



SOLUTION
PAPER

SOCIAL DISTANCING



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SOCIAL DISTANCING SOLUTIONS WITH POWER OF VIDEO

During a pandemic crisis, social distancing is one of the preventive measures individuals, organizations or governments should or must take. However, enforcing and maintaining these physical distance rules are not easy. It's human nature to get close and interact with each other.

As nations started to lift Covid-19 lockdown restrictions during spring 2020, large crowds of people flocked to beaches and parks to enjoy spring temperatures but risking social-distancing guidelines that are deemed crucial to prevent an uncontrollable spread of virus.

According to the recommendations of the World Healthcare Organization (WHO), people need to maintain a minimal social distance of 1 meter, and many countries maintain 1.5 meters. In shops and grocery stores, 10 sq. m per person should be used to determine the maximum number of people allowed inside.

However, enforcing and maintaining these physical distance rules is not easy. After all, it's human nature to get close and interact with each other, and it can be challenging for e.g. a shop owner to monitor the behavior of all customers in a grocery store.

However, not maintaining or complying with the social-distancing rules not only may result in hefty fines for

organizations and individuals, but also puts people at significant risk. It's a joint societal responsibility to maintain these rules and to make sure a second wave of the pandemic does not accelerate out of control.

Typically, governments and organizations are faced with the following challenges:

- Which part of my city, shop or premises are most crowded and when?
- How do I make sure my building or shop doesn't get over-crowded?
- How do I know when people are getting too close to each other?
- How do I address people and avoid confrontation or incidents at the entrance to a store?

In this paper, we will share inspiration and ideas on how to address these challenges using video technology.

Open platform technology

Based on open platform technology provided by Milestone XProtect end users and integrators can create a perfect end-to-end solution based on the Milestone Community. Milestone community partners provide best of breed solutions for any situation or demand. This makes the total solution scalable, flexible and future

proof. The open platform provides all the necessary features and functionality a user would need, combined with the power of openness to integrate any technology to assist with the process of social distancing. Below is shown the four-stage process in which the Open Platform can help to assist.

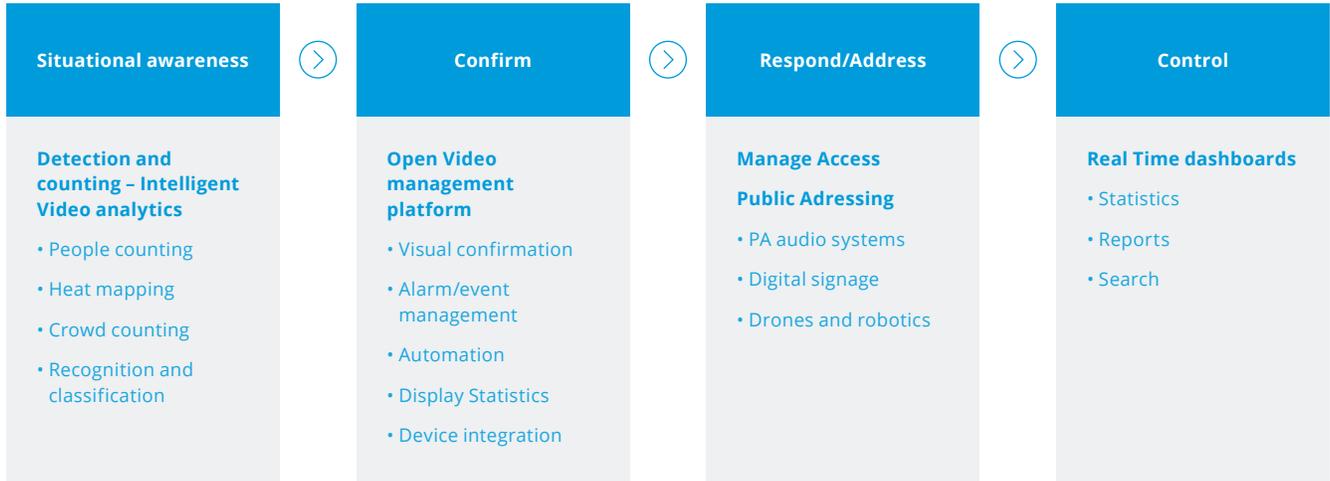


Figure 1: Four-stage process to manage social distancing

SITUATIONAL AWARENESS

Detection and counting solutions

Heatmap and occupancy statistics (historical)

With the power of video, we can identify the areas in a shop, premise or in a city which typically have the highest occupancy rates. This can be done by creating heatmaps or occupancy statistics based on the images the cameras have captured. Intelligent video analytics solutions can provide this information historically or in real-time. In this way, it's easy to figure out where to deploy preventive measures like dispatching enforcement personnel, mounting digital signs or create audio notifications with PA systems.



