

Preliminary results of the OBSEA Citizen Science project

Ikram Bghiel¹; Joaquin del Rio¹; Alberto Hidalgo¹; Daniel M. Toma¹; Antoni Mànuel¹, J. Aguzzi²

¹SARTI Research Group. Electronics Dept. Universitat Politècnica de Catalunya (UPC).
Rambla Exposició 24, 08800, Vilanova i la Geltrú. Barcelona. Spain. +(34) 938 967 200

²Marine Science Institute (ICM, CSIC), Paseo Marítim de la Barceloneta, 37-49, 08003 Barcelona, Spain

Abstract- *In this paper, the Citizen Science experience with the OBSEA costal-cabled video-observatory, deployed in western Mediterranean [1] is presented. A local biodiversity survey is being conducted by citizens as generic non-experienced users, high school students, and amateur divers helping to identify and classify fishes appearing within different digital products such as time-lapse images and footages. Accordingly, we implemented a protocol for the web-based species identification supervised by scientists, in order to evaluate the different performances for each group.*

Keywords— Citizen Science, biodiversity, marine observatory.

1. INTRODUCTION

The Citizen Science refers to the public participation in scientific activities and research projects related with environment and its biodiversity are taking advantage of new technologies such as internet and mobile phones with recording capabilities for an easy data collection and sharing. Most of nowadays deployed cabled observatories bear video cameras [2]. These

video-imaging systems may truly represent the first innovative and multifunctional sensor to monitor life activities at different levels of complexity (i.e. from the individual animal, to population, species up to the level of the whole community), provided that automated image analysis is sufficiently developed to classify animals based on differences in shape, texture and color.

Fluctuations in video-counted individuals over different time windows (from seconds to decades) can be linked to a wide variety of oceanographic and geologic phenomena, e.g. from cyclic changes in current speed and direction (i.e. internal tides and inertial currents [3]) to more stochastic seismic events.

2. PROJECT DESCRIPTION

An open access web site was designed in a friendly user fashion in order to allow registered users to be connected any time and everywhere with the OBSEA costal-cable video observatory as shown in figure 1.

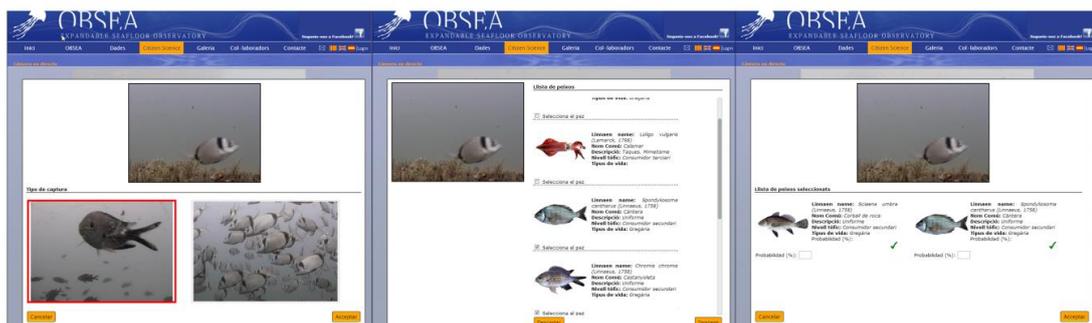


Figure 1. Web portal with real time video (a) After snapshot with options for individual and population species. (b) Identifying the possible species. (c) Allocating probability for each species

Users classification performances are evaluated by tagging options on each selected animal within each video output. A web referenced image library for all local species is used as reference for classification, being constantly updateable by new entries by any user (after supervised validation). Results are discussed considering Citizen Science classification outputs and performances as a reliable tool to improve the efficiency of future automated video-imaging. Manual classification performances may help to transform video cameras into “intelligent” sensors for the autonomous and continuously ongoing monitoring of marine communities at virtually any depth of the continental margin.

Citizen will participate on the experience through the web portal of the OBSEA Citizen Science project. This web portal user interface is structured in 4 phases as follows:

I. Phase 0: first time registration of the user in the web portal. The user will provide personal information to allow statistics of use of the portal, and knowledge of the marine environment by different ages, geographic area, education or professional dedication, etc...

II. Phase 1: selection between the options for training or research. The user has the possibility to start with a training option where previously acquired video is shown. The previously acquired video is selected in order to show animals recognized previously by the scientific team. The next option for the user is the possibility to start the research, dedicated to obtain an image wherein the animal is best presented.

III. Phase 2: identification of the animal.

IV. Phase 3: select options for scientific validation. When the user has identified the animal, he can choose to send the classification to scientific review or just archive its work for a later review. After scientific review, the user is informed about its success. Different rankings and statistics are done between users depending on its success classifying species.

3. CITIZEN SCIENCE EXPERIENCE

In June, the first Citizen Science experiments have been done in two Fairs, the “*Second Environmental Fair of Vilanova i la Geltrú*” in 8th of June, 2013 (figure 2) and “*Expomar*” between 15-16 of June 2013, both hold in Vilanova i la Geltru, Spain. In these experiments, the UPC-SARTI research group has demonstrated the use of OBSEA Citizen Science project to the public of Vilanova i la Geltru using recorded videos with marine species recognized previously by the scientific team.



Figure 2 Citizen participating in the OBSEA Citizen Science project at Second Environmental Fair of Vilanova I la Geltrú

Next February 2014, some primary and secondary schools will start using the web portal and more results will be obtained and processed.

4. CONCLUSIONS

Access to the web portal can be done at www.obsea.es. In September 2013 a pilot citizen science experiment has started for high school students, and amateur divers. Statistics and rankings are generated. Best images will allow the improvement of automatic video analysis algorithms.

REFERENCES

- [1]. Aguzzi, Jacopo; Mänuel, Antoni; Condal, Fernando; Guillén, Jorge; Nogueras, Marc; Del Rio, Joaquin; Costa, Corrado; Menesatti, Paolo; Puig, Pere; Sardà, Francesc; Toma, Daniel; Palanques, Albert. 2011. "The New Seafloor Observatory (OBSEA) for Remote and Long-Term Coastal Ecosystem Monitoring." *Sensors* 11, no. 6: 5850-5872
- [2]. Favali, P., Beranzoli, L., D'Anna, G., Gasparoni, F., Marvaldi, J., Clauss, G., Gerber, H.W., Nicot, M., Marani, M.P., Gamberi, F., Millot, C. & Flueh, E.R. 2006b. A fleet of multiparameter observatories for geophysical and environmental monitoring at seafloor. *Annals of Geophysics* 49, 659-680.

- [3]. Aguzzi, J., Costa, C., Furushima, Y., Chiesa, J.J., Company, J.B., Menesatti, P., Iwase R. & Fujiwara, Y. 2010. Behavioural rhythms of hydrocarbon seep fauna in relation to internal tides. *Marine Ecology Progress Series* 418, 47-56