



Mindtree

Welcome to possible

WHITE PAPER

Video Content Analysis - Retail



Video Content Analysis

Video content analysis (VCA) is the capability of automatically analyzing video to detect and determine events not based on just a single image. As such, it can be seen as the automated process unlike human's ability to see objects and activities and then ascribe meaning to them.

This technical capability is widely used in the security industry for better situation awareness. The video data generated by IP CCTV cameras are used for data analysis to process, categorize and analyse the objects and activities captured. The algorithms can be implemented as software on general purpose machines, or can be embedded in the IP CCTV camera's video processing units.

Many different capabilities can be implemented in VCA, some of them are as follows:

- **Motion detection:**

Video Motion Detection is one of the simpler forms of video analysis where motion is detected with regard to a fixed background scene. The region of interest can be set in the software for implementing analysis for a specific area.

- **People / Object Counter:**

This is an ability to count the number of people / object pass through a defined region in the camera's field of view.

- **Trip wire:**

The crossing of a boundary by any moving object within the camera's view can be detected using this algorithm.

- **Heat Maps:**

It is an ability of the video analysis software algorithm to overlay heat maps on the video in a defined area of the camera's view. The data analysed by the software will provide information on varying density of the object / people within the camera's field of view in a given time interval.

Challenges in Retail segment

Retail business today is quite complex and the storeowners face a lot of challenges in controlling theft and shrinkage, which directly affect their profit. In a bid to combat this situation, can the IP CCTV cameras in a store be used for business intelligence? The answer is yes.

This would not only enable the store owners to provide a safer environment to their customers and staff, but also provide business solutions to improve the store operations. By gathering and analyzing actual in-store performance, retailers now have the ability to monitor, measure and manage what is impacting the customer experience in their stores.

Deployment of Video Analysis in Retail:

The deployment of video analysis in a retail environment has always been complex compared to other places like hotel, museums, schools, library, and so on. The video analysis software deployment is quite easy in these places unlike retail, because the video data captured in the retail environment from IP CCTV cameras are used for business intelligence and not to raise alert, based on a simple trip wire. Most attempts to deploy video analysis in retail have failed so far because of inability to fulfill the following needs:

- Scalability
- Integration with video management system
- Consolidated reporting

Scalability:

Scalability of the solution plays an important role while deploying video analysis across a chain of retail shops / shopping malls. Many systems today fail to deliver this need because they are either too expensive or the system reaches a limit beyond which scalability becomes impossible.

Integration with video management system:

IP CCTV cameras which are typically used for security purpose can also be used for business intelligence in retail segment by deploying video analysis software. The most common practice in deploying such system is by integrating the video management software, which is used for providing electronic security with a third party video analysis software. The third party integration most of the time comes with its limitations which eventually make the integration not seamless and non-scalable. The retail video analysis with video management system as a bundle solution from the same OEM will not only provide a unified solution to the retailers, but also a tighter integration between both the software, making the whole solution scalable. Hence, providing video management and video analysis as a bundle solution is very critical to make video analysis in retail a success.

Consolidated reporting:

The software should provide a detailed consolidated reporting across the stores for analysis. The data captured from the CCTV cameras are normally stored in a table format and it is difficult to read those data to give meaningful information to act. Hence, the video analysis software should provide not only the information in a readable format but also a detailed consolidated report across a chain of retail shops.

Mindtree's offering

By effectively using the video data from the IP CCTV cameras, Mindtree's Heat Maps and People Counter Video Analysis Software for retailers can benefit from numerous business intelligence solutions.'

ManageMind Heat Maps

The heat maps application can provide critical information on measuring the shoppers' usage of the space in the store. The video data from the standard IP CCTV cameras are effectively used by Mindtree's Heat Maps application for providing this information. This data is very essential for a store manager to optimize the store layout and eventually provide better customer experience. It can also help the store owners to manage queues and monitor flow control and leverage the business dramatically.

