

How Can We Make Educational Institutions Safe and Comfortable for Students, Teachers, and Staff?

For children and adolescents, educational institutions are places where they acquire not only knowledge, but also life experience and social, communication and creative skills. Therefore, the security system in educational institutions is faced with the task of ensuring both the physical safety of students and a comfortable atmosphere free from conflicts and bullying.

Modern security and video surveillance systems effectively handle monitoring order and reducing the number of accidents and acts of physical and psychological violence and corruption.

Monitoring of truancy and tardiness has a positive effect on discipline, while the confidence of students in their own safety enables them to concentrate on their studies and facilitates higher quality of learning. All of this, together with parents' peace of mind with regard to the safety of their children, increases the rating of an educational institution.

AxxonSoft has many years of experience in creating integrated security systems for educational and pedagogical institutions of any size and type: preschools, elementary schools, general education schools, K-12 schools, colleges, vocational schools, and universities (including those with campuses).

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Advantages of Using a Video Surveillance System in Educational Institutions

Implementing an integrated security system in educational institutions provides the following benefits:

- ✓ Increased security thanks to round-the-clock monitoring of the behavior and movement of people in all spaces and on adjacent territories, as well as inside school and tour buses.
- ✓ Less misbehavior and fewer violations due to the inevitability of punishment.
- ✓ Reduced tardiness and truancy among students.
- ✓ Monitoring of the passage of unauthorized persons into the grounds and buildings of the educational institution.
- ✓ Monitoring of emergencies and prompt response to them.
- ✓ Monitoring of improper behavior of teachers toward students.
- ✓ Prevention of the distribution and use of drugs, alcohol, and smoking on the grounds of the educational institution.
- ✓ Monitoring of conflict situations involving a group of students aimed at a single person.
- ✓ Impartial analysis of the circumstances of incidents and conflicts using archived video camera footage.
- ✓ Implementation of measures to ensure the safety of property.
- ✓ Assessment of the quality of the learning process.
- ✓ Reduction of costs for the security of the educational institution.
- ✓ Increased prestige of the learning institution.

Confidentiality of Instructors and Students in Schools and Universities

When designing a video surveillance system for schools and universities, it is important to keep the confidentiality of students and instructors in mind. Video surveillance cameras should be installed only in common areas. It is categorically prohibited to equip restrooms, showers, dressing rooms, dormitory rooms, employee lounges and other personal-use areas with video surveillance. After installation of a video surveillance system, the employees and students of schools and universities should be informed that the area is under video surveillance, and appropriate signs should be posted throughout the grounds of the educational institution or campus.



AxxonSoft Tools for the Security of Educational Institutions

To ensure the highest level of security in schools and universities, it is advisable to use a combined system consisting of the following integrations:

- Alarm and emergency notification system
- Fire and security alarms
- Video surveillance system
- Access control system
- Biometric readers

AxxonSoft's neural network and conventional video analytics make it possible to increase the intellectual potential of a video surveillance system and provide additional security in school and university buildings, as well as on adjacent territories and in parking lots.



AI-Powered Analytics



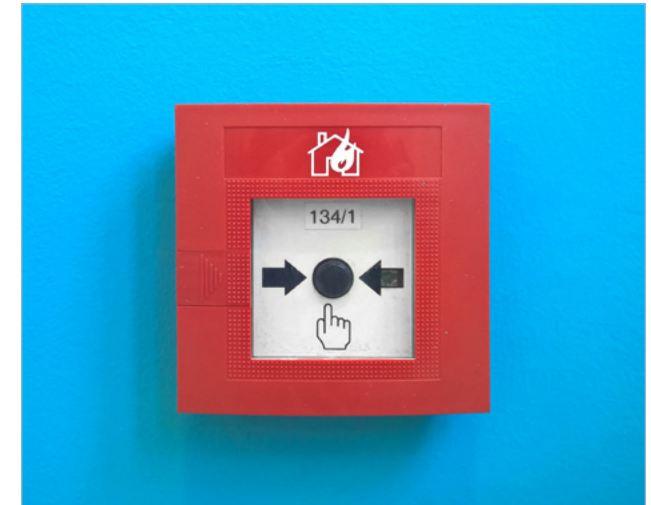
People Detection in Certain Areas

Specifically trained neural network accurately detects people in complex scenes, even in total darkness using thermal cameras. You can apply scheduled detection to control unauthorized human presence in the specified locations.



