Activist Investing Strategy

Introduction:

Prior federal redlining policies of the 1930s resulted in the racial and economic segregation of many cities that still exists today. As a result, real estate in formerly redlined neighborhoods often trades for a discount to market value not reflected in the physical state of the neighborhood. We call this the “discriminatory discount”. This project is designed to mitigate that discount, generating revenue for those that own discounted property through the closure of that gap.

Goals/Project Outcomes:

1. A competitor analysis for anyone doing housing code compliance workflows or iBuying.
2. Identify methodologies to reallocate government resources into target communities that affect home values (with low cost of operation and a high discriminatory divergence).

Limitations:

1. To raise a real estate fund
2. The fund's focus is on properties selling for less than market value when only physical conditions are considered.
3. A cluster of properties is undervalued due to non-physical conditions
4. Government resources provided to clustered area are below municipal average

Detailed hypo: Using machine learning to identify and rank areas in which to invest under our analysis in an unstructured fashion

Executive Summary:

- iBuying, short for "instant buying" or "internet buying," is a relatively new trend in the real estate industry that involves the quick and direct purchase of homes by real estate companies or technology-driven platforms. In an iBuying model, companies use advanced data analytics, algorithms, and artificial intelligence to evaluate property values and make rapid, all-cash offers to homeowners interested in selling their properties.
- Competitor analysis is a strategic process that businesses use to evaluate and understand their competitors' strengths, weaknesses, strategies, and overall market

position. It is a crucial component of strategic planning, as it provides valuable insights into the competitive landscape, helping companies identify opportunities and threats in the market.

- Housing code compliance workflows refer to the systematic processes and steps that housing authorities, inspectors, landlords, and property owners follow to ensure that residential properties meet the required housing codes and regulations. These workflows are put in place to safeguard the health, safety, and welfare of occupants, as well as maintain the overall quality of housing in a community. Housing codes typically cover various aspects, including building structure, electrical and plumbing systems, fire safety, sanitation, and occupancy standards.
- Activist investing refers to a strategy in the financial markets where an individual or a group of investors, often called "activist investors" or "activist hedge funds," purchase a significant stake in a company's shares with the goal of influencing the company's management and decision-making processes. These investors take an active and often public approach in advocating for specific changes they believe will enhance the company's performance and unlock shareholder value.

Data Sources:

- CoreLogic
- NAR (National Association of Realtors)
- Realtor.com
- NAHB (National Association of Home Builders)
- Zillow
- Altos
- Fannie Mae
- Redfin
- Trulia
- U.S. Census Bureau
- ATTOM Data Solutions
- American Community Survey
- Open Data Portals
- TylerTechnologies

Tools:

- Zillow Zestimate
- Redfin Estimate
- Realtor.com’s Home Value Tool
- CoreLogic Home Price Index
- SQL
- Python-Jupyter
- Excel-Pivot Tables
- TableauDashboard

Data Processing:

- Web scraping real-estate data using SQL and Python
- Implement ML models: k-means clustering, gradient boost, hedonic regression (supervised + unsupervised)
- Identify which is the best place to buy the property (based on price, location, or safety) using Python
- Categorizing, classifying and clustering using Excel-Pivot tables
- Visualizing the real-time processes data in Dashboards

Analysis:

- To analyze municipal open data like crime rates, code violations, permits, 311 complaints, property records, and census data to identify target investment areas. This data could reveal neighborhoods with high potential but historic disinvestment.
- Machine learning techniques like k-means clustering, gradient boosting, and hedonic regression can help model property values and find underpriced areas.
- Competitor analysis of other real estate funds and iBuyers can provide benchmarks and best practices.
- Blockchain and NFTs have potential to bring innovation like fractional ownership and transparent property records. But regulatory considerations need to be addressed.

Recommendations:

- Neighborhoods with clear signs of recent historic disinvestment but strong community ties and growth potential can be focused.
- Partnering with community groups can be initiated to ensure investments align with neighborhood needs and priorities.
- Adding social impact covenants (e.g right of first refusal for tenants) to purchased properties to prevent displacement can be considered.
- Clear metrics to track the social impact alongside financial returns to demonstrate proof of concept to be developed.

