

Video Based Fire Detection Using AVIOTEC

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Abstract-The appearance of smoke is the first sign of fire. Therefore to achieve early fire detection, the surveillance systems are used with motion sensor light. In this paper we proposed a AVIOTEC algorithm which is based on video fire detection. AVIOTEC can supplement state-of-the-art fire detection technologies and enables the early detection of smoke and flames in environments. AVIOTEC combine reliable smoke and flame detection with high speed. It also reduce the false alarm and speedup the response time.

I. INTRODUCTION

The fire accident frequently cause economical and environmental damage as well as it put the people lives in danger zone. One of the main characteristics of fire is it spread very fast. So it is very important to detect the fire reliably and fastly.

At present days there is more demand for automatic fire detection at early stage. In this paper we are using visible range and special purpose AVIOTEC technique for fire detection. AVIOTEC IP starlight 8000 operates as stand-alone unit and doesn't need a separate evaluation unit. Furthermore, it contains all features of the Intelligent Video Analytics which permit to analyze and evaluate the moving objects parallelly. Video-based fire detection and Intelligent Video Analytics operate independently from each other and are separately adjustable. AVIOTEC can detect all test fires such as:

- Open cellulosic (wood) fire
- Smoldering (pyrolysis) wood fire
- Glowing smoldering cotton fire
- Flaming plastics (polyurethane) fire
- Flaming liquid (n-heptane) fire
- Liquid (methylated spirit) fire
- Low temperature black smoke (decalin) liquid fire.

These different types of fire are shown in fig1. AVIOTEC detect any kind of fire color such as white, grey, black smoke etc, the color is not important to detect fire.



Fig 1: Different Types of Fire

AVIOTEC detect smoke obscuration levels as low as 30%, whereas most video based solutions require levels of 50-65%. Since AVIOTEC is dependent upon the movement of smoke, the emerging fire must be within the camera's field of vision. AVIOTEC IP starlight 8000 is the innovative solution for the following:

- Industry
- Transportation
- Energy & Utilities
- Warehouses

In warehouses, Aviotec can help to prevent theft and arson.

II. PROPOSED SYSTEM

In order to detect smoke quickly and efficiently, Aviotec technique use a physical smoke model to recognize smoke rising directly from the source. This model is based upon the shape assumed by smoke as it rises and dilutes as well as its characteristic movement pattern, among other information. The algorithms are able to make a reliable distinction between smoke and moving objects.

Another major advantage of Aviotec is that the algorithms used to detect smoke and flames are fully integrated into the camera, eliminating the need for any further analysis equipment. Once it has been installed, Aviotec IP starlight 8000 can also be used for automated surveillance tasks. The solution identifies unusual movements as well as emergency exits and thus improves a site's security, safety and cost-effectiveness.

Aviotec can be scaled up from an individual detector to a networked system with a central management system. The solution can transmit alarms to a central fire detection panel or system, a monitoring centre or even to a mobile device by means of Ethernet. The ability to view video images in HD quality in real time on the way to a fire can help emergency services personnel to obtain a good understanding of the situation even before they reach the site.

At present, technical personnel must still verify alarms from Aviotec before an external alarm is transmitted to emergency services. This is standard practice for the industry, prevent false decalin alarms in complex environments. The live camera image provides a very straightforward method to carry out verification. Direct external alarms

from video-based fire detection can only be realised on the basis of corresponding standards.

AVIOTEC IP starlight 8000 sets new standards in visual fire detection by combining reliable smoke and flame detection with outstanding speed. The system setup is shown in fig2. A 10/100 Base-T Fast Ethernet port on the back part of the device is used to connect the camera to Ethernet. This allows easy configuration and monitoring through network devices such as Client PCs or mobile devices. A video recording management system may be integrated optionally. Furthermore, the relay output is provided and it is transmit to alarm signals.

In the fig2 the number 1) indicate the video recording management(VRM), 2) indicate client PC, 3) indicate mobile device and 4) indicate FPA-5000 Fire Alarm Panel. In additionally, uninterruptible power supplies (UPS) can be used to ensure continuous operation, even during a power failure.

The proposed system offers the following functions:

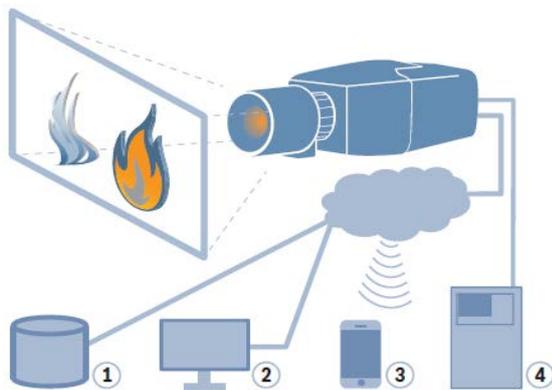


Fig 2: System Setup

Fast and reliable smoke and flame detection:

A unique Bosch algorithm is based on physical characteristics of fires. It detects smoke and flames within an incredibly short time span by analyzing video sequences. The video-based fire detection works under amazing low-light performance and detects test fires open wood fire to liquid decalin fire. In case of flame or smoke detection the video broadcast has the advantage to verify the alarm, speed up the rescue chain and give insights to rescue teams.

Monitoring large areas

Insensitive to the dust and humidity, and it is possible to monitor the large indoor areas that push conventional systems to their limits.

Large application range

The video-based fire detection is suitable for a range of challenging applications in harsh environments such as oil rigs or areas with a high fire hazard like paper mills. Highly versatile in application, AVIOTEC IP starlight

8000 offers the possibility to complement existing systems or to tap into new application fields.

Individually adjustable and adaptable

Verification time, sensitivity, detection size and selective masking for smoke and flame are individually configurable to adjust them to the customer needs. Flame and smoke detection can be activated or deactivated separately.

Root cause analysis:

Connecting the camera to a video management system offers the possibility to find out the cause of fires. Based on video recordings, incidents can carefully be established and evaluated. This helps eliminating and preventing hazardous situations in the future.

Easy installation

Power for the camera can be supplied via a Power over Ethernet compliant network cable connection. With this configuration, only a single cable connection is required to view, power, and control the camera. Using PoE makes installation easier and more cost effective, as cameras do not require a local power source.

III. CONCLUSION

The proposed system used the AVIOTEC in which Video-based fire detection and Intelligent Video Analytics combines and operate independently from each other. It detects reliable smoke and flames with a high speed so that it also reduce the false alarm.

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