

Applying video analytics to improve safety and security within the Smart and Wise City of Turku

CGI supports Turku's strategic plan for promoting citizen wellbeing and city competitiveness using advanced analytics.

Each day across the globe, millions of vehicles and individuals are in transit. Crowds form and disperse. Trucks block traffic to make deliveries. Workers search for parking spots. Major and minor accidents occur. Increasingly, data about this seemingly endless movement can be captured for analysis to improve the security and safety of citizens. As the City of Turku, Finland, is finding out, one innovative way of gaining such insight is advanced video analytics, which combines computer vision, machine learning and real-time analysis to interpret video content.



Digitalization and analytics **underpin** the smart city

Founded in 1229, Finland's oldest city, Turku, also is a city of the future pursuing strategic goals as part of its top initiative: Smart and Wise Turku. Focused on improving the wellbeing of city residents and improving the competitiveness and productivity of the City, the initiative encompasses climate neutrality, services control and digital services, town planning, prevention of exclusion, traffic and mobility, and safety.

Turku envisions using innovative technologies to drive this transformation. This includes harvesting the power of data, digitalization and analytics to improve city productivity while also enabling economic growth, environmental sustainability and improved quality of life.

For more than three decades, the city has partnered with CGI on numerous projects, from delivering innovative healthcare systems to implementing budgeting and planning solutions and more. Recently, as host of Finland's most popular summer rock festival, Ruisrock, Turku also learned of CGI's capabilities for using video analytics (including facial analytics and custom neural networks) and real-time data to improve the concertgoer experience. This got Turku planners thinking about how video analytics could apply to the city's safety and security goals.



Envisioning the **possibilities**

To launch this strategic initiative, Turku leaders sat down with CGI experts to discuss the city's security and safety priorities. Then, as part of its initial investigation phase, CGI assessed the city's in-place video monitoring capabilities, gathering data about current equipment, locations (public spaces, streets, buildings, etc.) and the way surveillance is performed.

Through a series of design-thinking sessions, Turku and CGI determined the top business cases for using video analytics. These co-creation workshops discussed the art of the possible, aligning anticipated value and benefits to city priorities. The strategy was further refined to identify potential bottlenecks or constraints to each concept.

“ We got started effectively with CGI by rolling up our sleeves in a joint workshop involving our key executives from each unit. The workshop created a number of visions from which we chose the most promising ideas for safety and traffic development. The team at CGI took the ideas to work and surprised us with their clear and advanced concepts, which they are also able to implement. ”

Tuomas Piippo, City Development Office of Turku

Use cases for Turku's security and safety

Together, the Turku and CGI team uncovered a variety of high-value use cases where advanced video analytics could improve city safety and security and created a visual concept of the most promising ones (see diagram). Computer vision and machine learning, combined with real-time data flow, were found to provide great opportunities for both traffic and event management as well as city productivity and planning.

Real-time visualization of traffic and events, the most extensive of the concepts envisioned, would make use of the current camera base of the city to increase safety and responsiveness in situations where every second counts. For example, it would enable an automatic call for an emergency vehicle, share information on accidents and instructions to mobile devices, and support subsequent analysis of the incident.

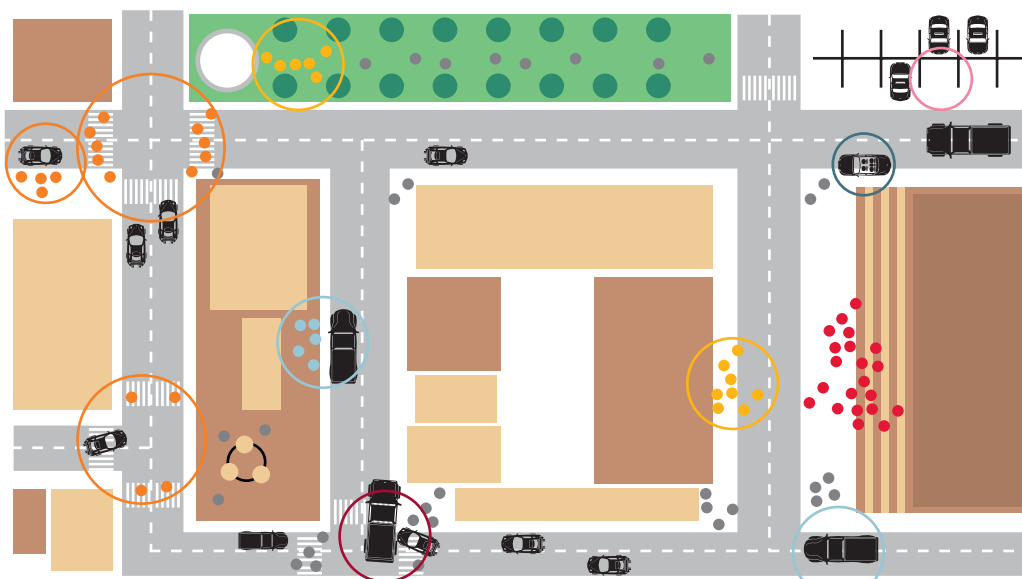
Calculating traffic volumes with video analytics is another idea that provides significant opportunities for city planning. Using technology to differentiate motorists, cyclists and pedestrians from each other would not only increase safety but also make traffic flow much smoother.