PROGRESS:

July 4- July 10, 2023

Redlining areas in America: https://dsl.richmond.edu/panorama/redlining/#loc=5/39.096/-94.57

Segregation, Inequality and Economic Impact: https://ncrc.org/holc/

The Color of Law: A Forgotten History of How our Govt segregated America

- The first chapter of the book, "If San Francisco, then Everywhere?", argues that the racially disparate policies instituted by the otherwise liberal governments of cities such as San Francisco is evidence of a widespread problem.
- Chapter two discusses the history of subsidized housing in the United States.
- The third chapter covers policies of "racial zoning", where local zoning ordinances lead to the segregation of white and black neighborhoods.

- Chapter four discusses a program by the US government, the Own-Your-Own-Home campaign, that systematically made it easier for white people to buy and pay off new homes in suburbs in the early 1900s.
- The fifth chapter discusses police and court enforcement of private agreements forbidding the sale of homes in white neighborhoods to blacks and other minorities. Many of these agreements were in the form of covenants in a house deed which explicitly blocked sales of the homes to anyone not of the "Caucasian race".
- Chapter six discusses white flight and blockbusting tactics used by real estate agents to accelerate the migration to make a profit.

The book provides a comprehensive and compelling account of how government policies and practices in the United States systematically enforced racial segregation in housing and communities.

The gist of the book can be summarized as follows:

- For many years, it has been commonly believed that residential segregation in America was primarily a result of private individual choices and economic forces. However, Richard Rothstein challenges this notion and presents evidence that government actions played a significant role in creating and perpetuating racial segregation in housing. Rothstein delves into the 20th-century history of housing policy and urban development, examining how various

  government institutions, including federal, state, and local governments, actively promoted discriminatory practices. These policies were carried out with the intention of segregating African Americans and other minority groups from white communities.
- Key elements of government-sanctioned segregation included racially restrictive housing covenants, redlining, and discriminatory lending practices that prevented minorities from buying homes in certain neighborhoods. Government agencies, such as the Federal Housing Administration (FHA), played a central role in promoting and enforcing these policies. The FHA, for instance, provided crucial financial support to the housing market, but it did so in a racially discriminatory manner. The agency denied loans and mortgage guarantees to minority communities or neighborhoods with significant minority populations. This led to devaluation of properties in those areas, making it harder for African Americans and other minorities to accumulate wealth through homeownership.
- Furthermore, Rothstein highlights that public housing projects, originally intended to address housing shortages, were often constructed in ways that reinforced segregation, concentrating minority populations in specific areas while maintaining predominantly white neighborhoods elsewhere.
- Rothstein argues that African Americans were unconstitutionally denied the means and the right to integrate in middle-class neighborhoods. Through “redlining,” the federal government- created Homeowners’ Loan Corporation used color-coded maps in the 1930s to decide who would receive assistance and low interest rates—regularly rescuing homeowners in white middle-class suburbs while viewing red areas of the map (often African American neighborhoods) as higher risk.
- The impacts of discriminatory housing policies have furthermore had more than financial implications. Being restricted from certain neighborhoods also allowed for the concentration of a variety of harms in areas made available to Black Americans. For example, zoning differences have resulted in higher industrial uses and toxic waste close to African American neighborhoods.

- As documented in a 2017 report from the NAACP and the Clean Air Task Force, African Americans are 75 percent more likely to live near facilities that produce hazardous waste. With the advent of climate change, we are also seeing disproportionate heat island effects in non-White urban neighborhoods, a fact that was recently corroborated by researchers at Portland State University and the Science Museum of Virginia, who found that areas redlined in the early to mid-1900s are now, on average, 5 degrees warmer than non- redlined neighborhoods. Racial discrimination and violence were also more easily concentrated, as demonstrated by the myriad of examples unearthed by Rothstein of police officers and other public servants engaging in discriminatory activities, while superiors encouraged these activities or took inadequate steps to restrain them. Condoning housing discrimination at nearly every level of government further allowed a culture of inequity to permeate and persist within society's other economic engines. The National Labor Relations Board, for example, did not refuse to certify White-only unions until 1964, at which point racial income inequality was already well-established.
- The Color of Law provides interpretation and a significant amount of credible evidence about how our past has informed our present and can be used to shape laws and policies that right historic wrongs, particularly when it comes to matters of housing and the environment.