Figure 2: Occupancy and heat mapping in Xprotect Smart Client

Overcrowding – crowd counting solutions for public spaces

There is a danger of a fallback when COVID-19 restrictions are gradually being relaxed. So, in city squares, beaches, tourist attractions or other popular public places, social distance needs to be maintained for a longer period of time. Crowd counting solutions based on video analytics can help alert authorities to when these places get too crowded and social distance is at jeopardy. These alerts will be received in real-time, and historical statistics will also be available.

Overcrowding and occupancy – people counting in the retail and private sectors

Inside buildings, shops and grocery stores, owners and facility managers need to guarantee the social distance. Shops/company owners will receive severe fines when they violate the social distancing regulations. With the 10 sq. m as the standard surface area required for each person - it's possible to calculate how many people you can have inside. Accurate video analytics that count the number of people can provide easy and proactive tools that give real-time alerts about how many people are inside and notify customers, visitors and managers.

On top of the number of people inside, there is also the challenge of crowding. By setting up real-time occupancy monitors based on the people counting engine, crowding inside is avoided or at least alerted.

Overcrowding – distance detection

Since viruses spread from individual to individual, it's important to limit the number of people who are close together. However, it's OK for a parent to walk with their children, so distancing alerts must be flexible – a crowd proximity detection system can provide alerts when too many people get too close.

One-way direction

To avoid close contact and congestion in shops and grocery stores, store managers can use one-way detection based on video analytics to warn customers and alert store managers if someone is going in the wrong direction. At the same time, store managers gain valuable information and statistics about the effectiveness of their implementation of the routes they have chosen for the shop. They can further benefit by offering a guided tour through their shop and potentially increase revenue.

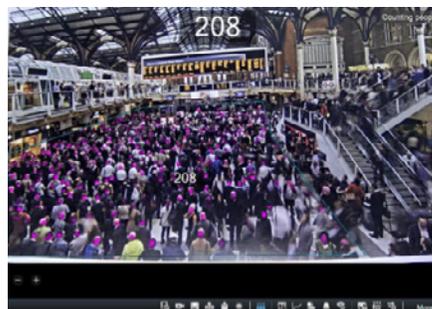


Figure 3: Crowd counting in XProtect Smart Client



Figure 4: 2D people counting

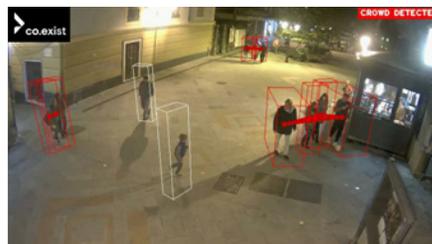


Figure 5: Crowd Proximity Detection



Figure 6: Modern video analytics based on direction detection, data gathering and occupancy monitoring to help retailers to maintain social distance in their shops

RESPOND AND CONTROL

Managing access

With the power of video provided by the open platform, end-users can combine the detection system with access regulation systems. The XProtect Access, or XProtect License Plate Registration modules allows access to be managed based on the statistics or real-time information produced by intelligent video detection systems. With these modules, it's easy and efficient to open or close doors, road barriers or entry turnstiles based on real-time information when too many people are inside a specific area. XProtect Access can be used with many global access control vendors.

Combining video with access control events offers several advantages. For example:

- Better decision making from your operators, who visually verify the identity of individuals requesting access.
- More efficient work processes, as operators can manage video surveillance and access control from one interface at their desk or on-the-go with XProtect Mobile
- More thorough, straightforward post-incident investigations, as you have video information linked to each entry/exit event.

No-touch access control

To prevent viruses from spreading, it is also important to reduce physical contact with devices and surfaces. Current studies from [the New England Journal of Medicine about the viability of COVID-19](#) indicate the virus can survive up to 72 hours on stainless steel and plastics. On copper, no viable virus was detected after 4 hours. On cardboard, no viable virus was detected after 24 hours.

