



CS418:  
Introduction To Data Science

# URBAN PULSE CHICAGO

## Analyzing Mobility and Safety

**PRESENTED BY TEAM:**  
Urban Pulse

**PRESENTED TO:**  
Prof. Sourav Medya

Presentation Video: <https://tinyurl.com/cs-418-presentation>



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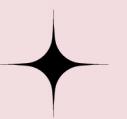
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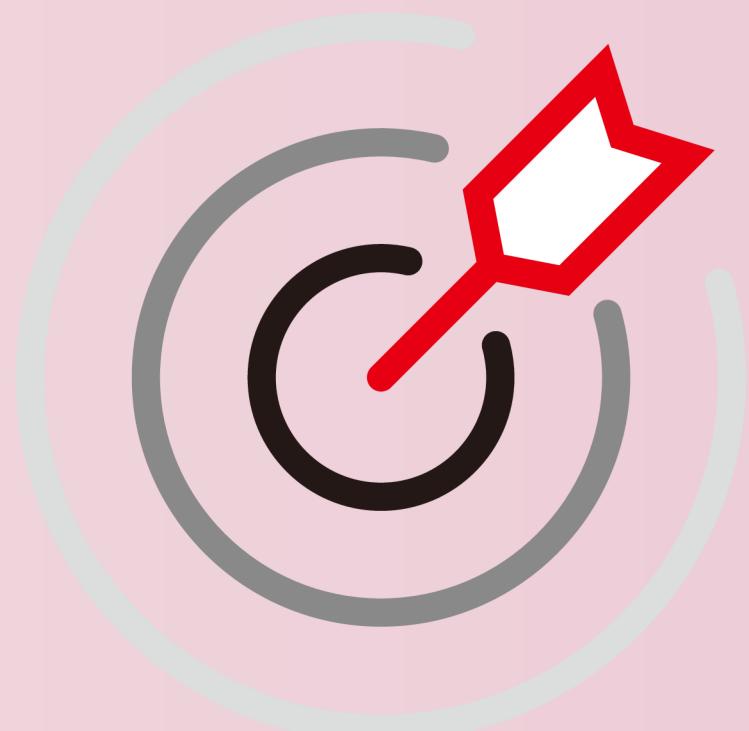


# The Vision



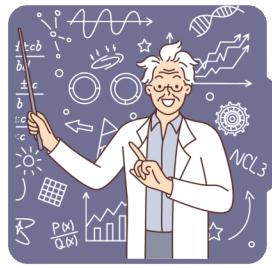
This project empowers residents, planners, law enforcement, journalists, and businesses to make data-driven decisions that enhance safety and urban planning in Chicago. By bringing together data from **public transit**, bike-sharing, weather, and major **events**, we aim to explore how the city's daily rhythms relate to neighborhood-level **crime**.

Through this analysis, we seek to uncover patterns that can inform smarter policies and resource allocation. The goal is to turn complex urban data into practical insights that help build **safer**, more responsive, and better-connected **communities** across **Chicago**.



# WHY IT MATTERS?

This analysis is valuable for residents seeking to understand their neighborhoods, urban planners making resource allocation decisions, and journalists telling data-driven stories.



## Hypothesis 1

01

Increased Divvy bike usage correlates with increase in certain crimes.

- Does a decrease in bike usage cause an increase in violent crimes in a bike station?



## Hypothesis 2

02

Major events create predictable, localized spikes in specific non-violent or violent crimes.

- Does pickpocketing increase around the place of the event.



## Hypothesis 3

03

Extreme Hot/Cold Weather can cause decrease/increase in different categories of crime.

- Battery might increase during the summer.
- Shoplifting could decrease in the winter.

# THE DATA USED

This project uses Chicago data on events, weather, crime, and Divvy bike trips to analyze urban patterns. Combined, they offer insights into city activity, mobility, and safety.

## Crime Data

Millions of records from the City of Chicago Data Portal, including location, time, and type of crime.



## Divvy Bike Trips

Millions of individual trip records with start/end times and station locations.



