

CS 422 Project 1

Time Series Forecasting & Benchmarks

Team 1 “zeakz”

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Kareem Taha, Zachary Weisenbloom

Team Management and Meetings

Product Owner – Aiden

Frontend – Erin

Backend – Zane, Zach and Kareem

Meetings (online and in person)

Mondays 6–8pm

Thursdays 4–6pm

What we considered:

Frontend:

Flask, React, Express



Flask



React

Backend:

Flask, MongoDB, mySQL



Flask



mongoDB®



MySQL™

What we did:

Frontend:

HTML, JS, CSS Integration into Django



Backend:

SQLite through Django



Planning and Task Dispersal

[illegible]

Our initial approach – Good decisions

- Using SQLite for our database
- Relational database scheme
- Converting uploaded sets into downloadable zip files
- Using a Python-based web framework



Our initial approach – Flawed decisions

Frontend vs. Backend

Consequences:

- Lack of clarity about what the other end has accomplished
- Lack of clarity from backend about how frontend works (HTML, JS, etc)
- Lack of clarity from frontend about how backend works (Django models, views)
- Inability to integrate frontend with backend due to the limitations/mechanics of the Django framework and JavaScript

Our solution to that mistake

Frontend vs. Backend

- We ended up having to redo almost all of the frontend development to integrate it with the backend.
- Parts of the frontend implementation had to be scrapped in order to preserve the backend functionality of uploading and using files with the database.

Evolution of Design

My Website

- [Home](#)
- [About](#)
- [Contact](#)

Upload a file

File: No file chosen

© My Website 2023

Who are you?

