Project Rent Collusion

Presentation 1 — 2025/02/03

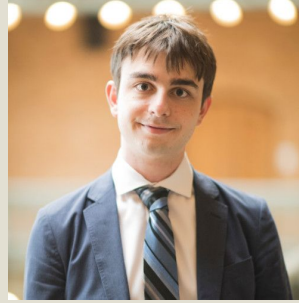# Project Plan – Team Assignments

Chelle
- Web Development
- Data Visualization
- Public Dashboards (e.g. Amazon Quicksight)
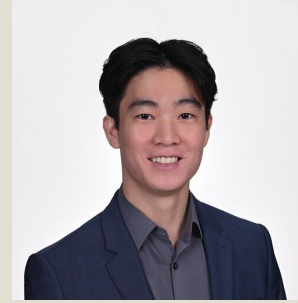- EDA
- Model Evaluation

Ahmad
- Data Infrastructure
- Data Engineering
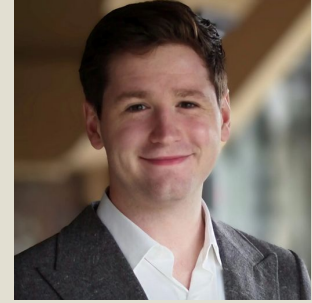- Industry and Econometrics Research
- Modeling

Tim
- Writing
- Management
- Subject Matter Expertise
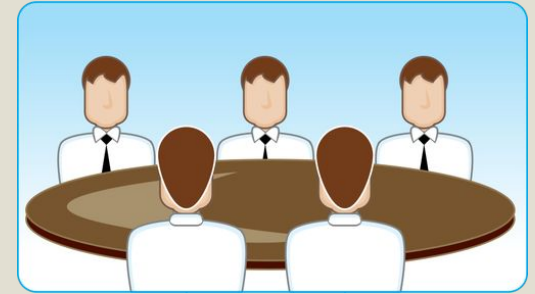- Data Programming
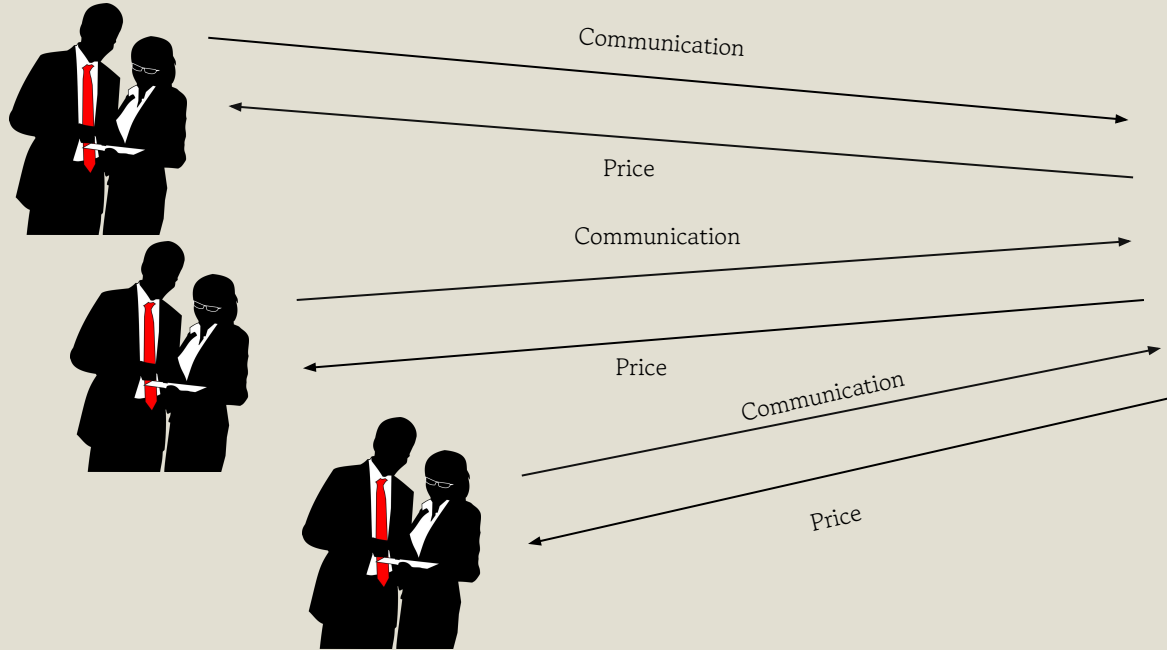- Modeling
- EDA

