A whitepaper on

AI-powered CCTV cameras are the future of security and surveillance, How Presear Softwares deliver advanced CCTV video analytics softwares as a hybrid software package minimizing your cost

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Everybody knows that the normal CCTV cameras provide one of the best security and surveillance systems, with some manual work to be done like appointing someone in front of your computer screen 24 x 7 to check the security and a manual alert system with less accuracy. But the question is, how can Artificial Intelligence(AI) enhance the quality of your entire surveillance system. AI-powered CCTV cameras deliver advanced analytical functions like theft detection, vehicle detection, face detection, person detection, people counting, traffic counting, license plate recognition (LPR), weapons detection and behavioural analytics. Advanced video analytics software is built into the camera and recorder, which then enables artificial intelligence functions. The prepared AI model can be integrated further into a hybrid system which can be installed on desktops, android applications, iOS applications and even in smartwatches.

Detailed Problem Statement

1. The normal CCTV surveillance system has a strong limitation in the ability of humans to constantly monitor video surveillance live footage accurately, which led to the implementation of artificial intelligence.
2. According to research performed earlier, humans watching a single monitor for more than twenty minutes lose 95% of their concentration. Many offices have dozens or even hundreds of cameras, the task is clearly beyond human ability.
3. The camera views of empty hallways, storage facilities, parking lots or structures are exceedingly boring and thus attention is diverted and the humans lose interest.
4. There is no track record of the events, in case of any emergency or requirement, we can’t have a smart system to analyze them for us in case of a normal CCTV system.

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Proposed Solutions

AI enabled CCTV camera are not new in the market, advanced video intelligence systems are already being used in military and faicilities like Airport and nucelar power plants. Presear Softwares PVT LTD is committed to improve the accessibility of such features as a hybrid application, that can be installed seamlessly in any operating system (windows, macOS or Linux), as well as in Android systems and in iOS systems at the same time. Our proposed solution have involvement of cloud database and an advanced alerting mechanism which can also further help in your usecase requirements. Most importantly having a hybrid software is cost effective and easy to maintain.

