International Conference on Latest Innovation in Engineering Science and Management
Buddha Institute of Technology, GIDA, Gorakhpur (UP)
30th - 31st March 2019 www.conferenceworld.in ISBN : 978-93-87793-80-4

Optical Sensor Based Techniques Using Concealed Weapon Detection

Huma Khan[1],O.P Singh[2]

Departments of Electronics and Communication Engineering

Amity School of Engineering and Technology, Amity University Uttar Pradesh, Lucknow Campus

ABSTRACT

Today concealed weapon Detection is based on a large variety of technologies. They are divided into two categories namely traces or bulk explosives. They are indirectly detected image characteristics shape, wires and detonators and chemical composition or directly properties of the explosive materials detected through bulk explosives. The trace detection consists of electronic chemical, optical and biosensors.

The trace detection depends on vapour emitted through explosive or on particles that deposited on surface. The trace detection in optical consists of transmission & reflection spectroscopy, LIDAR and nonlinear optics. A challenging and Combination task for various techniques are available in optical fiber. The other techniques such as detect a weapon using millimeter wave holographic imaging techniques are introduced. These techniques define that forming focused image of target through coherent wave data gathered are being extinguished a 2-D aperture. The requirement of concealed weapon detection is critical to military as federal, state and local law enforcement communities in different operations and environment include metallic or non-metallic detection weapon.

Keywords:*CWD, Explosives, biosensors holographic, Aperture.*

1.INTRODUCTION

Now days a various technique used to detect to identify weapons on individuals. The definition of CWD is a method required to find out doubtful items and the convert to remote frisking and potential concealed weapon on individuals. The concealed weapon mainly handgun and edged weapons are a major denouncement to law enforcement and military. The trace detection in optical consists of transmission & reflection spectroscopy, LIDAR and nonlinear optics. The necessity for CWD capability is critical to federal, military & law enforcement communities under their operations [1]. The trace detection is at deadlock distance for an exclusive challenging task. There is lot of scenarios such as air volume containing the explosive is large at least the large room size. In many explosive particles have sublimate probability of attaching an electron becoming charged which are strongly electronegative. They will determine the original concentration and explosive particles mostly in air current, charging explosive particles & absorption through closely to surface. The sampling

technique for explosive trace detection is concentrators [2]. For example, this principle works on dog's nose. The dog respires and concentrates particle and molecules over a large regions upto $10m^2$. The researchers find a wayto create biological, chemical, electronic and optical "noses" that will equal dog nose. To uniquely identify explosive particles requiring their UV electronic and infrared vibrational resonances through optical absorption. The techniques utilize gather a sample and examine over a time period increasing a SNR to desired level [3]. The drawback of this techniques is large particle have to be gained andanalyzed with relatively costly and critical apparatus. The other interesting technique with deadlock potential is optical fluorescence from granular materials. The amount of trace explosive detection can be irradiated laser in the ultraviolet and they absorb and dissolve into fragments that pass off laser induced fluorescence [4]. The outcome of fluorescence pattern can be picture from deadlock distance. The other drawbacks of these techniques are shortage of sensitivity is high and the issue of suppression with contaminant environments [5].

Light detection and ranging, Differential absorption lidar and reflectance lidar all of them includes these techniques. The operation of lidar is that radiation from a pulsed illuminating source is backscattered through a detector. The backscattered beam attenuates to absorption and it permitting detection of explosive [6]. The range of standoff distance is 10 to 30m.The characters tics of explosive particle result it is very low molecular concentration and sensitivity limit for these lasers ranging techniques. The non-linear optics used to increase SNR ratio and these techniques sensing an imaging mode and they locate the direction and distance to target but can't image. The other two techniques utilize the dial &dirl mode which is form of dual spectral imaging. It involves two laser wavelengths for light can use equivalent technique of light with a broadband source and perceiving with two narrow band filters[7].

