

CCTV Monitoring Applications

Eng. Manal Qabazard & Eng. Athoub ALZuwaid

ABSTRACT

The use of Close Circuit Television has grown very popular over the last few decades as more countries contend with rising insecurity as well as the need for great accountability or transparency. Despite the fact that the growth of CCTV has been slowing down over the last few years, it is estimated that there are at least one billion CCTV surveillance cameras in use around the globe. Asia alone accounts for at least 65% of CCTV installations. CCTV deployment has aided the growth of state surveillance, crime prevention measures, as well as advancements of social monitoring and control (Kumar & Svensson, 2015). There has been increased criticism from members of the public and policy makers who feel that some aspects of CCTV usage infringe on the right to privacy which is considered very important by most Americans. This is especially in the digital age where individual privacy has continuously been eroded as Big Tech monopolizes customer information. Recently, CCTV has shifted towards the internet-based products and systems, necessitating the use of various applications or software. There are numerous CCTV applications that can be relied upon by individuals as well as businesses to increase their safety or security. The utility of such applications depends on the cost of acquisition as well as maintenance, the needs of the consumer, the functionality of the said application, and the ease of its use, just to cite a few (Kruegle, 2011).

Date of Submission: 27-02-2021

Date of Acceptance: 12-03-2021

I. INTRODUCTION

CCTV is a reference to closed circuit television which is also known as video surveillance. It is the use of video cameras for the transmission of signals to a specific location as well as on a limited set of monitors (Yesil, 2006). The difference between CCTV and broadcast television lies in the fact that the former is not openly transmitted. Even though most video cameras qualify as CCTV, the term is often used to refer to surveillance that is ongoing in security risk areas. The use of CCTV has grown considerably over the last few years, going beyond crime prevention or solutions and monitoring of traffic. Police officers in some states have begun using body-worn cameras as a means of increasing accountability, especially with a growing backlash over excessive force disproportionately targeted at black Americans (Mould et al., 2014). Closed circuit television has increasingly been used in employee, students, and even home monitoring. In American schools, the use of CCTV has grown considerably, thanks to the occurrence of active shooter incidents in the last two decades (Birnhack & Perry-Hazan, 2020). CCTV is also used in the transmission of live sporting or entertainment events so that the latter can be enjoyed by viewers at home using the pay-per-view model. Last but not least, close circuit television can also be used

by criminals to either monitor members of the public or to access personal information such as ATM pin or perform identity fraud.

Objective/Aim

This research paper aims to critically discuss CCTV monitoring applications that are popularly used. The study will debate various software products, their features, the costs involved, and also their overall structures for the client. Towards this end, the paper will thus perform extensive research on existing empirical evidence to draw support for its premises and claims. Moreover, the paper will also provide several recommendations on the most appropriate applications for specific situations or those that are likely to maximize customer utility.

CCTV Monitoring Applications

There are several CCTV monitoring applications that are available to clients. These pieces of software can be used for the purposes of recording video footage from camcorders, encoders, webcams, IP cameras, DVRs, and NVRs.

Luxriot EVO

The Luxriot EVO is one of the most popular free CCTV applications, thanks to its professional video management system. The free version of the application can support up to 4,000

different CCTV brands. Its features go beyond most of those found in regular software (Rose, 2020). For clients with a small installation that requires the robust video management software, Luxriot Evo can provide great utility, thanks to its stability as well as its additional features. These aspects include the ability to support up to 9 IP cameras and an endless array of camera models. In addition, this application provides a single remote connection and also runs on Windows 64-bit. It also comes with a setup wizard for easier installation of the software. Last but not least, it also has a live podcast feature that allows the broadcast of surveillance video to YouTube as well as other Real-Time Messaging Protocol (RTMP) services. Moreover, this application has an interface that is clear and intuitive for optimal customer utility (Birnhack, Michael, Perry-Hazan, 2020).

Blue Iris

The Blue Iris Software is a free security camera application that is designed for small offices and homes. Unlike the video management system leveraged by the Luxriot EVO, this particular software has limited support for professional applications. Nonetheless, the Blue Iris Software is very popular, thanks to its ability to record using up to 64 cameras, including webcams, camcorders, IP cameras, and capture cards (Rose, 2020). In addition, the video is standardized for easier playback on a personal computer or handheld devices. Blue Iris also has an inbuilt web server that aids in posting information in website. The application has a multiple views option for a more nuanced monitoring of the premises, and when motion is detected, the owner is notified via loudspeaker, text message, and email. Last but not least, the software is available for both for personal computers and mobile devices for optimal client convenience. The revenue model of the company has two versions, the light edition form which costs \$29.95 and supports a single camera, as well as the full version which goes for \$59.95 and supports 64 cameras. The application also has a 15-day free trial period for users who still need to make up their minds (Birnhack, Michael, Perry-Hazan, 2020).

