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CASE STUDY

TRAFFIC INCIDENT COMMUNICATION PLATFORM

By: IPgallery Urban Mobility and City of Fremont, CA Public Works Department

IN THIS CASE STUDY YOU WILL LEARN:

1. How integration with transportation users can help develop a Mobility Action Plan.
2. How the use of an Artificial Intelligence (AI) based real-time data management platform helped mitigate congestion.
3. How the city worked successfully with the application developer during the process.

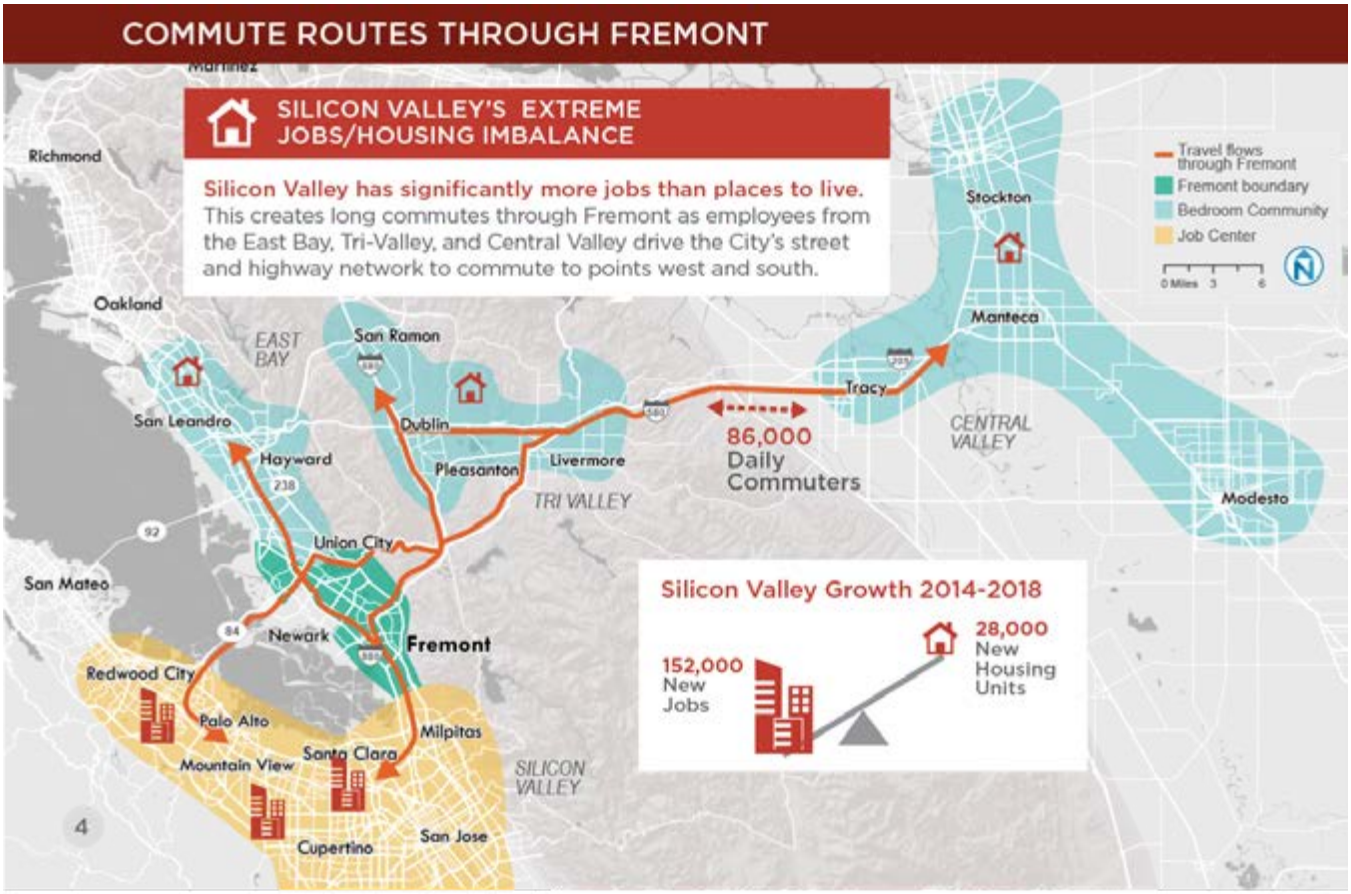
BACKGROUND

The primary reason traffic congestion in Fremont has escalated is due to the growth in the Silicon Valley economy. This growth has led to a rapid increase in jobs but there has not been a corresponding growth in Silicon Valley housing. Fremont is at the crossroads between where the jobs are and where the employees are living. Many new jobs have been created at companies like Facebook, Apple, and Google. But relatively little new housing has been created near these job sites. This imbalance between jobs and housing induces commute trips through Fremont and sends traffic crawling along the three highway corridors of Interstate 880, Interstate 680, and State Route 84. A "triple tidal wave" of traffic passes over Fremont every weekday morning and afternoon. Traffic congestion is further compounded by a "funnel effect" created by the geography of Fremont. Navigation apps aggravate the problem by directing regional commuters through Fremont's main streets and neighborhoods to avoid clogged highways. Besides the regional traffic congestion challenge, Fremont also has to address local traffic congestion issues to serve the internal travel demands of Fremont's growing population of 230,000 residents. Access to all areas of the city, for getting to work, schools, shopping, appointments, friends and youth activities among their day-to-day travels, must be available. Accordingly, it is necessary to maintain and improve the interconnected network of roads to provide safe and efficient travel throughout Fremont for its residents.

Newsletter sent to all Fremont households.