## Events Data

Chicago Park District - Event Permits Dataset - Contains ~132,000 entries of events in Chicago from 2012.



## Weather Data

Daily historical weather records from the NOAA API.





## Crime Data

Millions of records from the City of Chicago Data Portal, including location, time, and type of crime.

ID	Case Number	Date	Block	IUCR	Primary Type	Description	Location Description	Arrest	Domestic	...	Ward	Community Area	FBI Code	X Coordinate	
0	11824091	JC428303	09/10/2019 11:55:00 PM	065XX S MAY ST	141A	WEAPONS VIOLATION	UNLAWFUL USE HANDGUN	RESIDENCE PORCH/HALLWAY	False	False	...	16	68	15	1169774.0
1	11824121	JC428304	09/10/2019 11:50:00 PM	0000X N LECLAIRE AVE	0486	BATTERY	DOMESTIC BATTERY SIMPLE	APARTMENT	True	True	...	28	25	08B	1142386.0
2	11824149	JC428308	09/10/2019 11:50:00 PM	009XX W 79TH ST	502R	OTHER OFFENSE	VEHICLE TITLE/REG OFFENSE	STREET	True	False	...	17	71	26	1171263.0
3	11824152	JC428300	09/10/2019 11:47:00 PM	078XX S CARPENTER ST	1310	CRIMINAL DAMAGE	TO PROPERTY	RESIDENCE	False	False	...	17	71	14	1170674.0

- The data contains ‘Date’ and ‘Block’ to map them to the Divvy, Event, and Weather datasets.
- It contains a ‘Type’ field for fine-grained analysis of the crime type correlation/causation with the factors we are going to assess.



## Divvy Bike Trips

Millions of individual trip records with start/end times and station locations.

	<b>from_station_name</b>	<b>to_station_name</b>	<b>starttime</b>	<b>stoptime</b>
0	Lincoln Ave & Belmont Ave	Broadway & Cornelia Ave	2014-06-30 23:57:00	2014-07-01 00:07:00
1	Halsted St & Maxwell St	May St & Taylor St	2014-06-30 23:56:00	2014-07-01 00:00:00
2	Sheffield Ave & Webster Ave	Halsted St & Dickens Ave	2014-06-30 23:33:00	2014-06-30 23:35:00
3	Peoria St & Jackson Blvd	State St & Wacker Dr	2014-06-30 23:26:00	2014-07-01 00:24:00
4	Loomis St & Lexington St	Peoria St & Jackson Blvd	2014-06-30 23:16:00	2014-06-30 23:26:00

- The data contains the route of the trip and the time to map it to the crime data.
- We can use this data to assess the surge in transportation in a local neighborhood in a specific timeframe.
- A challenge is to how to map station names to their corresponding blocks.



