Sensor-Driven Video Analytics
Next Generation Surveillance System

Concept

We are investigating a new approach to the development of sensor-driven surveillance systems which will monitor security conditions, identify events of interest, and coordinate emergency response operations. The integration of multi-source sensor data will improve the accuracy, speed, and efficiency of traditional video analysis techniques and create a more efficient environment for decision making using fused and correlated, relevant streaming and processed data.

Our basic approach is to harness the efficiency and confirmation of uncertain data by combining analysis from several low cost, low power sensor systems in conjunction with high-end imaging systems. Our system will support the following tasks:

- **Planning:** Our sensor-based detection algorithms, resource allocation strategies, and integrated visual analytic solutions will enable effective surveillance and response planning.
- **Monitoring and Detection:** We will accurately identify and classify objects and events of interest. The results of the analysis will be integrated, synthesized, and presented in understandable, timely displays that will allow easy exploration of the supporting evidence to enable appropriate decision-making from the video and sensor data. The strategic use of low cost sensors will yield an affordable and easy to maintain system.
- **Management:** One of the basic management components for crisis response is providing accurate situational awareness and producing a common operational picture (COP). During a critical incident, a substantial amount of data is generated from many disparate sources. We will develop system tools that are adaptable and scalable while integrating all relevant information to provide accurate, relevant, credible, real-time temporal and geospatial awareness.
- **Response and Recovery:** Unfortunately, most current surveillance systems only extend to the common operation picture/situational awareness capability. For effective response and recovery, resource awareness and resource management capabilities must be included.

**Benefits:** Integrated sensor and video analytics environments have the potential to increase the reliability and confidence of data used during planning, monitoring, detection, management, and response to critical incidents.

Integrating and correlating multi-source sensor, video, and resource data and presenting it in an understandable and actionable manner will improve the level of situational awareness and enable more effective decision making.

**Collaborators:**
- Indiana Department of Homeland Security
- Purdue Homeland Security Institute
- Next Wave Systems

**Funded by:**
- US Department of Homeland Security
- Army CERDEC

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