

CCTV Technology: Features & Benefits

CCTV systems have historically and remain to be one of the most popular systems to tackle all sorts of issues including Crime, Productivity and Health and Safety. Cameras not only act as a deterrent but also provide essential evidential benefits

CCTV cameras were originally meant only to record video, but the sheer number of cameras, the volume of data, and security and law enforcement requirements have led CCTV equipment manufacturers to raise the stakes and provide a wide array of advanced features.

Some of these features are relevant to all CCTV users, however, all of them contribute to the final price of your equipment; understanding these features can help you make the right choice — so let's explore the most important ones and see where they are useful or important.



1. Motion Detection

When looking at large CCTV systems it can become very costly to install the required amount of memory to store the recorded images for the desired time period. Most CCTV operators like to store images for at least 28 days to make sure that no events are missed.

When you have areas that are not populated very often, motion detection can be hugely beneficial by only recording when the sensor is activated. This means that only the footage required is recorded instead of hours recording of the same scene with no action.

CCTV systems with motion detection support allow you to configure your camera to start recording only when it has detected motion within its field of view. This way, only footage that contains relevant data will be stored. This saves you money on storage, backup and archiving, and makes it easier to browse and retrieve data when you need.

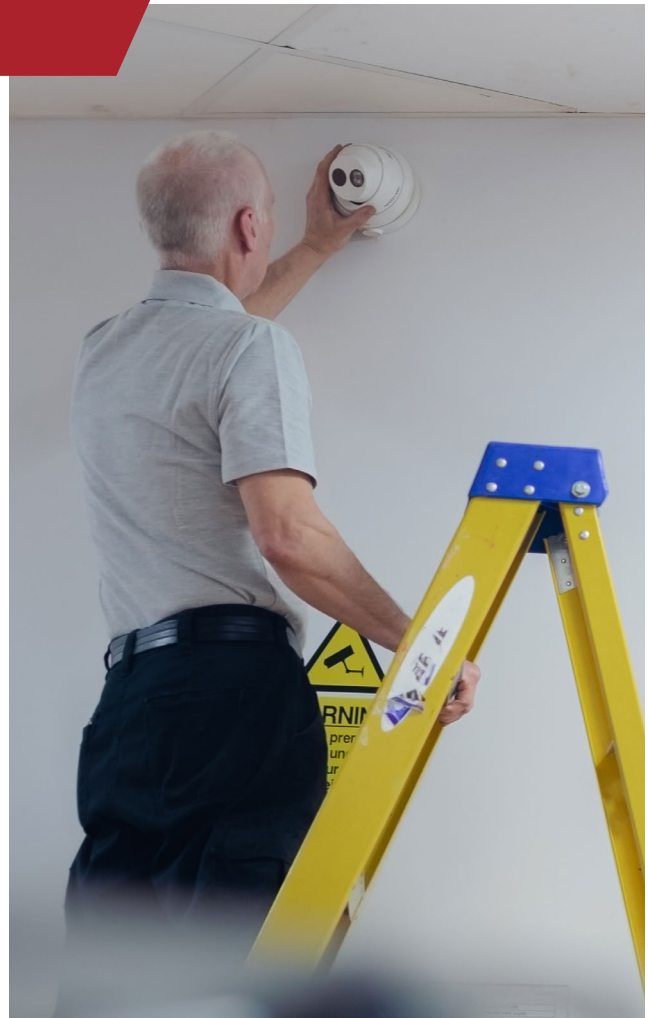
2. Infra-Red Lighting

It's no good only having a CCTV system that can effectively capture footage, that is not only viewable but that can identify, in the daytime. Like all cameras, CCTV cameras can only record objects if there is some amount of light shining on them. However, this light needs not be in the visible spectrum.

Infra-red CCTV cameras have integrated infra-red LEDs, which they can use to illuminate the objects in their field of view. This allows CCTVs to "see" during the night, too.

You will often see these cameras marketed as "day/night CCTV cameras". Day/night CCTV cameras automatically detect the ambient light level, and turn the Infra-Red LEDs on and off as needed.

Infra-red CCTV cameras use cheap, widely-available components, so infra-red capabilities do not necessarily add much to your camera's price. However, you should steer clear of the cheaper models, which often have insufficient illumination levels, or which cannot adjust the illumination level automatically (or at all), leading to poor-quality footage.