Upload time series set

74c2ec6c8dc0f6a6d133379d7d3a33a.json

Set Metadata

Forecasting Task

Upload time series sets

cat.csv

No file chosen

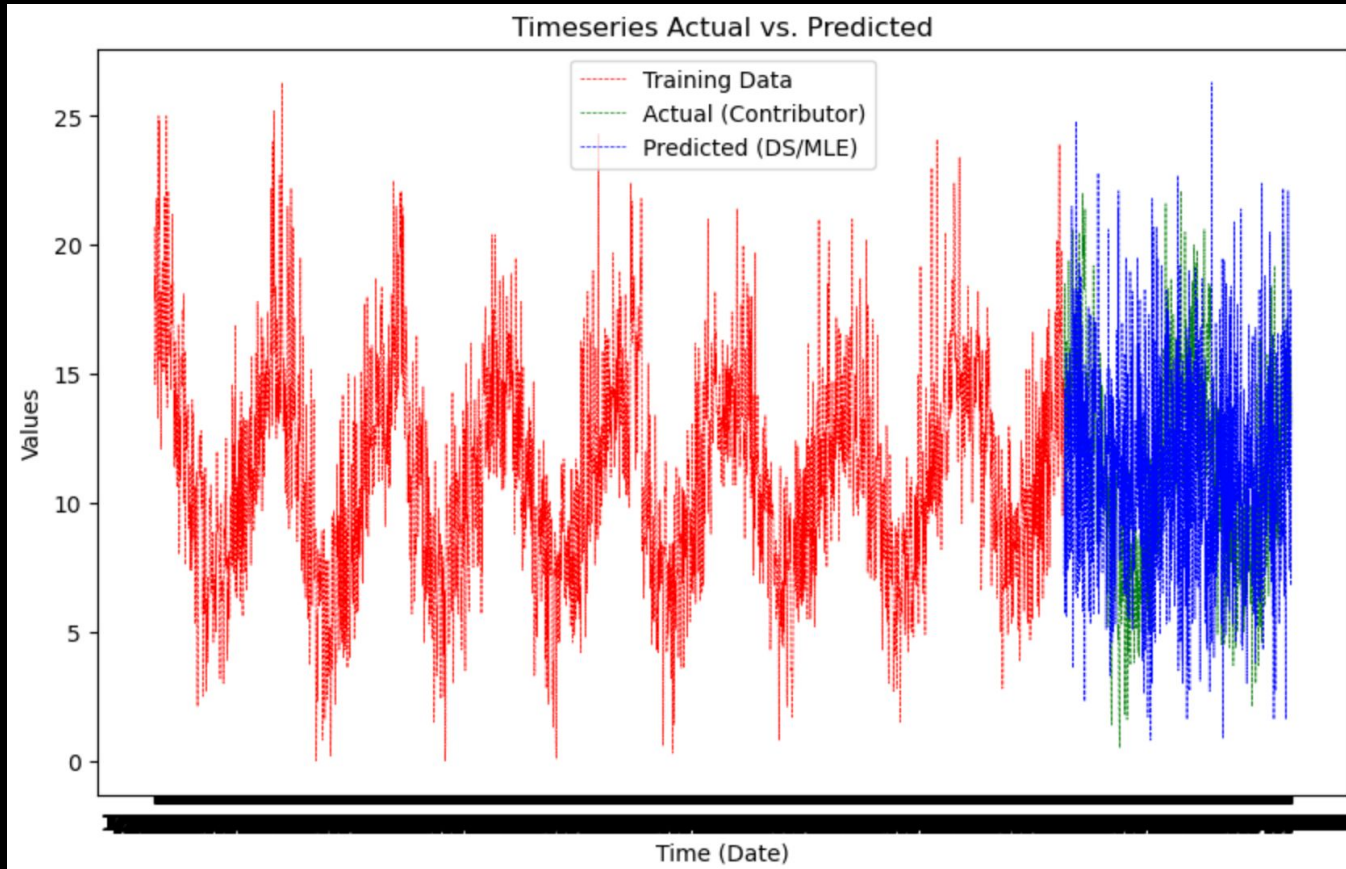
Available Files

Title Test set Training set

Accuracy Metrics

Accuracy Score	% correct
R-correlation	Relationship strength
MAE (Mean Absolute Error)	Avg difference
MAPE (Mean Absolute %Error)	Avg % difference
SMAPE (Symmetric MAPE)	Avg % difference (from symmetric μ)
MSE (Mean Squared Error)	Avg (difference ²)
RMSE (Root MSE)	$\sqrt{\text{Avg (difference}^2\text{)}}$

Model Comparison



Team Experience

- Gained a lot of knowledge about Django/software development
- Difficulty Organizing
 - How do we break down large tasks and split them among the team?
 - What responsibilities will each team member have time to take on?
 - How can we apply everyone's unique skills to the task at hand?
 - What to do next?
- Unforeseen technical problems
 - Linking HTML to Django models to database
 - Issues with version control and GitHub (merging)
- Time management
 - Linking frontend HTML to Django models to database

