# Image Sensor Network

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Traffic control centers use several methods to monitor traffic conditions. Currently, the most popular methods involve the use of cameras (image sensors) at high-density traffic locations. The cameras are controlled at the traffic control centers. The traffic control center determines which images to view based on whether an accident has been reported, in some cases images from various cameras are cycled through or directly selected by an operator to view. Our system distributes the control to the image sensor. Each image sensor sets its own priority based on the contents of the image and uses mobile agents to decide if an image is sent to the traffic control center. This shift in the control of the images from the traffic control center to the image sensor is a more efficient method than centralizing control. The goal of this work is to reduce the transmission load of image sensor networks by distributing processing tasks and providing select images in an efficient and timely manner.

Process distribution involves using the image sensor network to perform object recognition and image compression on the images at the image sensor before the image reaches the control center.

Figure shows the system overview. Providing select images to the user is achieved by using mobile agents. The control center dispatches mobile agents which search for images according to a user established priority criteria. At an image sensor, the mobile agent checks when the image is updated and the level of priority of the image. The mobile agent decides if an image is sent back to the dispatcher based on the priority criteria.

Each sensor has a processor, which acquires images and performs the 3D contour based image compression. The 3D image compression divides the image into three components: contour, color, and distance information and compresses them individually. Each component can be used together or separately to aid in object recognition without decompression of the image. Object recognition is performed on the compressed images to determine traffic flow and to detect incidents. The image sensor assigns a priority level to each image based on its contents (i.e. traffic congestion has medium priority, accidents have high priority, etc…).

Using the image sensor and mobile agents to complete processing tasks and to retrieve select images reduces the network's transmission load. For example, a police station dispatches a mobile agent to the cameras. The police station requests images with the criteria for high priority level accidents. The mobile agent will only retrieve those images with accidents. Transmission of traffic accident images versus all available images improves the network efficiency. The research develops a demonstration where mobile agents are sent with a given criteria to several camera locations where the desired image is retrieved.

Reduction of the transmission load will enable more users to obtain information in a timely manner without loss of performance. Distributed processing helps to minimize the transmission load by using the image sensors to complete normal processing tasks as opposed to processing at the control center. Mobile agents are equipped with the appropriate criteria to sift through the traffic information and to provide up to date traffic images and information to the user. The agents complement the image sensor network by providing select images based on criteria set by the user.

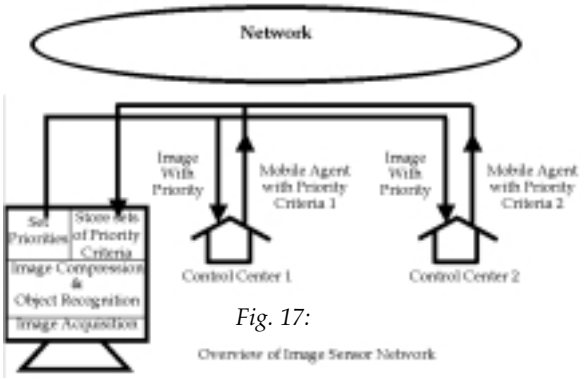


*Fig. 17:*
Overview of Image Sensor Network