Underwater Imaging: using computer vision for mapping in a participating medium

Prof. Rafael Garcia,

University of Girona, Spain

Abstract

In this talk we will describe the work carried out by the Underwater Vision Lab of the University of Girona (Spain) to address the problem of robotic exploration and mapping of the seafloor using computer vision. Underwater imaging needs to deal with several limitations imposed by the medium. The interaction between the light and the aquatic environment includes basically two processes: absorption – where light is gradually attenuated and eventually disappears from the image- forming process, and scattering – a change in the direction of individual photons, mainly due to the various particles suspended in water. These transmission particularities of this medium result in additional challenges in underwater imaging, such a blurring, limited range, color shift, clutter, non-uniform illumination and "marine snow" due to suspended particles. Over the talk we will address the peculiarities of underwater imaging and we will report our results in seafloor mapping and characterization using machine learning techniques.