Intrada® ALPR for Security

Application examples using ALPR for forensics and surveillance

Introduction

Camera installations for surveillance purposes, or CCTV, are ubiquitous in private and public settings. To use these systems to their full capability for vehicle or traffic analysis, they either require a dedicated 24/7 operator available screening the feeds, possibly assisted by video analytics triggering on activity, or intelligent real-time triggering or smart post-fact analysis. In this use case we will go over common applications of the Intrada ALPR libraries for security and some creative uses of ALPR technology to support modern surveillance systems.

Different implementations of video analytics can be made, and through it, the efficacy of the system is largely determined. One of the major factors in determining where the ALPR is deployed is connectivity and bandwidth, local privacy laws, and security regulations on the site itself. In these examples, we will go over merits and drawbacks of the choices and how drawbacks can be avoided or worked around. Here developers can really push the envelope to deliver new and exciting applications.

Neighborhood Security

In many cases connectivity to send image and ALPR data is not a major issue. Mobile data coverage is generally good in populated areas. This makes it easy to deploy security cameras and collect and analyze their data centrally using mobile data networks. A good example of such an application is the neighborhood watch. In this scenario cameras are used to monitor suspicious activity in a local area using a protected cloud-based environment. The ability to deploy cameras in-the-field, combine or group them, perform analytics remotely in the cloud bring new business opportunities. In addition cloud-based services can provide the users with an easy and intuitive way of using the cameras and data from anywhere. For a developer or integrator, however, the setup offers numerous challenges with regards to ALPR.

A neighborhood watch system must be relatively low cost to appeal to a consumer budget or earned back within a limited subscription time. In addition, the ALPR must be sufficiently accurate to avoid flagging the wrong vehicles leading to a bad customer experience. The ALPR engine also must be capable of handling a large variety of plates as the system can be deployed practically anywhere in the world. Having to deal with several engines for different geographical markets will increase software maintenance and support costs.

There are two main routes that a develop can take to develop the solution. The first is implementing ALPR in the back-end of the system. It is ideal to deploy your ALPR as you centralize your IP and can scale using cloud computing. It also adds the advantage of reducing cost in the camera by reducing processing power of the camera system and license cost. In addition, a back-end system can easily employ multiple ALPR engines, analytics or other accuracy enhancing features making support and maintenance easier. With low-volume traffic a more attractive pricing model can be offered. ALPR for a neighborhood watch is critical, but not real-time critical, so potential lag is not a major obstacle. The technical cost of the data connections and storage as well as legal burden to protect privacy and provide a secure system for images or video will be significant.

The other option is to move ALPR analytics into the camera. Although this leads to higher costs of the camera itself, there may be good reasons to implement ALPR or vehicle fingerprinting in the camera. The main design restriction is the available bandwidth for the camera. Uploading images or streaming video is costly. Only sending images of vehicles with an unlisted registration number or below a set confidence level combines reducing processing power in the back-end and significantly decrease limit bandwidth use. This type is a sort of "command and control" whereby the camera's data can be accessed and configured remotely but the processing happens locally. A combination of the centralized and local is useful when multiple OCR techniques in the back-end system may yield a higher confidence of the read.

There is not one solution that will fit. Depending on what market your solution is targeting will determine what type of solution you can develop. Consider these when you design your solution. Your ALPR provider can provide excellent insight into what is and is not feasible when it comes to processing requirements and accuracy.

Site Security

When connectivity is not desirable or even not available, such as in defence operations and remote industrial plants, ALPR can be deployed locally either via an on-site server / workstation as well as on-camera. On-site ALPR deployments are typically used in combination with local security staff to monitor the feeds and ALPR output. This means accuracy is important but likely not the main deciding factor. Rather, reader versatility to handle multiple countries and plate styles for re-deployment as well as vehicle analytics to differentiate between cargo, military units or staff is more useful.

Because of these situations, security and privacy of data handled by the ALPR data processor, will be limited to a physical site. It will have more physical and digital safeguards than in a cloud based situation, such as the scenario description for the neighborhood watch system. Therefore, it contains less risk to the ALPR data processor. In addition to reduced privacy and security risks here are other advantages to using ALPR in an off-line context.

The most common example is the use of ALPR controlled entry and exit system using a boom gate or motorized fence. In these situations, having a local reliable connection between the system and the access gate is paramount. Quick local feedback can be provided through local network loop or even a camera directly connected to the gate. Similarly, when an unauthorized vehicle is approaching the site -whether not matching trusted plates or other distinct characteristic - local security officers or guards on duty can be notified in real-time.

ALPR is a useful tool in off-line security operations. It can help automate entry and exit tasks, identify risks around the site perimeter and provide an invaluable addition to security operations.

Forensics

In both earlier examples a generic purpose video software system for image and video monitoring and analysis could have been used. A Video Management System (VMS) is a generic software platform that combines multiple camera feeds in a centralized system. The VMS acts as a bridge between video and image input, analytics and peripherals. VMS software can be extended with modules that can interact with storage, backup, but most importantly analytics and actionable triggers such as access gate control. ALPR enriches the VMS by providing essential tools for use in traffic, parking and security applications. Matching captured license plates with pre-defined lists and further refine triggered actions are productive tools to enhance ALPR user experience and productivity.

Another common application using ALPR for is post-recording analysis. For instance, the analysis of large amounts of video data to detect certain vehicles (e.g. based on make and color), (partial) license plates, or vehicle movement reconstructions around a crime scene. Based on video of camera footage - for instance from CCTV or private owners- ALPR with vehicle analytics can save a valuable amount of time by avoiding manual searching or mapping where the suspect vehicles were detected or in what direction they were heading. While this may consume significant processing power - the drawbacks of human review are much greater.

About Intrada Insight

Intrada® ALPR (ANPR) is the Q-Free software library solution for automatic license plate recognition and vehicle video analytics offering an easy API for integration on any platform. Intrada® ALPR is suitable for any project, including white-label OEM applications such as ALPR camera's, value-added functionality in embedded devices, traffic back offices, and video analysis software. Intrada® ALPR is used worldwide in speed enforcement, parking and access control, low-emission zones, congestion charging schemes, among many others.

Intrada® Synergy Server (ISS) is a high-performance image processing solution with the lowest operational cost for automated video passages in the market. Intrada® Synergy Server is camera and back office supplier agnostic providing flexibility to work with any system. It is optimized for read accuracy or error rate delivering unparalleled performance in over 160 countries worldwide.