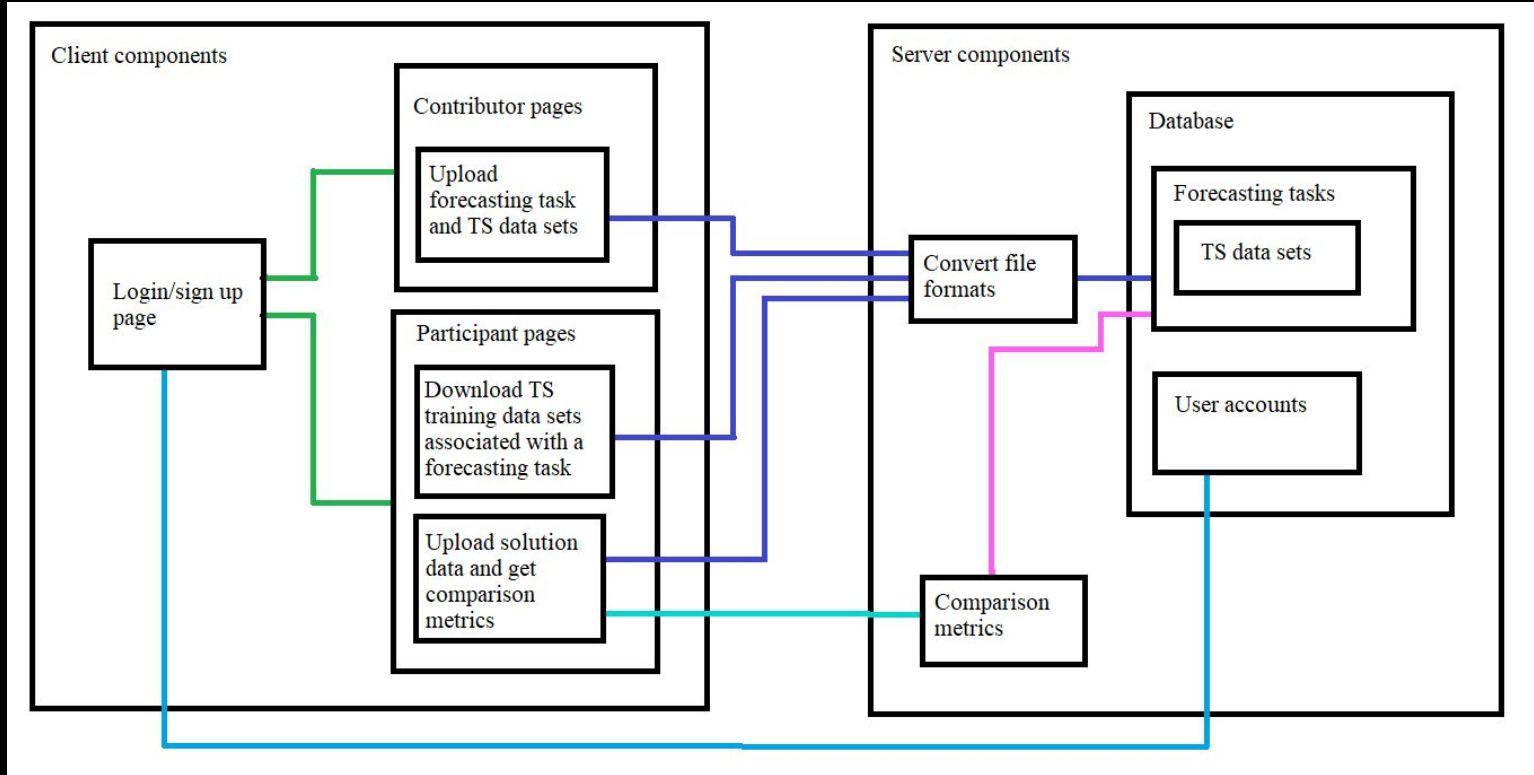
Questions We Asked Our Client

How will time series data be displayed and compared to our models?

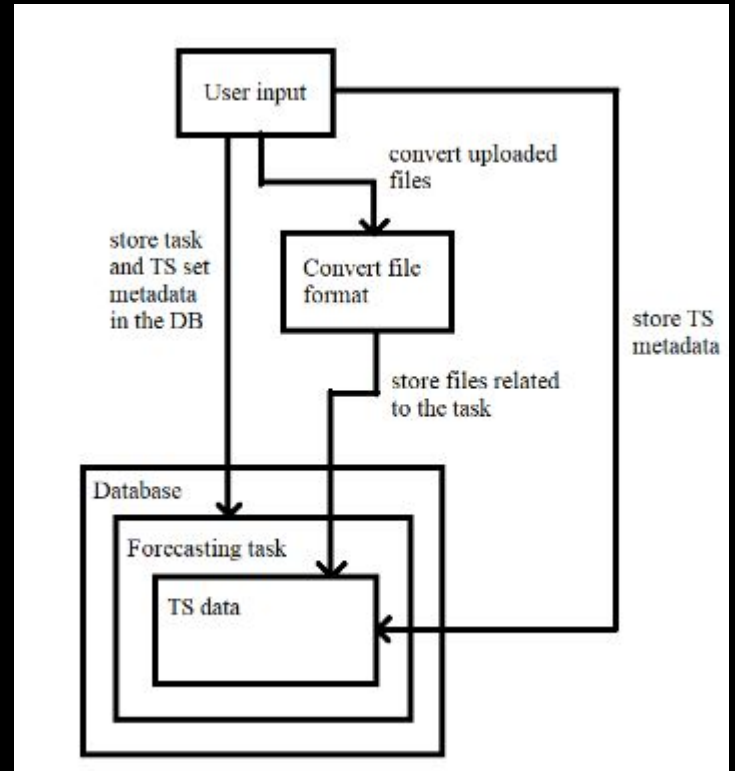
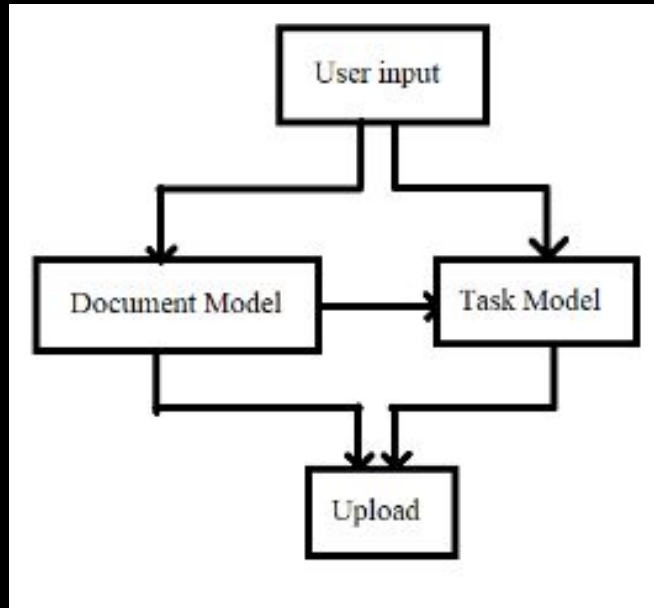
What does each user need to have in terms of functionality and data access?

