

Building Cities Twice: **The Making of Digital Twins**

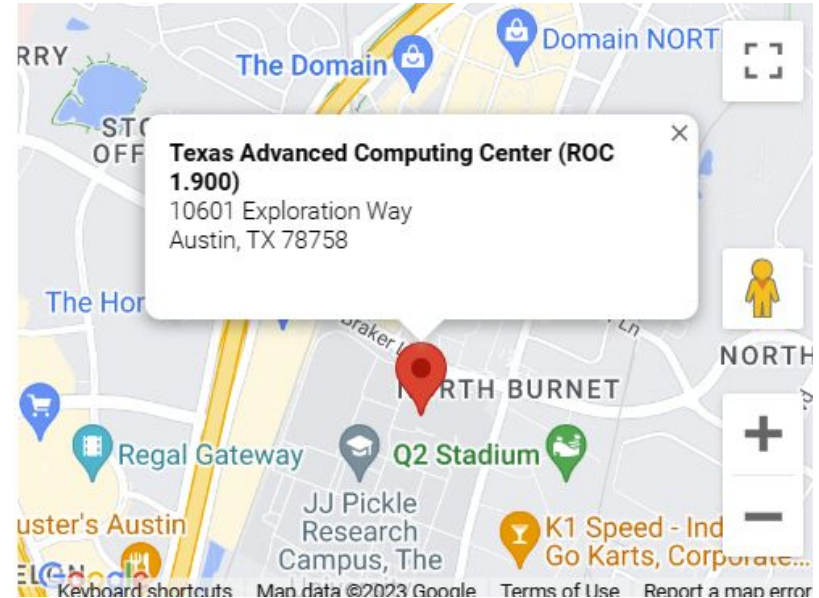
Ryan Hardesty Lewis
Research Assistant, Urban Information Lab



The Power of AI in Shaping Smart Cities

1

- Generative AI's impact on urban development
- The interdisciplinary nature of the symposium
- **Goal:** Understanding AI's role in city planning & development



GOOD SYSTEMS

A UT Grand Challenge

2

Designing Ethical AI for Society

- University-wide research initiative
- Focus on ethical AI technologies
- A core project:
"A Good System for Smart Cities"



