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City of Fairfield, California, strategises post-pandemic public transport recovery using mobile location data

INNOVATE MOBILITY X QUADRANT CUSTOMER SUCCESS STORY

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ABOUT INNOVATE MOBILITY

Website: www.innovatemobility.com
Industry: Transportation/Mobility Design and Planning
Headquarters: Raleigh, North Carolina, USA

Innovate Mobility is a public transit consulting firm that works with city administrations, public works departments and transportation companies to deliver data-driven mobility design and planning services. Innovate Mobility has created the first-ever software-with-a-service transit practice. Their expertise in providing actionable intelligence with big data has helped many transit agencies modernise public transportation, focusing on experience, access, sustainability, and resilience.

FAST
FAIRFIELD AND SUISUN TRANSIT

ABOUT FAST

Website: www.fasttransit.org
Industry: Government Administration
Headquarters: Fairfield, California, USA

The City of Fairfield California Transport Division provides local service and commuter service to the Bay Area, San Francisco, Oakland, and Sacramento. The city's local transit service, Fairfield and Suisun Transit (FAST) is a system that's services Fairfield and provides the general public with fixed route bus service through eight local and one intercity/commuter routes. FAST, alongside other public transportation operators in Solano County, also serves lines of the intercity Solano Express service.

OVERVIEW

Location-based intelligence plays a vital role in helping city administrations and public transportation agencies expand and improve their services. With the increasing popularity of rideshare platforms and shared micro-mobility, public transit systems need to go the extra mile to understand their rider's needs and make adjustments to maximise availability while staying profitable.

This case study discusses how Innovate Mobility worked with the City of Fairfield, California and its transit system FAST to help them understand changes in mobility patterns pre- and post-COVID and redesign their transit services. This case study examines some of the city's challenges and goals, and how Innovate Mobility helped solve them using Quadrant's high-quality, ethically sourced mobile location data.

The primary focus of the project was to perform a comprehensive operational analysis for the city to build a 5-to-10-year roadmap to improve and expand their transit services.

GOALS AND OBJECTIVES

Immediately after the start of the COVID-19 pandemic in the USA in March of 2020, the city's ridership dropped by 90%. With many people working from home and not going to work five days a week, the demand for public transportation drastically reduced. As the world recuperated from the pandemic, the city needed to reimagine its transit services. In December of 2020, the city began a project to re-evaluate its transit system knowing that to fully revive its services and accommodate changing travel patterns, the city would need critical insight into citizens' movement patterns. The city's focus was to better:

- Identify and reach new and underserved riders
- Encourage commuters to use public transportation
- Implement alternative modes of transportation to justify the operational costs for low density routes
- Replace large Diesel buses for smaller electric vehicles for an on-demand, micro-transit service
- Modify routes based on ridership, and more.

CHALLENGES

The transportation industry generally uses data collected via ticketing systems, public surveys etc. However, these data types do not offer insight into potential riders, underserved routes, and changes in passengers' mobility. Additionally, this data becomes unreliable when a major event like a recession or the pandemic occur. For example, ticketing data is excellent for understanding single trip usage, but it does not meet the quantitative or qualitative criteria for operationally relevant analysis, nor does it offer predictive intelligence at a network level. Predictive analytics can be a powerful tool to inform transport companies and agencies on how people move in cities and how best to deploy their services to meet their needs.

Like many transportation agencies, FAST also used survey data to strategise the development of their services. However, leveraging survey data to understand mobility patterns can produce unreliable results. Survey data is not quantitative as it relies on user generated information and there is no mechanism for ensuring the validity of the information collected. Moreover, analysts need to gather and unify multiple types of data to decipher insights, which requires additional time, in-house expertise, resources, and costs for city administrations.

The city selected Innovate Mobility for its approach to gathering data, analysing it in a way that provided actionable intelligence and created a strategy for a post-COVID revitalizing of transit. Innovate Mobility sought a partner to provide mobility data around the city to analyse pre- and post-pandemic movement patterns. Before partnering with Quadrant, Innovate Mobility worked with several different vendors. Unfortunately, most of these sources did not provide data in their desired format or were lacking compliance with privacy regulations. Some companies offered information packaged with analyses, which were not relevant to the customer's goals. Being experts at mobility planning and design, Innovate Mobility needed raw data tailored to a specific region to run its own algorithms and simulations.