Summary:

- Early public housing programs-maintained segregation by building separate projects for blacks. The government's Homeowners' Loan Corporation also drew color-coded maps rating neighborhoods by race and ethnicity, steering whites away from black neighborhoods.
- The Federal Housing Administration subsidized builders who promised not to sell homes to African Americans. This practice, known as redlining, meant blacks were excluded from suburban home ownership as those areas boomed in the 1950s-60s.
- Urban renewal programs often destroyed integrated or black neighborhoods to build things like highways and civic centers. This destroyed social networks and forced blacks into public housing.
- Realtors practiced racial steering, guiding white home seekers away from integrated areas and black home seekers away from white areas. This entrenched segregation.
- Suburban zoning codes also excluded blacks by mandating minimum lot sizes and prohibiting multifamily units. These rules promoted single-family homes unaffordable to mostblacks.
- The book argues that residential segregation was created purposefully by government policy at all levels, not just private prejudice. It calls for proactive policies to reverse these effects.

IBUYING:

https://www.nytimes.com/2021/11/19/realestate/ibuying-ilending.html

https://www.opendoor.com/articles/what-is-an-ibuyer

https://therealdeal.com/new-york/2022/12/07/ibuying-on-the-brink-where-does-the-controversial-homebuying-model-go-from-here/

The iBuying process typically follows these steps:

1. Property Valuation: Using extensive data analysis, iBuyers assess the market value of a property. This valuation is usually based on various factors, including recent sales of comparable homes in the area, property condition, location, and other relevant data points.

2. Instant Cash Offer: Once the property is evaluated, the iBuyer provides the homeowner with an almost immediate cash offer for their home. The offer is often competitive and meant to streamline the selling process, avoiding the traditional listing and negotiation phases.

3. Seller Acceptance: If the homeowner accepts the iBuyer's offer, the transaction moves forward.

4. Closing Process: After accepting the offer, the homeowner proceeds with the closing process. The timeframe from offer acceptance to closing is generally quicker than traditional real estate sales, often taking a matter of days or weeks.

5. Reselling the Property: After acquiring the property, the iBuyer may choose to make repairs or renovations to increase its value. The goal is to resell the property in a short time frame, aiming to profit from the resale.

It's essential for homeowners considering iBuyers to carefully assess the offered price, terms, and fees associated with the transaction to ensure it aligns with their specific needs and priorities. Additionally, iBuying availability may vary based on the location and the specific real estate companies or platforms operating in that area.

Public housing at Risk: https://www.hrw.org/report/2022/01/27/tenant-never-wins/private-takeover-
public-housing-puts-rights-risk-new-york-city

Hedge fund: https://www.wsj.com/articles/hedge-funds-brawl-over-battered-commercial-real-estate-
1a12df4

COMPETITOR ANALYSIS:

The main objectives of competitor analysis include:

1. Understanding the Competition: By studying competitors, businesses gain a clear understanding of who their rivals are, their products or services, target markets, and overall business strategies.

2. Identifying Strengths and Weaknesses: Analyzing competitors allows a company to identify its rivals' strengths and areas where they may have a competitive advantage, as well as weaknesses that could be exploited.

3. Evaluating Market Positioning: Competitor analysis helps companies assess how they are positioned in the market compared to their competitors. This knowledge enables them to refine their market positioning and differentiate themselves from others.

4. Assessing Threats and Opportunities: By understanding their competitors, businesses can anticipate potential threats and identify new opportunities in the market.

5. Formulating Effective Strategies: Armed with knowledge about their rivals, companies can develop more effective business strategies that leverage their strengths and address their weaknesses.

The competitor analysis process involves several steps:

1. Identifying Competitors: The first step is to identify direct and indirect competitors operating in the same market or targeting similar customer segments.

2. Gathering Data: Collecting relevant data about competitors is crucial. This data may include financial information, product or service offerings, marketing strategies, customer reviews, and news articles.

