



Award for Research Data Stewardship Case Study:

University of Florida Transportation Institute & Gravy Analytics

Research from the University of Florida and Gravy Analytics: Using Location Analytics to Enhance Natural Disaster Emergency Response Planning and Management

Xilei Zhao, Ph.D., from the University of Florida and Gravy Analytics, a leading provider of enterprise location intelligence, was awarded an honorable mention for the Future of Privacy Forum's third-annual Award for Research Data Stewardship for their study, *"Using Location Analytics to Enhance Natural Disaster Emergency Response Planning and Management."* Utilizing secure human mobility data, the collaboration between the research team from the University of Florida's Transportation Institute (UFTI) and Gravy Analytics examined the movement of local residents before, during and after the 2019 Kincade Fire in Sonoma County, CA.

The team of researchers and their corporate partners demonstrated a commitment to privacy and ethical uses of data in their efforts to help with emergencies related to natural disasters. To ensure a secure data exchange, the teams built robust privacy protections into the project, including using pseudonymized location data and processing data with a 24-48 hour delay.

"Beyond providing actionable insights to businesses, Gravy Analytics believes that location intelligence should be used for social good," said Jason Sarfati, Chief Privacy Officer & Vice President of Legal at Gravy Analytics. "As a leading provider of enterprise location intelligence, the company knows that location data and its derived datasets have the potential to fuel innovation within our communities and help people live healthier, more fulfilling lives."

The Research Project

To reduce wildfire risks and strengthen the resilience of wildland-urban interface (WUI) communities, UFTI researchers studied the movements of local residents during the 2019 Kincade Fire in Sonoma County, California. UFTI researchers collaborated with Gravy Analytics to analyze human mobility data from the Kincade Fire's evacuation zone and surrounding area using Gravy's Observations Data-as-a-Service (DaaS) product.

With Gravy's data, UFTI researchers were able to isolate the human mobility data and examine the movement of Sonoma County residents before, during and after the fire. By examining these movements, researchers gained a deeper understanding of how people behave during wildfire evacuations.

Data Protection Procedures and Processes in the Research by UFTI and Gravy Analytics:

1. **Established Limits on Shared Data.** As part of a Data Sharing Agreement (DSA), Gravy Analytics limited observation data to the specific area and time of the Kincadee Wildfire.
2. **Protecting Consumer Data.** Gravy Analytics employed a variety of techniques to reduce the risk of individual reidentification, including the use of pseudonymized location data and data processing with a 24-48 hour delay. The company required consumer consent for location data collection with the ability to opt-out, in compliance with all applicable laws, including the European Union's General Data Protection Regulation (GDPR) and the various U.S. state-level privacy laws.
3. **Enabling Safe Use of Data.** Gravy maintains a dynamic privacy blacklist of more than 500,000 sensitive locations through its recently launched product called PrivacyCheck. PrivacyCheck allows outside companies to flag location data to ensure that data generated by consumer mobile devices while visiting sensitive locations is never used, shared or resold.
4. **Leveraging Technology to Enhance Safe Sharing.** Gravy Analytics delivered the data to researchers from the University of Florida Transportation Institute via an Amazon Simple Storage Service (S3) bucket, a storage service offered by Amazon Web Services (AWS). Through Amazon S3, there are several mechanisms used to ensure data stored in S3 buckets is secured, including access controls, data encryption, identity authentication and more.

Lessons for Future Data-Sharing Projects

The data-sharing collaboration between the research team at UFTI and Gravy Analytics highlights several valuable lessons that companies and academic institutions may apply to future data-sharing collaborations.

- **Establishing Pathways for Secure Collaborations.** UFTI's request for data was made through Gravy's [Data for Social Good](#) program, an established program in which researchers looking to study areas that can improve communities and society at large can request location data from Gravy at a nominal cost to use in their research. This request was handled by Gravy Analytics employees who specialize in working with researchers and non-profit organizations to deliver data for research purposes.
- **Work the Process.** Gravy Analytics and the research team at UFTI established a clear process to obtain necessary approvals and maintain privacy protections throughout the research collaboration. The team at Gravy Analytics worked diligently to ensure that they adhered to global privacy laws, processes and frameworks throughout the data-sharing process.
- **Equal Emphasis on Privacy.** The UFTI team also responsibly handled observational data shared by Gravy Analytics and used relevant classifications to group categories of evacuees.

The Result

The study revealed many insights, including that among all residents inside of the evacuation warning/order zones who were categorized as either a non-evacuee or an evacuee, 46% of residents evacuated and 54% did not evacuate during the 2019 Kincade Fire. Additionally, the project found that Self-Evacuees and Shadow Evacuees accounted for more than half of the evacuees (55%). UFTI inferred that residents in these two groups may have proactively evacuated due to prior experiences with wildfires. Classified as Evacuees Under Warning, 7% of evacuees left home as soon as they received an evacuation warning. Among Ordered Evacuees, 38% of evacuees left home once they received mandatory evacuation orders.

UFTI's research can benefit the general public, especially those who live in areas vulnerable to wildfires or other natural disasters, by supporting more effective emergency management. Additionally, UFTI's research can help vulnerable communities prepare and mitigate risks associated with wildfires or other natural disasters.

The Selection Process

Nominees for the Award for Research Data Stewardship were judged by an Award Committee composed of representatives from FPF, academics and industry leaders. The Award Committee evaluated projects based on several factors, including their adherence to privacy protection in the sharing process, the quality of the data handling process and the company's commitment to supporting independent academic research.

To learn more about best practices for instituting research data-sharing programs between corporations and research institutions, download the Future of Privacy Forum's "[The Playbook: Data Sharing for Research](#)." This report addresses vital steps for data management, sharing, and program execution between companies and researchers while aiming to encourage safe, responsible data-sharing between industries and researchers.