



## Big-Data Analytics to Policing Fisheries and Aquaculture

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Big-Data can assist in arrangements of the current trends in aggregations of various information's for fisheries and aquaculture monitoring, control and surveillance. Big data enables an alternative to existing database, cloud gatherings and requests tools. After the gathering, development and/ or creation of data, it can be displayed through mobile devices in real time basis by cloud processing. Big-Data comprises a wide range of elements, which may include customer transaction records, production databases, web traffic logs, automation, satellites, sensors and IoT.

### Big-Data as an analytical tool:

One of the major problems with Big Data implementation is the lack of common language. For instance, there is no kind of "Big Data SQL" shared by various databases and comparisons between systems are far from simple. Big data can help in sorting the information especially in case of vessel traffic intensity. For example, new web-based technology platform e.g. Global Fishing Watch was launched by Oceana, SkyTruth, Google in 2015 combining data from AIS sources (terrestrial and satellite) with powerful algorithms to isolate suspect vessel behaviors. Additionally, Project Eyes on the Sea is developed to analyze and synthesize data and information of multiple layer to observe and identify suspicious vessels in the global waters. It was developed jointly by Pew and Satellite Applications Catapult. Other national initiatives are under way. Data analytics is the science of analyzing different data & information's, which may help reach to some conclusions. It can be concluded in new knowledge and consequent appropriate and effective decision making (Rouse, M. 2016).

### Big-Data and Fisheries:

Advancement of Technology and digitalization facilitates innovative monitoring equipment and tools for improvised and better management of fish stocks (Roy, A.K., 2019). Fishermen are looking for a new way to collect the same important information using technology at a low cost. The way system are designed each vessel is equipped with three or four digital cameras. Those cameras are connected to a hard drive that's recording digital video. Fishermen, when they leave the dock, the system turns on automatically. And at the same time, it's getting information from a GPS unit. Fishermen try really hard to reduce the amount of discards but the gear is not perfect, and so they end up with some discards. They sort those fish one at a time put them on a measuring strip and slide them over the side. The video reviewer then will look at the footage; they can see the fish that are being discarded. Identify what the species is. They then submit a written report to the federal regulators that says how many fish were discarded and what the weights were on a particular trip. And that's the same information that they get from an observer, they're just collecting it in a different manner.

Marine and inland fisheries resources are vital for coastal and riparian communities respectively. These large water bodies are potential resources for livelihood to millions of people. Advance processes with Big-data and analytics may help farmers to improve feed efficiency, higher growth and reduce mortality percentage. In aquaculture; advanced analytics keeps a potential



towards sharp incline in production in terms of Feed Conversion Rate (FCR), cost, diseases, mortality and environmental effects etc. Bringing such technologies along with cloud based platforms assisted by Machine Learning (ML) and data mining tools may support real time precision monitoring and decision process.

### **Artificial Intelligence empowers aquaculture decision-making:**

Many leading technological companies such as Steinvikare looking for incorporation AI and system learning into their existed technologies in order to enhance the tools & thus remain competitive in the market. “The Economist” reported nearly 32 per cent of wild-caught fish are comes under unsustainable fishing. Artificial Intelligence can reduce effectively the overexploited fish species through data and smart monitoring systems with remote fish identification tools. AI can enable a better accountability for harvested fish composition. Various agencies and institutions are working on AI incorporation in different techniques. For example:

**Aqua cloud:** Aqua cloud platform by the Seafood Innovation Cluster aims to assist managers, students, researchers and technologies through their wide storage of data and information analysis system. They implemented AI to monitor the sea lice infestation and its spread within the environment.

**The YIELD:** Many companies dealing with fisheries and aquaculture technologies are currently utilising the various tools and practicable applications of Artificial Intelligence. For example Australian agricultural company The YIELD is using Sensing + Aqua technology for development and to create data-driven predictive analysis for precision decision making.

**Shoal:** Shoal, A robotic fish uses AI, or swarm intelligence (SI), to sense and detects pollution within a water body. These robots are operated in groups, keeps an ability to navigate their environment and sense, avoid possible barriers through the course, including other robotic fish. These groups of robotic fishes are also able to recharge themselves at charging stations and thus finally make decisions independently of human touch.

### **Farming the ocean to feed the world: An inference**

Current practices and methods involves in fishing globally impacts our environment and climate in many different ways. Humans have been hunter-gatherers since prehistoric times harvesting food from land and sea. We’ve made this transition over the ages to agriculture to more reliably feed our growing population but at sea we haven’t made that change we are still fishing like we’re hunter gatherers only with new technology and scale. Now by 2050 well within the lifetime just 30 years from now our population is set to be 10 billion that’s 3 billion more mouths to feed that we have currently to add to the challenge. We’re going to need to feed ourselves with the looming and uncertain. Impacts of climate change on food production top that with a rising middle class worldwide that’s going to expect to eat more animal protein. We need more efficient farming, more fishing or do we need to consider an entirely different other form of food production. Now modern agriculture has been hugely successful at boosting crop yields and production but it’s using up about 70% of our freshwater resources already and half of our habitable land we threaten unique conservation lands and special places. If we develop anymore and even if we did even if we plowed up paradise and applied our most modern agriculture technologies it would still not be enough because in order to feed our growing populations come mid-century. We would need to discover and develop new agriculture lands equivalent to a continent another addition continents.

### **Conclusion:**

Big Data being the technology of trend; is one of those mega trends that will impact everyone in one way or another (Goodwin *et al.* 2016). Sensing technologies are expanding at greater rate from a satellite to smartphone, from a navigational ship to deep in ocean etc. Real-time monitoring of



different fishing practices, tracking of their vessels at deep sea areas and contact with artisanal fishers at any emergency is now widely accessible and feasible. Any changes in the environment from wave height to wind flow can be addressed at any time through web-portal, applications, Radio and other mobile routes etc. However, Big-data and Artificial Intelligence are crucial for tackling Illegal, Unreported and Unsustainable (IUU) fishing. Thus more emphasis on governance, policy, port measures and global collaborations are vital element for successful results.

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