Human Behavior Analysis

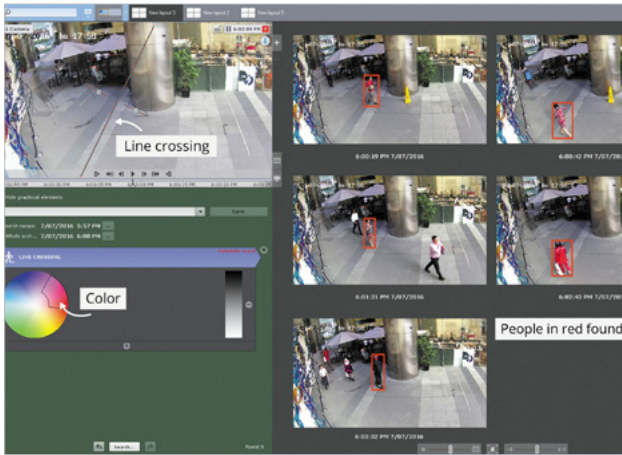
This tool recognizes situations of risk early on by detecting specific human postures, such as a person lying on the floor or ground, etc. Swift alerts to first responders help quickly neutralize the threat and minimize negative outcomes.



Early Fire Detection

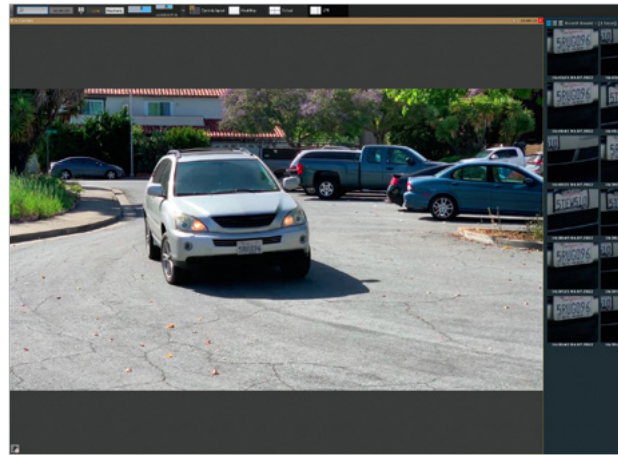
AI video analytics can detect a fire at its earliest stage when a visible flame or smoke appears. It may be applied as a complement to regular sensors to maximize the reliability of fire detection or as a standalone tool in open spaces, such as a school stadium or campus territory.

Smart Forensic Search



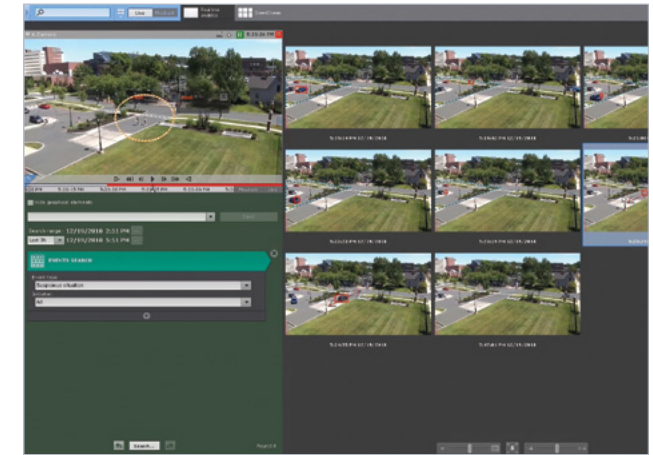
MomentQuest

MomentQuest is near-instant forensic search for recorded video. It analyzes live video and generates a stream of metadata — a lean description of moving objects within the scene — which is recorded along with video stream. To retrieve recorded footage of an event of interest, just enter specific criteria: motion in area(s), crossing of a line, object color or size, etc. Within seconds, the system displays thumbnails of relevant video episodes.



License Plate Search

AxxonSoft software captures and recognizes vehicle license plates, so you can quickly check a vehicle number, full or partial, against the video footage from multiple cameras. You can quickly find out when the car of interest entered the territory, when it left, and where and when it appeared.



Standard Search Options

You can quickly find recorded events of interest using simple yet effective functions.

- Search by alarm events: filter alarms by type and initiator.
- Search by bookmarks: view all bookmarked events or search by operators' comments.
- Time slicing: split the selected time interval into video fragments of the specified duration.