As most doorknobs or handlebars, card readers and fingerprint readers are made of steel, aluminum or similar metals, it's good practice to use no-touch access control systems. It's best practice to use electronic, motorized door opening systems when access is granted. Additional options to consider would be, face recognition systems or QR code scanning from a mobile phone, or simply using the XProtect Mobile Application to open the doors

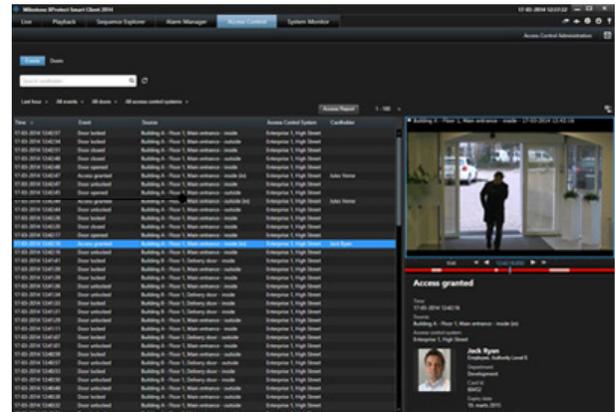


Figure 7: XProtect Access – Vendor independent Access management



Figure 8: No-Touch Access control with facial recognition by Anyvision Abraxas

through WIFI. Any Access control system integrated to the open platform with XProtect Access can be linked to any facial recognition system integrated into XProtect for opening or locking doors.

Public address

After detection and alert the next action to be taken can be automated efficiently. The power of the open platform technology provides a powerful rule engine to activate actions based on the detection made by overcrowding or occupancy. There are three ways to address the public:

1. Dispatch security personnel
2. Audio messaging (PA systems)
3. Visual messaging video/text (digital signage)
4. Other (drones, robotics)

Dispatch personnel

Dispatching personnel to manage a situation is very effective but not ideal. It's expensive, risky, and sometimes they face verbal or physical harassment. However, deploying personnel does have an advantage because it's a fast and flexible interaction with other individuals due to the human interaction. To support these personnel, they can be provided the following solutions to execute their jobs efficiently. The open platform provides users with:

- Push event notifications on mobile devices
- Live video and bi-directional audio on mobile devices
- Live access control on mobile devices
- Video and audio push from mobile devices
- Support for body-worn cameras
- Incident management tools

Audio messaging

The open platform supports many types of audio devices. With these audio devices, users can address the public fast and efficiently based on the detection and observation made. Audio solutions are bi-directional. This means users can speak but also listen to crowds in a certain area. Audio can be recorded in case incidents escalate. The audio solution also contains the option to play pre-recorded audio clips to warn or instruct crowds of people on their behaviors. These clips can be triggered manually or automatically based on the detection made from crowd counting solutions.

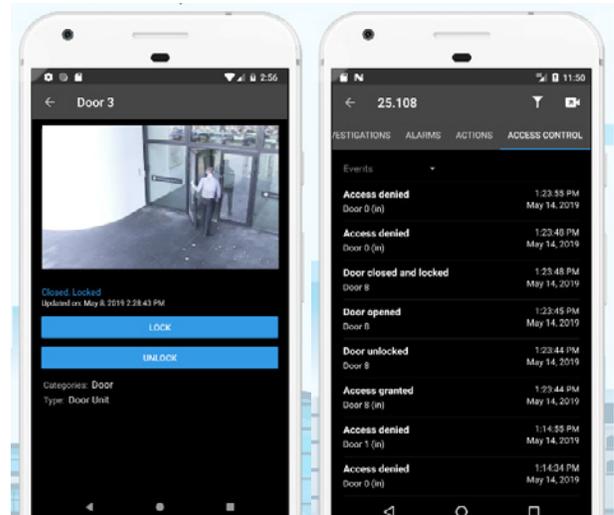


Figure 9: XProtect Mobile Access control with push event notifications

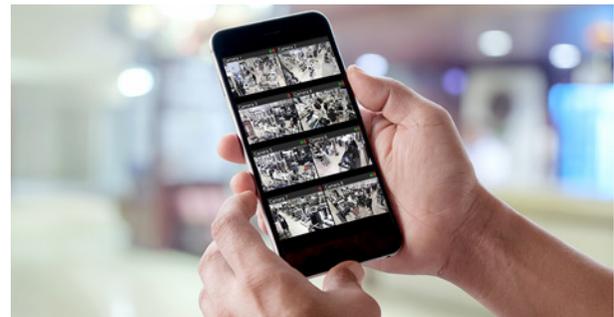


Figure 10: XProtect Mobile Interface for live video and bi-directional audio, event notification and access control