3. Analyzing Competitor Strategies: Analyzing competitors' actions and strategies can reveal valuable insights into their approach to the market.

4. Comparing Strengths and Weaknesses: Identifying areas where competitors excel or fall short in comparison to the business being analyzed.

5. Identifying Opportunities and Threats: Understanding the potential opportunities that competitors may be pursuing or the threats they pose to the business.

6. Formulating Actionable Insights: Utilizing the findings from the analysis to make informed decisions and adjust the company's strategies and tactics accordingly.

Competitor analysis is an ongoing process as markets and competitors' actions continuously evolve. Regularly updating the analysis ensures that businesses stay relevant and can adapt to changing competitive dynamics effectively.

HOUSING CODE COMPLIANCE WORKFLOWS:

The exact steps and procedures in a housing code compliance workflow can vary depending on local laws and regulations, but generally, they involve the following key components:

1. Inspections and Assessments: Housing authorities or designated inspectors conduct regular inspections of residential properties to assess their compliance with applicable housing codes. Inspections may also be triggered by tenant complaints or requests.

2. Code Review and Updates: Housing authorities continuously review and update housing codes to keep them in line with safety standards, industry best practices, and changing community needs.

3. Notice of Violations: If violations are identified during an inspection, the housing authority issues a notice of violations to the property owner or landlord, outlining the specific areas that need to be addressed for compliance.

4. Correction Period: Property owners or landlords are given a specific period to rectify the identified violations and bring the property into compliance with the housing codes.

5. Re-Inspection: Once the correction period elapses, the property is re-inspected to ensure that the necessary corrections have been made.

6. Penalties and Fines: In cases where violations persist or are not adequately addressed, the housing authority may impose fines or penalties on the property owner or landlord.

7. Tenant Rights and Protection: Housing code compliance workflows may include provisions to protect tenant rights, such as ensuring habitable living conditions and timely resolution of maintenance issues.

8. Education and Outreach: Housing authorities may conduct educational programs and outreach efforts to inform property owners, landlords, and tenants about housing codes and their responsibilities.

9. Legal Proceedings: In extreme cases of non-compliance or unsafe living conditions, housing authorities may resort to legal actions such as eviction or condemnation of the property.

Overall, housing code compliance workflows are essential to maintain housing quality, ensure tenant safety, and create healthy and sustainable communities.

July 11- July 17, 2023

- For low-income families, affordable housing can be done only by Public. But private companies are taking over and making it a risk for the US government.
- Federal spending figures can change due to various factors, including changes in economic conditions, housing policies, and government budgets.
- Federal government is composed of three distinctive branches: Legislative, Executive, Judicial
- Federal spending on public housing has declined in the last 30 years; Federal spend on public housing has increased in the last 30 years.
- Rental Assistance Demonstration (RAD) - Private companies - profit from tenantrents
- Private- Lost important protections that are available in public housing and are faced with repairs
- One of these strategies is a federal program called the Rental Assistance Demonstration (RAD), that allows housing authorities to convert their public housing to more stable subsidy programs that are typically used to finance private-sector affordable housing.
- RAD, at its most basic, allows PHAs to change how their public housing developments are financed. The program allows PHAs to "convert" their developments from the conventional public housing program under Section 9 of the US Housing Act, to a long-term contract under Section 8 of the Act, a program typically used to subsidize private low-income housing.

ACTIVIST INVESTING (HEDGE FUND ACTIVISM):

The key characteristics of activist investing include:

1. Significant Ownership Stake: Activist investors typically acquire a substantial portion of the company's shares to gain influence and ensure their voice is heard.

2. Active Engagement: Unlike traditional investors who may buy shares and hold them passively, activists actively engage with the company's management, board of directors, and other stakeholders. They may propose specific strategies, changes in leadership, cost-cutting measures, mergers, acquisitions, or other corporate actions they believe will lead to increased shareholderreturns.

3. Public Campaigns: Activist investors often make their demands and proposals public, using various communication channels like press releases, interviews, shareholder letters, and social media to attract attention and rally support from other shareholders.