How should data be forecasting internally based on the situation of files uploaded/downloaded?

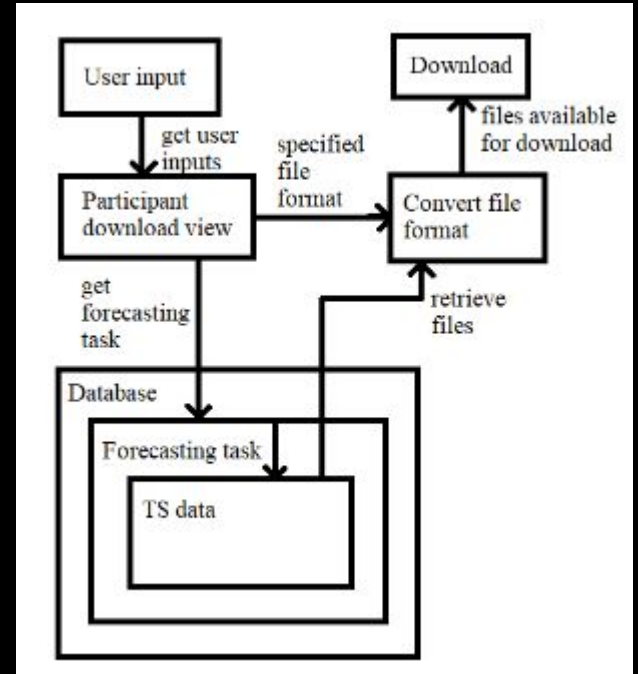
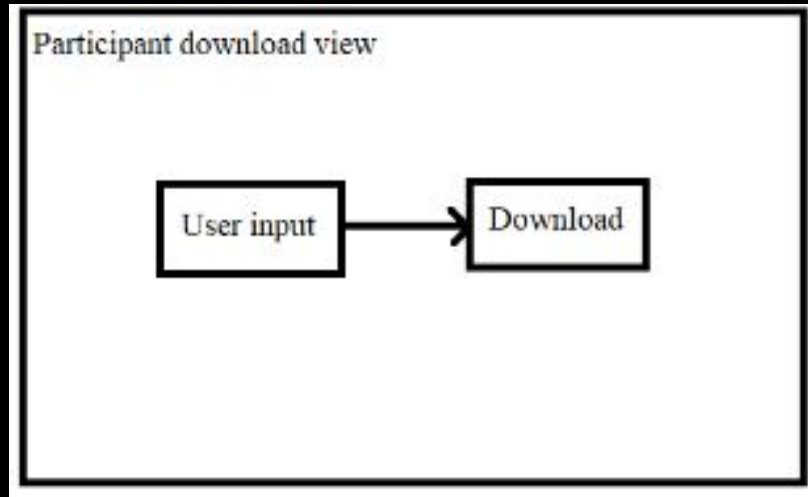
Design & Integration



