# Introduction

- In the present scenario, bomb blasts are rampant all around the world. Bombs went of in buses and underground stations, killed many and left many injured. Bomb blasts can not be predicted beforehand. This report is all about the technology which predicts the suicide bombers and explosion of weapons through “CONCEALED WEAPON DETECTION USING DIGITAL IMAGE PROCESSING”

# Introduction

- The detection of weapons concealed underneath a person's clothing is very much important to the improvement of the security of the general public as well as the safety of public assets like airports, buildings, and railway stations etc.
- It is desirable sometimes to be able to detect concealed weapons from a standoff distance

# Proposed methods

- In our proposed technique for CWD we consider two types of image – a visual image and an IR image. Visual image is nothing but an RGB image which has three main colour components Red, Green and Blue.
- we consider IR image as second input. It basically depends on high thermal emissivity of the body. Basically the infrared radiation emitted by the body is absorbed by clothing and then re-emitted by it, is sensed by the infrared sensors.

# RGB image (visual image) & IR image

# Resize two input images:

- Since these two input images are taken from two different image sensing devices so they are of different size. So we first resize these two types of images because the image fusion and other operations are not possible if the sizes are not same.

# Combine two images



- Perform the addition operation between visual and IR (visual + IR) images to get the Iv_IR image. But the resultant image does not give enough information.Then we complement the IR image (IIR_c) to remove the background darkness.
- Then add visual image and complemented IR image (visual + complemented IR) and get a resultant image which is denoted by Iv_IR_c.

# Conversion of IR to HSV

- we convert IR image into HSV colour model (IIR_HSV) because components of IR image are all correlated with the amount of light hitting the object, and therefore with each other, image descriptions in terms of those components make object discrimination difficult. Descriptions in terms of hue/lightness/saturation are often more relevant.

# Fused two images

- After converting HSV model the image is now three components. Now we can use fusion technique because two images have the same dimension with same size and we use DWT fusion technique between HSV colour image (IIR_HSV) and combined image Iv_IR_c

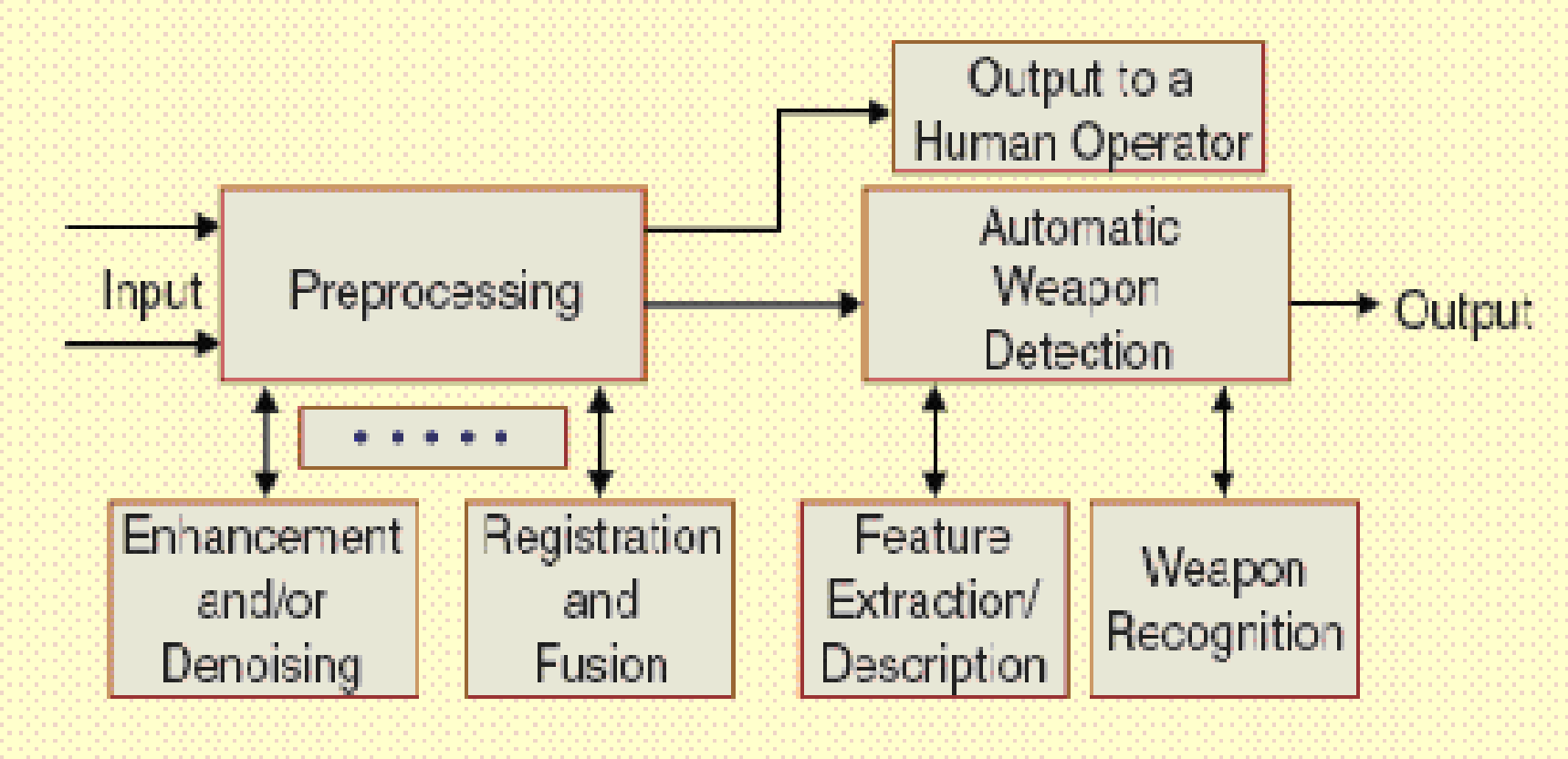
# ALGORITHM:

