

Gunshot Detection System



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Chapter 1

1. ABSTRACT

This paper presents a new approach to determine the direction of arrival of gunshots, which will highlight the novel state of the art algorithm, is proposed. Array of microphones is used to compute the path of gunshot and exhibit it in a clockwise manner. Each microphone acts as a sensor node to compute angle of arrival and time of arrival information. The proposed algorithm use the angle of arrival information gathered from multiple sources to determine the direction of shooter. Experimental result shows that to improve accuracy, time of arrival information comes in handy. We can achieve greater precision and accuracy by merging both techniques .i.e. angle of arrival and time of arrival.

***Keywords*—Gunshot detection, microphones array, angle of arrival, time of arrival, signal processing**

Chapter 2

2. INTRODUCTON / PURPOSE

In recent years, war fighters and security personnel are under increasing risk from sniper fire and drive-by shootings [1]. This paper proposed an acoustic-based security system that can detect and locate the direction of sniper or gunshot activity. In contrast to optical systems, that detects either the physical phenomenon of the muzzle flash of a bullet being fired or the heat caused by the friction of the bullet as it moves through the air. Such systems require that they have a clear line of sight to the weapon being fired otherwise the flash will not be seen. Due to their limitation to sense at minute distances and to sense in a line-of-sight manner, acoustic-only technique is preferred [2].

Primarily, there are three main components of this system:

- An array of microphones or sensors either co-located or geographically dispersed
- A signal processing unit
- A user-interface that displays gunfire alerts.

Most broadly, this paper presents an accurate gunshot detection method by using array of microphones to perform signal processing based on characteristics of a signal to extract angle of arrival (AOA) and time of arrival (TOA) information. Subsequently, information is displayed in a clockwise manner on LCD display.