4. Focus on Corporate Governance: Activist investors often push for improvements in corporate governance practices to ensure transparency, accountability, and fairness.Long-term or Short-term Focus: Activists may pursue short-term changes to unlock value quickly or focus on long-term strategic changes to improve the company's overall performance.

5. Varied Objectives: Activist campaigns can have different objectives, such as increasing dividends, share buybacks, divesting non-core assets, changing executive compensation, or advocating for more environmentally sustainable practices.

6. Legal and Regulatory Considerations: Activist investing is subject to various legal and regulatory guidelines, which may vary depending on the country or stock exchange in which the company is listed.

It's essential to note that activist investing can be controversial and can create tensions between the activists and the company's management or other shareholders who may have different perspectives on the best path forward for the company. Some view activist investors as valuable catalysts for positive change, while others see them as short-term profiteers focused solely on short-term gains. Ultimately, the impact of ativist investing depends on the specific situation and the effectiveness of the proposed changes.

July 18- July 24, 2023

Measuring Land value in the era of Big data and Machine Learning:
https://govwhitepapers.com/whitepapers/for-what-its-worth-measuring-land-value-in-the-era-of-big-data-and-machine-learning?ref=social-campaign&utm_source=delivra&utm_medium=email&utm_campaign=GWP%20WNL%207-18-2023&utm_id=45037673

Here are the key details and summary of the paper:

- The paper develops a new machine learning-based approach to estimate land value at a detailed, property-level using microdata on millions of property transactions and characteristics.
- It compares the performance of machine learning models like gradient boosted trees (GBT) versus traditional hedonic regression models. The ML models generally predict property prices/values more accurately out-of-sample.
- The method pairs an unsupervised learning technique (k-means clustering) with the GBT model to account for unobserved heterogeneity. This groups properties along key characteristics to create more homogeneous comparable, similar to how appraisers evaluate comps.
- A composite model stacking the ML and hedonic models performs best overall in tests. This approach is then used to estimate land value for residential, commercial, industrial, and agricultural land from 2006-2015.
- Key findings: Private land value in the contiguous US totaled $24 trillion in 2015, with significant regional variation. Land values were procyclical, with the national peak in 2006/2007, but regions bottomed out at different times from 2009-2013. Single-family residential land was most valuable, but dense urban and commercial land had the highest price per acre.
- The method shows how microdata and ML can improve land valuation for macro accounts. It provides a template for constructing land accounts, a gap in US national accounts and internationally.

In summary, the paper demonstrates how modern data science methods can improve economic measurement, using land valuation as a case study. The granular, property-level estimates can be scaled up to provide new insights into macroeconomic trends.

July 25- July 31, 2023

Open Data Portals: http://data.ny.gov/

http://data.buffalony.gov/

ODP collection:

https://docs.google.com/spreadsheets/d/1Y5sPhRkcVnRkJeU5tMazbxT8unC2gleZcExyWG_DTbc/edit
?usp=sharing

August 1- August 7, 2023

https://www.tylertech.com/products/data-insights/open-data-platform

https://www.corelogic.com/real-estate/

A REAL ESTATE INVESTMENT TRUST (REIT) is a corporation that invests in income-producing real estate and is bought and sold like a stock.

A real estate fund is a type of mutual fund that invests in securities offered by public real estate companies, including REITs. REITs pay out regular dividends, while real estate funds provide value through appreciation.

While there are plenty of ways to secure working capital, there are six sources investors have come to rely on more than any others:

- Private & Hard Money Lenders
- Self-Directed Accounts
- Private Placement Memorandums
- Wholesaling
- FHA Investment Loan
- Peer-to-Peer Loan
- Crowdfunding

CoreLogic HPI- provides direction to home market

- The CoreLogic HPI provides the fastest home-price valuation information in the industry. It has the most up-to-date, accurate indication of home-price movements and trends available. The complete index includes pricing history from 1976 to the present. All datasets are refreshed monthly, and the fully revised index is published five weeks after the month's end.
- The S&P CoreLogic Case-Shiller Home Price Indices are the leading measures of U.S. residential real estate prices, tracking changes in the value of residential real estate nationally.
  Home price insights: YoY and MoM basis
- The CoreLogic Market Risk Indicator (MRI) forecasts the status and confidence score of home prices (incline or decline) for different states and cities based on the data for the next 12 months.

