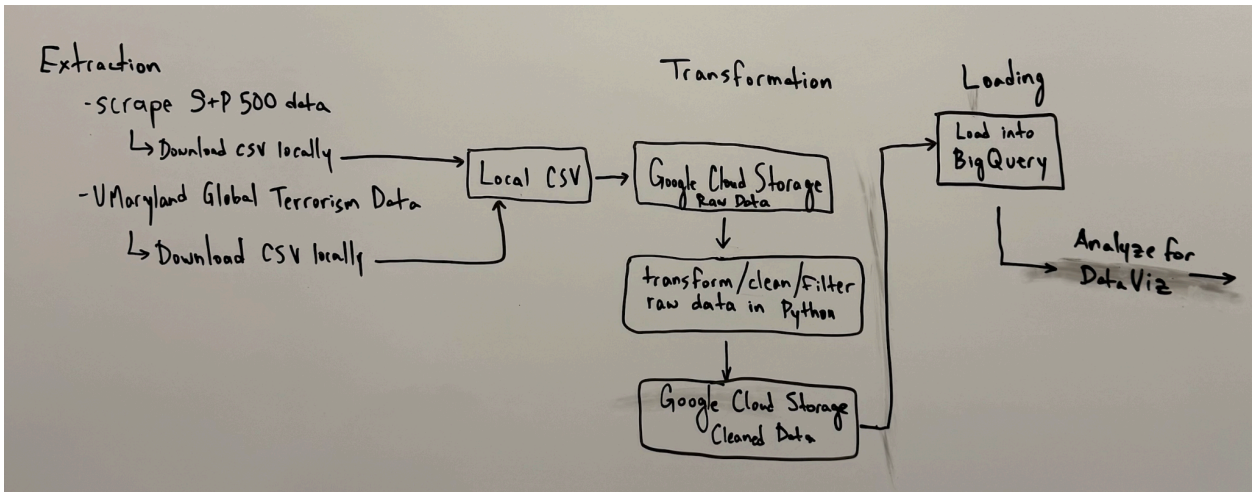
ETL Setup



Data Considerations

- Filesize (row counts)
- Null values
- Naming convention

Storage Considerations

- Having enough Google Cloud credits
- Naming our bucket in a understandable way

ETL/Storage Steps

- Create venv
- python3.9 -m venv venv
- source venv/bin/activate

- Install dependencies
- pip install google-cloud-storage pandas
- pip install google

- Create Google Cloud Project
- Collect Project ID: datasystemsfinal
- Enable Cloud Storage API and BigQuery API
- Install Google Cloud SDK

- `gcloud auth login`
- `gcloud config set project [YOUR_PROJECT_ID]`
- Create a storage bucket in console, name: etl-bucket-2002, region: us-east1, storage_class: standard, access_control: uniform, data_protection: default

- Clean data
- Load data into bucket

Data Analysis

Attacks were the most common in Asia, with almost 50% of terrorist attacks coming from that region. The police and military were the most commonly targeted demographic of these attacks, followed by the government as a close second in every region around the world. In the second graphic, we can clearly see that terrorist attacks massively rose in mid-2008, which was accompanied by a massive decrease in the stock market. This drop in the stock market was likely mostly caused by the housing crash at the time, but it cannot explain the variation later in the graph. Terrorist attacks continued to remain at elevated levels until the end of 2017. During this period, the stock market experienced much larger swings in percent change than before terrorist attacks increased. In act, from 2000 to 2003, when there was a slight increase in terrorist attacks, we can see that the percent change in the stock market was also a little bit more variable. The same can be said in the early 1970s. As a result, it seems that terrorist attacks are a good indicator for stock market variability.

Now we can use the datasets to get a better idea of any correlations between terrorism and the market. Firstly we filtered the attacks by both the region where the attack occurred and the target of the attack so we could better understand any trends within the data subsets. This showed that 90.4% of all recorded attacks occurred in the global east between Asia, Europe and the Middle East with only 2% of attacks occurring in North America. When we look at the data by target type it shows 66% of attacks globally, 12700 in total, were targeting police and military assets making it by far the most popular target with the 4806 non-military government attacks making up the second largest demographic at 25% of the

global total. When we display the frequency of attacks in every month since 1970 against the percent change across the entire S&P 500 in that month we see no direct relation until we reach 2008. In the midst of the 2008 financial recession we see the market take consecutive drops of 137% in June 90% in September and 271% decrease in October, by far the largest dips in the recorded data. Over this same period there is a spike in global terrorist attacks exponentially larger than anything that ever occurred before. Over the whole period before February of 2008 the monthly average for reported attacks was 3.5 globally. Before the financial recession the largest increase in terrorism month over month was a 100% increase in early 2000 (from 8 to 16) but in 2008 a jump from 2 attacks in march to 106 over 2 months marked a 5200% increase. After March 2008 there was a staggering jump to 139.9 attacks monthly until the end of 2017. The 2 attacks in march of 2008 still stands as the lowest value for any month since the beginning of 2008, as numbers have never returned to their previous lows. These trends suggest that the increase in global economic turmoil during the recession may have been a catalyst for the dramatic increase in attacks. However, in each instance where there is a dramatic fall in stock value the spike in attacks occurred 1 or 2 months beforehand. We can attribute this to a phenomenon known as economic lag. The public often feels the effects of economic turmoil, like job losses or rising costs, before the stock market reacts because the market is forward-looking and driven by investor expectations. While individuals experience immediate financial effects, the market may not respond until companies report declining profits. If we make the assumption that public sentiment of economic standing is a driving factor of increasing terrorist events then increases in attacks may be a semi-reliable indicator of future stock market value in certain instances. In any case, the dramatic changes in the market like the unprecedented changes seen in 2008 certainly seem to be correlated to an increase in worldwide terrorism.