iSpy

Another popular piece of software is the iSpy CCTV which also offers some interesting features. Being an open source application developed by iSpyConnect, this software is compatible with numerous CCTV cameras from various manufacturers. It allows clients to not only

download plugins for barcode scanning, but also text overlay as well as face and license recognition (Brown, 2021). Additionally, footage can also be uploaded to the cloud or Google Drive as well as on YouTube. It also has a text to speech option that allows the client to talk via the iSpy website and also monitor or listen to mic setup. The iSpy software can be used locally for as many cameras as the client wants. The free version of the software comes with several additional features including broadcasting, motion detection, and recording schedule. It also has several features such as email alerts, Twitter and SMS notifications, remote view, and cloud recording which are available at a certain price. The application has two subscription plans for clients to choose from, the basic package at \$7.95 and the ultimate package costing \$49.95. Moreover, the plugins also come at an extra cost, although they have a free 7-day trial period.

Webcam XP

The WebcamXP was also quite popular among the clients of closed circuit television programs, thanks to its compatibility with diverse device manufactures as well as the fact that it allows for remote monitoring. Clients can monitor their homes or business premises from any location by converting their computer or mobile device into a security system. It also has other features including broadcasting live video to a website and scheduling of automatic recording as well as capturing. Even more impressive is the fact that this software can support a wide range of over 1,500 surveillance cameras. The closed circuit monitoring application also provides a highly stable and superior performance to the client. This software is renowned for its ease of setting up as well as versatility. It supports USB webcams as well as popular video formats such as AVI, MOV, MP4, and WMV, just to cite a few. It can also be used with https (Hypertext Transfer Protocol Secure) posts, FTP, and media streams. The software is designed for digital use and is very lightweight, which allows it to reduce the resources utilized on a personal computer or any device used (Martins, 2019). Last but not least, the software has pan, tilt, and zoom options as well as advanced controls for restricting access depending on the user. This application is 100% free.

Shinobi

Another CCTV monitoring application is Shinobi. This is an open platform application that supports Windows, Linux, and also Mac OS.

Shinobi is an open source CCTV application that is famous for its client-friendly interface. The application leverages a multicast stream where a single source provides multiple clients with video and records videos that are compatible with most personal devices such as PCs and mobile phones (Rose, 2020). In addition, Shinobi also has no stream limits often brought about by browser shortcomings. It also provides automatic backup for client data where information is stored using MYSQL and MARIADB databases. The Shinobi software is available in two subscription packages, a free version for personal/home use as well as professional version that retails at \$75 per month (Birnhack, Michael, Perry-Hazan, 2020).

Cam Wizard

Cam Wizard is the alternative CCTV software that supports USB camera recording as well IP cameras. This a surveillance application that includes essential features such as motion detection, notification, time schedule, and FTP upload (CNET, 2020). It supports Windows operating system and compresses content into Windows Media video that can be viewed on most devices. The software can be triggered to start recording physically, remotely, and through motion detection. The motion detection capabilities of the software are top-notch and consistent, relying on the latest algorithms to minimize false alarms. It can also be used as a webcam server since it has the capability of streaming live JPG stills over HTTP. The surveillance recordings can be sent to an email address or uploaded to remote server via file transfer protocol (FTP). Cam Wizard has an advanced compression algorithm that allows clients to use minimal storage space. Last but not least, the CCTV software also has a free 99-day trial period as well as a paid version costing only \$9.95, making it a major bargain.

Ivideon Software

The Ivideon software supports CCTV cameras from different manufacturers and the video stream is recorded using a cloud recording service. This application enables the client to use computer cams, IP cameras, NVRs, and DVRs as sources for the stream. The Ivideon CCTV software is highly recommended for users seeking a low-cost surveillance solution that delivers optimal utility for light user demands. It comes in two versions including home and business edition. Users can monitor their premises even when nowhere near the device as it has a remote access feature that enables notifications to be sent when there is an incident. This software also has

sophisticated algorithms for detecting motion and flickers in fixtures that may indicate a security breach. Moreover, it is very affordable with plans starting at \$4 per month.

