Computational System for the Monitoring Ecosystem of the Endangered White Fish (Chirostoma estor estor) in the Patzcuaro Lake, Mexico

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Abstract : White fish (Chirostoma estor estor) is an endemic species that habits in the Patzcuaro Lake, located in Michoacan, Mexico; being an important source of gastronomic and cultural wealth of the area. Actually, it have undergone an immense depopulation of individuals, due to the high fishing, contamination and eutrophication of the lake water, resulting in the possible extinction of this important species. This work proposes a new computational model for monitoring and assessment of critical environmental parameters of the white fish ecosystem. According to an Analytical Hierarchy Process, a mathematical model is built assigning weights to each environmental parameter depending on their water quality importance on the ecosystem. Then, a development of an advanced system for the monitoring, analysis and control of water quality is built using the virtual environment of LabVIEW. As results, we have obtained a global score that indicates the condition level of the water quality in the Chirostoma estor ecosystem (excellent, good, regular and poor), allowing to provide an effective decision making about the environmental parameters that affect the proper culture of the white fish such as temperature, pH and dissolved oxygen. In situ evaluations show regular conditions for a success reproduction and growth rates of this species where the water quality tends to have regular levels. This system emerges as a suitable tool for the water management, where future laws for white fish fishery regulations will result in the reduction of the mortality rate in the early stages of development of the species, which represent the most critical phase. This can guarantees better population sizes than those currently obtained in the aquiculture crop. The main benefit will be seen as a contribution to maintain the cultural and gastronomic wealth of the area and for its inhabitants, since white fish is an important food and economical income of the region, but the species is endangered.

Keywords : Chirostoma estor estor, computational system, lab view, white fish

Conference Title : ICMCS 2017 : International Conference on Multimedia Computing and Systems

Conference Location : San Francisco, United States

Conference Dates : June 07-08, 2017