Some of the key features are:

- People density in different isles – indicating green / yellow / red
- Reports per day of week, per hour
- Works with standard IP Cameras
- Identifies areas that needs attention

- Provides an input for reviewing store planning, suggesting places for promotion merchandizes
- Embedded directly in Axis IP CCTV cameras
- Also, available as a standalone solution, support other standard IP CCTV cameras

ManageMind People Counter

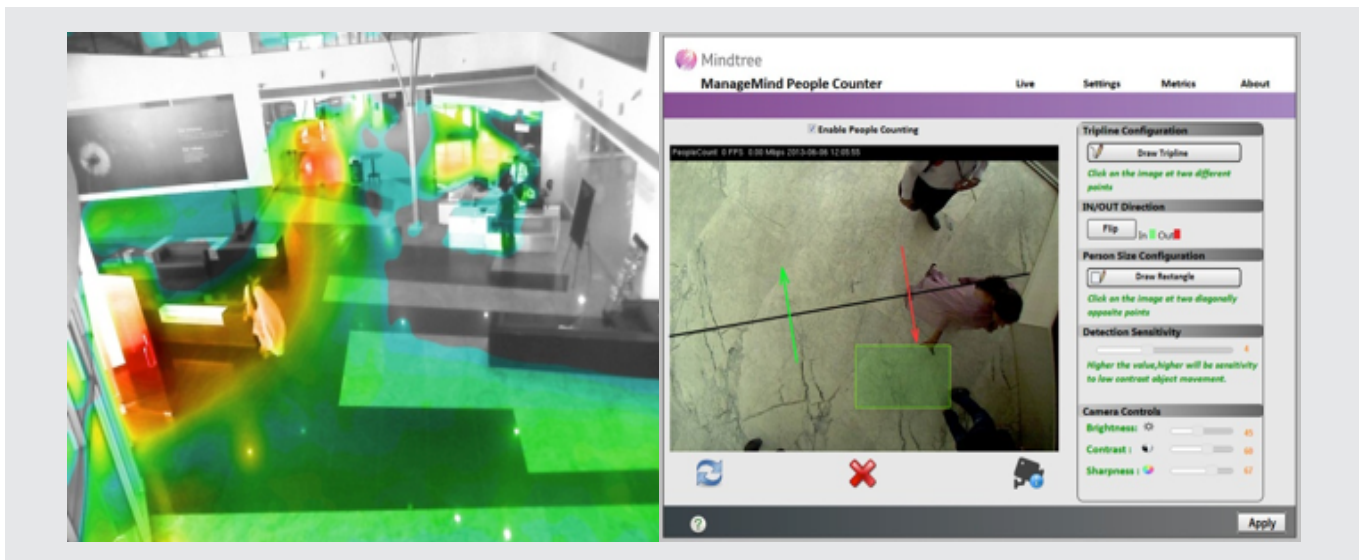
The people counter application provides the data of the number of visitors entering to a store. The video data from the standard IP CCTV cameras are effectively used by Mindtree's People Counter application for providing this information. This critical data can further be used for analyzing the conversion ratio.

The conversion ratio is the number of people who walked in to a store versus the number of invoices generated. This would help the store manager to look at ways to improve the conversion by adopting unique sales strategies to attract the customers and increase the profit.

Some of the key features / benefits are:

- Number of people who entered / exited the store –
- Generating reports on the conversion rates by comparing against PoS data
- Number of people visiting the promotion counter / booth
- Impact of promotion or seasonal offers
- Trends on Peak / lean hour traffic
- Works with standard IP Cameras
- Integrated with ManageMind and SecureMind Surveillance Manager Applications
- Embedded directly in Axis IP CCTV cameras
- Also, available as a standalone solution, support other standard IP CCTV cameras

Screenshots:



Future Offerings from Mindtree:

Mindtree has a strong roadmap plan in video analysis for addressing some of the other critical retail challenges. Our every offering will comply to the key needs of the retailers, such as Integration with video management system, scalability, and consolidated reporting. These filters help the retail shop owners to deploy video analysis in every location to deliver meaningful information which ultimately improve the customer experience and increased sales conversion ratio. Some of our future offerings are:

Demographic

Demographic based counting can do more than just counting. This would help the retailers understand the actual demographics of their customers like gender, age

range, group size, and so on. This information captured would let the retailers plan the merchandising and promotion campaign better. The gender specific marketing campaigns would become lot more easier to run by using demographic based counting system.

Sales performance analysis

The sales performance analysis is the time taken by the sales employee at the selling counter to intercept with the customer and the time consumed to complete the transaction. This would help the retailers to plan sales strategies which could maximize the conversion ratio. A detailed consolidated reporting on store wise benchmarking can also be generated to maximize the impact of the sales employees across the location in everyday transaction.

Reference:

http://en.wikipedia.org/wiki/Video_content_analysis



About the author:

Pradeep Thiyagarajan - Associate Director, Product Management
(Intelligent Video Surveillance Solution)

About Mindtree

Mindtree is a global information technology solutions company with revenues of over USD 430 million. Our team of 12,000+ experts engineer meaningful technology solutions to help businesses and societies flourish. We enable our customers to achieve competitive advantage through flexible and global delivery models, agile methodologies and expert frameworks.