Patrick
- Industry Expertise
- Data Acquisition
- Web Scraping
- Modeling
- Web Development
- Data Visualization

Peter
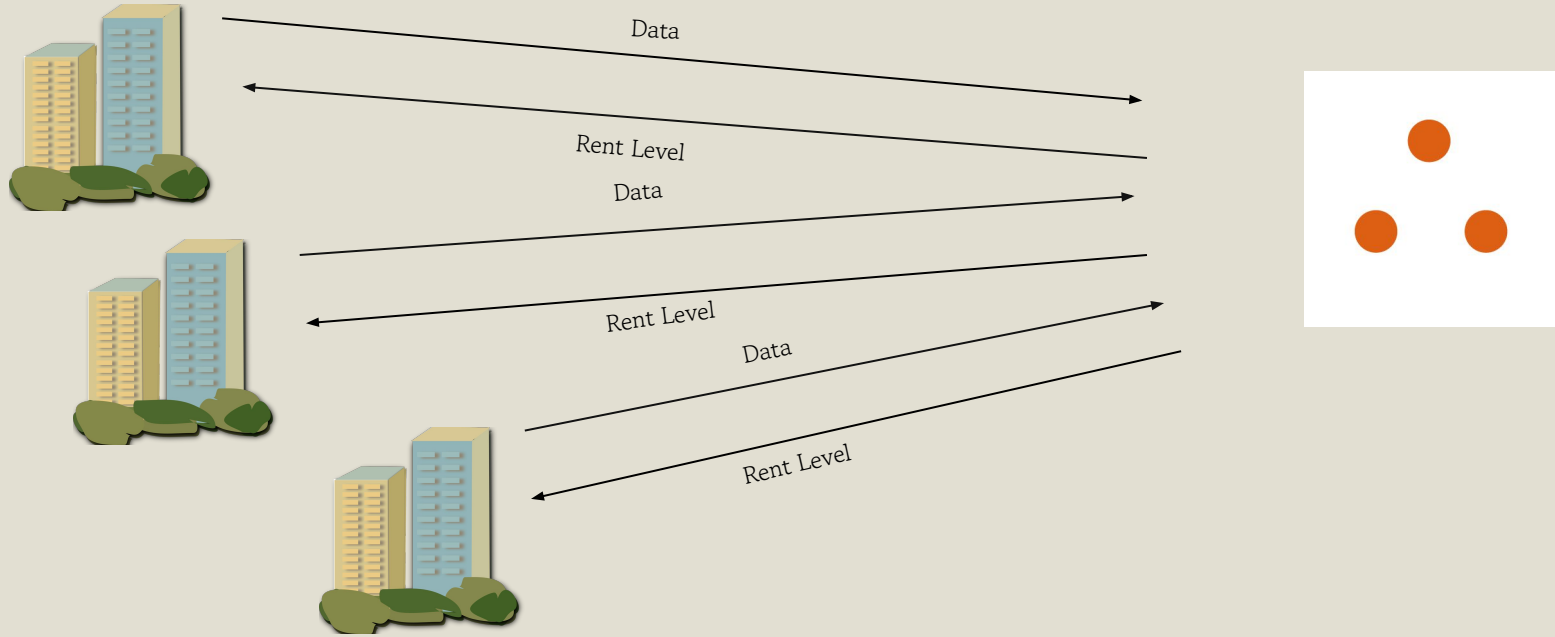- Writing
- Management
- Data Acquisition
- Web Scraping
- Data Processing
- EDA

Collusion

Communication

Price

Communication

Price

Communication

Price

Alleged "Algorithmic Collusion"

Data

Rent Level

Data

Rent Level

Data

Rent Level

Problem (Research Question)

Is there a statistically significant change in rent level and / or housing supply associated with RealPage market share?

