

Securing the Future in Tigre

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Abstract

A city just 32 km from the Argentinean capital Buenos Aires, the city of Tigre had experienced strong growth since the 1990s. As it did, the city's planners looked to an advanced surveillance platform to bring improved security and safety to its residents and visitors. The city rolled a sophisticated video surveillance system with CCTV cameras and intelligent video analysis, and a command and control center in 2013. With its various video analysis solutions, NEC contributes in improving the security and safety in the city, by identifying possible threats and alerting the city officers in a timely manner.

Keywords



urban surveillance, city operation center, video monitoring, analysis of human behavior, face recognition

1. Introduction

On weekends, the city of Tigre in Argentina sees its population swell as much as three times. With its popular museums, game parks, casinos, beautiful large green areas and relevant gastronomic offers, the City has been a popular destination for weekend getaways, and has been steadily attracting visitors from in-country and overseas while enjoying a housing boom since the 1990s.

Thus when Tigre planners recently strategized to improve security and safety to both residents and visitors, it banked on a long-term plan. A sophisticated, effective urban monitoring system was needed to provide advanced capabilities to security forces while strengthening the bond with residents.

In 2013, a memorandum of understanding was signed between NEC Argentina and the Municipality of Tigre for the evaluation and testing of a wide portfolio of "Safer Cities" technologies offered by the company. Since then, NEC has developed and deployed a wide variety of technologies for public safety. Using a series of cameras and intelligence video analysis tools, NEC provided a system that enables public safety officers to effectively monitor the city's key areas and improve public safety for residents.

Located 32 km from the Argentinean capital Buenos Aires (Fig. 1), Tigre had unique challenges. One was the high volume of traffic through the city, which occupies an area of 148 km² on the mainland and 220 km² on nearby islands.

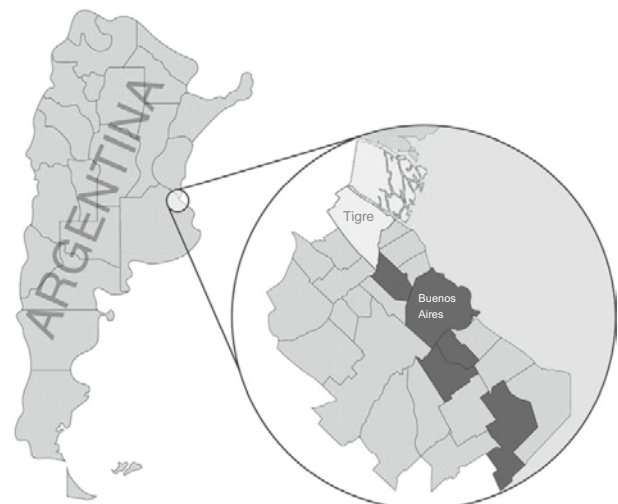


Fig. 1 Location of the City of Tigre.

The huge housing boom in the past two decades has also increased the number of large private neighborhoods, while the resident population stood at about 380,000 residents in 2010. Providing adequate security and safety was a top priority for Sergio Massa, national deputy and former mayor of Tigre, who is also a strong presidential candidate for the upcoming 2015 national elections.

2. Eyes in the City

Among the first items to be installed was a network of cameras that provided the raw footage for advanced analysis. This yielded practical intelligence for security agencies seeking to more effectively react to emerging situations.

The system involved 640 pan-tilt-zoom dome cameras, and integrated an existing 200 cameras from closed neighborhoods that were already in place.

Another 12 fixed cameras were set up to recognize license plates on cars entering and leaving Tigre City's boundaries, while a number of other cameras were set up to recognize faces and detect specific behaviors. All in, the video technology was run on a hybrid fiber optic and wireless network.

3. Intelligent Video Analysis

With that amount of raw video data, the next step would be to make sense of it for both real-time analysis and forensic analysis. NEC offers highly efficient and user-friendly video analysis solutions such as the award-winning NeoFace face recognition solution. With these video analysis solutions, Tigre City could gather critical information for its public safety and security agencies. As one example, the current solution is integrated with the Missing Children Argentina database to help search for missing children around the clock in strategic locations.

License plate recognition, face recognition and behavior detection functions were the key analysis solutions used, together with specific scene analysis solutions. The specific scene analysis provides moving object detection, retrieval and image sharpening functions, for more in-depth but non-real-time intelligence. These tools empowered security agencies to track down important details in an investigation.

3.1 License Plate Recognition

The city installed 12 cameras at six places in the city to have a complete record of cars entering and exiting from Tigre, so it could have a real-time comparison against a watch list of wanted cars.