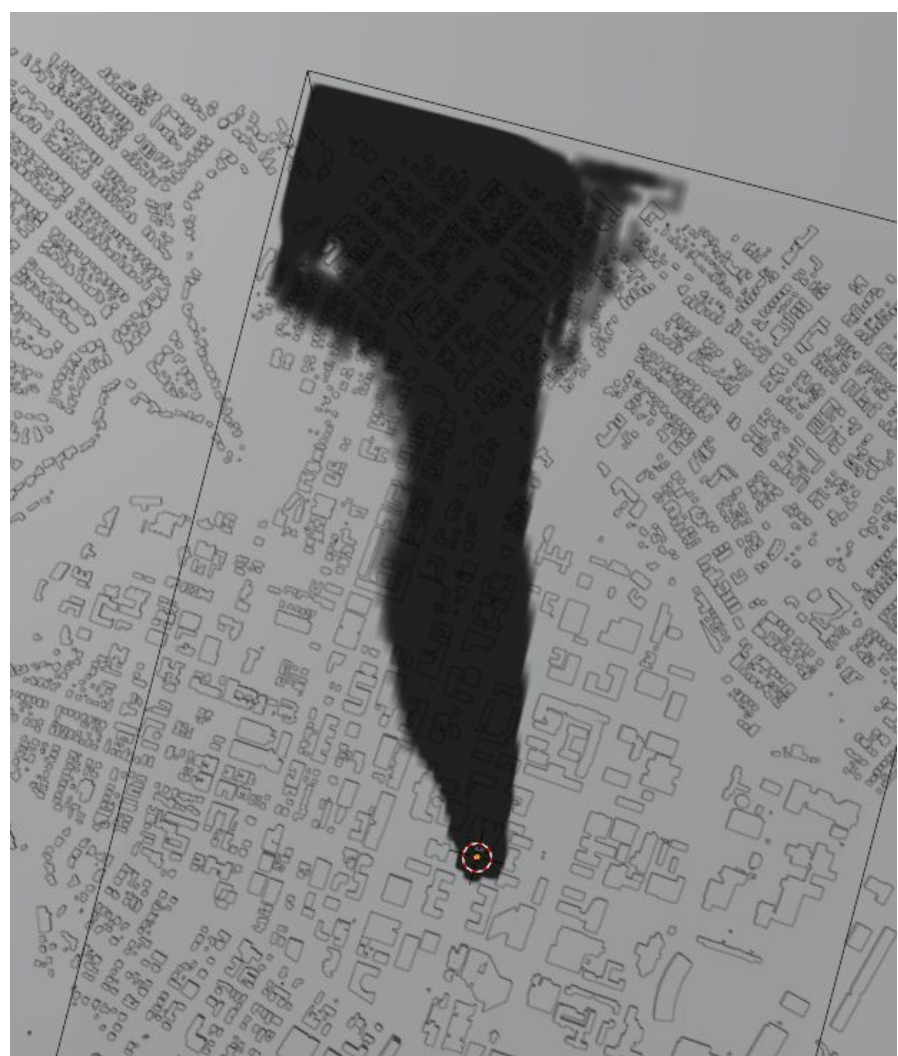
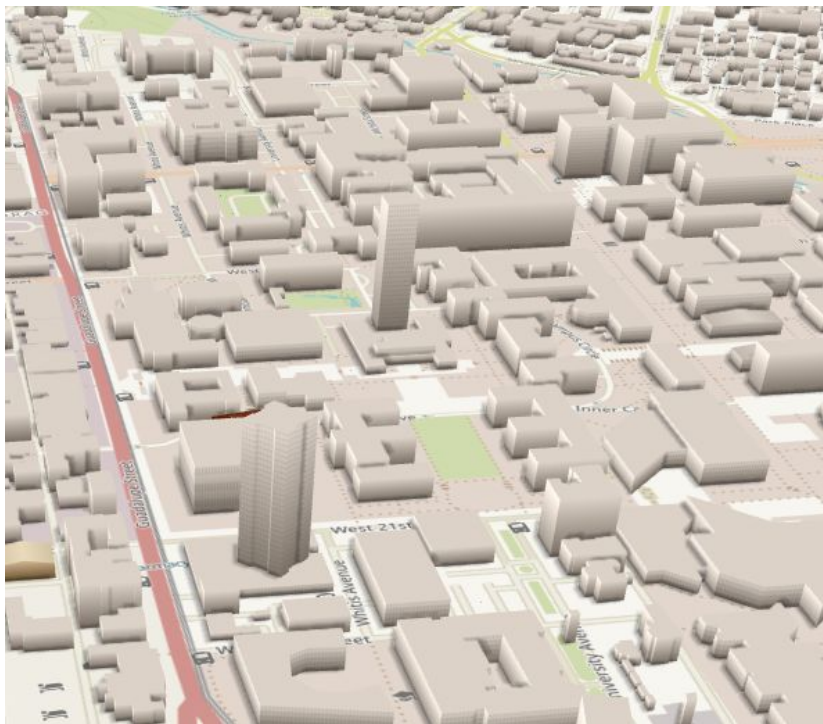
Monitoring Fire & Air Quality in Real-Time

3

- Addressing the global challenge of PM2.5
- Live fire tracking from over 20 US cities
- 2D + 3D simulation of fire and smoke in Austin



We needed to do smoke prediction in 3D.





Predicting Fire Smoke & Impacts

4

- Close to real-time tracking
- 3D building footprints of Austin
- Predictions on smoke outputs & falloffs





Collaboration for Impactful Results

- Partnership with City of Austin Fire Department
- Challenges of validating urban fire presence
- Release of code for replication worldwide