Potential Impacts

- Ongoing Lawsuits
- Urban Rent (_your_ rent?)
- Housing Instability
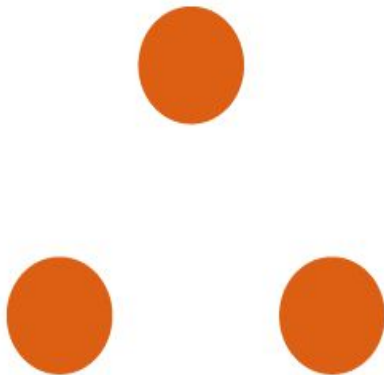- Housing Supply
- Inflation
- Homelessness

EXISTING RESEARCH

RealPage Official Response
- Denies wrongdoing
- Partisan
- Discloses some data on rental listings & Realpage users

ProPublica Report
- Brought issue into the spotlight - kickstarted wave of lawsuits
- Partisan
- Not a statistical analysis; may not be legally admissible

White House Analysis
- Price-Elasticity Approach: Estimated 4% Price Increase
- Political but Independent
- Taken down by Trump Admin

EXISTING RESEARCH

The Washington Post

Arizona L.S. Discussion
- Orbach, B., suggests that the use of "nonpublic business information" to generate prices likely violates antitrust law.

CEPR

Washington Post Analysis
- Identified buildings named in lawsuits against RealPage, estimated RealPage share of units

CEPR Model
- Calzolari et al. (2021) show that algorithms can "learn to collude" without instruction or communication.

Available Data
Zillow Rent Indices

Available At: https://www.zillow.com/research/data/

Especially: "Zillow Observed Rent Index" (ZORI)

- Index calculated as the mean of listed rents between the 35th and 65th percentile.
- Time Series / Panel data
- Separate calculations for: All Homes, Single Family, Multi-Family.
- Available for US, Metro-area, City, County and ZIP code geographies.

Available Data
RealPage Statement

Available At:
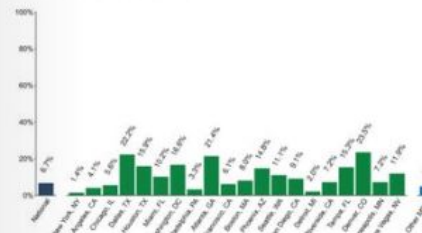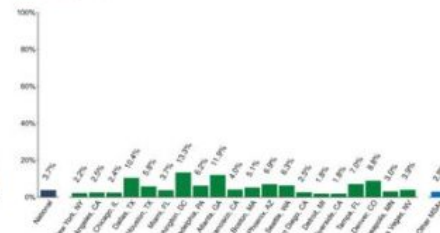https://www.realpagepublicpolicy.com/realpagestatement

- Denies allegations against RealPage
- Discloses some relevant market information, such as RealPage's estimated penetration rate for selected metro areas.
- Was used in the Biden-Harris White House analysis.

1. RealPage revenue management software serves a much smaller portion of the rental market than has been falsely alleged.

Contrary to the implausible allegations about RealPage's purported market power, the actual data shows that RealPage revenue management software has low penetration rates that cannot possibly support a conspiracy to fix prices or collude through the software. *As of May 2023, less than 7% of rental units used AI Revenue Management (AIRM) or YieldStar (combined) across metropolitan statistical areas (MSAs) throughout the United States, and less than 4% of rental units used Lease Rent Options (LRO).*

Available Data

US Census Bureau and Housing and Urban Development

Available At:
https://data.census.gov/table?t=Housing%20Units
and
https://www.huduser.gov/portal/datasets/fmr/fmrs/FY2025_code/select_Geography.odn

