Improvement of Productivity in Aquaculture

Organizations

Insuiña S.L. is a subsidiary of the Grupo Nueva Pescacnova corporation, specialised in the cultivation of turbot.

Delcom Technologies is an SME and Data Analysis solutions provider employing Big Data and AI technologies.

Geneaqua is an SME providing genetic analysis solutions.

CESGA is a public HPC centre providing services for R&D.
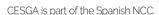
End Users

Technology Provider

HPC Provider

CESGA is part of the Spanish NCC.

The Challenge

In aquaculture, fish growth and mortality are affected by highly volatile environmental conditions such as tides, temperature, salt levels, water nutrients. This can result in losses to businesses of millions of Euros. Therefore, it is vitally important to analyse relevant data for fish growth and welfare, as quickly and accurately as possible, to avoid mortality and maximize fish growth.

Improving the ability of aquaculture farms to handle volatility, and so increase productivity, requires the centralised and rapid analysis of millions of productive, genetic, environmental and biological data.

Enabling use of HPC for these analyses would allow these companies to have customized data-driven decision tools, with near-immediate predictive results, to carry out improvement or preventive actions that translate into improved productivity.

The Solution

HPC and Artificial Intelligence applied to data analytics empower the understanding of what influences fish behaviour, wellness, and growth, and allow aquaculture managers and operators to make data-driven decisions to prevent fish losses to achieve business stability or growth. HPC has enhanced ACUATIA, a DEICOM fish farm software, to incorporate data gathering, visualization, an expert system for custom AI model creation, and an online cloud management system to store, manage, and update data.

The Impact

Precision aquaculture contributes in a very important way to a healthy human diet while improving animal welfare in the farms, reducing food waste and avoiding overexploitation of marine resources. The business impact for aquaculture is direct and significant: the faster growth of the fish, through optimized aquaculture management means that the appropriate sales-weight is reached 2 months early. This also has a positive environmental impact: the reduction of the sale age by 2 months leads to a proportional reduction in saltwater consumption, oxygen usage, and electricity consumption. Because of the new accurate and faster growth predictions, the commercial department has more reliable information about the fish that they can offer to their customers and stock breaks (highly undesirable), are prevented. Data analysis service providers can adopt the approach taken in this experiment to enhance their service offerings through improved predictive capabilities and faster development of customized predictive tools.

Benefits

- 30% reduction in predictive model error through HPC.
- Shortening time to production in new user facilities or new procedures by 50%.
- Increasing business know-how for data-driven decisions for aquaculture farmers.
- 7% improvement in fish growth and a related 6.5% cost savings for the end user.