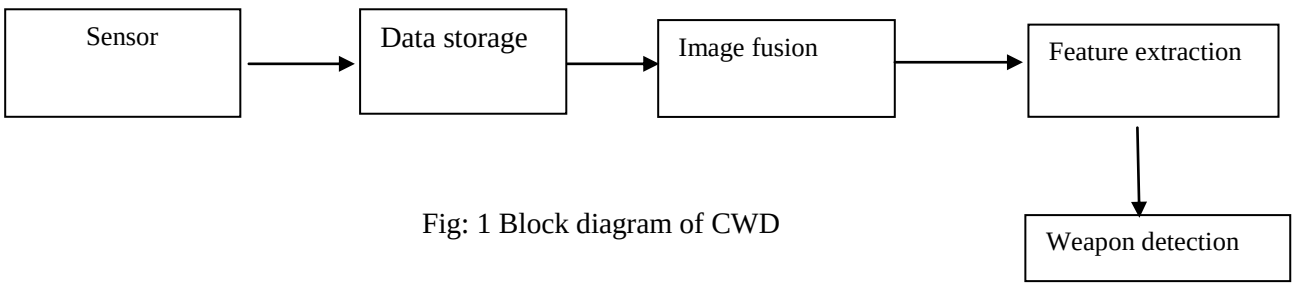

Fig: 1 Block diagram of CWD

2. Review of Literature

The reviews of this paper recently established in many areas of CWD utilizing in electro-magnetic methods it comprises metal detection, X-rays, millimeter waves, infrared, magnetic field distortion etc. R.W. Mc Millan & NC Curie research study (1998) IR and MM wave technologies remotely to detect concealed weapon through clothing in cases through walls. After that R.W. Mc Mitlan& O. Milto research (2000) purposed larger wavelength at radiation about 20 microns will push in clothing in order to detection of concealed weapon preferable shorter wavelength. Seungsin Lee & R. Rao (2002) established passive MM gives the benefit of CWD its ability through fog, clothing, smoke etc.P.J. Costianes research study (2005) there is urgently need of

law enforcement & homeland security to recognize concealed weapons.In (2010) Timofey Savelyev &XiaodongZhuge are two scientists which discovered of UWB microwave array radar for CWD. Tuzhi Xu and Q. M. Jonathan Wu research study (2015) it gives accomplished CWD algorithm which is based on image fusion. The picture acquired utilizes different sensors disorganized into low and high frequency band with double dual tree complex wavelet transform. Now latest research (2018) KudzaisheMhou and Dustin van der Haar are two scientist discovered review of threat profiling techniques for use in CWD systems.

3.Result and Discussion:

Fig: 2 RGB Image Figs: 3 Hand Gun

In our target to detect the weapon from human body so firstly we consider a visual human image. Visual image is an RGB image. RGB image components are red, blue and green.Since these two images are contracted from two different pictures sensing devices and resize the picture from image fusion. Perform addition operation in human image and remove the darkness and get a resultant [8].

4.Conclusion

Concealed weapon detection is used to recognize & capacity to detect the weapon. The sensor of concealed weapon detection system has the efficiency to remove the weapons from objects and items. The definition of CWD is a method required to find out doubtful items and the convert to remote frisking and potential concealed weapon on individuals. Metal detectors are some limitation they cannot identify plastic weapons and x-ray picture is also limited in utilize because of radiological health considered. Concealed weapon detection system is absolutely integrated into present security system save time and space.

References

[1] Burschini, C. Commercial Systems for the Direct Detection of Explosives (for Explosive Ordnance Disposal Tasks), ExploStudy, Final Report, 2001. http://diwww.epfl.ch/lami/detec/ExploStudyv1.0.pdf.

[2] Shen, Y.R. The Principles of Nonlinear Optics; John Wiley & Sons: 1991, pp 267-272.

[3] Varshney, P. K., Slamani, M.A., Alford, M. G., and Ferris, D., "On the Modeling of the Sensor Fusion Process for Concealed Weapons," Proceedings of the Information Technology Conference, 1–3 Sept. 1998, p. 14.

[4] "Demonstration of a Concealed Weapons Detection System Using Electromagnetic Resonances (Final Report)," Tech. Sept 21.

[5] Griffy T.A A Model of explosive vapour concentration II, In Advances in Analysis and detection of Explosives, Proceeding of the 4th international symbolism on analysis detection of Explosives, Sept 7-10 ,1992, Jeusalem Isreal, pp 503-511

[6] Heflinger, D; Arusi –Parpar T; Ron, Y; Lavi R. Opt Commun. 2002; 204,327 Cabalo J; Sausa, R Applied Spectrometery 2003, 57 1196.

[7] N.G. Paulter, "Guide to the techniques of concealed weapon imaging & detection, "NIJ Guide 602-00.

[8] R.C Gonzalez R.E Woods, Digital Image Processing", Second edition, Prentice Hall, New Jersey 2002.