Especially: American Community Survey (2023) and American Housing Survey (2023)

- Demographic data tables include information on the total housing inventory in the U.S.
- Can query specific geographies and types of housing.
- Was used in the Biden-Harris White House analysis.
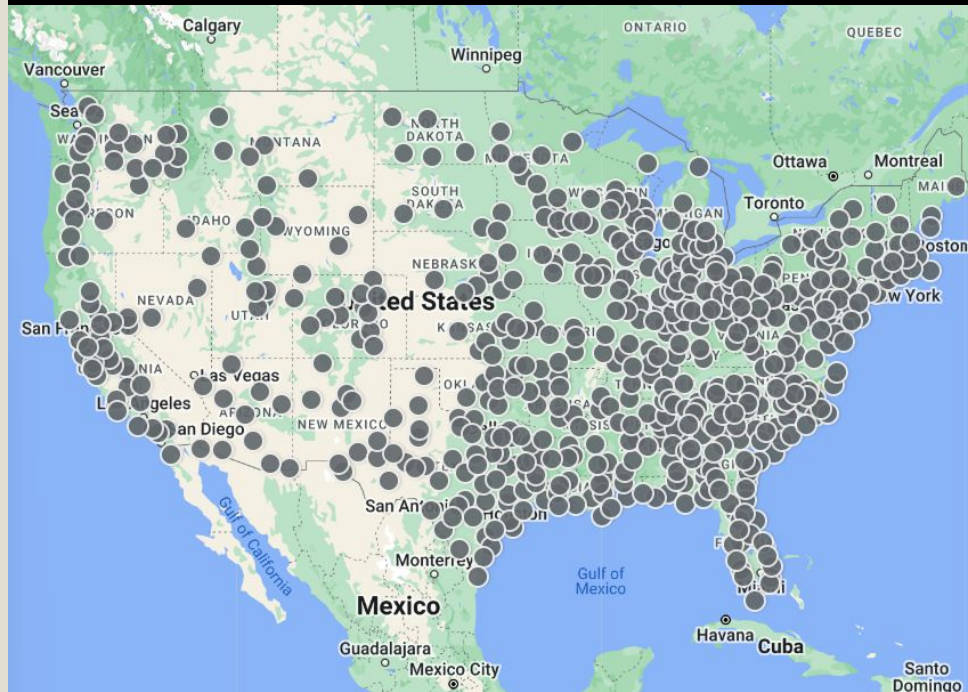- HUD data is FMR per-unit, so utility may be limited

