



Video Enhancement for Intelligent Surveillance in Poor Lighting Conditions

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Abstract :

This work deals with the research work involved in the design of efficient system for intelligent video surveillance applications. A system of video/image fusion and enhancement for visibility improvement is proposed in this work for intelligent surveillance at night or under bad weather conditions. Two videos are acquired, one by a color CCD camera, and the other by a infrared camera (IR). Before performing multispectral fusion, image registration and image preprocessing (denoising, Normalization and enhancement) are required. The IR image and the visible image are then fused. First, a pixel-level multi-resolution based image fusion method is applied to source images. Techniques which will be used in multispectral fusion are Discrete Wavelet Transform(DWT) then the Dual-Tree Complex Wavelet Transform (DT-CWT). After image fusion, a color restoration is performed on fused images with the chromatic information of visible images. We will propose a Modified Look-Up Table (LUT) technique to color the night video. The entire image processing and analysis system will be developed in Matlab/Simulink environment. Preliminary results of fusion obtained in some experiments are presented.

Key-words: Video enhancement, Video fusion, Video surveillance, Color night vision, Look-Up Table, Discrete Wavelet Transform(DWT).

I. PURPOSE

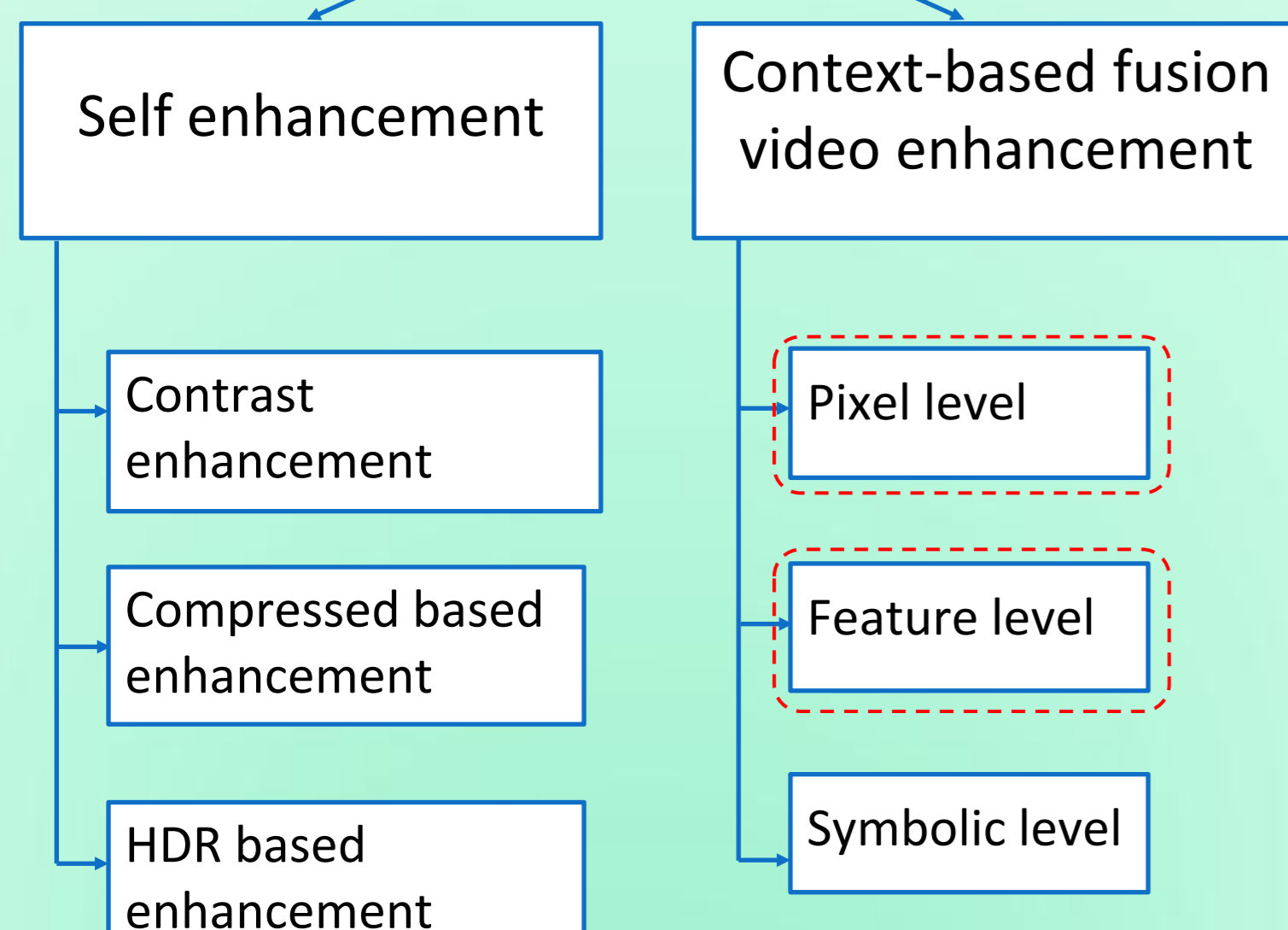
Develop an intelligent video surveillance system which:

- Is efficient in term of fusion performance
- Enhances video at night
- Colors the video resulting of fusion
- Can be implemented in real time

II. INTRODUCTION & CONTEXT

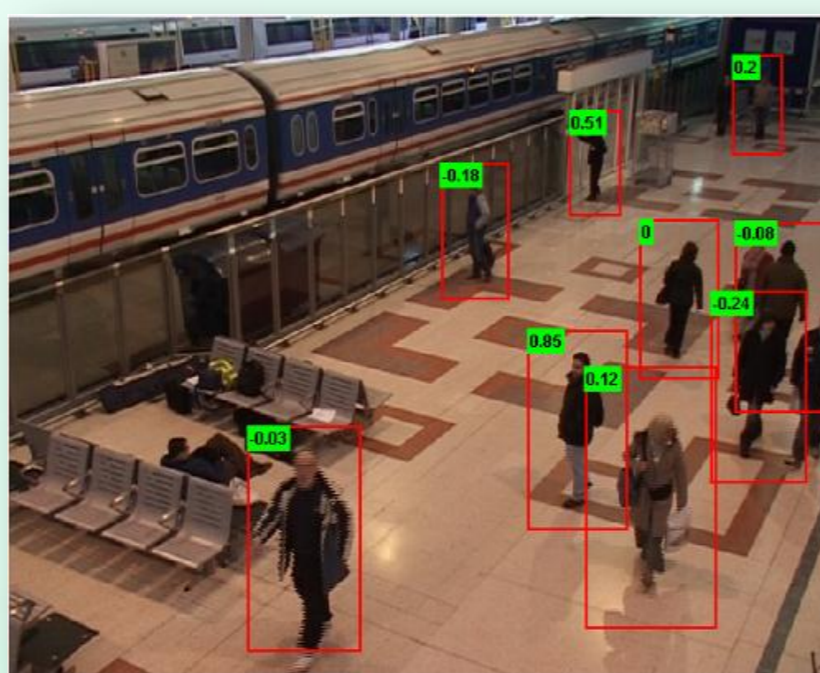


Video enhancement



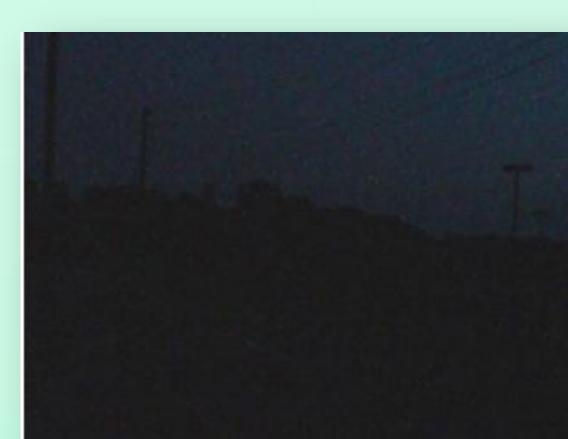
III. PROBLEMATIC

Color day video



Intelligent video surveillance is ideal under good lighting conditions