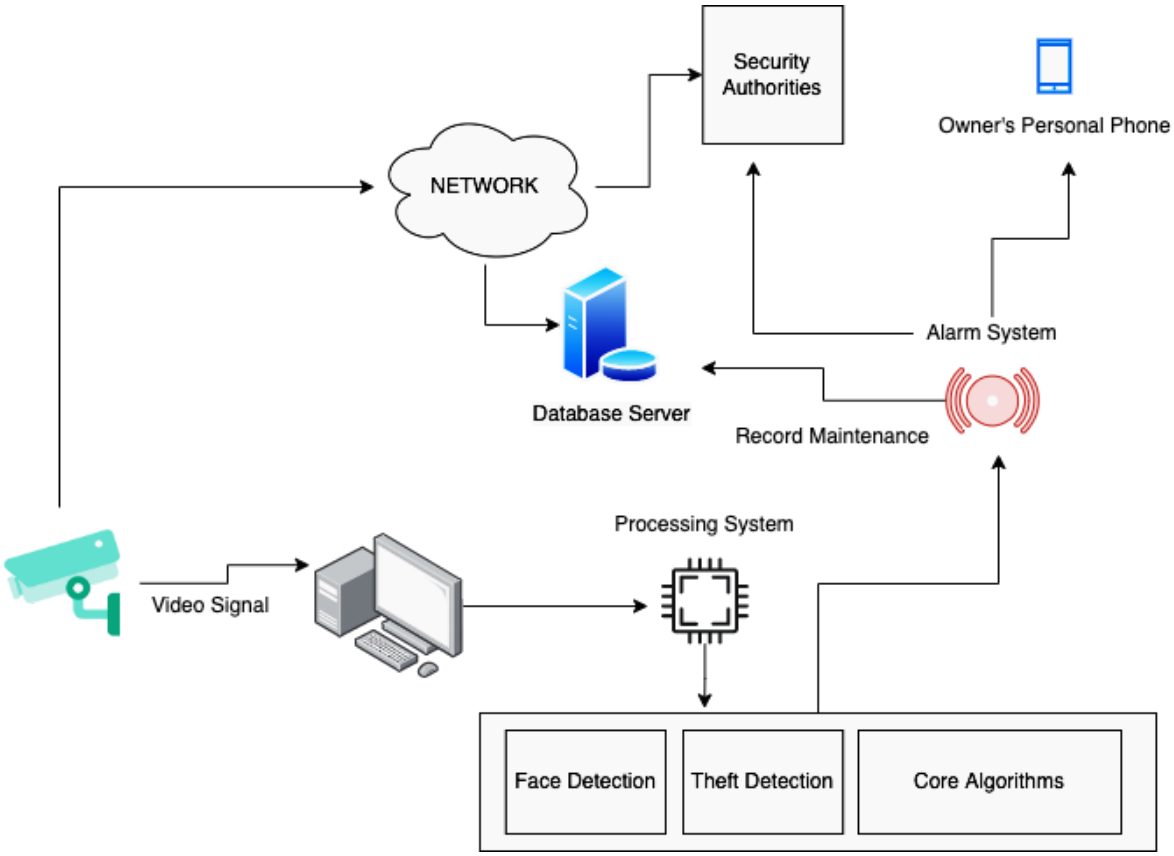

Fig1. - Proposed Architecture for AI enabled CCTV

Working Modules

There are two ways, in which we can apply an AI layer to your currently existing CCTV hardware.

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- **Recorder AI -** The most common level of AI is 'recorder-level' - i.e. data is sent from a standard camera to a recorder, and is then processed with a layer of artificial intelligence - making sense of the raw video data provided. This recorder-level approach means it's possible to turn standard/legacy CCTV cameras into AI-enhanced cameras.
- **Cloud AI** - Running the artificial intelligence layer in the 'cloud' means that the AI software is applied virtually. The main benefit of this is that no hardware upgrades are needed, and instead the intelligence is added on top of the existing hardware infrastructure - remotely, but the cloud cost can be more depending upon the computational power we are using.

Core Technical Features

- **Movement detection**: Identify and send alerts based on either human or vehicle movement detection.
- **Stranger detection**: Identify when an individual is not registered on the database when they are spotted by a camera.
- **Weapon detection**: Anyone with a weapon like a gun, a bat or a knife? Alert and save people.
- **Thief Detection**: Anyone trying to rob your store or your home? This module can help in detecting thieves.
- **Face recognition**: Get different alerts based on different people enrolled on a GDPR complaint "face library" database. For example, if a pre-enrolled VIP walks into your lobby, you can set the system to notify your team.
- **Passive access control:** Enable access to a specific location when a person registered on the database is spotted (e.g. by connecting to a door/barrier control system). And create alerts when a person who is not permitted in a certain location is identified (e.g. a cleaner operating in the safe room).
- **People-counting / people management**: Track and manage people entering/exiting your property, how many people enter specific areas of your property, and track building utility over time (e.g. levels of usage of different areas of the building).
- **ANPR**: Identify and log vehicles via their number plates; track car park usage over time.

Accuracy of the AI layer

AI CCTV cameras are significantly more accurate than the more traditional systems, as they leave no room for human error. This substantially reduces the number of false alarms therefore the operating costs of these systems. A traditional camera's view of public space may be obscured by weather such as rain or fog or perhaps shielded by certain physical objects. For the human watching the camera, this can make any possible security risks challenging to discern. However, for the AI CCTV camera, it can look impartially at all the cameras in the area simultaneously and compare them to the many million reference images it processes to detect an intruder or hazard more efficiently.

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How the software is delivered?

The AI model is developed in bundles, depending on the client's requirements. All the features mentioned above can be integrated into one hybrid software(software which can be installed on mobile, desktop, tablets etc), but that will increase the development as well as maintenance cost. It's always advised to develop the most important specialized features, which your CCTV is intending to focus on. A few specific use cases are given as an example below.

- AI-enabled security cameras on the highways like NH and AH can be used to detect license plates [LPR] and act accordingly (FasTag can be one example of detecting the tag on the windshield)
- Home protection CCTV cameras may have integrated alerting mechanisms to the house owner for intruder detection, theft detection and face recognition.
- Industrial CCTV applications can be used to count and monitor workers effectively thereby minimizing costs up to a large extent.
- Passive Access control CCTV can be integrated in offices or factories, where everyone is not allowed to access a specific place.

Conclusion

Security in the practical world is economically determined so that the expenditure of preventative security will never typically exceed the perceived cost of the risk to be avoided. Presear Softwares PVT LTD is committed to providing excellent hybrid softwares at an optimized cost so that the risks can be avoided. Our AI model is also scalable in terms of the volume of incoming data, and we are researching further the improvement of the accuracy.

About the Author :

Mr Abhijit Tripathy, Chief Executive Officer at Presear Softwares PVT LTD has a distinguished history of publishing research as well as working with core technology domains like AI, cloud computing and software architecture. He has also worked with hybrid software projects and holds a patent for an advanced QR code system to manage important resources.

Ms Vedangini Singh, Artificial Intelligence Researcher at Presear Softwares PVT LTD has proved her excellence in research by working with core software products of the company like medicomatic which is a clinical software for management. She has also worked with numerous open source projects which makes her an excellent data science professional.

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