Contaware ContaCam

Contaware ContaCam is another simple system that enables the user to utilize their webcam as a surveillance camera to record security footage on the local drive. Light and versatile, Contaware comes with motion detection capabilities and the ability to support unlimited cameras. This software records many hours of non-stop video for household purposes. It has simple features such as motion sensors that optimize the utility of available storage. Clients can also access their recordings and images remotely via port forwarding or drop box. It supports network cameras, IP cameras, webcams, USB webcams, WDM, and DV. Moreover, the webserver has internet as well as intranet password protection. Unlike most of the available software for CCTV recording purposes, this application is available for free. However, this also means that the webserver has limited features as well as functionality. Moreover, support and maintenance are not responsive when compared to alternative premium solutions.

Zone Minder

Zone Minder is a free open source application that only runs on the Linux operating system. It is accessible from all internet-enabled devices and is compatible with both digital and analog cameras (Brown, 2021). The software also supports 4K resolution with plans underway to provide cloud support. Additionally, the application comes with video analytics and other statistical support. Zone Minder is robust enough to handle large amounts of data and can also be used with third-party programs for optimal performance (Brown, 2021). It is designed for both home and professional use and works with a diverse selection of surveillance hardware.

SmartViewer

SmartViewer is also a good CCTV monitoring application that updates to the latest version automatically as long as there is access to the internet. The software application was developed by Samsung to simplify the management of Wisenet device control. It provides an intuitive interface for monitoring live feeds or recorded video over a network. This application is compatible with DVR and NVR devices as well as cameras. SmartViewer supports two monitors and up to seventy two cameras. It is also easy to set up,

export videos. Besides, it has a viewing app for booting. It has search option, favorites section, as well as built-in support for sequence function.

Genius Vision

Genius vision is another video management application popular among clients seeking surveillance solutions. This closed circuit software has numerous versions including but not limited to enterprise, community, NVR subscription, NVR lite, and enterprise editions. The app is designed to be compatible with different kinds of cameras including webcams, IP cameras, and USB cameras, just to cite a few. The software can be customized or tailored to the needs of the business. The application also offers full remote control and management through the browser. Other features include vision tamper detection, a panorama view, and video export to AVI. Moreover, it can be used with multiple monitors. The trigger rule and the event management capabilities increase the customer experience (Rose, 2020). The Genius Vision software also provides support for mobile devices, making monitoring possible from anywhere.

NetCam Studio

The NetCam studio comes with a free version and a paid version. The free version includes a camera feed to two monitors, notifications, and community support. However, the images and the videos captured are watermarked. The free version of the software does a decent job, but for a more impactful product/ service experience, it is advisable for clients to buy the license. This license allows clients to use the software for as long as they want with software updates for up to two years (CNET, 2020). After the two years expire, the application still runs as usual, but any upgrades have to be purchased. However, upgrades are only necessary when new hardware that requires the software installation is bought (CNET, 2020). The paid version has no watermarks, includes 250-day notification, and priority support for up to 64 sources. The software supports a wide variety of camera brands and is updated regularly to fix most system breaking bugs (CNET, 2020). Nonetheless, the interface of the application is not customer-friendly. The process of adding sources and troubleshooting also needs to be explained better to the final consumer.

Freedom VMS

Freedom video management system provides full support for all contemporary CCTV technologies including but not limited to Hdctv

v2, HD-SDI, HD-IP, HD-TVI, HD-CVI, SD CCTV (Brown, 2021). To optimize compatibility, the application also supports a variety of cables such as catt5, coax, and fiber. The Freedom VMS has sophisticated features including timeline playback as well as an E-map that supports drag and drop. The software enables the user to use four cameras at the same time, making it easier to go over the footage and observe it from multiple angles. All cameras can also be synced to show the same time. This VMS also supports export to external sources as well as downloading of recorded footage. The intuitive user interface makes it easier for the first-timers to navigate it with ease. Last but not least, the software can also be connected to NVRs, DVR, encoders, and servers.

SGS Home Guard

SGS HomeGuard has received pole ranking among the free camera software since 2018. It is an all-in-one surveillance software designed for business and also home use. The application is specifically linked to personal computers and used for home-monitoring via the webcam. The program comes with the ability to be customized and has adequate privacy policies that make it safe for monitoring children (Stephenson, 2021). It is easy to set and comes with preview mode that saves bandwidth as well as time. The capabilities of the motion center ensure that recording is done in manner that optimizes storage. HomeGuard free is optimized for Windows. The standard version has additional features including saving screenshots, one-year free updates, time scheduler, events log, and a smart noise reduction filter.