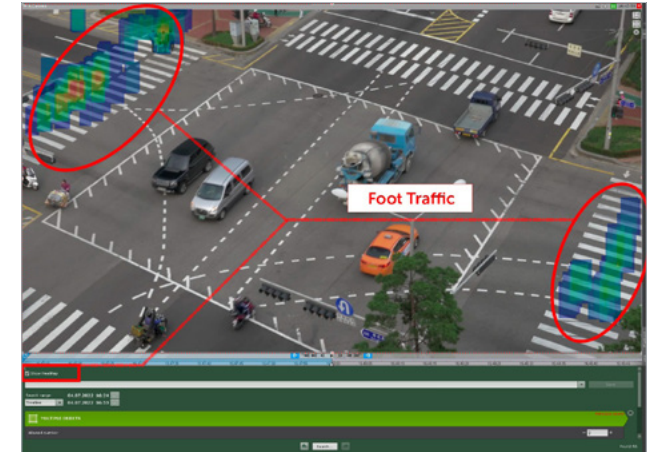
Vape Detector Integration

AxxonSoft products are integrated with vape detectors that are able to detect vaping, measure the content of air for harmful chemicals components (such as THS oils), and intentionally mask vaping behavior by using aerosols to cover it up. Our unified system can alert the school/university management about when and where students vape in school grounds and trigger recording to get video evidence.



Video Wall Management

Video wall management is incredibly useful for monitoring rooms when working with dozens or hundreds of cameras. You don't need to use dedicated hardware controllers — just designate a client computer or several computers as a video wall and control them from any workstation connected to the system. In addition, GPU video decoding helps build large video walls based on computers of average CPU performance.



Foot Traffic Analysis

Heat map represents motion activity (people numbers/time spent) in different areas. It helps identify bottlenecks and high-traffic areas to better plan student evacuation routes in the event of an emergency. Recognizing unusual traffic patterns within the campus facilitates revealing illegal activities such as drug distribution.

Integration

AxxonSoft products enable integration of video surveillance with security and fire alarm systems, and access control systems, including biometric readers, and vape sensor readings. When an alarm is activated, the security service instantly receives video from alarm location to quickly assess the situation; the staff can also monitor all incoming and outgoing remotely and view video recordings of anyone coming or going.

Cloud Monitoring

AxxonSoft cloud service offers remote monitoring of multiple sites in different locations via a web interface. This may be used by educational institutions that have geographically distributed subsidiaries, as well as for setting up monitoring workstations at city police departments or any other relevant agencies.

Intel® Products to Increase Video Analytics Performance

The Intel Partner logo consists of the word "intel." in a small, lowercase, sans-serif font, followed by the word "partner" in a larger, lowercase, sans-serif font. Both are white on a blue background.The IoT Video Specialist logo features the text "IoT Video" on the top line and "Specialist" on the bottom line, both in a white, sans-serif font, set against a blue background.

Video analytics requires sizable computing resources. For example, if the number of camera channels exceeds 10–20, it's almost impossible to build a cost-effective AI video surveillance system without using dedicated AI accelerators. To optimize the workload and ensure that video analytics operate quickly, AxxonSoft have partnered with Intel and now uses their accelerators and specialized tools in its products.

Intel® Distribution of OpenVINO™ Toolkit

OpenVINO™ is a toolkit for computer vision applications which extends workloads across Intel® hardware (including accelerators) and maximizes performance. Intel® Distribution of OpenVINO™ toolkit is applied for neural network inference in AxxonSoft AI analytics tools.

Intel® Vision Accelerator Design Products

AxxonSoft boosts AI performance using Intel® Vision Accelerator Design products with Intel® Movidius™ VPU:

- Mustang-V100-MX8 accelerator card,
- Neural Compute Stick 2.

Intel® Quick Sync Video

Intel® Quick Sync Video is a technology available on Intel® processors that provides hardware acceleration for video decoding. The decoding is performed by GPU, which significantly reduces the server's CPU load when applying video analytics, and the client's CPU load when displaying video feeds.

Using client-side hardware video decoding results in:

- Dramatically improved decoding times, which is essential for smooth playback.
- The client can display more cameras, or you can use client computers with lower performance specs.

Benefits of server-side hardware video decoding:

- Servers can handle more concurrent video streams at HD resolution and even higher.
- More cameras can be connected to a single server, reducing hardware expenses and support issues.

This is how Intel® products and technologies help you build value-added solutions with AxxonSoft software.

Security in Schools, Colleges, and Universities

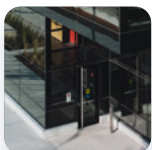
Schools perform not only educational functions, but formative ones as well. They are an important and essential part of the lives of children and adolescents. Children's personalities are formed during their school years, which is why a certain amount of aggression and rebellion is typical of this age; however, it is necessary to control this so it doesn't get out of hand. As a rule, conflict situations involve three parties: students, teachers, and parents. Besides its main function of providing security on the grounds, a video surveillance system in a school can be a tool for preventing and resolving disputes between the parties.