Addressing Food Insecurity Post-COVID

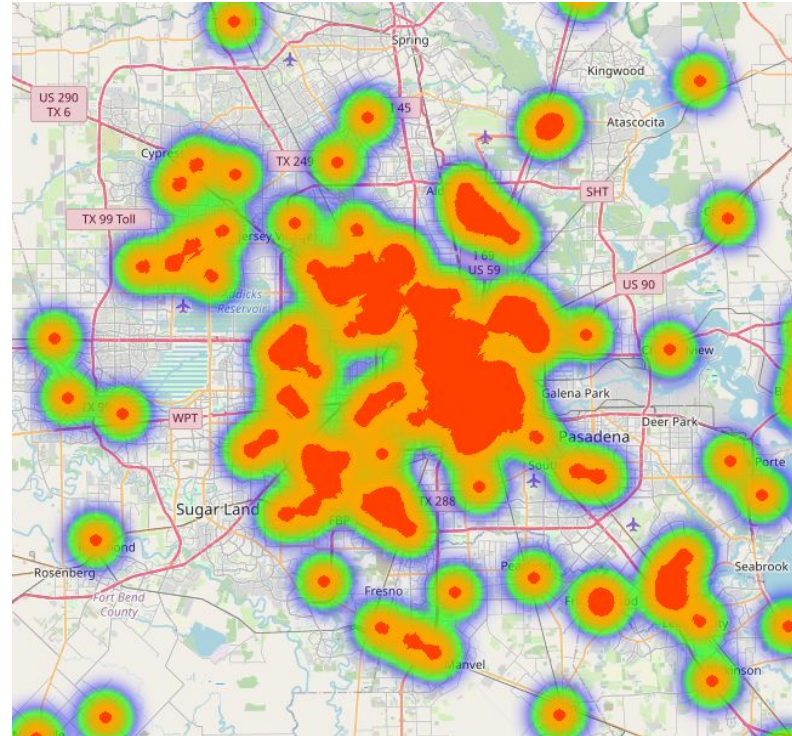
6

- Rise in food insecurity & challenges faced
- Importance of understanding resources & challenges
- Ensuring effective delivery of resources



Empowering Local Food Security Systems

- Collaboration with food charities & local governments
- Identifying areas with limited healthy food access
- Encouraging culturally appropriate donations





forked from [ryanhlewis/GPT-Auto-Scraper](#)

[main](#)[1 branch](#)[0 tags](#)[Go to file](#)[Add file](#)[Code](#)

About



This branch is up to date with [ryanhlewis/GPT-Auto-Scraper:main](#).

[Contribute](#)[Sync fork](#)

A GPT-powered AI auto scraper for websites. AI Web Scraping made easy.



[ryanhlewis](#) Update ReadMe.md

9d8af56 on Jun 26 3 commits

.gitattributes	Initial commit	2 months ago
ReadMe.md	Update ReadMe.md	2 months ago
requirements.txt	Initial commit	2 months ago
scraper.py	Initial commit	2 months ago
server.py	Initial commit	2 months ago

[Readme](#)[Activity](#)[0 stars](#)[1 watching](#)[1 fork](#)[Report repository](#)

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GPT Auto Scraper

GPT Auto Scraper is a project that leverages AI capabilities to carry out web scraping tasks. It offers a solution for pulling out information from HTML data sources according to the specifications set by the user. It not only creates the necessary scraping code in Python but also runs it to fetch the data of interest.

Releases

No releases published
[Create a new release](#)

Packages

No packages published
[Publish your first package](#)

Languages

Find & help a local food charity today!

