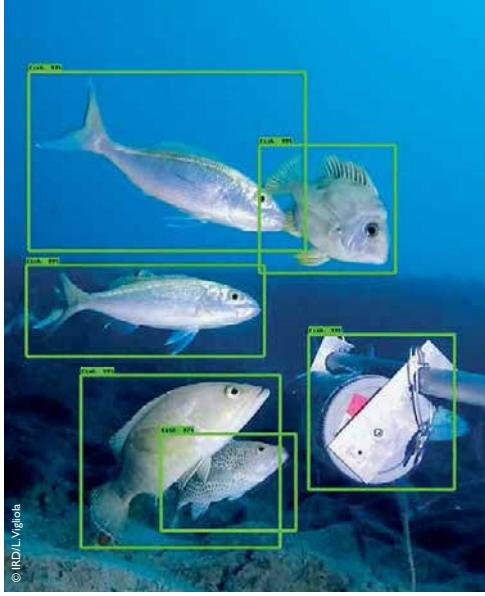
Artificial intelligence to the rescue for biodiversity

Climate change is already upon us. It is a global phenomenon whose multifaceted impact is particularly hard to assess, especially when it comes to estimating the decline in biodiversity.



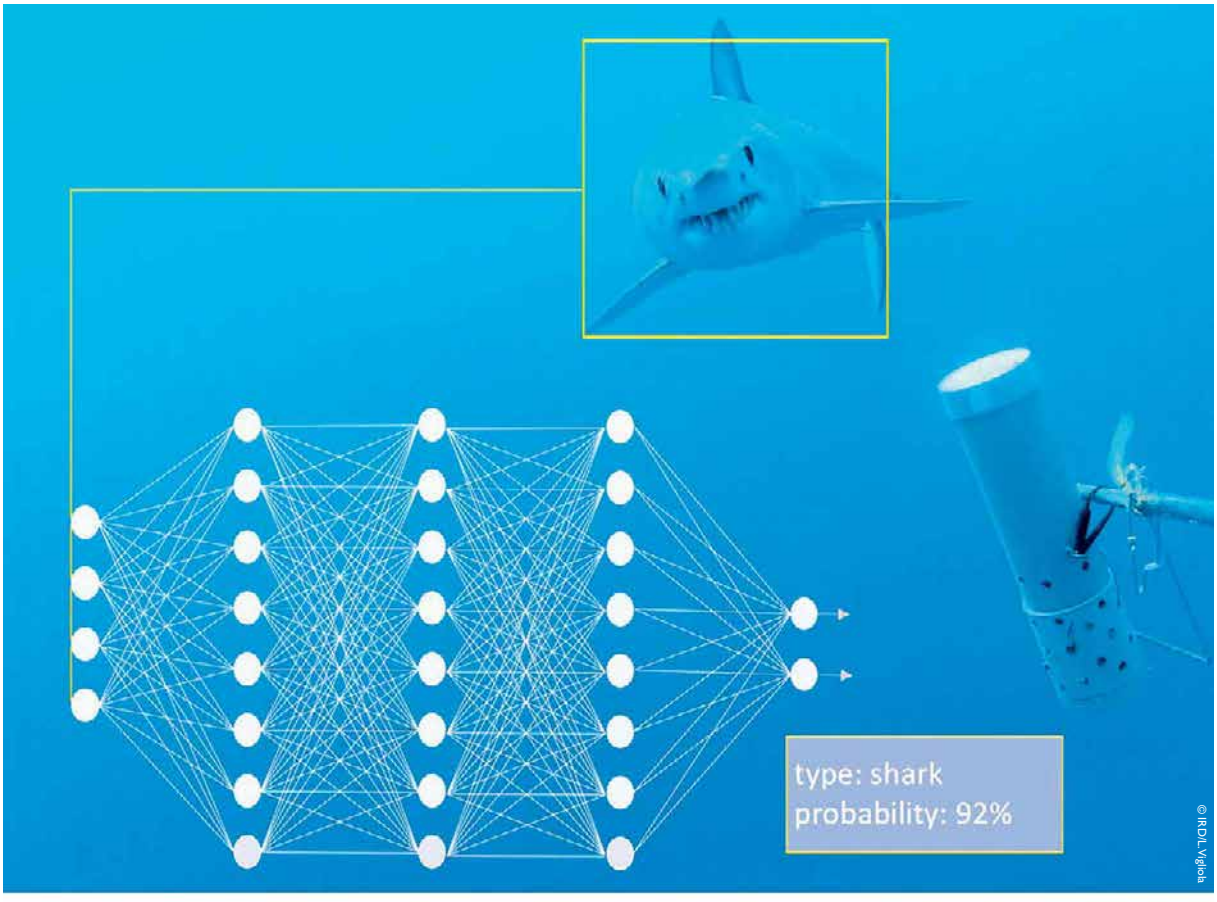
Detecting deep-sea fish using deep learning, New Caledonia, South Pacific.

It is a phenomenon which first emerged a decade ago, and over the past five years has opened up new horizons for the conservation of biodiversity: the rise of artificial intelligence (AI). Thanks to AI, computers are now capable of extracting the maximum potential of databanks, image libraries and sound recordings gathered by researchers from the four corners of the earth.

More specifically, deep learning is a technique which offers numerous benefits when it comes to analysing data recorded by sensors. It allows computers to detect and classify animals in photographs and videos taken on land or in underwater environments. The performances attained are equal or even superior to what human analysis can achieve, with the added advantage that computers can analyse millions of images very quickly. This technique has already been used to estimate the biodiversity of fish in the vicinity of coral reefs, the pelagic zone and the underwater mountain ranges of the South Pacific.

The possibilities are so vast that it is now more effective than ever to collect biodiversity observations *in situ*, then use AI to extract the useful information. One of the most interesting databases in this field is the Global Biodiversity Information Facility (GBIF), which gathers together all open data on life in all its forms, from bacteria up to large vertebrates. An accumulation of heterogeneous data that artificial

··· New applications utilising artificial intelligence may help experts to analyse fluctuations in biodiversity more effectively, and preserve it better ···



Identification of sea fish using deep learning, shown here is a pelagic Mako shark, New Caledonia, South Pacific.

intelligence – and innovative data sorting methods more broadly – can process effectively, helping researchers to better comprehend the spatial and temporal dynamics at play between climate, land usage and biodiversity. A godsend for scientists and those responsible for looking after the world's natural resources.

But that's not all, since AI can also be used to enrich data collected in the field and identify unexpected connections between species, reconstructing networks of interactions and revealing their sensitivity to environmental variations. AI can even be used to make predictions for the future, and identify pertinent indicators. A raft of useful features simply not available with classic methods. For biodiversity as a scientific field, the arrival of artificial intelligence is a major turning point whose impact is only just becoming clear. Hence the prominent participation of IRD in the GBIF project, and our decision to create a new data warehouse. Named DataSuds, it is used to host and share all types of data from IRD researchers and their scientific partners, on a voluntary basis.

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Artificial intelligence to the rescue for biodiversity

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