Available Data
RealPage Explore

Available At: https://www.realpage.com/explore

- Nationwide map of multifamily rentals which RealPage discloses (including both clients and non-clients)
- Scrapable, returns a well-formatted JSON with building information
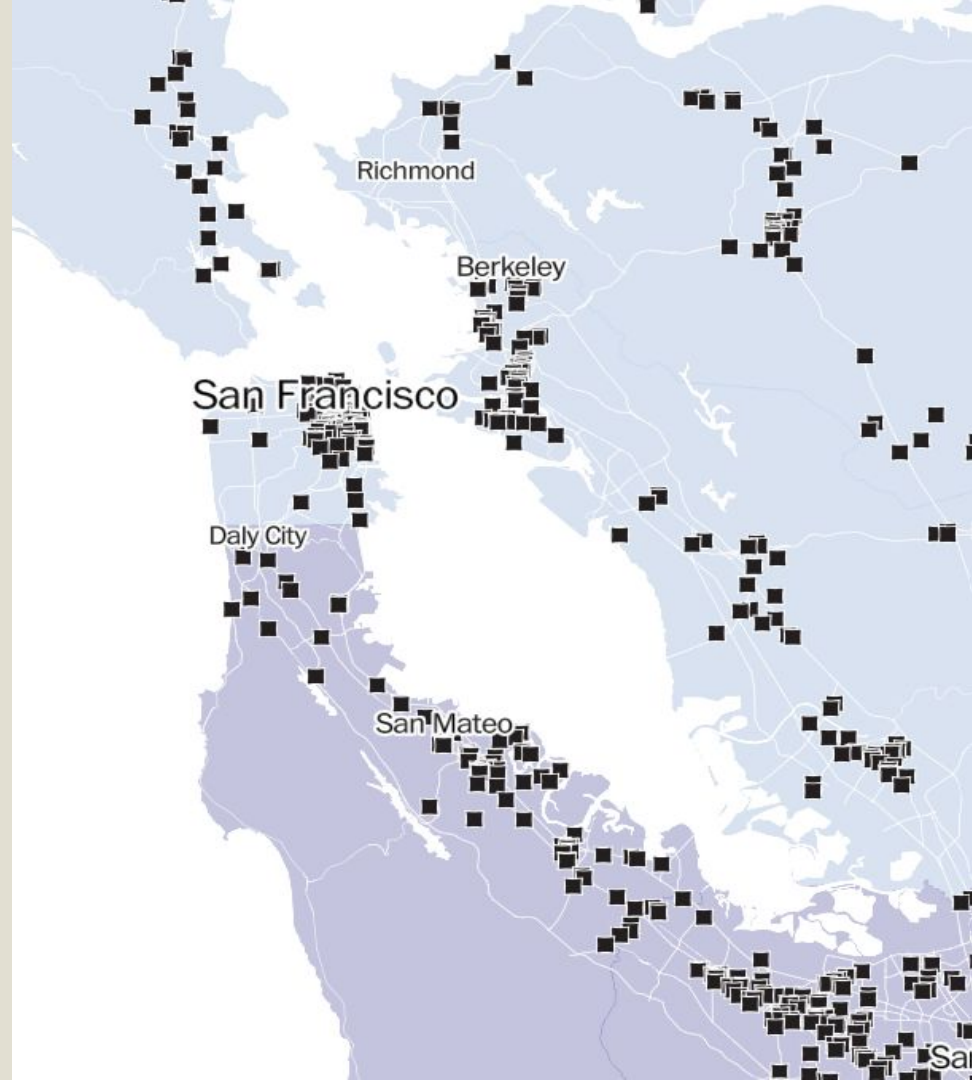- *Might* identify clients via a hidden "heroSource" variable, which is always either "realpage" or "google"

Available Data
Washington Post Map

Available At:
https://www.washingtonpost.com/business/interactive/2025/realpage-lawsuit-rent-map/

- Created as part of the Washington Post's analysis.
- Nationwide map of multifamily rentals which are managed by companies named in lawsuits against RealPage.
- Searchable and scrapable - could be joined by address with the RealPage map data.
- Includes Market % estimates

Minimum Viable Product

National and Metro-Level Analyses of RealPage Correlation with Rent Level

Multiple Methods to show that analysis is robust to different assumptions

Academic Paper and Charts to Demonstrate Relationship

Additional Goals

Listing-Level predictions of rent levels and effect of RealPage on this prediction

Website with dashboards to communicate and allow user exploration

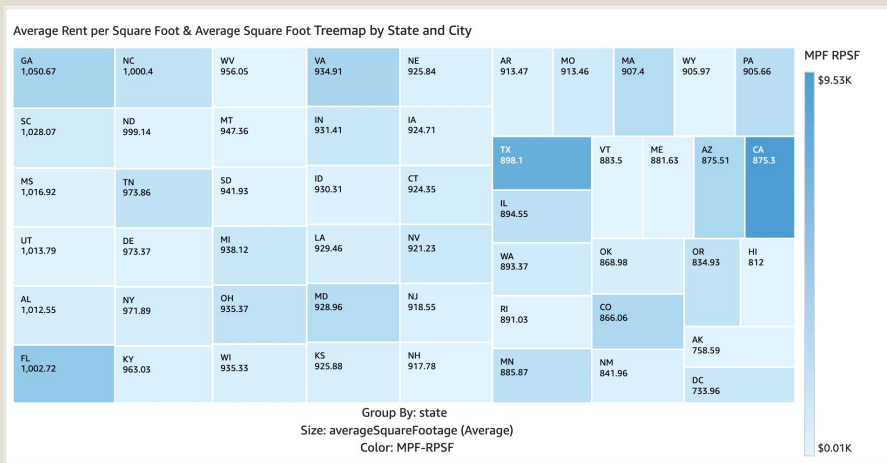Causal Inference to show that "algorithmic collusion" is the true cause