The very fact of video monitoring helps to improve discipline in the school and forces adolescents with criminal intentions to think about the consequences of their actions. Extortion, threats, bullying and violence toward any student, even if it takes place in the farthest and most out-of-the-way corners of the school, will be recorded by video surveillance cameras and will not go unpunished. In addition, security systems integrated with various sensors help prevent emergencies (fires, acts of terrorism, shootings). If an emergency still arises, the response will be much faster if there is a video surveillance system.



Problems Solved by a Security System Based on AxxonSoft Software in Schools, Colleges, and Universities

Video surveillance in a school based on AxxonSoft products helps monitor the following aspects:



Access to the school building and grounds

Integration of the video surveillance system with access control makes it possible to identify all visitors to the school and determine whether they are unauthorized persons.



Tardiness and attendance

An access control system identifies students and documents their entries and exits from the school building. Reports can be created based on this information.



Documentation and analysis of disputes

Any conflict situation in a camera's field of view can be thoroughly analyzed to determine who is at fault. In such situations the use of cameras with a built-in microphone is especially effective. Recording with sound can help establish the whole picture of the conflict situation and determine its cause, which can be either the improper behavior of the student or a teacher overreaching his or her authority or being prejudiced against the student.



Safety of school property

Suppression of vandalism and damage to school property, as well as other actions causing material damage.



Analysis of student behavior

If suspicious activities are detected, a member of the school's security service can point a PTZ camera at the students in real time and find out what they are doing, for example, playing or fighting. The use of a video surveillance system with neural network analytics makes it possible to determine a person's possible intentions based on his or her pose. For example, arms stretched forward can be an indication that a person is holding a weapon. Prompt detection of such potentially dangerous situations makes it possible to eliminate the threat as soon as possible and prevent a tragedy.



Exams and lessons

During lessons — assessment of the teachers' level of competency. During exams — ensuring the transparency of the exam, resolving controversies, and preventing violations on the part of teachers and students.



Adjacent territories

Ensuring the safety of students in school stadiums and athletic fields, control of the entry of unauthorized persons into the school grounds, and monitoring of student misconduct: fights, smoking, and alcohol or drug use.

Designing a Security System for Schools, Colleges, and Universities



Main Entrance

Equipping a school with video cameras starts with the entry zone. As a rule, standard outdoor cylindrical or vandalproof dome cameras with infrared lighting are installed at the entrance; these provide a high-quality nighttime image. It is also possible to integrate the video surveillance system with thermal cameras to detect visitors with elevated body temperature.



Grounds

For surveillance of the school grounds at a distance of over 30 meters, it makes sense to use a high-speed PTZ camera with infrared lighting so that the security service can point it at a suspicious area needing close attention. Special attention should be paid to blind zones, as students often choose them for fights. Ideally, video surveillance should cover the entire perimeter of the school.

AxxonSoft tools make it possible to indicate zones in the grounds of a school where someone's presence could cause suspicion. When motion is detected in such a zone (loitering), the school's security service will get a notification and can personally see to the situation.



Corridors and Stairways

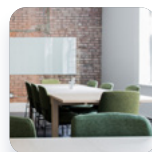
Conflicts and accidents are possible not only in classrooms and on the school grounds, but also in student lounges, corridors, stairways, and cafeterias. As in classrooms, dome cameras are used there, as well as box cameras or mini-cameras.



Classrooms and Laboratories

In classrooms and laboratories, indoor dome cameras with a prime lens are usually installed so that the board and the teacher's desk are in the camera's field of view. In chemistry labs, workshops, and other hazardous spaces, as well as in classrooms for exams, it is advisable to also have cameras aimed at the students' desks. For video surveillance in classrooms, it is highly recommended to have cameras with audio recording.

AxxonSoft's neural network video analytics make it possible to automatically detect potentially dangerous situations based on analysis of a person's pose and instantly notify the security service about them. For example, a person lying down might need emergency medical assistance, while a person with his or her arms stretched forward might be holding a weapon.



Teachers' Offices

Video surveillance is necessary in the principal's office and the teachers' lounge to ensure the integrity of official documentation and to prevent corruption and controversies between school employees or involving parents.

Footage from all video surveillance cameras in a school should be sharp so that people's faces can be clearly recognized. Furthermore, video footage should be kept no less than one month so that scenes can be analyzed after the fact. AxxonSoft offers a wide selection of tools for quickly searching for the desired moments in a large archive of video footage from a multitude of cameras.