ASSESSMENT TABLES

Assessment tables, in the context of real estate and property, refer to tables or matrices used by government agencies or assessment authorities to determine the assessed value of properties for tax purposes. These tables are an essential part of the property tax assessment process and help in calculating the property tax that property owners are required to pay.

The property tax assessment process involves determining the value of a property based on its characteristics, location, and market conditions. Assessment tables are used to standardize this process and provide a systematic way to evaluate properties consistently and fairly.

The specific factors and data included in assessment tables may vary depending on the jurisdiction and the type of property being assessed. Some common factors that can influence the assessed value of a property include:

1. Property size and dimensions
2. Building type and size
3. Property age and condition
4. Location (neighborhood, proximity to amenities, schools, etc.)
5. Recent property sales and market trends in the area

Assessment tables may assign different weightings to each factor and use a combination of quantitative data and qualitative judgments to arrive at the assessed value. The resulting value is typically used as the basis for calculating the property tax liability.

It's important to note that assessment tables and property tax assessment processes can vary significantly between different countries, states, and municipalities. Each jurisdiction has its own specific rules, regulations, and methodologies for property tax assessment. Property owners should review the assessment process in their local area to understand how their property's value is determined and how property taxes are calculated.

https://www.nyc.gov/site/finance/about/open-portal.page

- Use of ML in Real estate research: https://www.mdpi.com/2073-445X/12/4/740
- Comparable price real estate: https://catalog.data.gov/dataset/dof-cooperative-comparable-rental-income-citywide
- Property assessment data: https://www.nyc.gov/site/finance/taxes/property-assessments.page

FORECLOSURE

Foreclosure is a legal process through which a lender or a lienholder reclaims ownership of a property from a borrower who has defaulted on their mortgage or loan. When a borrower fails to make mortgage payments as agreed, the lender can initiate foreclosure proceedings to recover the outstanding debt by selling the property.

The foreclosure process typically involves the following steps:

1. Missed Payments: The borrower fails to make timely mortgage payments, usually for a few consecutive months. The specific number of missed payments required to trigger foreclosure can vary depending on local laws and the terms of the mortgage contract.

2. Notice of Default (NOD): After the borrower has missed several payments, the lender sends a Notice of Default to the borrower. This document informs the borrower that they are in breach of the loan agreement and gives them a certain period (grace period) to bring the mortgage current and avoid further actions.

3. Pre-Foreclosure Period: During the grace period, the borrower can attempt to negotiate with the lender for loan modification or explore options like a short sale, in which the property is sold for less than the remaining loan balance with the lender's approval.

4. Foreclosure Auction: If the borrower fails to cure the default or reach an agreement with the lender, the property is typically scheduled for a foreclosure auction. The auction allows potential buyers to bid on the property, and the highest bidder becomes the new owner.

5. Real Estate Owned (REO): If the property doesn't sell at the foreclosure auction, it becomes real estate owned (REO) by the lender. At this point, the lender becomes the owner and may list the property for sale through a real estate agent or other means.

Foreclosure laws and processes can vary significantly from one country to another and from state to state within the United States. Some countries have judicial foreclosure processes, where the foreclosure must go through the court system, while others have non-judicial foreclosure processes, where the lender can foreclose without court involvement.

Foreclosure is a serious event that can have long-lasting consequences for the borrower's credit history and financial situation. It is essential for borrowers facing financial difficulties to seek advice from financial experts or housing counselors and explore all available options to avoid foreclosure if possible.

https://www.investopedia.com/investing/buying-foreclosed-home/

https://www3.erie.gov/gis/internet-mapping

August 8- August 15, 2023

Current_Assessment_Roll 2023-2024 dataset – Buffalo

- Identify all the important coloumns
- In real estate, a "deed type" refers to the specific legal document that conveys ownership of a property from one party to another. Deeds are essential for transferring property rights and interests. Different types of deeds serve various purposes and offer different levels of protection to the buyer.

How Blockchain can be implemented in Real Estate transactions?

