



SHEDDING LIGHT ON ILLEGAL AND UNREPORTED FISHING IN THE STRAIT OF SICILY

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Illegal, unreported and unregulated fishing (IUU) can manifest in different forms violating national, regional or international laws: from misreporting catch, fishing in areas where fishing is not allowed, to catch undersized fish or not complying with monitoring and control regulations and more ([IUU fishing FAO](#)). Identifying IUU fishing is often a challenge as a result of scarce available data on vessels operating illegally. Given the nature of IUU activities, vessels operating illegally will have a tendency to avoid being monitored with vessel tracking systems and might not comply with reporting correctly their catch to relevant authorities. This poses a challenge to track, identify and trace illegal vessels activity and relative catch.

Today, the application of machine learning models to an increasing volume of accessible data generated by new vessel monitoring technologies such as AIS, VMS, satellite imagery including SAR and optical imagery is starting to fill some of these gaps in identifying IUU fishing. For instance, the use of Satellite imagery and applied detection algorithms led to the identification of more than 900 Chinese flagged vessels operating illegally without any tracking device on board in North Korea (Park et al. 2020). Moreover, machine learning models applied to vessel tracking data have been applied to identify vessels at risk of forced labor at sea globally (McDonald 2020). However, combining vessel tracking - detection data with catch / landings data with the purpose of identifying IUU could help in filling some of the gaps in identifying IUU but also offer relevant insights on the detrimental possible impact of IUU on seafood commodities. In fact, when working with vessel tracking data often IUU is solely identified in relation to vessel presence and activity in areas where these vessels are not allowed. However, this does not give a complete picture of the actual impact of IUU, particularly on the “hidden” catches resulting from IUU. The combination of positional data with landings and catches data could shed light on the impact of IUU activities on the socio - economic and ecological system that IUU is operating upon. Recently, some authors attempted to predict unobserved fishing effort using machine learning (Russo et al., 2019), while IUU events were identified from vessel behavior (Selig et al. 2022).

The Mediterranean Sea represents a challenge for sustainable management of fisheries and fish stocks: studies highlight that 75 percent are fished beyond biological safe limits (FAO 2018). It is unknown the role and overall contribution that IUU plays in threatening sustainable fisheries management in the Mediterranean. During the past years, there have been several media outlets, reports, investigations released by NGOs, journalists and governmental institutions, reporting and describing IUU across the Mediterranean. However, scientific studies aiming to quantify the extent of this problem have not yet been developed for this region.

Scope and partnerships

The idea behind this PhD is a cross collaboration between a national University ([Tor Vergata, Rome](#)), an international technology NGO ([Global Fishing Watch](#)) and a regional institution ([The](#)



General Fisheries Commission for the Mediterranean) to apply machine learning models on a variety of data including AIS, VMS, satellite imagery, catch and landing data, to identify and quantify the extent of IUU in the Mediterranean or at least in some parts of it.

Tommaso Russo Lab in Tor Vergata offers expertise on machine learning models, fisheries ecology, the possibility to work on VMS and catch - landing data for the Italian fleet. Global Fishing Watch brings on expertise on machine learning models, access to AIS and satellite data including SAR. GFCM involvement will be fundamental to understanding some of the dynamics around IUU in the Mediterranean and to engage with local and national relevant parties that can offer useful insights to this project.

The goal of this project is to evaluate all aspects of IUU and to understand where, how and how much of it is happening. IUU does not happen necessarily in areas that are closed to or restricted to fishing activities but also in areas where fishing is allowed. Therefore, by studying the behavior of single vessels and understanding how broadcasted signal varies and comparing it to logbook data we hope to get insights on other aspects of IUU fishing besides fishing in restricted areas. Thus, including aspects of IUU such as fishing more than what is allowed, catching undersized fish in nursery areas etc.. An important aspect of this research will be the comparison between AIS and VMS data and how the relation between the use of both or only of VMS varies in space and time.

References

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