A third concept, real-time video analytics for specified locations, would provide information about the gender, age and mood (based on facial expressions) of the people moving in the target area. The collected information could be useful in marketing empty business locations, capitalizing spaces, designing business centers, and in managing events and activities initiated by city partners.



When a traffic accident occurs, every second counts! In-place city cameras can identify that a collision has occurred. Combining this visual data with machine learning can speed alerts and notification of first responders, saving more lives.

Unexpected end-of-day traffic jam? No worries. With visual data and machine learning, along with connected devices, your navigation can tell you where to turn next to avoid congestion. The city achieves improved traffic flow, and you arrive on time to pick up your children from daycare.



Traffic counts and flows
 Understand vehicle, cyclist and pedestrian patterns
 Send congestion alerts

Accident detected
 Identify vehicles involved
 Alert authorities
 Notify public

Track city vehicles
 Calculate real time "point-to-point" driving times
 Notify public

Parking availability
 Identify number of spaces
 Send notifications
 Search for citizens

Illegal parking
 See vehicles blocking bike lanes or sidewalks
 Notify owners by registration lookup

Crowd analytics
 Identify abnormal behaviors at venue and public spaces
 Mitigate risk

Drones
 Deploy to better understand events

Demographics
 Improve use of public space
 Plan city expansion
 Support business growth

Putting video **analytics to work**

Together, Turku and CGI have established a vision for executing on video analytics initiatives that will increase both safety and security. Through our co-creation workshops, we addressed potential challenges to success for future planning.

For example, video analytics creates a vast amount of data, and cities require appropriate high-performance computing environments to support this scale. Security and privacy also must be considered, and communications regarding new initiatives must explain to residents what data is collected and how that data will be used in compliance with regulations such as the General Data Protection Regulation (GDPR).

CGI brings Turku not only consultative guidance in envisioning the smart city but also the advanced technology know-how—including bleeding-edge capabilities such as video analytics—to achieve meaningful results. As City Development Officer of Turku Tuomas Piippo noted, *“In addition to their high-quality video analytics expertise, CGI has a broad vision for developing future cities. And CGI’s expertise will not just remain at the level of good ideas. Their strategic experience, customer-oriented service design, and profound understanding of technology...make them a reliable partner...now and in the future.”*



CGI's video analytics expertise

The global video analytics market is set for rapid growth and is expected to reach around USD \$11.10 billion by 2022*. Combining computer visioning, machine learning and real-time analytics, video analytics captures sophisticated data and generates rich insight that can be used for a wide range of purposes across industries— from improving the customer experience, to assessing quality, to streamlining operations.

CGI offers extensive video analytic capabilities, including:

- Object recognition
- Edge detection
- Optical character recognition
- Facial analytics
- Object and people tracking
- Behavior and product analysis
- Targeted marketing
- Augmented reality

Our capabilities help clients conduct crowd analysis, monitor traffic, detect defects, prevent fraud, improve safety and security, conduct marketing campaigns, perform predictive maintenance, and much more. The end result is higher customer satisfaction, revenue, quality, safety and compliance.

To learn more, contact us at info@cgi.com.

*Source: <https://thetechnicalprogress.com/2018/04/global-video-analytics-market-is-set-for-a-rapid-growth-and-is-expected-to-reach-aroundusd-11-10-billion-by-2022/>.

The CGI logo consists of the letters 'CGI' in a bold, red, sans-serif font.

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