Visec Surveillance

The Visec Surveillance software is often used by cities for the purposes of plate analysis. Home security clients can also use it to playback and analyze recorded video on a local disk or on the internet. The one-button design of the application makes it easy to find the right IP camera in the network. Other features include a log window for convenient access as well as tilt and zoom capabilities. The software also supports multiple Windows and analog cameras such capture cards and webcams in addition to the IP ones. Visec surveillance is easy to navigate and it supports h.264, MJPEG, and MPEG4 formats. Despite being designed for Windows, Visec software is accessible on Android and Apple devices.

IcamViewer

IcamViewer is one of the best software built for IP camera viewing, but can also be used for analog CCTV cameras. The application can be utilized with up to 16 cameras, appropriate for covering a large area. The software is easy to set up and the interface has an easier learning curve. The application works with different kinds of cameras and comes with numerous features including an up-to-date surveillance section to keep the client apprised as far as technology and the latest features are concerned. It is available for iPhone and iPad users.

Sentry Vision Security

Sentry Vision Security is also free software that can be used for home security. This freeware allows the client to convert their webcam into a surveillance system to monitor their premises. The output of the program is easily viewable on a smartphone or any personal internet-enabled device. It has features such as alarm notifications, automatic start up, scheduling, and motion detection that make it a good choice for customers without the need of any heavy duty.

Sighthound Video

Another free CCTV security app is Sighthound Video which also turns the webcam on a personal computer into a surveillance system. The most outstanding feature of this freeware is its people detection feature that enables it to sense when a room is occupied and start recording. It comes with a free version as well as paid version. Even though the former has adequate features for lightweight surveillance at home, upgrading to the standard package also provides more utility for the client.

Azimuth VMS CCTV

Despite the fact that the original VMS was discarded by the founding company, this application has become one of the most popular free IP camera programs. It can be connected to an endless number of cameras and it is also compatible with analog CCTVs. The VMS also supports h.264 compression, MPEG4, and also MJPEG. Other features include support for Intel IPP, PSIM connection, multilayer map, and client multiscreen (Martins, 2019). The application also includes edge detection and 360 as well as flat support. It is compatible with the support SIM and has integrated video analytics as well as superior notion sensor capabilities relative to other free software. This VMS has advanced features, but manages to remain very easy to use for first-time customers.

II. RECOMMENDATIONS

The large number of apps highlighted in the preceding section is adequate evidence that customers are spoilt for choice. The important question becomes, 'Why choose a particular CCTV monitoring application from the multitude of available options?' When making a choice as far as CCTV surveillance software is concerned, there are several factors that have to be considered. It is recommended that before settling on one of the CCTV software options, clients should first determine their own needs. The needs of clients vary depending on the nature of the premises, that is, whether the CCTV is for in-house monitoring, home security or business surveillance (Stephenson, 2021). For in-house surveillance such as monitoring kids or the interior of a house, almost all applications have such capability. Therefore, it makes no sense to spend on a premium package when all that is needed is a nanny cam. The needs of home security also have their own considerations, but remains manageable with most of the leading freeware in the market. For business premises surveillance, a more professional application is required. Surveillance software for a business has to contend with increased demands as far as the number of cameras, amount of storage, and access to the Internet as well as multiple format support are concerned. These demands of a professional work environment cannot be met by most of the available CCTV freeware due to the need for greater capacity as well as responsive support (CNET, 2020). This necessitates subscription to standard or premium packages depending on business needs. Thus, before making a purchase, it is important for the client to match their needs to the most appropriate software. Otherwise, there is the likelihood that optimal utility won't be derived from consumption, resulting in dissatisfaction.

Cost is also an important consideration when purchasing a CCTV monitoring application. As shown by the evidence gathered, there are numerous free options available for various clients with less demands as far as capacity, processing power, and versatility are concerned. Clients seeking software for lightweight surveillance such as homestead monitoring do not have to make major cost considerations as they can have most of their needs met by freeware. However, for professional clients, cost of purchase as well as maintenance is a very important factor to consider. Most premium applications available in the market offer affordable subscription packages that most businesses would find attractive. However, there are also other costs that may arise from upgrading and updating of software. Therefore, it is prudent

for businesses to choose packages that require low initial investment and little or no additional payments. Therefore, once a business has identified its needs, the next logical step is to establish the available budget so that the cost of acquisition and maintenance can be calculated. It is also important to consider the cost of auxiliary or support services such as cloud storage and also the hardware compatible with the selected software (Stephenson, 2021).