Figure 11: IP Audio devices fully integrated with XProtect for bi-directional communication and announcements

Visual messaging

Having video management as a core solution provides the benefit of issuing visual messaging through display systems such as digital signage systems. With the powerful rule engine, XProtect provides users with the ability to control what will be presented on a certain display with the Smart Wall feature. Options to integrate the open platform to digital signage systems is also possible.

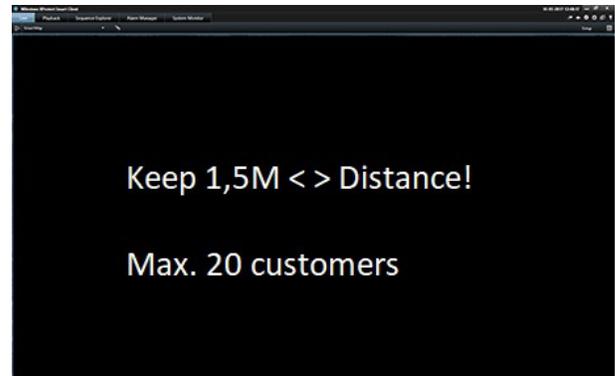


Figure 12: Smart Wall screen showing rule triggered text

OTHER TECHNOLOGIES TO MANAGE A PANDEMIC

Apart from social distancing solutions, business owners or governments might also consider other possibilities to manage a pandemic crisis. Robotics and drones are fast and effective and, most important, are not vulnerable to infection. At the same time, facial recognition systems can help prevent a second wave of the pandemic because it makes contact investigation fast and easy once an individual has tested positive in a facility.

Drones

In today's modern society, the acceptance of robotic devices and drones is more and more tolerated and used. During a pandemic crisis, users want a fast response and don't want to risk exposing humans to contagious areas. Sending drones or using robotic devices can assist in enforcing regulations and gives visibility to operators about the current situation. Such devices are equipped with input and output mechanisms to provide live video and bi-directional audio.

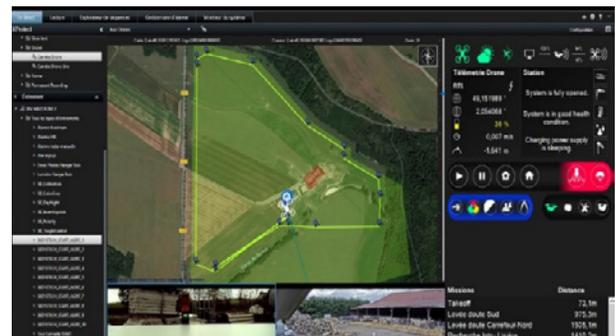


Figure 13: Drone Integration in XProtect Smart Client

Facial recognition and mask detection

At the start of a pandemic, health care organizations can conduct contact research of patients that tested positive and inform other individuals that may be unaware of their contact with the positive patient. Governments are currently investigating using mobile applications to achieve this. When conducting contact tracings, facial recognition systems can help to identify the people the patient has been in contact with. Within minutes, recorded video from all cameras in the system can be scanned based on an individuals' face to check whom that person has been in contact with before, or right after they reported themselves sick.

Facial recognition systems can also be used to detect face masks or protective eyewear in areas where this personal protective equipment is required or standard policy. It might even be required by temporary law to wear a mask in public places.

Airports, customs, and governments can also benefit from the face mask detecting statistics. For example: a sudden increase of passengers wearing masks might indicate a virus is spreading in a region of a country where the passengers were coming from. At the same time, people can still be identified even wearing the mask.

Hardware solutions

As with all software, it requires hardware to enable the capability to run the actual analytics many of us rely on. This hardware could vary from units at the edge of a system like today's powerful IoT devices to on-prem systems or cloud solutions. open platforms adapt and scale to most of those situations because of the strong partnerships with hardware manufacturers like Intel, Dell and Aopen and cloud providers like AWS. Using the Milestone Video Processing Toolkit within the MIPS-SDK that supports the Intel Open VINO Toolkit, the Milestone community is able to develop open analytics solutions that are easy to adapt to any hardware platform desired.