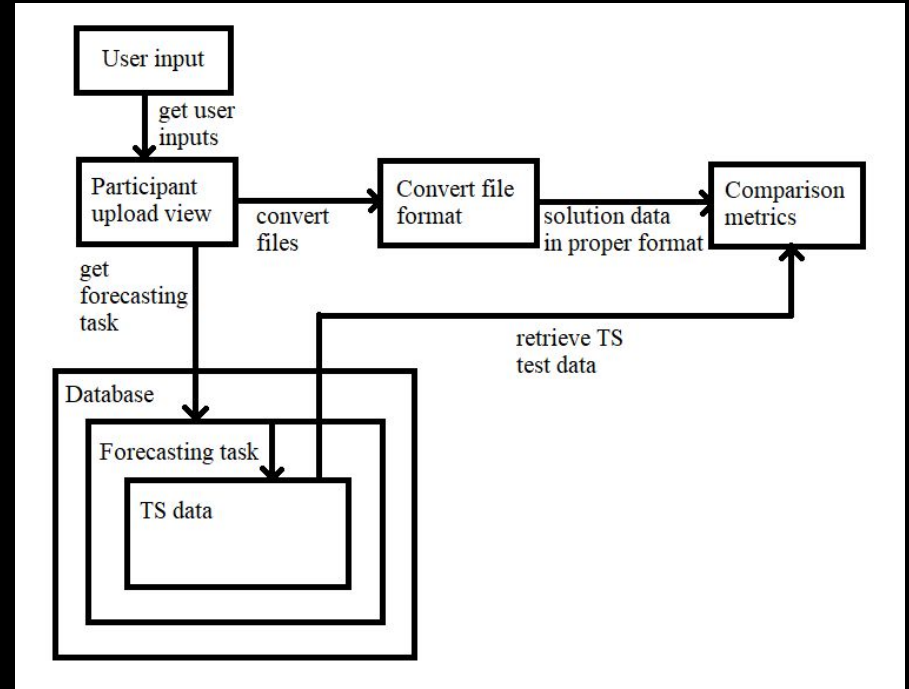
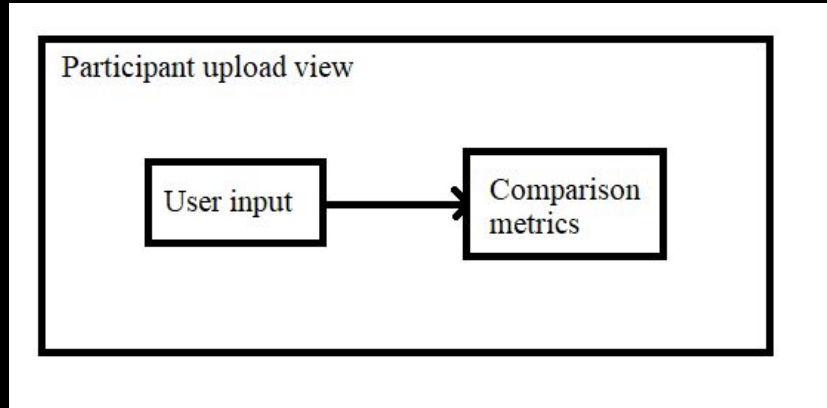
Contributor Page