The City of Fremont understands that Transportation Systems Management and Operations (TSMO) including traffic, congestion and incident management are among the community's major concerns. The Bay Area is one of the top three traffic-plagued regions in the country, so it's no surprise Fremont residents are concerned. Having ongoing regional transportation projects that are managed and overseen by regional agencies such as Alameda County Transportation Commission (ACTC), Bay Area Rapid Transit (BART), and the California Department of Transportation (Caltrans) as well as several local transportation projects overseen by the city results in a complex system of management. This complexity led to the motivation to develop innovative methods to manage data and improve the day-to-day cross-organizational management of transportation flow. Innovation was also needed to manage the reciprocal influences of various traffic incidents that require emergency response. IPgallery's AI-based Transportation Incident Management and Evaluation Platform was implemented by the Fremont's Public Works Department. The implementation was done through the Transportation Engineering Division which coordinates regional transportation projects that affect Fremont; plans and designs bicycle, pedestrian and street improvement projects; operates and maintains the city's transportation system; and analyzes the transportation impacts of new developments.

TRAFFIC INCIDENT COMMUNICATION PLATFORM



TSMO PLANNING, STRATEGIES, AND DEPLOYMENT

In May 2017, Fremont's Mayor and City Council initiated the process to develop a Mobility Action Plan and appoint a Mobility Task Force to guide staff and consultants on Fremont's transportation issues and needs. From its inception, the goal of the Mobility Action Plan would be to address traffic congestion, improve local multimodal circulation, reduce traffic crashes, and adapt new transportation technologies. In September 2017, the City Council appointed a 14-member Mobility Task Force composed of Fremont residents and stakeholders. The task force represented different areas of the city and contributed a variety of perspectives and knowledge from a wide range of professional backgrounds. The Fremont Mobility Action Plan was developed from community input solicited at five community events, a topic posted on Fremont Open City Hall, the City's online civic engagement forum, and 11 Mobility Task Force meetings. The Mobility Action Plan is intended to guide the city's local implementation priorities and regional advocacy efforts over the next five years. Recommendations in the plan include topics of traffic signal modernization, school zones and access, travel alternatives, a traffic safety program, new technologies and smart mobility, and regional policy and projects.

IPgallery won the bid for the City of Fremont's request for proposal. The project tasks included the following 2018-2019 Startup in Residence (STiR) challenge of developing a Traffic Incident Communication Platform to address challenges experienced by government and residents. During a 16-week residency IPgallery developed, tested and implemented a customized solution that included:

1. collection of traffic and transportation data from all the available dynamic and static data sources
2. preprocessing of data utilizing advanced AI algorithms
3. visualization of multiple layers of intelligent information
4. real-time based and predictive actionable insights
5. day-to-day and during event management tools
6. sharing of transportation related events with the different agencies and residents

COMMUNICATIONS PLANNING AND EXECUTION

Initially IPgallery and the Public Works Department of Fremont worked closely to:

TRAFFIC INCIDENT COMMUNICATION PLATFORM

- Define the roles and responsibilities of the city department and IPgallery teams
- Co-define project goals to align project development with department objectives - scope preliminary technical requirements
- Complete scope-of-work document
- Co-define deliverables, deadlines and metrics
- Agree on frequency and format of communications

The scope-of-work template included discussions on department objectives and project goals, sources of insight, technical requirements, key tasks, timelines and responsibilities, risks and mitigation, and definitions of what the user tools would look like.

A final task included setting working norms for the team, including communications expectations and regular syncs of the system. IPgallery's advanced robust AI Smart Transportation Platform addresses both the economic and technical challenges with the city transportation system. This enables the city to provide citizens and businesses with smooth, safe, sustainable and resilient multimodal transportation services, as well as improve congestion condition, air quality and well-being. IPgallery's implementation includes an interactive Command & Control main operations dashboard, smart multimodal transportation services, optimization and management tools, and real-time and history analysis, predictions, pattern and anomaly detection tools. Reporting mechanisms, and applications that allow communication between agencies and residents round out the toolbox.

OUTCOMES, LEARNINGS, AND PUBLIC BENEFIT

The challenges addressed by this process include collecting, preprocessing and converging data from various sources in real-time, and then generating intelligent actionable insights supporting knowledge management and decision-making. These tools increase transportation resiliency, when affected by electric outages, hazards, and natural disasters. Overall benefits include:

- Unified Data Platform converging all data sources into a structured Data Lake
- Real-time AI-based preprocessing of data generating intelligent actionable insights
- Robust optimization and management tools
- Powerful real-time and history data analysis, predictions, pattern detection and anomaly detection tools, as well as reporting mechanisms
- Empowering Smart Transportation services including: traffic management, multimodal transportation stations and availability, parking management, public transportation management, air quality condition, agency/stakeholder/resident notifications and communication, EV charging stations locations and availability, and more

This new system supports sustainable transportation with low impact on the environment, reduces carbon footprint and improves air quality, facilitates alternative energy sources by providing management for air quality and EV charging, improves well-being and lifestyle by reducing traffic congestion, and promotes transportation equality and accessibility. The platform is also an enabler for various other application developments. IPgallery's holistic approach backed by robust technologies enables and empowers Public Private Partnerships (PPP). IPgallery provides the ability and intelligence, in real-time, to improve effectiveness and efficiencies, strengthen the Urban Ecosystem competitive-edge, drive innovative knowledge management, predictive decision making and digital transformation that significantly enhance user experiences, reduces costs and transform futuristic urban mobility into a reality.

FURTHER INFORMATION

Mobility Action Plan Website

NOCoE Knowledge Center: https://transportationops.org/knowledge-center

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