Color night video



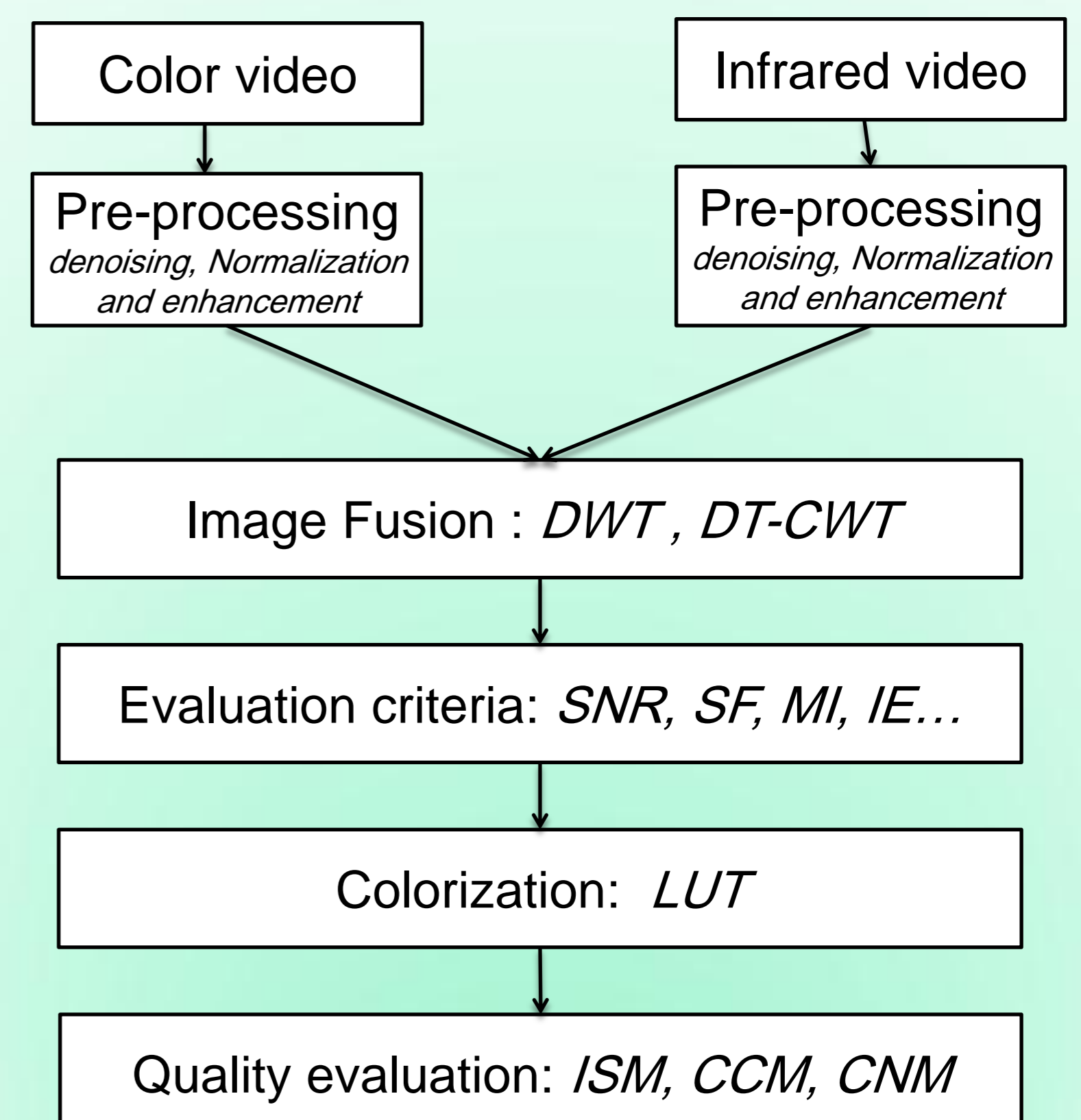
At night, vision becomes very difficult, it is impossible to detect objects in a color video

Infrared night video



In an infrared video, people and objects are visible. But, there is no color

IV. OUTLINE



V. FIRST RESULTS

Color



Infrared



+

Fusion with DWT

