

Cooperative Multiagents Detection and Beamforming with Spherical Array Sensors

Belkacem Benadda and Fethi Tarik Bendimerad

Dept. of Electrical and Electronic Engineering,
University of Abou Bekr Belkaid,
BP 230 Pole Chetouane 13000
Tlemcen Algeria
{benadda.belkacem, ftbendimerad}@gmail.com

Abstract. In this paper multi-agents systems are presented as a new design paradigm that allows an efficient use of multiprocessor architectures and distributed systems architectures currently widely available and preferred. Moreover, in our case, multiagent systems will bring the concepts of artificial intelligence, collaboration principles, autonomy, proactive behavior and communications possibility. Adopting a multiagent approach on spherical array sensors for both sources detection and spatial filtering will provide several issues: simultaneous several signals acquisition, effective spatial filtering, optimal performance under the imposed environment circumstances and prompt reaction and treatment.

Keywords: Array Sensors, Acquisition, Beam-forming, Space filtering, source detection, multiagent systems.

1 Introduction

The world is observed through sensors. Their objective consists on the transformation of specified physical entity into electrical signal. The measurement of physical entity is often masked by the perception of other undesirable phenomena, called noise [1-6]. The signals spectral characteristics can be used for discrimination and selection between useful signal and undesired signals [1-6] (see Fig.1). This technique can be used, only if the useful signal and the noises have distinct frequential bands. This situation is not satisfied in all cases. Often useful signal and noises have encroached frequential bands and the frequential filter cannot be effective (see Fig.2) [1-6].

On the other hand, if in an environment, signals share the same frequency band they have certainly, for a given observer, different arrival directions [6-12]. Indeed, it is practically impossible that two information sources operate in the same frequency band and have the same geometrical coordinates. The purpose of this work is to create a complete multiagents system able to detect environmental sources and listen to them simultaneously. In our case, multiagent systems are presented as new paradigm used to design intelligent independent systems. To accomplish this specific task, several agents with different goals, must cooperate on the system. In this paper we are using