



Night Vision System, Device and Method for Enhanced Signal-to-Noise Ratio

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a device and method for a night vision system that filters a series of image frames to improve the signal-to-noise ratio of each image frame.

Overview

Night vision systems utilize cameras that are sensitive to wavelengths such as infrared (IR) to produce image frames. The IR image frames may be displayed alone in sequence to provide a moving picture of a night-time scene as captured by the camera, or in combination with image frames acquired at optical wavelengths to enhance the optical picture.

Night vision systems generally employ image intensifiers to increase brightness and provide modest improvements in detected signal-to-noise ratio. However, image intensifiers cannot improve on the signal-to-noise provided by the light emanating from a low-light-level scene and characteristically contribute to images with high noise content. These night vision systems also are characterized by poor depictions of moving subjects or changing scenes, which causes difficulty in filtering noise from the image frames without losing significant information. A lightweight, optionally non-intensified night vision system with an improved signal-to-noise ratio without loss of information is needed to enhance the visualization of static and moving objects in low light.

The Invention

UW-Madison researchers have developed a method for displaying images using motion adaptive frame integration with real time digital processing and display. The method for filtering a series of image frames of a moving subject improves the signal-to-noise ratio of each image frame. The method combined with an optical apparatus configured to receive light from the scene comprises a lightweight, non-intensified imaging system for night vision.

A filtered image is formed by combining pixel values in a current image frame with weighted pixel values in previous and subsequent processed frames. Motion of the imaging system is compensated for so that the corresponding pixels in each image frame are registered to the same pixel locations before filtering. In effect, this registers the series of image frames with each other, providing an enhanced signal-to-noise ratio.

Applications

- Generation of lightweight night vision “moonglasses” that may resemble sunglasses
- Use in military, law enforcement, commercial consumer cameras or night-time sports
- Potential applications in video and medical imaging systems in which bulk motion within the field of vision is a concern

Key Benefits

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- Improves signal-to-noise ratio in image frames of moving objects or changing scenes without requiring an image intensifier
- Allows lightweight night vision imaging system

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Additional Information

For More Information About the Inventors

- [Charles Mistretta](#)

Related Intellectual Property

- [View Continuation Patent in PDF format.](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Sensors](#)
- [Information Technology : Image processing](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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