3. Two-Way Audio

So you have seen someone on your property via your CCTV system, now you want to tell them to go away!

Two-way Audio is one of the more overlooked advanced CCTV features. Two-way audio allows the operator in the control room to converse with the person in front of the CCTV camera. The conversation itself can be recorded and archived, just like any other kind of footage.

Two-way audio is primarily useful for interactive

access control systems, where access to a restricted area must always be confirmed or controlled by a human operator. However, it is useful in other situations as well.

For example, it allows human operators to immediately learn of, and understand access attempts, making it easier to tell an honest attempt from a malicious access attempt. It is also a good replacement for a separate intercom system, decreasing complexity and easing maintenance.

4. Automatic Number Plate Recognition

Automatic Number Plate Recognition (ANPR) is an advanced CCTV feature which allows video analysis software to automatically detect and read vehicles' number plates.

The value of this system lies not so much in the feature itself (which is interesting, but otherwise little more than an exercise in computer vision) as in its integration with archiving, access management and parking management software, and in the analytics value of the data that it can provide.



You can use ANPR to:



**Ease parking
access**

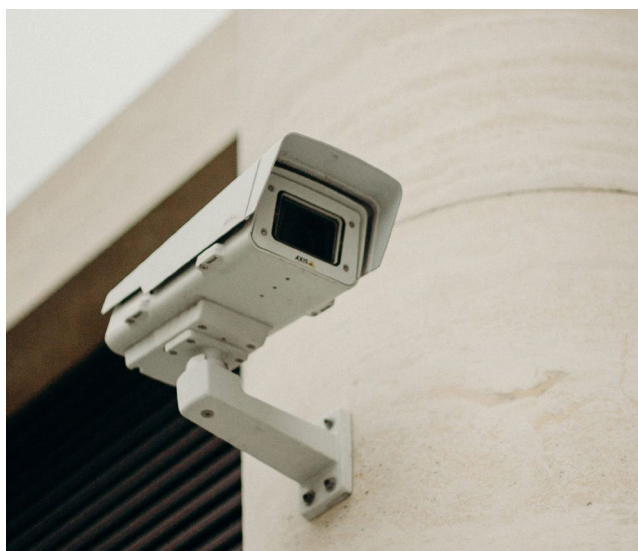


**Reduce transit
times**



**Keep accurate,
real-time data**

on how many Control
and log access to a
building's parking space.



If you need these features, ANPR is a feature worth considering.

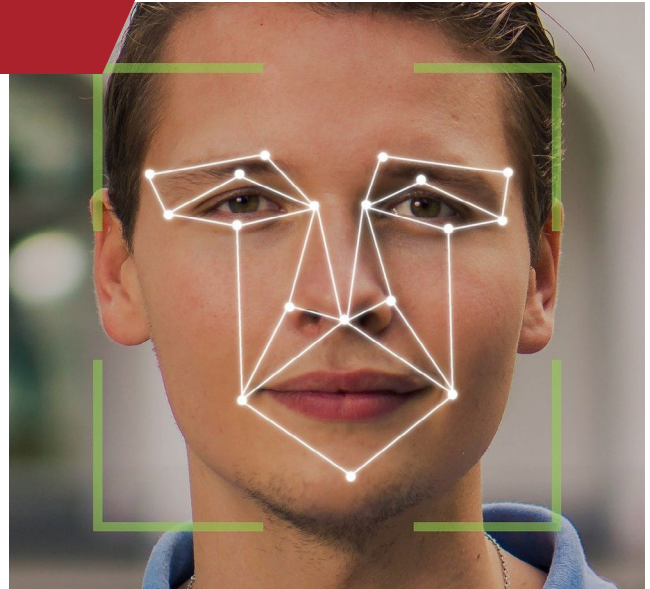
Bear in mind, though, that ANPR is as complex as it is useful. Not only does it require high-quality imaging hardware, but the cameras themselves need to be installed in a manner that ensures correct lighting, field-of-view and distance parameters.

The Home Office maintains an excellent guide for the installation and performance assessment of ANPR systems, which you can use, together with your service provider, in order to select, install, test and commission the right CCTV cameras.

5. Facial Recognition

Facial recognition is to human faces what ANPR is to vehicle number plates: it enables a CCTV security system to match a person's face with an internal database record, telling you *who* just passed before the camera.