INSTRUCTIONS

Center of Life International

38-49 12th Street, Long Island City, NY 11101-6107

Lenox Hill Neighborhood House - Food Distribution Center

331 E 70th St, New York, NY 10021-8601

Hour Children Community Outreach and Food Pantry

36-24 11th St, Queens, NY 11106

Hour Children Community Outreach and Food Pantry

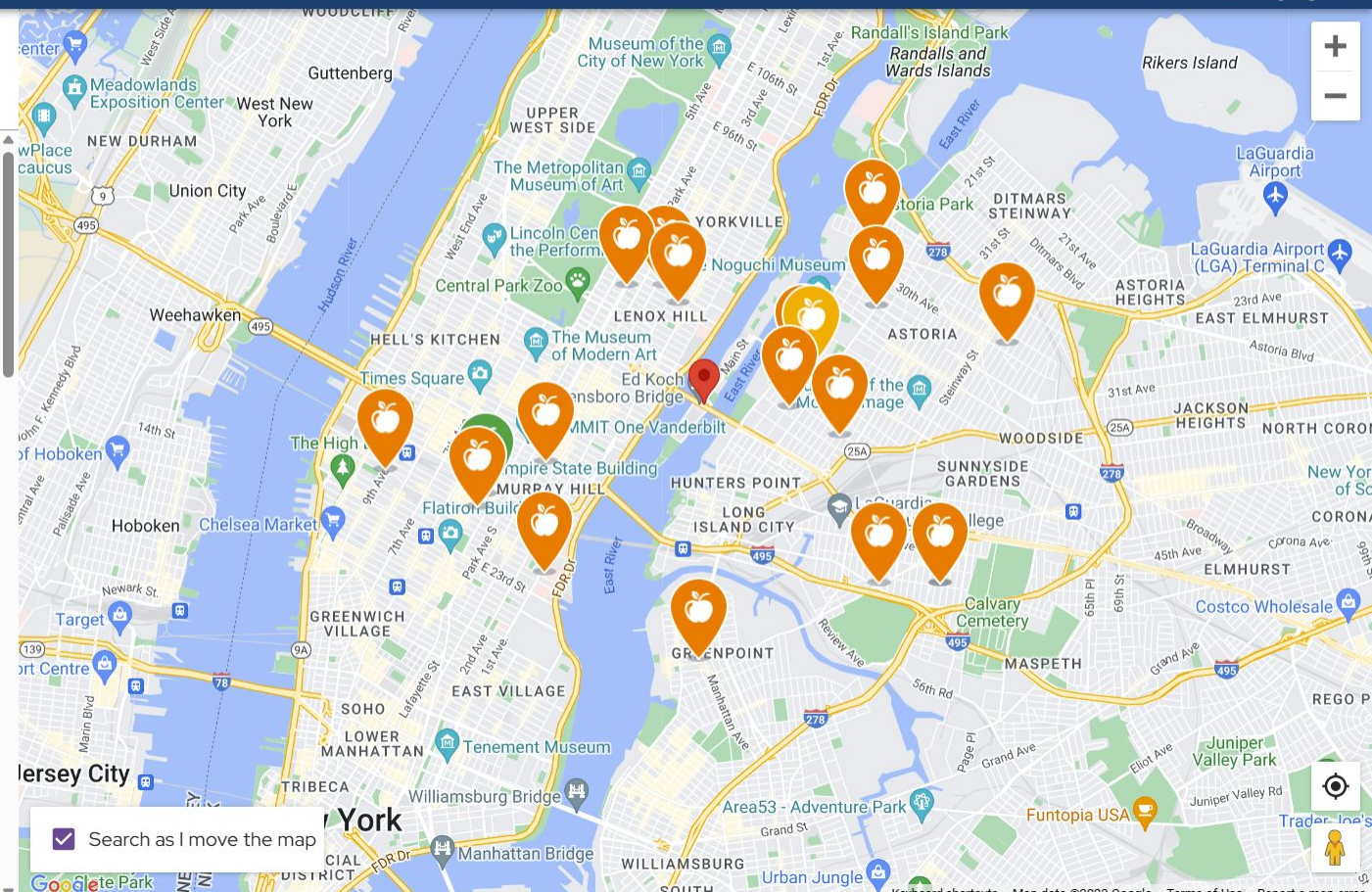
36-24 11th St, Queens, NY 11106

Hour Children, Inc.

