

Lehigh University Center for Optical Technologies

Color Image Fusion for Concealed Weapon Detection

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Introduction

Image fusion:

- A process of combining images from different sources to obtain a single composite image with extended or enhanced information content

Concealed weapon detection:

- An increasingly important topic in the general area of law enforcement
- Image fusion has been identified as a key technology to achieve improved CWD procedures
- Most of the image fusion work has been limited to monochrome images

The objectives:

- Develop a new technique to fuse a color visual image with corresponding IR image for a CWD application.
- The fused image should have both
 - high resolution & natural color of visual image
 - weapon detected by IR sensor

Color Image Fusion Algorithm

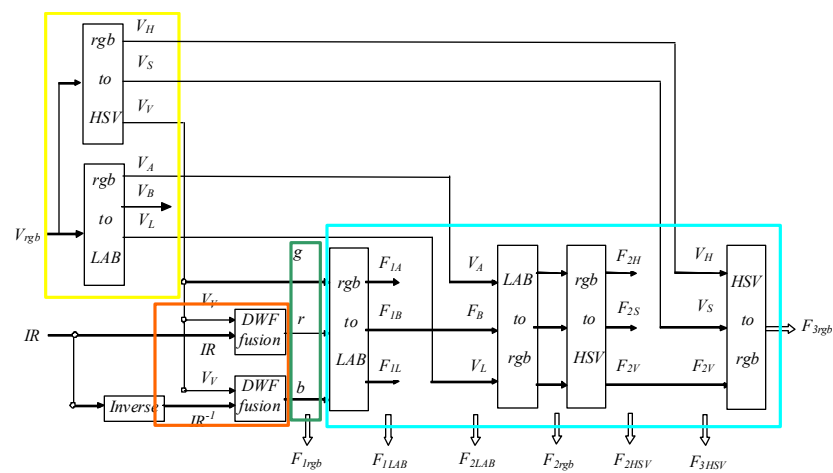


Figure 2. Example - 1

Four components:

- Color space transformation
HSV color space, LAB color space
- Discrete wavelet frame based image fusion
- Color assignment
in RGB color space
- Color adjustments
in HSV color space, in LAB color space

Experimental Results

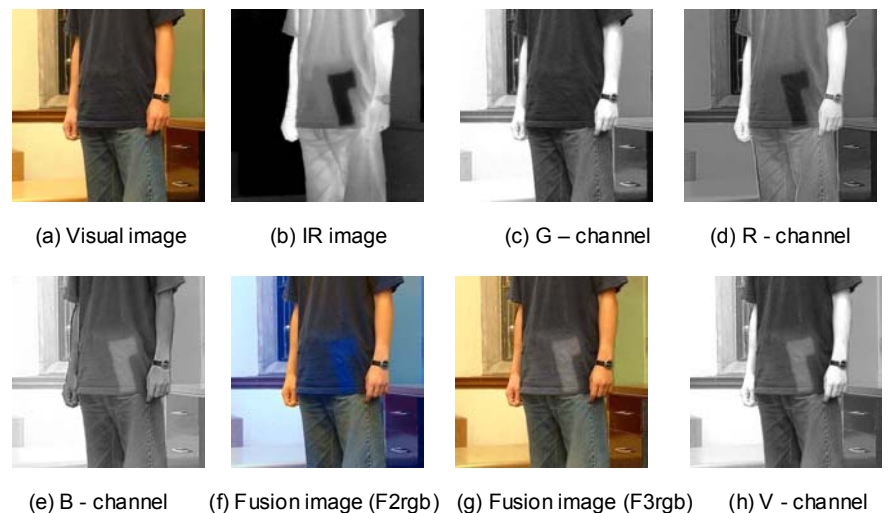


Figure 2. Example - 1

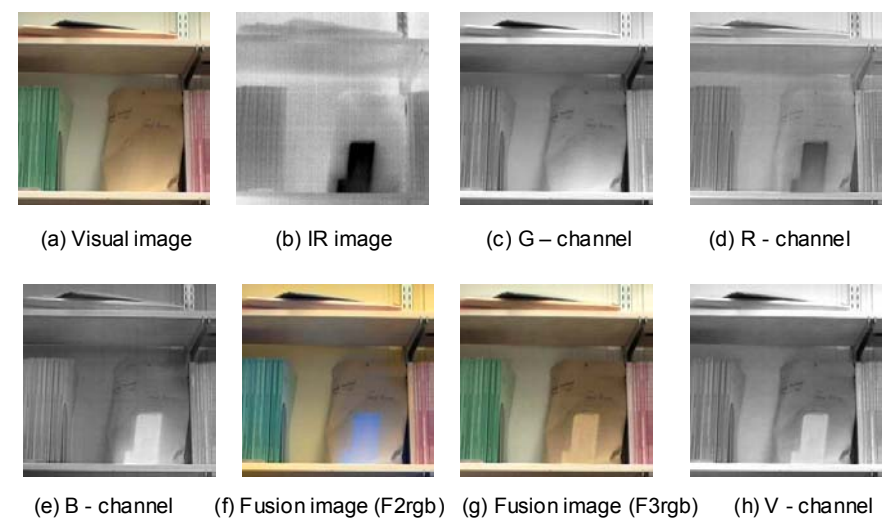


Figure 3. Example - 2

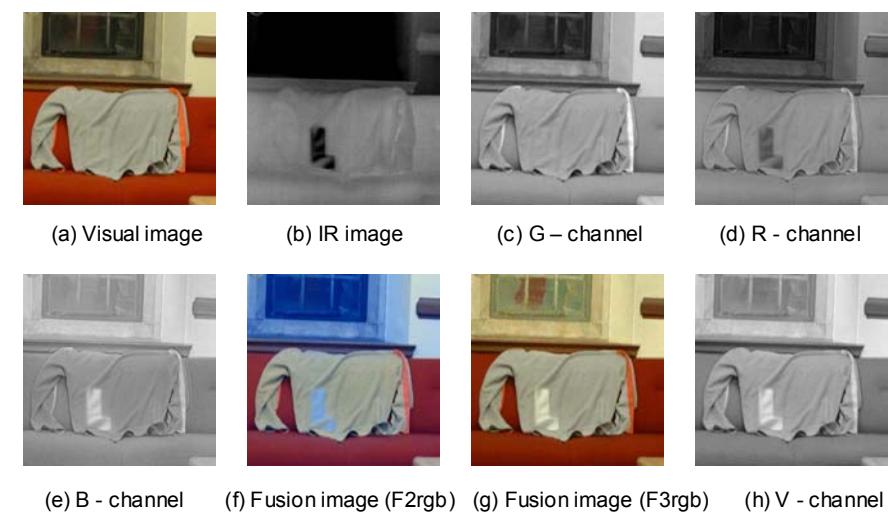


Figure 4. Example - 3