Methods to detect collusion

- Collusion Marker: Reduced price variance during collusion (unfortunately we do not have an appropriate dataset for this method)
- Markov Switching Model: A statistical tool to detect changes in patterns over time without knowing exactly when the changes occur
- OLS: simplest approach to finding relationships between variables (although this will only allow us to determine correlation and not causal inferences)
- Limitations: Most data is private, hard to find causal relationships with the data we have
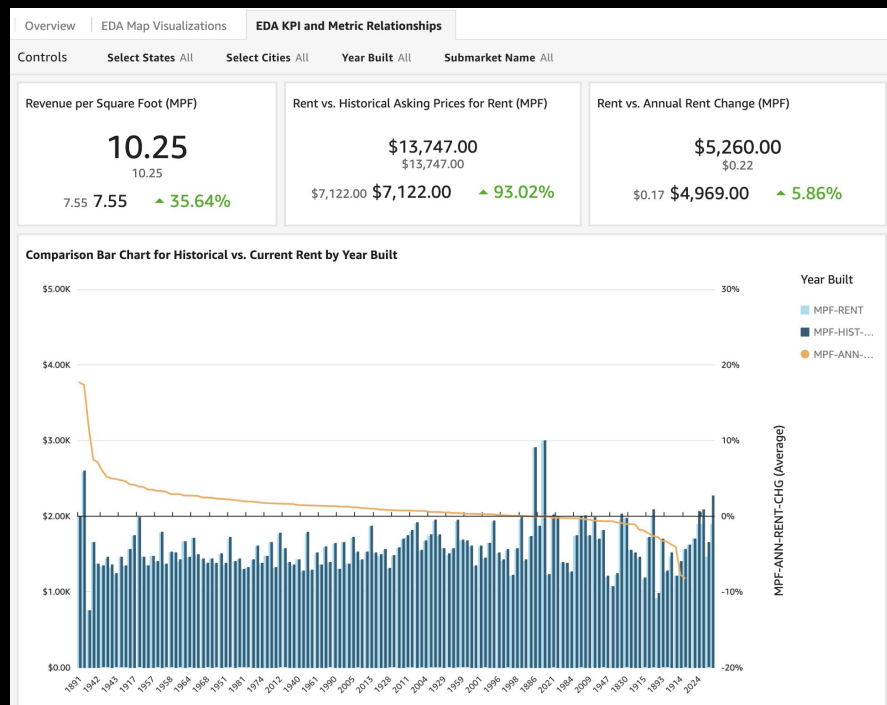
Interactive Webpage

Current State:

- Created an overview page, and interactive pages for our data (so far) & EDA from RealPage explorer via Amazon QuickSight
- Hosting website via Github

Average Rent per Square Foot & Average Square Foot Treemap by State and City

Group By: state
Size: averageSquareFootage (Average)
Color: MPF-RPSF

Upcoming enhancements:

- Phase 2: Add interactive pages + visuals with additional data for analysis
- Phase 3: Integrate modelling/research with front-end for user interaction