SOLUTION

Innovate Mobility developed an advanced analysis model that uses Quadrant's high-quality mobile location data to understand the discrepancies in the supply and demand of public transportation. Their algorithms convert anonymised GPS signals, among other data types, into actionable intelligence for FAST, such as providing FAST insights concerning how transit services maybe adapted to better match how people actually move. Innovate Mobility also has built custom modelling tools to better understand demand and allocate transit supply accordingly. These insights can help the city plan and implement cost-effective microtransit services that complement the city's overall infrastructure.

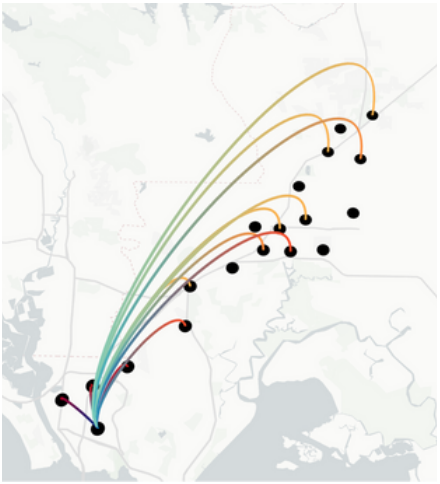


Image 1

Image 2

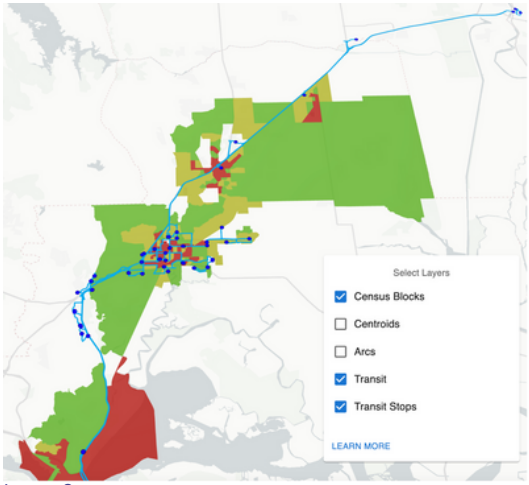


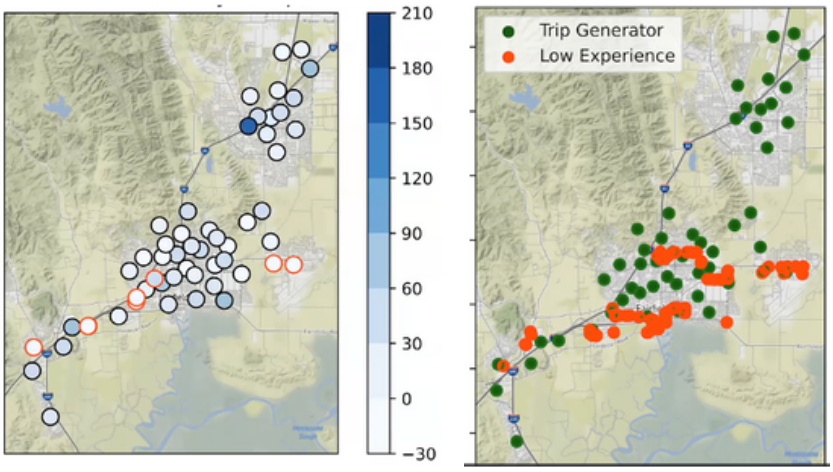
Image 3

Quadrant's raw location data consists of a latitude, a longitude, and time. Experts at Innovate Mobility use these signals to create centroids that represents major trip origins and destinations and then pair them to create travel patterns. The custom signal processing algorithms built by Innovate Mobility provide the basis for origins and destinations and allow them to do complex clustering (see image 1).