1. Smart Contracts for Transactions: Smart contracts are self-executing contracts with terms directly written into code. They can automate property transactions, making the process more efficient and reducing the need for intermediaries. When certain conditions are met (e.g., payment received, inspections passed), the smart contract automatically transfers ownership to the buyer, reducing the risk of fraud.

2. Tokenization of Property: Blockchain enables the tokenization of real estate, breaking properties into smaller digital tokens. This allows investors to buy fractions of a property, increasing liquidity and opening up real estate investment opportunities to a broader audience. Buyers can diversify their investments by owning parts of multiple properties

3. Data Accuracy and Verification: Property information can be verified and stored on the blockchain, reducing the chances of inaccurate or falsified data. Potential buyers can access trustworthy information about a property's history, ownership, liens, and other relevant details.

4. Decentralized Identity Verification: Blockchain can be used to securely verify the identity of property owners and buyers. This ensures that parties involved in transactions are legitimate and minimizes the risk of fraudulent activities.

5. Secure Financing and Payments: Blockchain can streamline the financing process by providing secure, tamper-resistant records of mortgage agreements and payments. This reduces the risk of errors and disputes related to payments.

6. Property Management and Maintenance: Blockchain-based systems can help property managers and owners keep track of maintenance schedules, repair records, and tenant agreements. This transparency can enhance the property's overall value and attractiveness to potential buyers.

7. Data Analytics and Insights: Blockchain-powered platforms can aggregate data from various sources, including property listings, market trends, and historical sales. This data can be analyzed to identify patterns and insights, helping buyers make more informed decisions about purchasing properties.

It's important to note that while blockchain technology offers numerous benefits, implementing it in the real estate industry requires collaboration between various stakeholders, including government agencies, real estate professionals, technology providers, and legal experts. Additionally, regulatory considerations and data privacy concerns need to be addressed to ensure a smooth integration of
blockchain into real estate processes.

https://www.forbes.com/sites/forbesbusinesscouncil/2022/12/13/how-blockchain-and-nfts-could-revolutionize-real-estate-investment/?sh=c4883775b9ee

https://builtin.com/blockchain/blockchain-real-estate-companies

- Propy – example, implementing blockchain to Real Estate
- Comparables' Qualities

- Age and condition of buildings
- Date of sale, if economic changes occur between the date of sale of a comparable and the date of the appraisal
- Terms and conditions of sale, such as if a property's seller was under duress or if a property was sold between relatives (at a discounted price)
- Location, since similar properties might differ in price from neighborhood to neighborhood

August 15- August 22, 2023

1. K-Nearest Neighbors (KNN): Type: Supervised Learning (both classification and regression)
   Usage: KNN is used for classification and regression tasks where the algorithm predicts the class or value of a data point based on its proximity to other data points.
   Working: For a given data point, KNN calculates the distance between that point and all other data points in the training dataset. It then selects the "k" nearest neighbors based on distance (usually using Euclidean distance) and considers their class labels or values. In classification, the class that occurs most frequently among the neighbors is assigned to the new data point. In regression, the algorithm calculates the average or weighted average of the neighbors' values to predict the target value for the new data point.
   Hyperparameter: The main hyperparameter in KNN is "k," which represents the number of neighbors to consider.

2. Gradient Boosting: Type: Supervised Learning (both classification and regression)
   Usage: Gradient Boosting is a powerful ensemble technique used for improving the predictive performance of models. It's commonly used when you have multiple weak models and want to combine their predictions to create a stronger model.
   Working: Gradient Boosting works by sequentially adding weak models (typically decision trees) to the ensemble. Each new model is trained to correct the errors made by the previous models. The algorithm assigns more weight to the instances that were misclassified by the previous models. At each iteration, the new model focuses on the residual errors of the ensemble. The predictions of all models are combined to create the final ensemble prediction.
   Hyperparameters: Some important hyperparameters in Gradient Boosting include the number of trees (iterations), the learning rate (controls the contribution of each model), and the depth of the decision trees (controls their complexity).

In summary, K-Nearest Neighbors (KNN) is a simple algorithm that makes predictions based on the proximity of data points, while Gradient Boosting is an ensemble technique that combines the predictions of weak models to create a stronger model with better predictive performance. Both algorithms are commonly used in machine learning for various tasks, but they have different underlying mechanisms and use cases.