Facial recognition is a very powerful CCTV feature, which is used in many settings where security or customer service are of utmost importance. It can be used, for example, to spot and track VIP customers in hotels or casinos — or, equally well, to recognise people who are no longer allowed to be on a business' premises or suspected criminals.



CCTV-based facial recognition is a very complex problem, though, and this has two important consequences.



1. Price

Facial recognition is a premium feature; manufacturers may not necessarily charge extra for it, but the hardware that supports it is on the pricey side of the budget divide.



2. Accuracy

Recognising human faces is such a complex task that even biological systems sometimes fail.



Even we humans will sometimes mistake a stranger for an acquaintance, for example. Computers are even worse at it. They will get things right most of the time, but will hit both false positives (confuse a stranger with someone known to them) and false negatives (failing to recognise someone that is known to them).

CCTV facial recognition is not yet at the level when you can rely on it entirely. It can make your staff's work considerably easier, but it cannot replace it.

6. Other Video Analytics Features

ANPR and facial recognition are the most advanced video analytics features that CCTV systems offer. **However, many systems also offer other useful video analytics features, such as:**

- **Loitering detection:** Some CCTV systems can detect a stationary object that remains in a camera's field of vision for longer than a given amount of time. This can be used to detect unauthorised access, parking in forbidden areas and various other types of suspicious behaviour.

- **Object classification and tracking:** Many CCTV systems can detect and classify objects in various categories (such as “persons” and “vehicles”) and track their motion across their field of view, or across multiple cameras.

CCTV video analytics is a very effervescent field, which has seen rapid development of a lot of other advanced features. However, their accuracy and reliability varies considerably, even across a single manufacturer's portfolio. If you need a particular class of video analytics, it is usually a good idea to perform some testing before you commit to using a particular CCTV camera.

7. Real-Time Alerts

Real-time alerts (sometimes called push notifications) are a relatively new feature of IP-enabled CCTV cameras. CCTV systems that support this feature can issue an alert to a smartphone or tablet in response to certain events, such as detecting motion.

Real-time alerts are a very useful CCTV feature, but it should be deployed with care.

First, a system that issues too many needless alerts will quickly bury the useless alerts in a stream of irrelevant material — which tends to

decrease, rather than increase security, as everyone will quickly end up assuming that every alert is bogus.

Second, push notifications may look simple, but they rely on very complex cloud technology. Some models will rely on their manufacturers' infrastructure to relay the alerts to your equipment, which makes you dependent on their security and uptime. Others allow you to deploy your own infrastructure — which makes you less reliant on third-party tools, but the infrastructure is yours to deploy and, especially, to secure.



8. Cloud Storage

Storing CCTV data in a secure and redundant manner that also enables fast and efficient access to camera data is among the most difficult challenges that CCTV users face.

Cloud storage is primarily aimed at two types of users:

- **Users who have a large number of streams** to manage and the supporting infrastructure is too large and difficult to manage, even with dedicated IT resources.
- **Users who have very few streams** to manage and few advanced requirements, so the costs associated with a dedicated, in-house infrastructure for secure storage and back-up are hard to justify.

With cloud storage, CCTV systems will use cloud resources to store and retrieve data. This outsources the task of maintaining a secure and

redundant storage infrastructure, with all the advantages and disadvantages that ensue.

CCTV cloud storage from reputable partners uses state-of-the-art encryption, high availability and efficient back-up capabilities, that typically go beyond what most small and medium businesses can afford.

That being said, some of the systems' security is still dependent on your own security practices; for example, an attacker can still gain access to your footage if you use weak passwords. Cloud storage also involves a trade-off between infrastructure maintenance and cost, and vendor independence; a given cloud platform only works with some CCTV cameras. If it is ran by a particular manufacturer, then it will, more often than not, work only with that manufacturer's cameras.

9. Wireless Connectivity

Traditionally, CCTV cameras have used wire connections, primarily because wireless protocols were deemed either too unreliable or too slow for real-time video monitoring. This is no longer the case, and many CCTV cameras offer wireless connectivity instead.

Wireless CCTVs use Wi-Fi to communicate with the rest of the security system, so they don't need any data cables. This can tremendously simplify

your infrastructure (and its installation!), and improves your security system's reliability, as one less cable means one less failure point.

However, wireless CCTV still need *power* cables, and all that traffic still needs to flow: you still need a data network that can support a continuous video stream, and a wireless access point that bridges the data network and the cameras is still needed.