36-11 12th St, NY 11106

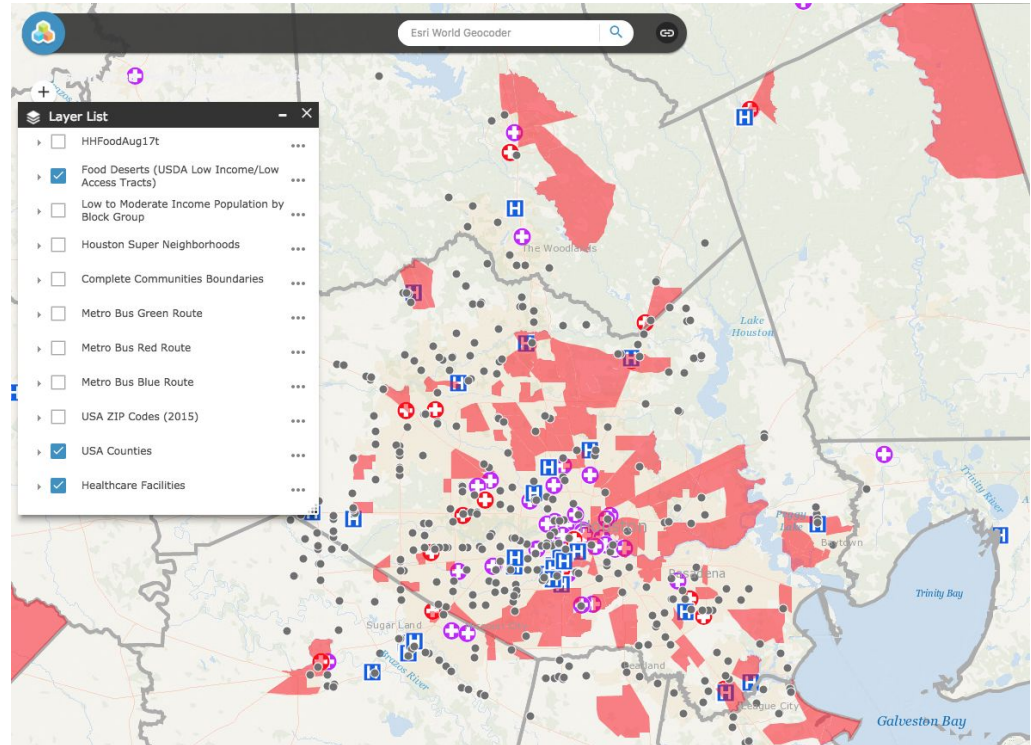
Marymount Manhattan Student Pantry

221 E 71st St New York NY 10021-4532



A New Paradigm in Healthy Food Access

- Auto-updated food access map
- Layered data for informed decision-making
- AI-driven suggestions for service locations



Enhancing Food Charity Operations

9

- Auto-generation of food pantry information
- Accurate food preparation instructions
- Tailored to real-time conditions