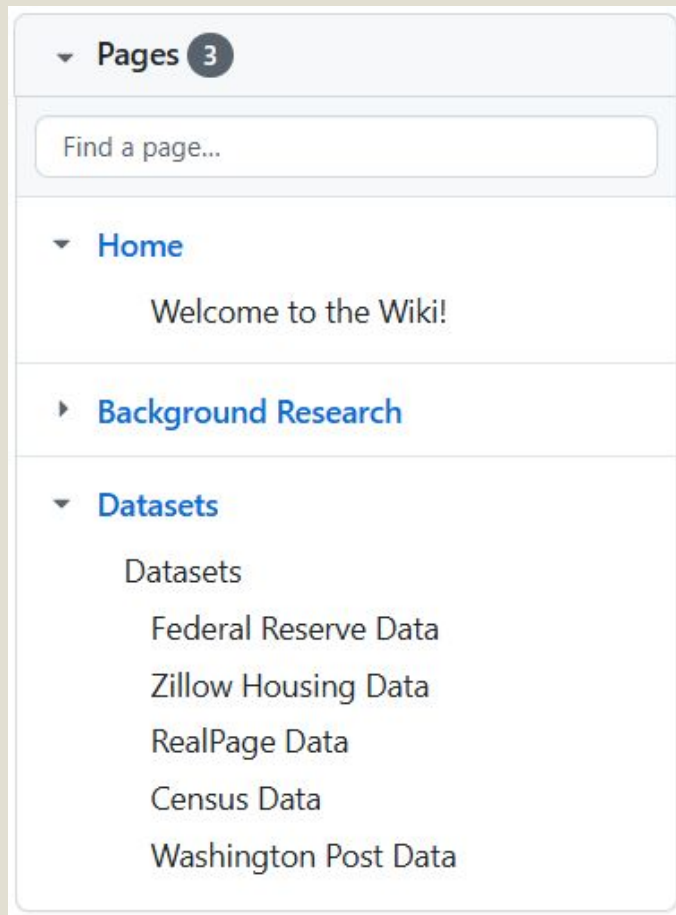# Open Questions & Ethical Considerations

- Can we use scraped data - particularly data scraped from RealPage, an interested party?
- Positionality of the team: independent, but we are also renters affected by the alleged conduct. Can we check our work for bias?
- The most relevant data is private RealPage data - what can we do with only the public data?
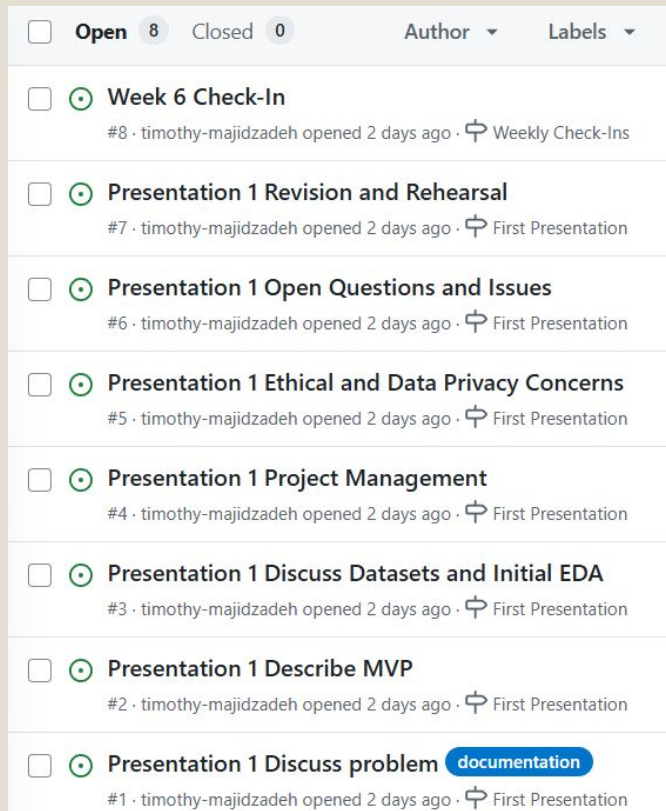
Project Plan: Docs

GitHub Wiki

- Any team member can edit

- Automatically generates searchable, organized sidebar

- Documents datasets, background research, and planned analysis

Project Plan: Timelines

GitHub Issues & Milestones

- Any team member can create or modify tasks as "Issues"

- Issues are sorted under "Milestones"

- Milestones are our medium-term objectives, such as presentations and major analyses.

Conclusion and Q&A