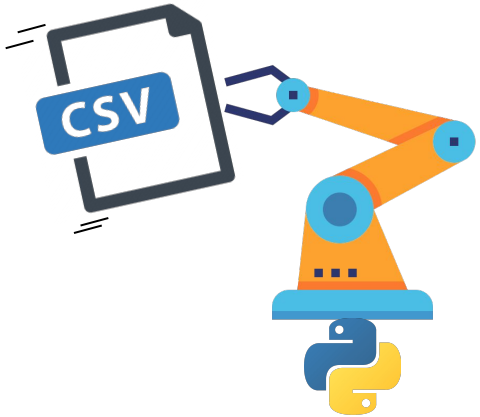
ATS Project

Noah Blake, Dakota Flath, Jacob Rawlings, Alex Ross, Stephen Herbert

Overview

Our Project - The Algorithmic Trading System Warehouse



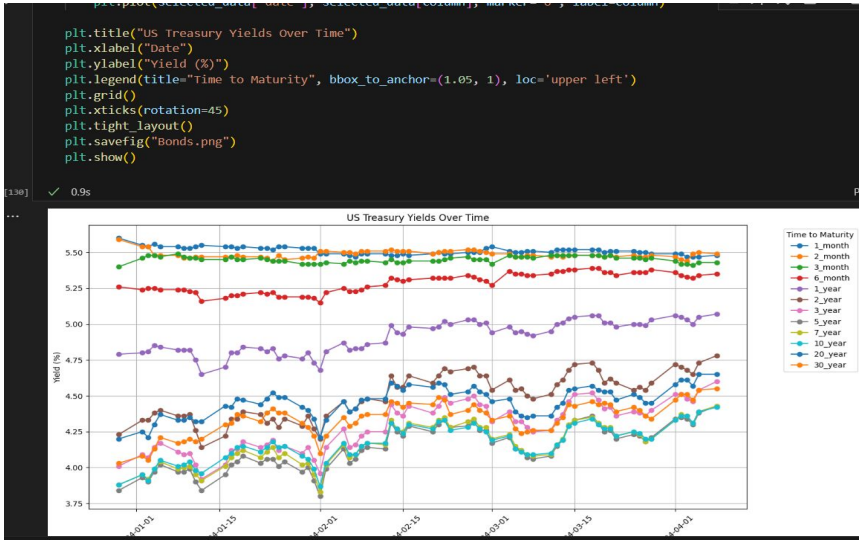
Primary Goals

- Design a **data warehouse** to store financial market data
- Develop an ETL process for an existing dataset
- Generate graph visualizations to represent data

Milestones

Planning our necessary milestones was key

- Examine existing dataset and project
- Design an ERD / Warehouse schema
- Load raw CSV data from the original ATS project
- Clean and verify data, then load into the Warehouse
- Create program that graphs data points for analysis and prediction (scikit-learn)



Technology Used

- MySQl
- Python
- Guacamole
- scikit-learn
- Github
- Google Drive
- Discord (Communication)

Delivered

Our Delivered items:

- Designed a Warehouse ER Diagram / Schema
- Designed a ETL for the index’s, bond’s, stock’s, commodities
- Loaded CSV data from original ATS project and clean up data to send to the Warehouse
- Automated ETL process to automatically add new records to the Warehouse
- Created graph data and used machine learning(scikit-learn) to predict movements in financial systems

Challenges

Our Challenges:

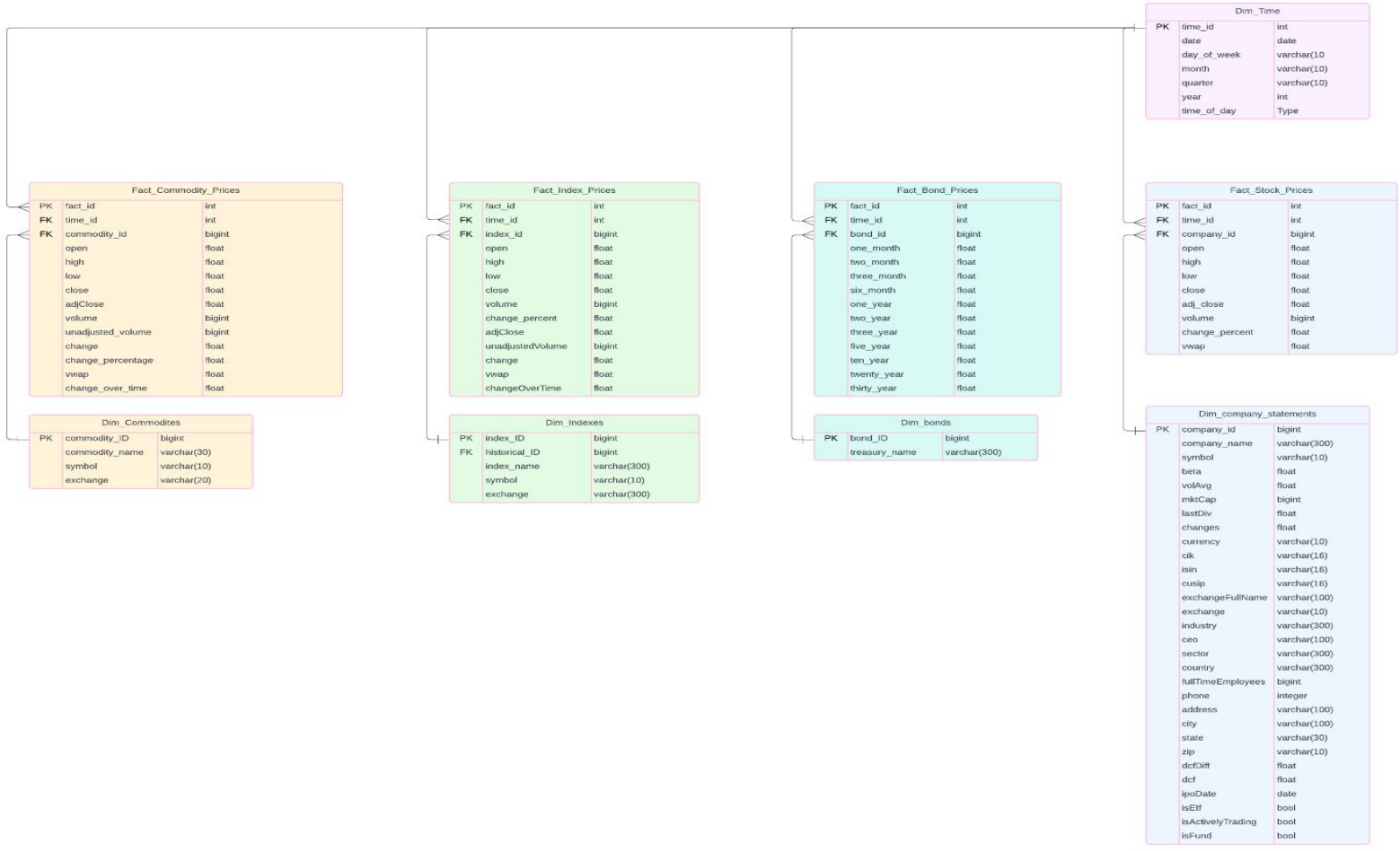
1. Designed a Warehouse ER Diagram / Schema
2. Data visualization difficult to achieve
3. Out-of-date dataset in the beginning
4. One person had access to the guacamole server at a time

Previous Project

1. We initially picked the UFV Urban Agriculture game project. This project had to be abandoned because of…
    a. Unclear requirements for the project
    b. No assets or previous versions of the project
    c. Project was not feasible application to deploy a data warehouse
        i. Engine Limitations
        ii. Lack of support