Outsourcing of CCTV surveillance and security services is also an important consideration, especially for large business clients. Establishing a CCTV surveillance system comes with additional costs including personnel and hardware necessary for optimal functionality. This often involves setting up an entire department and providing it with adequate resources. For a company that has no prior experience or knowledge of security and surveillance, this can be a major distraction from its core competencies. Consequently, some businesses prefer to outsource their services to third parties who are experts at security services. By outsourcing CCTV monitoring application, the company is able to maintain its lean structure and avoid taking on responsibilities that add no value to the overarching corporate strategy (Kroener, 2014). In addition, it also improves the quality of services while also reducing the costs associated with surveillance. Security consultants whose core competence is surveillance are likely to do a better job as opposed to newly hired employees. In addition, the company does not need to pay for updated software or hardware because that is covered under the subscription plan. Moreover, in case of a security breach, their third party service provider can be held liable.

III. CONCLUSION

In conclusion, there are numerous CCTV monitoring applications for individual clients and companies to choose from depending on their needs as well as the financial ability. Most of the applications have free versions that offer basic functionalities. However, for more intensive home and business needs, it is important to purchase a standard or premium package that guarantees that client needs will be met optimally. Therefore, the choice for the most appropriate CCTV monitoring software is thus dependent on the needs of the client as well as their ability and willingness to pay. For large organizations where CCTV surveillance may be accompanied by additional resources such as hardware and personnel, it is advisable to outsource these services. This not only guarantees superior quality owing to the expertise

of the third party as well as reduced additional costs, but also reduces the financial and legal liability exposure of the client.

REFERENCES

- [1]. Birnhack, Michael D.; Perry-Hazan, Lotem (2020). "School Surveillance in Context: High School Students' Perspectives on CCTV, Privacy, and Security". SSRN Electronic Journal. doi:10.2139/ssrn.3587450. ISSN 1556-5068
- [2]. Brown, Liza. (2021) 10 Best Free Security Camera Software. Retrieved from <https://filmora.wondershare.com/video/best-security-camera-software.html>
- [3]. CNET. (2020) Surveillance software. Retrieved from <https://download.cnet.com/s/surveillance-software>
- [4]. Kroener, Inga (2014). CCTV: A Technology Under the Radar?. Ashgate Publishing. ISBN 9781472400963.
- [5]. Kruegle, Herman (2011). CCTV Surveillance. ISBN 9780080468181
- [6]. Kumar, Vikas; Svensson, Jakob, eds. (2015). Promoting Social Change and Democracy Through Information Technology. IGI Global. p. 75. ISBN 9781466685031.
- [7]. Kroener, Inga (2013). CCTV: A Technology Under the Radar?. Ashgate Publishing. ISBN 9781472400963.
- [8]. Kumar, Vikas; Svensson, Jakob, eds. (2014). Promoting Social Change and Democracy Through Information Technology. IGI Global. p. 75. ISBN 9781466685031.
- [9]. Martins, Claudemir. (2019) Best CCTV Software for Modern Security Cameras. Retrieved from <https://learnccctv.com/best-cctvsoftware/#:~:text=Cam%20Wizard%20s%20a%20CCTV%20software%20for%20IP,triggers%20such%20as%20motion%20detection%20in%20the%20scene>.
- [10]. Mould, Nick; Regens, James L.; Jensen, Carl J.; Edger, David N. (30 August 2014). "Video surveillance and counterterrorism: the application of suspicious activity recognition in visual surveillance systems to counterterrorism". Journal of Policing, Intelligence and Counter Terrorism. 9 (2): 151–175. doi:10.1080/18335330.2014.940819. S2CID 62710484
- [11]. Rose, Gordon. (2020) Best IP Camera Software 2020 – Top 15 Free & Paid Surveillance DVR NVR Camera Viewer.

- Retrieved from
<https://www.phenomsecurity.com/best-ip-camera-software/>
- [12]. Rose, Gordon. (2019) Best IP Camera Software 2020 – Top 15 Free & Paid Surveillance DVR NVR Camera Viewer. Retrieved from
<https://www.phenomsecurity.com/best-ip-camera-software/>
- [13]. Stephenson, Brad. (2021) 5 Best Security Camera Apps for 2021. Retrieved from
<https://www.lifewire.com/best-security-camera-apps-4176111>
- [14]. Yesil, Bilge. (2006) "Watching Ourselves" *Cultural Studies*. Vol 20(4-5) pg. 400-416.
- [15]. Yesil, Bilge. (2007) "Watching Ourselves" *Cultural Studies*. Vol 20(4-5) pg. 400-416.

Eng. Manal Qabazard, et. al. "CCTV Monitoring Applications." *International Journal of Engineering Research and Applications (IJERA)*, vol.11 (3), 2021, pp 22-28.