How to Wash Quinoa



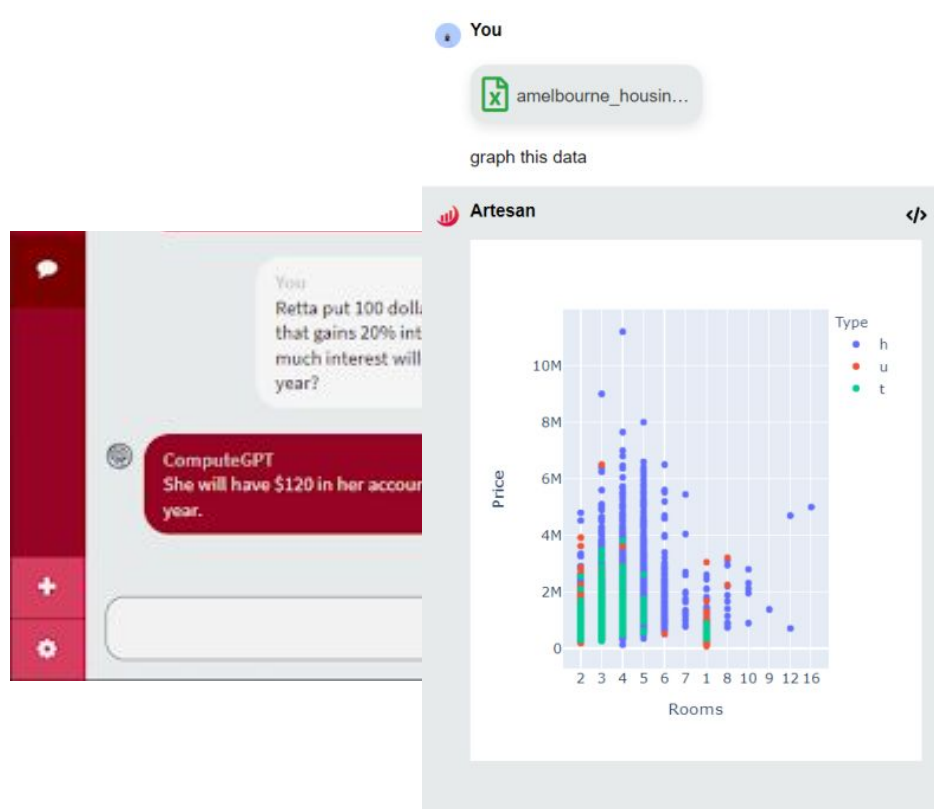
DEYMOS/GETTY IMAGES

Quinoa should always be washed before cooking. This extra step will remove the saponin (quinoa's natural coating), which not only tastes bitter but also prevents the grain from expanding as it cooks. If the packaging for your quinoa says it's already been pre-washed, washing it again will be up to your own personal preferences.

Pioneering LLM Models for Precision

10

- ComputeGPT: Accuracy in mathematical computations
- Artesan: AI-powered statistician & data analyst



🔍 Search conversations...

💬 Conversation 1

💬 Conversation 2

ComputeGPT

Examples

"What's the fifth derivative of $200x^7$?" →

"Given three seconds and a task that takes 0.2 seconds to complete, how many tasks can we complete?" →

"Solve for the central angle of a circle that has an inscribed angle of 35 degrees." →

Limitations

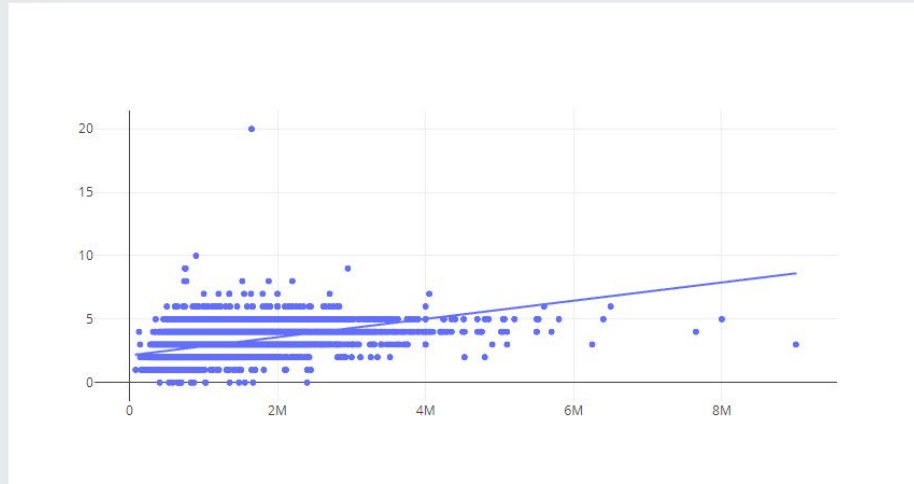
May occasionally generate incorrect information

Unable to answer multi-query questions

Limited knowledge of proofs and logic-based questions

Write your question..



 Artesan

You

Find the correlation between number of bedrooms and price.



Artesan

The correlation between number of bedrooms and price is: 0.4759510323766368



You

Explain the correlation between bedrooms and price.



Artesan

The correlation coefficient of 0.4759 suggests a moderate positive relationship between the number of bedrooms in a property and its price. This means that as the number of bedrooms increases, the price tends to increase as well, but not necessarily at a strong rate.

"Graph the prices versus the number of bedrooms."

"Explain the correlation between bedrooms and price."

Subscribe to Artesan Plus use open-ended prompting.