American Community Survey (ACS)

- Code Violations
- Property Crimes
- Permits
- Housing Characteristics
- Social Characteristics
- Economic Characteristics
- Demographic characteristics

Python- Current Assessment roll_2023-2024: Pre-processing and modelling Through web scraping and Zillow API, Dashboard creation – NYC Housing Data

August 23 – August 29, 2023

Pivot table analysis of Physical conditions (BUFFALO DATA)

- Primary crime incident types on what days and hours in which neighborhood

Row Labels	Count of Incident Type Primary
AGG ASSAULT ON P/OFFICER	10
Sunday	3
Central	1
Kenfield	1
Masten Park	1
Monday	2
Delavan Grider	1
Hopkins-Tifft	1
Tuesday	2
Ellicott	1
Hopkins-Tifft	1
Wednesday	1
Fillmore-Leroy	1
Saturday	2
Genesee-Moselle	1
UNKNOWN	1
AGGR ASSAULT	126
Sunday	24

- Type of code violations noticed in the city ordinances, at what rate and neighborhood.

Row Labels	Count of Case Type
ACTIVE	78056
Allentown	748
Black Rock	2047
Broadway Fillmore	5945
Central	318
Central Park	464
Delavan Grider	2571
Ellicott	490
Elmwood Bidwell	2383
Elmwood Bryant	1764
Fillmore-Leroy	2137
First Ward	743
Fruit Belt	817
Genesee-Moselle	4840
Grant-Amherst	2000
Hamlin Park	1766
Hopkins-Tifft	2260

- Highly issued permits and their count

Row Labels	Count of Permit Type
REPAIR	47653
ELECTRICAL	34705
PLUMBING	21944
HEATING	13544
DEMOLITION	6439
GC	6090
USE	1842
SIGN	1653
FENDRIVE	1611
PLUMB-GC	1170
TEAROUT	789
GARSHED	723
ELEVATOR	719
ASBESTOS	657
PLAN-COPY	585
TOWERSATT	569
ELEC-GC	402
SWIM POOL	360

- 311 complaints and non-emergency services; Recorded the count and neighborhood.

Rodent Control	38036
Broadway Fillmore	3438
North Park	2074
Kensington-Bailey	2011
Genesee-Moselle	2011
South Park	1972
UNKNOWN	1660
Masten Park	1450
Lovejoy	1351
Schiller Park	1320
Upper West Side	1251
Hopkins-Tifft	1237
Delavan Grider	1231
Seneca-Cazenovia	1223
MLK Park	1159
University Heights	1159
Fillmore-Leroy	1151
Riverside	1107
Elmwood Bidwell	1051

- Housing court cases

Zillow Home Value Index (ZHVI): A measure of the typical home value and market changes across a given region and housing type. It reflects the typical value for homes in the 35th to 65th percentile range. Available as a smoothed, seasonally adjusted measure and as a raw measure.

Zillow publishes top-tier ZHVI ($, typical value for homes within the 65th to 95th percentile range for a given region) and bottom-tier ZHVI ($, typical value for homes within the 5th to 35th percentile range for a given region).

Zillow also publishes ZHVI for all single-family residences ($, typical value for all single-family homes in a given region), for condo/coops ($), for all homes with 1, 2, 3, 4 and 5+ bedrooms ($), and the ZHVI per square foot ($, typical value of all homes per square foot calculated by taking the estimated home value for each home in a given region and dividing it by the home's square footage).

- ZHVI Pivot recorded for All homes, Condo/Co-op and 4 bedroom houses

August 30 – Sept 4, 2023

- Zillow API housing data creation and insertion of physical conditions filtration in Dashboards

TAKEAWAYS:

Overall, the project has given a good practice of requirement gathering, understanding clear goals and consumer requirements for optimization of the organization's strategy. Exposure and versatile usage to new platforms led to handle big amount of data and create dynamic real-time dashboards. Also, the tasks and milestones have helped to improve decision-making and operational efficiencies. The process of customer collaboration and data governance are key takeaways from this project.