UNREAL ENGINE

Warehouse Design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month varchar(10)
quarter varchar(10)
year int
time_of_day Type
Fact_Commodity_Prices
PK fact_id int
FK time_id int
FK commodity_id bigint
open float
high float
low float
close float
adjClose float
volume bigint
unadjusted_volume bigint
change float
change_percentage float
vwap float
change_over_time float
Fact_Index_Prices
PK fact_id int
FK time_id int
FK index_id bigint
open float
high float
low float
close float
volume bigint
change_percent float
adjClose float
unadjustedVolume bigint
change float
vwap float
changeOverTime float
Fact_Bond_Prices
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FK time_id int
FK bond_id bigint
one_month float
two_month float
three_month float
six_month float
one_year float
two_year float
three_year float
five_year float
ten_year float
twenty_year float
thirty_year float
Fact_Stock_Prices
PK fact_id int
FK time_id int
FK company_id bigint
open float
high float
low float
close float
adj_close float
volume bigint
change_percent float
vwap float
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PK commodity_ID bigint
commodity_name varchar(30)
symbol varchar(10)
exchange varchar(20)
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FK historical_ID bigint
index_name varchar(300)
symbol varchar(10)
exchange varchar(300)
Dim_bonds
PK bond_ID bigint
treasury_name varchar(300)
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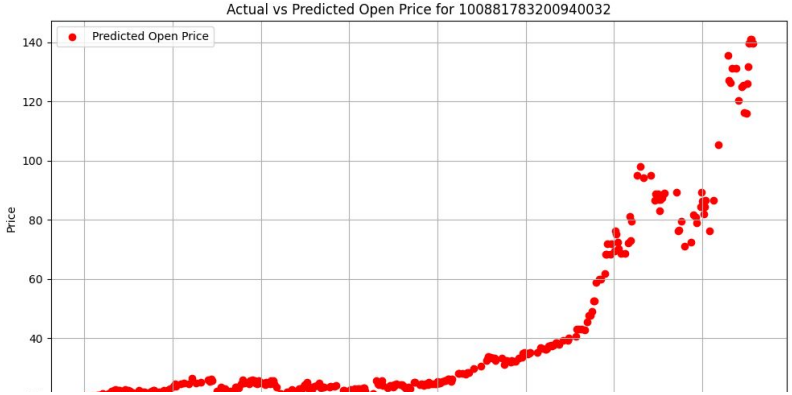
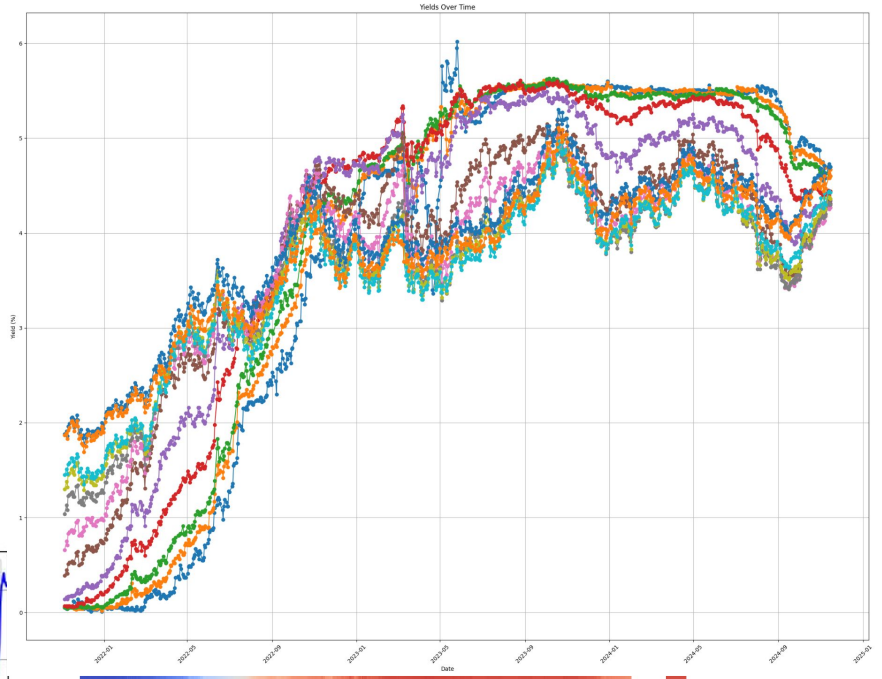
company_name varchar(300)
symbol varchar(10)
beta float
volAvg float
mktCap bigint
lastDiv float
changes float
currency varchar(10)
cik varchar(16)
isin varchar(16)
cusip varchar(16)
exchangeFullName varchar(100)
exchange varchar(10)
industry varchar(300)
ceo varchar(100)
sector varchar(300)
country varchar(300)
fullTimeEmployees bigint
phone integer
address varchar(100)
city varchar(100)
state varchar(30)
zip varchar(10)
dcfDiff float
dcf float
ipoDate date
isEtf bool
isActivelyTrading bool
isFund bool

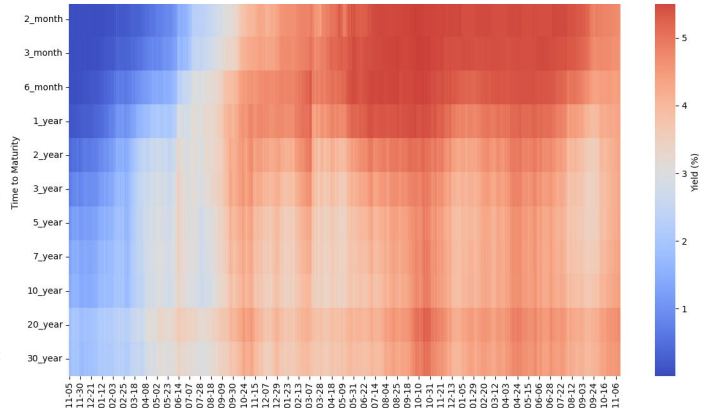
Data Visualization

Some Graphs


Actual vs Predicted Open Price for 100881783200940032
Predicted Open Price
Price
140
120
100
80
60
40


Yields Over Time
Time to Maturity
1_month
2_month
3_month
6_month
1_year
2_year
3_year
5_year
7_year
10_year
20_year
30_year
Yield (%)
Date


100881783200940032 Closing Prices Over Time
100881783200940032 Close Price
2022-01
2022-05
2022-09
2023-01
2023-05
2023-09
2024-01
2024-05
2024-09


Time to Maturity
2_month
3_month
6_month
1_year
2_year
3_year
5_year
7_year
10_year
20_year
30_year
Yield (%)

Questions?