EE368 Project Proposal

Concealed Weapons Detection

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1. Introduction:

The goal of our project is to detect weapons' positions that concealed underneath people's clothes and at the same time to have better visual performance on the infused color images.

2. Project description

According to statistics, 13,286 people were killed and 26,819 people were injured in the US in 2015. In order to effectively prevent the occurrence of firearms incidents, hidden weapon detection technology (Concealed Weapon Detection, CWD) has become an important research topic. Researchers have been using image fusion technique to combine the weapon information(from infrared imaging) and scene information(from visible light imaging). Here we aim at improving the fusion of IR image and RGB image in order to pinpoint the position of the weapons. We also aim at firearm shape recognition in order to have better knowledge of the concealed weapon.

3. Implements

This project will use Matlab and may use Caffe framework to train models for weapons's classification. Three main parts are as follows:

1. Two types of images are needed as input for the detection system. Since human visual system are sensitive to colors, only RGB images are not sufficient for finding the concealed weapons.Thus, we need extra IR images to do the analysis.

2. Algorithms concerning imaging processing will be used for identifying the positions of the hidden weapons. In order to protect personal privacy, we will try to avoid using other parts of the human body in the images infusion procedure and only use weapons' information.

3. Training a CNN classification model aimed to get better knowledge of the concealed weapons.

4. References:

1. Bandyopadhyay, Prof, et al. "Identifications of concealed weapon in a Human Body." arXiv preprint arXiv:1210.5653 (2012).
2. Chen, Hua-Mei, et al. "Imaging for concealed weapon detection: a tutorial overview of development in imaging sensors and processing." IEEE signal processing Magazine 22.2 (2005): 52-61.
3. Simonyan, Karen, and Andrew Zisserman. "Very deep convolutional networks for large-scale image recognition." arXiv preprint arXiv:1409.1556 (2014).