- Step 1: Take a visual image (basically, RGB image) and an infrared (IR) image as input.
- Step 2: Resize this two image so that they have same size.
- Step 3: Combine i.e. add resized Visual and IR image.
- Step 4: Complement the IR image.
- Step5: Combine i.e. add resized Visual image and complemented IR image.
- Step 6: Convert the visual RGB image to its HSV format.
- Step 7: Perform DWT fusion on Step 5's combined image and Step 6's converted HSV image.
- Step 8: Convert the fused image into its gray scale format.
- Step 9: Binarize the Fused image.
- Step 10: Detect the weapon from that image.
- Step 11: Combine this detected weapon with visual image.
- Step 12: For detecting the weapon clearly we find out the contour of the weapon.
- Step 13: Then combine the contour of the weapon with visual image.
- Step 14: End

# IMAGING SENSORS

- **INFRARED IMAGER :** Infrared imagers utilize the temperature distribution information of the target to form an image. infrared radiation can be used to show the image of a concealed weapon only when the clothing is tight, thin, and stationary.
- **P M W IMAGING SENSORS :** Passive millimeter wave (MMW) sensors measure the apparent temperature through the energy that is emitted or reflected by sources. . Clothing penetration for concealed weapon detection is made possible by MMW sensors due to the low emissive and high reflectivity of objects like metallic guns

# An imaging processing architecture overview for CWD



# CHALLENGES

- There are several challenges ahead. One critical issue is the challenge of performing detection at a distance with high probability of detection and low probability of false alarm. Yet another difficulty to be surmounted is forging portable multi-sensor instruments. Also, detection systems go hand in hand with subsequent response by the operator, and system development should take into account the overall context of deployment.

# CONCLUSION

- In this report I introduce a color image fusion technique for CWD where we fuse a visual RGB image and IR image. We can able to detect the weapon concealed under person's clothes and bags. But infrared radiation can be used to show the image of a concealed weapon only when the clothing is tight, thin, and stationary. For normally loose clothing, the emitted infrared radiation will be spread over a larger clothing area, thus decreasing the ability to image a weapon. To solve this problem some more research should be done on CWD.