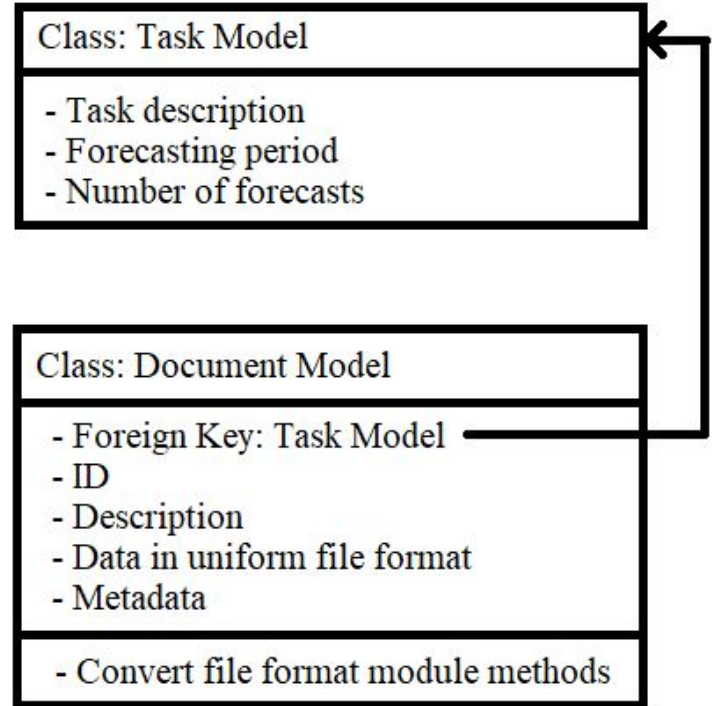
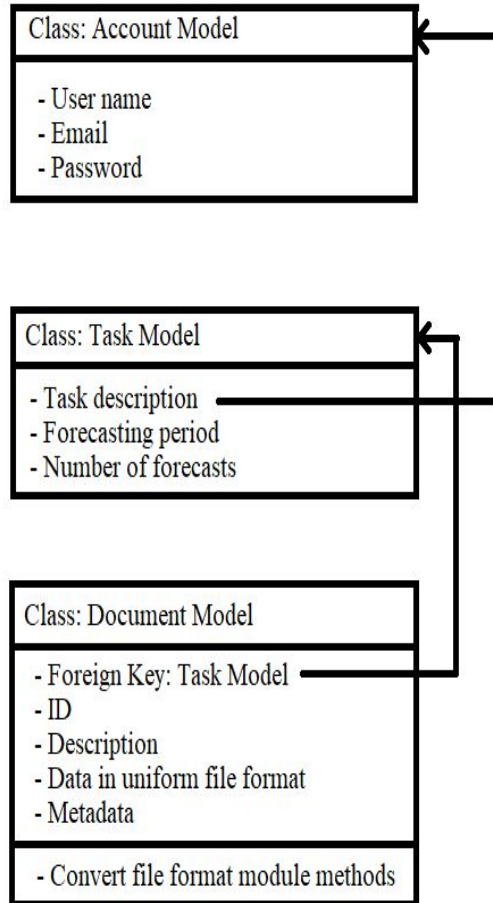
Participant download Page



Participant upload page



Relational database scheme



Testing

- Unittests

- Backend

- Accuracy metrics
 - Set, Timeseries, Data objects

- Jupyter

- I/O

- Database conversion (JSON -> Pandas)
 - Graph functionality (matplotlib -> Fronter)

- User testing

- Dreamweaver real-time web design

Testing everything is difficult

```
Test 1: Accuracy-Score
# of predictions correct
=====
Accuracy Score: 0.0085 proportion of predictions were correct
Accuracy Score: 0.8493% of predictions were correct

.=====
Test 2: Correlation
How similar 2 variables are
=====
r-value: 0.0068

.=====
Test 3: MAE (Mean-Absolute Error)
Average prediction error
=====
Mean-Absolute Error (MAE): 4.6390

.=====
Test 4: MAPE (Mean-Absolute Percentage Error)
Average prediction % \error
=====
Mean-Absolute Percentage Error (MAPE): 30476413916726.9805

.=====
Test 5: SMAPE (Symmetric Mean-Absolute Percentage Error)
Average prediction % \error
=====
Symmetric Mean-Absolute Percentage Error (MAPE): 4.5801

.=====
Test 6: MSE (Mean-Squared Error)
Average squared prediction error
=====
Mean-Squared Error (MSE): 32.5554

.=====
Test 7: RMSE (Root Mean-Squared Error)
Average root squared prediction error
=====
Root Mean-Squared Error (RMSE): 4.5905

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Ran 7 tests in 0.179s

OK

[Done] exited with code=0 in 15.371 seconds
```