Once travel patterns were identified and defined, they overlaid the existing public transit network to determine how well it served these clustered trip patterns (see image 2). This provided insight into where gaps in the existing transit route network exist.

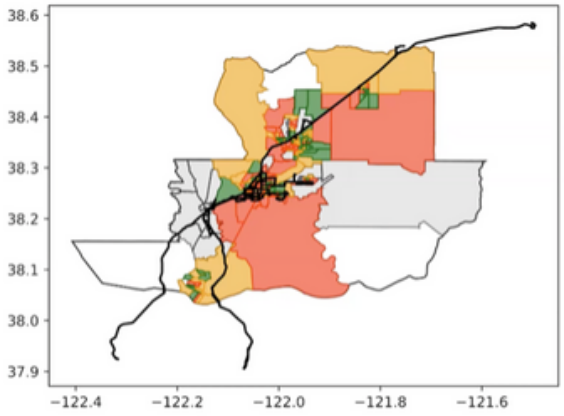
Finally, Innovate Mobility combined the location data with U.S. census data to determine where vulnerable populations live and what their current travel experience is (see image 3). Utilising their sophisticated and complex routing algorithms, Innovate Mobility provided the city with the ability to know travel time and wait time throughout their region. Thus, helping the city design new routes that are more accessible to create a more equitable service.

THE ANALYSIS



The blue centroids in the image represent trip generators in the city whereas the red centroids denote where public transit services are most saturated. Based on these centroids, Innovate Mobility performs Origin-Destination (OD) analysis which shows a snapshot of where people are coming from and where they are going.

Quadrant's data helps with identifying where people originate from, where they are headed, and how fast they are travelling. The green dots represent trips that take people 5 minutes or less to complete while using private transport. The red dots represent similar trips that take people 15-20 mins to complete using public transit. Together, these visuals enable the identification of "transit deserts" so that cities can design public transport to provide better access to underserved regions.



The Mobility Vulnerability Index: The analyses are combined with census data and data from the local public transportation network to ascertain which areas have a significant percentage of inhabitants that are "transit dependent" (people who use public transport because of socio-economic limitations). The index is constructed by incorporating 17 distinct indicators. Data from the General Transit Feed Specification is overlayed on the OD analysis and trip generators to better understand deficiencies in transit systems.

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RESULTS AND BENEFITS

The quantitative report produced by Innovate Mobility is helping the city build a well-informed improvement strategy and attain federal resources to improve public transit in underserved areas. The analysis of Quadrant's data presented the city with recommendations to change its services to meet its goal of a sustainable public transit system.

Innovate Mobility's work is beneficial for transportation managers at FAST as it provides a detailed view of coverage vs frequency across the city. The coverage maps represent the proximity of the existing transit network to major trip generators, and the mobility vulnerability index provides a view of where vulnerable populations reside in a city.
Monitoring movement data in the region will also help FAST identify routes with lesser but consistent ridership, providing the basis for their on-demand micro-transit services. This will help the city plan better transit and lower costs significantly without compromising the needs of low-density regions.

This analysis also helped the City of Fairfield secure additional funding for its services. **In June 2022, FAST received a $1 million competitive Federal Transit Administration grant** to implement microtransit services in new areas using Innovate Mobility's resources that provided a thorough analysis of the city's transit system.

> *When we created our company, the goal was to look at transit analysis a different way. We wanted to make sure that we could help our clients modernize their services using big data and custom-built tools. We selected Quadrant after an exhaustive search based on their ability to provide real, meaningful data, that respected the privacy of the users.*

Rahul Kumar
President, Innovate Mobility

Quadrant (An Appen Company) is a global leader in mobile location data, POI data, and corresponding compliance services. Our data is verified, trustworthy, and ready to use, allowing businesses, organisations, and innovators to build tailored solutions for a myriad of real-world problems. Since Sep 2021, we are part of Appen, the global leader in AI training data that helps build and improve the world's most innovative artificial intelligence systems. To learn more about Quadrant's mobile location data, **talk to a data consultant today**!

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