Together with the Milestone System Builder program, end-users and system integrators can rely on tested and verified performance.



Figure 14: Skeyetech autonomous drone monitoring a port under lockdown



Figure 15: Face metadata in XProtect Smart Client detecting real time: Eyewear: YES, Mask: YES



Figure 16: Kiosk with integrated face recognition video analytics edge, built-in camera and signage display running XProtect to address and instruct visitors

THE PROTECTION OF DATA PRIVACY

When video technology is being used to assist us in public areas, we must consider data protection and privacy because video technology processes Personal Identifiable Information. Many of the described solutions might seem to be intrusive regarding privacy at first but the most important fact is how we process this information.

Europe's General Data Protection Regulation (GDPR) helps us to make sure that the systems we deploy comply with the rules and legislation of data protection, data processing and privacy. The existence of GDPR does not mean we can't use video enabled technology to help us with complex situations.

Most of this depends on how it's being used and for what lawful basis there is to use such systems. GDPR might be applicable in many parts of the world but not all of them. GDPR implementation can also vary from country to country or state by state, where some countries, states or provinces even keep a stricter legislation on certain parts of GDPR. It's recommended to seek legal advice. As the General Data Protection Regulation (EU) 2016/679 is regarded as one of the strictest regulations globally. Milestone offers an extensive privacy guide, system hardening guides and a EuroPrise (European Privacy Seal) certified platform with XProtect Corporate which helps our partners and end-users to comply to GDPR.

In principle users/owners of video surveillance systems, or the ones who are processing personally identifiable information (the data processor), generally need to take note of 6 lawful principles where video technology or data processing may or even must be used.

1. **Legal Obligation** – processing is permitted if it is necessary for compliance with legal obligations
2. **Public Interest** – data processing carried out for the sake of public interest, in the exercise of official authority entrusted the controller
3. **Vital Interest** – data processing carried out to protect the vital interests of the data subject



4. **Legitimate Interests** – processing required for the purpose of protecting the legitimate interests of the controller, not infringing the rights of the data subject
5. **Contract fulfilment** – personal data may be processed if necessary, to enter, or perform, a contract with the data subject
6. **Consent** – the data subject has consented to data processing

With any of the above 6 lawful principles for video surveillance/data processing, it's advised to seek legal advice to comply with your local data protection and privacy laws or policies.

BENEFITS OF CHOOSING THE RIGHT PLATFORM

The benefits of implementing the right platform that can adapt to many situations saves time, money and makes it easier to solve new upcoming challenges. This is where the power of open is truly demonstrated. Users of an open platform already acknowledge this. They only need to adapt and connect – integrate the readily available solution onto their platform and continue business as usual with enhanced video without reinvesting into a new video platform.

Another benefit of an open platform is the implementation of the platform in an existing installation.

Since XProtect supports more than 8,500 devices, it's easy to implement into an existing installation. Business and governments can easily get the technology required to get the notifications, insights and situational awareness they need during challenging times.

The Milestone Systems community currently offers more than 100 verified integrations on the Milestone Marketplace that are ready to integrate into the open platform, and this amount continues to grow every day.

RESPONSIBLE USE OF TECHNOLOGY

The COVID-19 pandemic is accelerating the use of digital technologies across work life, in the home and in our social interaction. This creates new opportunities but also risks and challenges on a global scale. For example, how will this impact human rights and data privacy?

At Milestone Systems, we are proud to see how video technology is coming to the fore as a major support for businesses and workers, governments and citizens in these challenging times.

At the same time, we take the responsible use of technology very seriously as stated in [the Copenhagen Letter](#). We encourage all Milestone System partners and end-users to respect local law regarding data protection and data privacy, and, we may terminate the whole license for a product immediately if it is used in a way we consider to be a material breach of our end-user-license-agreement. Innovations in technology should be celebrated, but we must acknowledge our role in developing new technologies responsibly.

About Milestone Systems

Milestone Systems is a leading provider of open platform video management software; technology that helps the world see how to ensure safety, protect assets and increase business efficiency. Milestone enables an open platform community that drives collaboration and innovation in the development and use of network video technology, with reliable and scalable solutions that are proven in more than 500,000 installations worldwide. Founded in 1998, Milestone is a stand-alone company in the Canon Group.



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