3.2 Face Recognition

NeoFace Watch is a high-performance automated real-time



Fig. 2 NeoFace Watch alert screen.

face recognition system using standard monitoring cameras and it is capable of handling the most demanding crowd surveillance requirements. In addition to the integration with monitoring cameras, it can also take feeds from hand-held cameras and smart devices, recorded video, and stored bulk images. The system helps reduce the risk of security threats by checking individuals in the video input against known photographic watchlists, and issuing real-time alerts when a person of interest is found (Fig. 2). The alerts can be shown on the wall displays or the local monitors of the security officers in the city operation center, as well as be issued via email to the most appropriate personnel best placed to react to the situation, to enabling a quick response to the threat.

NeoFace Watch is being used with the monitoring cameras at urban terminals deployed in short, medium and long distance railway and river stations, enabling the city officers to locate persons of interest in the watchlist of individuals. For instance, the system will be available for prosecutors and other judicial bodies, public welfare organizations in order to locate missing persons.

3.3 Behavior Detection

NEC's Behavior detection solution monitors behaviors and flags any actions pre-determined as unusual or suspicious, such as intrusion, loitering, and object abandonment based on user-defined time and location parameters. The system is capable of distinguishing humans from shadows and moving objects, and provides supports detection of both simple and complex behaviors (Table).

Monitoring cameras installed at train stations, parks, streets and banks looked out for suspicious behavior by analyzing the footage captured in real-time. For example, spaces near banks were monitored for loitering and cars parked in the no-parking

zones. On the streets, the system detects such driving behaviors that are characteristic to potential crime committers, such as speeding, double riding, and riding without helmets.

4. Bringing the Information Together

All the capabilities are brought together in a command and control center and crisis room purpose-built in Tigre City (Photo). Here, in a 22-seat operation room, officers could view the incoming information in dedicated large screens that provided easy integration with all related agencies (Fig. 3).

The mission-critical systems required for the project is

Table Types of behaviors that can be detected.

Simple Behaviors	Complex Behaviors
Intrusion	Crowd estimation
Loitering	Object counting
Tripwire	Speed detection
Unattended object	Abnormal behavior
Removed object	Person on the ground



Photo Tigre City Operation Centre.

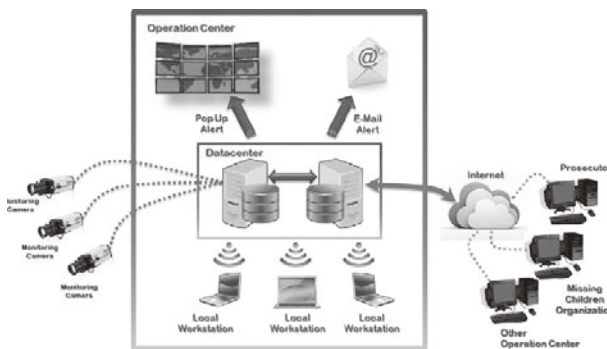


Fig. 3 Overview of the system.

hosted in a data center that provides 30 days of storage for the CCTV footage. The video management system and NEC’s core analytic engines and safety management suite are operated here as well.

Another interesting part of the Tigre City project is the way it was rolled out. Rather than invest heavily on one technology, the surveillance technology has been deployed as a service, as part of a 36-month contract. This has enabled the city to build up capabilities over time, and plug in new innovations as they become available.

“As the city experiences exciting developments in the years ahead, it is important that we provide the security and safety that residents and visitors demand and expect” says Mr. Sergio Massa, National Deputy and former Mayor of Tigre. “Technology is no longer deemed a luxury - it is in fact, an essential in providing this security and safety. We have been able to take advantage of the latest innovations in urban surveillance, such as behavior detection by integrating technologies. This has raised the capabilities of our security and emergency agencies, while building a stronger bond with residents.”

5. Conclusion

NEC’s video analysis solutions support in making sense of the huge amount of raw video data obtained from monitoring cameras located around the city. NEC aims to continue working with the City of Tigre to contribute to improved availability of information for decision-making. The constant willingness and proactivity of Tigre City in the search of technological solutions to improve the quality of life of its citizens and visitors, allows us to move forward in making safer cities. Looking forward, NEC aims to continue supporting the improvement of public safety through new and innovative technologies and partnerships that reach communities worldwide.

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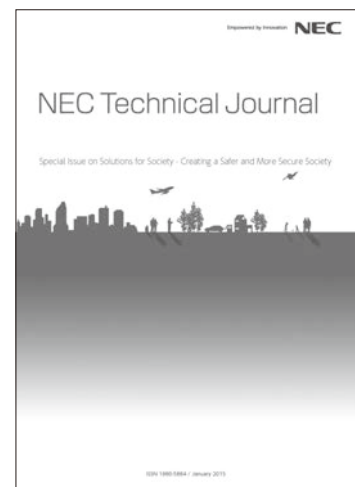
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