IDEA GROUP PUBLISHING **ITB11842**

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

This chapter appears in the book, *Artificial Neural Networks in Real-Life Applications* edited by Juan R. Rabunal and Julian Dorado © 2006, Idea Group Inc.

Chapter XIII

Connectionist Systems for Fishing Prediction

Alfonso Iglesias, University of A Coruña, Spain

Bernardino Arcay, University of A Coruña, Spain

José Manuel Cotos, University of Santiago de Compostela, Spain

Abstract

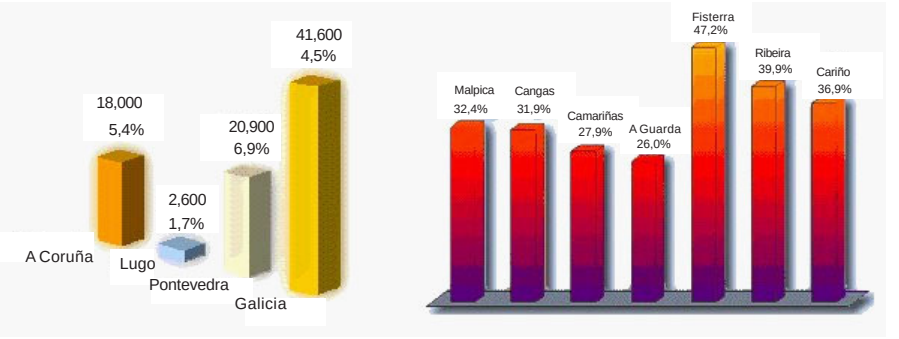
This chapter explains the foundations of a new support system for fisheries, based on connectionist techniques, digital image treatment, and fuzzy logic. The purpose of our system is to increase the output of the pelagic fisheries without endangering the natural balance of the fishing resources. It uses data from various remote sensors and the logbook of a collaborating fishing boat to improve the catches of the Prionace Glauca, a pelagic shark species also known as the blue shark.

Introduction

The Problem

Fishing, or the exploitation and optimisation of marine resources, is one of Galicia's main economical sectors and the basis of many industrial activities and services. According to the Fishing Council (Figure 1a), a total of 41,600 persons, or 4.5% of the autonomy's active population, are actively involved in the fishing sector.

Figure 1. The Galician population employed in the fishing sector. (a). The population in total numbers and in percentage of the active population for each province (Data provided by the Xunta de Galicia, 2002) (b). Relative importance of the fishing sector in various coastal areas (Data provided by the Xunta de Galicia, 2002.)



(a) *(b)*

Logically, this sector does not affect the whole Galician territory to the same extent: Places such as Fisterra, where 47.2% of the active population works for the fishing industry, are far above the Galician average (Figure 1b).

This percentage should include the jobs that are closely related to the fishing sector and increase the amount of generated jobs to a total of 120,000; This means that 12.2% of Galicia's employment is based either directly or indirectly on the fishing industry, which makes it the European region that most depends on this activity.

These data clearly show that the Galician fishing sector has grown from a local craft industry into the motor of the autonomy's economy. However, it is a sector that has recently been affected by ecological disasters, quota policies, biological stops, and the enlargement of the exclusive economical zones of riparian countries. Commercial agreements with other countries impose the import from foreign fish at very low prices. On the other hand, there is an increasing tendency in national and international organisms toward more protection and conservation of the natural resources and a sustainable development that preserves the oceans as an important provider of food for the entire world.

We believe that a fishing fleet can only stay competitive if it disposes of the most advanced technology and the largest amount of information possible. In this context, the new remote sensors are privileged tools when used as information sources of the biological conditions of the fishing environment. This work applies connectionist systems for the prediction and optimization of the available resources, based on the remotely gathered information. It is a method that enables the fisheries to reduce their