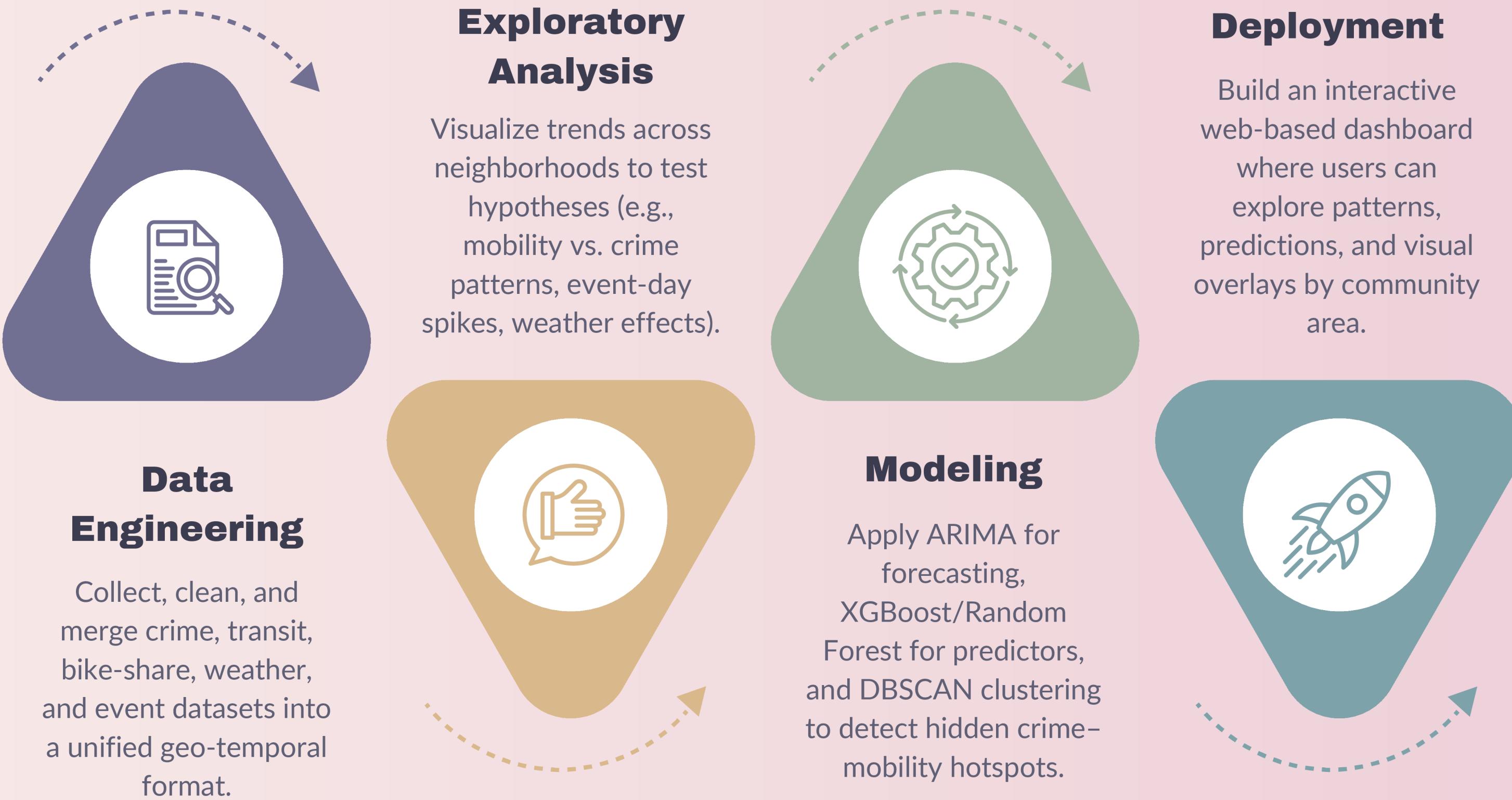
## Events Data

Chicago Park District -  
Event Permits Dataset -  
Contains ~132,000  
entries of events in  
Chicago from 2012.

	Requestor	Organization	Park Number	Park/Facility Name	Reservation Start Date	Reservation End Date	Event Type	Event Description	Permit Status
0	Permit Holder Account	--	21.0	Washington Grove East of 7 Hills North	12/31/2025	12/31/2025	Administrative Reservation - Internal Hold REV...	Admin Hold Washington Grove East of 7 Hills North	Tentative
1	Fleet Feet Training X CES	--	100.0	Lincoln Ben Franklin Statue	12/31/2025	12/31/2025	Permit - Athletic T Cluster 3	Fleet Feet Training - Ben Franklin	Approved
2	Permit Holder Account	--	19.0	Jackson Osaka Garden	12/31/2025	12/31/2025	Administrative Reservation - Internal Hold REV...	Admin Hold Osaka Garden	Approved
3	Sara Hruska	--	228.0	Horner Lawn N of front walkway	12/31/2025	12/31/2025	Permit - Athletic Event Level 4	Spark Montessori Outdoor Program	Approved

- This dataset specifically contains 'Park/Facility Names' and the 'Reservation Dates', which allow us to map the events to the crime data.
- One challenge is how to map the 'Park Name' to a specific block in our crime dataset.
- Another challenge is that the exact time of event is missing.

# THE SOLUTION





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# THANK YOU!

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