Security on Campuses

A university campus is like a lively mini-city with a constant stream of students and instructors. Besides the main university building it includes many other buildings and structures distributed throughout the grounds: dormitories, libraries, sports complexes and athletic fields, laboratories, administrative and maintenance buildings, cafeterias, gazebos etc. Each building on campus has its own peculiarities, which means it has different security requirements.

- For administrative and educational buildings, these are primarily the security of property, ensuring human safety, and maintaining discipline.
- For dormitories they are maintaining proper conduct and order, monitoring discipline, and excluding unauthorized persons.
- For cafes and dining facilities, they are quality control of ingredients and dishes, monitoring workflows with food products and areas for their unloading.
- For parking lots, it is prevention of car thefts and break-ins.
- For squares and outlying territories, it is prevention of interpersonal conflicts in secluded areas and criminal acts such as the use or sale of prohibited substances.

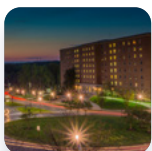
A properly designed video surveillance system for a campus accounts for all the peculiarities of this complex site and can significantly help in ensuring the safety of students, instructors, visitors, and campus infrastructure.

Thefts, fights, and other incidents do not just cause material damage to an educational institution; they also have a negative effect on its reputation. That is why it is extremely important to promptly detect criminal acts on campus. If an unpleasant situation has already occurred, the video surveillance system will help investigate it and punish the guilty parties.

Security on campus is important both for students and for their parents, who will have peace of mind knowing that, even when far from home, their child is in a safe environment.

Problems Solved by a Security System Based on AxxonSoft Software on University Campuses

A video surveillance system on a university campus based on AxxonSoft products helps solve the following problems:



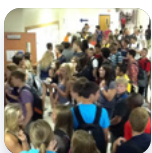
Ensuring security at night

Since students live on campus, sometimes they are active when it's dark: students may just walk around or go between classrooms and buildings or through the parking lot, and newer students may have trouble finding their way around a big campus. For students to be comfortable going for a walk in the dark, they need to feel that they are under the protection of the security system.



Ensuring the safety and peace of mind of teachers

A security system with an integrated access control system guarantees that only authorized persons are on campus. Thus, teachers no longer need to examine the faces of students and track unfamiliar people. Furthermore, if a conflict arises, such as slander or accusations from students, footage from video surveillance cameras provide incontrovertible proof for resolving the situation.



Detecting bottlenecks on campus

Integration of a video surveillance system with a heat map makes it possible to track changes in student traffic depending on time of day, weather, and other factors. For example, in the beginning or end of the academic day a traffic jam forms at the building entrance, while during the lunch break one forms at the entrance to the cafeteria. Identifying bottlenecks and high-traffic areas will make it possible to better plan student evacuation routes in the event of an emergency.



Ensuring campus security during off hours

On weekends or during breaks, on holidays or at other times when campuses are closed, they often become targets for attacks from vandals or criminals who might be after expensive technical or laboratory equipment. An integrated security system with video surveillance, perimeter control, alarms and emergency notification will make it possible to prevent theft and property damage.



Instant searching in footage

Search by object features and trajectories combined with the capability to search for vehicle license plates makes video footage retrieval interactive and helps hugely reduce the time spent on video investigations, maximizing the efficiency of your security staff.



Quick emergency response

If a bomb threat, shooting, evacuation or other emergency arises, remotely controlled video surveillance cameras can help identify people leaving the building, as well as students or teachers who are still inside, and send them emergency response teams. Cameras can also track people (for example, attackers) when they move from one space to another.

Designing a Video Surveillance System for Campuses

A campus is a large and multifaceted site. Its security system may include hundreds of video cameras, data from which will flow to a single monitoring center; therefore, when designing a system, it is necessary to provide for high-capacity storage systems or the possibility of connecting the system to a cloud data storage. Searching for specific people, cars or situations in a huge volume of accumulated video archives will be quick and convenient with such AxxonSoft tools as forensic search by criteria and face and number plate search.

Besides cameras, a large amount of specialized equipment must be installed for access control, fire protection and the operation of other integrated systems. Therefore, the installation of such a system shouldn't be entrusted to security service employees; this work should be performed by professionals with long experience in installing integrated video surveillance systems. Integrator companies that are certified AxxonSoft partners will easily handle tasks of any complexity. They will determine the optimal placement of video cameras, select the necessary equipment, design a surveillance system, install it, and test it before launch. Contact us to find an integrator company in your region.