Ryan Lewis

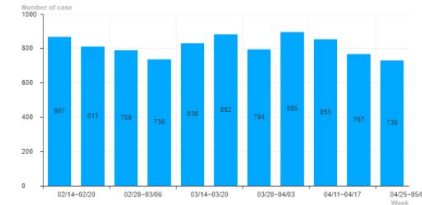


Bridging Accuracy & Real-world Simulations

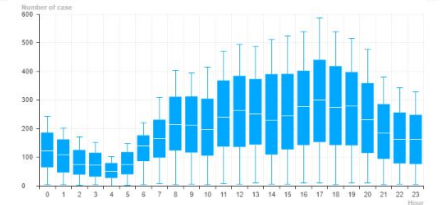
- Digital twins: Real-time replication of urban environments
- LLM models: Ensuring accuracy in data interpretation
- Synergy for a smarter, safer urban future

Active Fire Incidents Stats

Weekly Fire Case



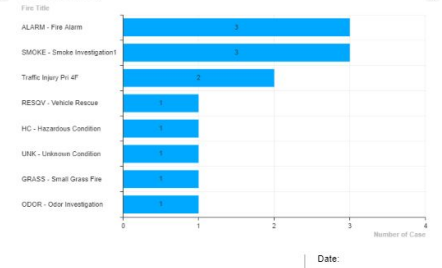
Average Hourly Fire Case



Monday to Friday Fire Case

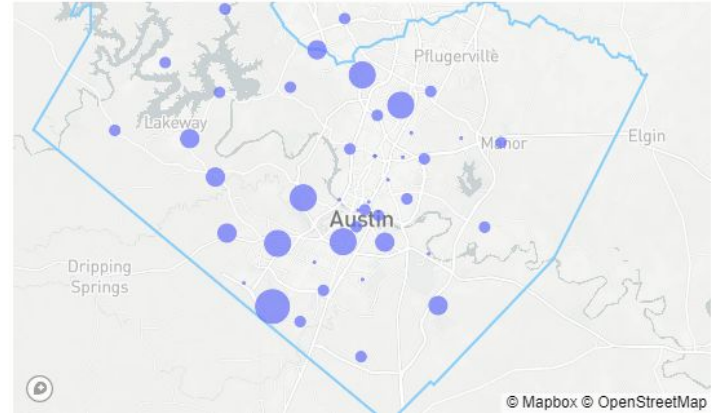


Fire Title by Day



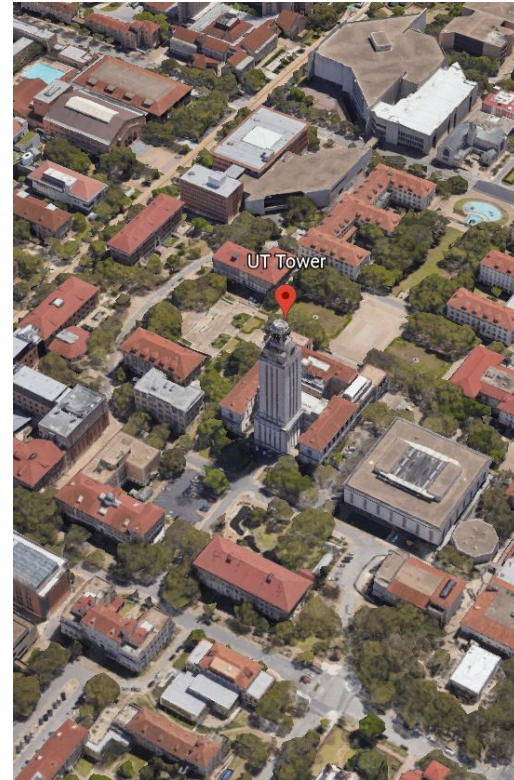
Ensuring Reliable Outcomes

- The need for high precision in AI models
- Real-world implications of accurate predictions
- Trustworthiness in AI-powered urban solutions



The Future of Smart Cities

- The transformative power of generative AI
- Ongoing research & its implications for society
- The promise of a smarter, safer, and healthier urban life



Engage with Us!

Thank you for your attention! :)

- Open for questions and discussions
- Collaboration opportunities & future projects

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@ **COMPUTEGPT.ORG**

@ **AUSTINDIGITALTWIN.COM**

@ **TRAFFICEMS.COM**

@ **SITES.UTEXAS.EDU/UII**

@ **SMARTCITY.TACC.UTEXAS.EDU**



[https://github.com/
UrbanInfoLab](https://github.com/UrbanInfoLab)