Smart Pleco: A Multi-Functional Eco-Friendly Unmanned Craft for Waterbodies Protection

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Given the considerable threat water pollution poses to the ecosystem, Smart Pleco, an Unmanned Surface Vehicle (USV) designed to track pollution sources in relatively small water bodies, could be the solution. While automated data collection can generate paths in accordance with waterbody outline, fixed point sampling enables customized coordinates data collection. Mainly 4 types of data: pH, conductivity, dissolved oxygen and temperature, can be retrieved and the corresponding pollution type can be identified with reference to the water pollution index from Guidelines for Drinking-water Quality (WHO 2011, p.226-230). Changes in pH, conductivity, DO and temperature and their correlation may indicate possible sources of pollution (e.g. inorganic pollution, plant nutrient pollution). Data visualization comes in the form of Environmental-n-color-map. Typically, Sequential Analysis allows the visualization of one single data type in one dataset. Panoramic Data Overview provides an overview of all data types in one dataset, highlighting the area whose pollution level exceeds the corresponding standard, whereas Overtime Data Analysis compares one data type in a series of datasets to highlight over-time changes. Multiple data sampling tests have been conducted in a 22000 m2 lake. The results reveal that the over-time changes are insignificant with no abnormal indication of pollution sources in the lake. Smart Pleco features collecting, analysing and visualizing data, and constant monitoring and tracking the water quality of waterbodies. Our team uphold the importance to safeguard the right to access fresh water and the social responsibility to conserve our precious water resources.

Awards Won:

Third Award of $1,000

China Association for Science and Technology (CAST): Award of $1,200