Autonomous Underwater Vehicle to Inspect Hydroelectric Dams

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Abstract
Driven by the rising demand for underwater operations in the fields of dam structure monitoring, ecosystems of reservoir lakes from Hydropower Plants (HPP) and mining and oil, underwater robotics is increasing rapidly. The increase in exploration, prospecting, monitoring and security in lakes, rivers and sea, both in commercial applications such as scientific applications, has led large companies and research centers to invest in the development of underwater vehicles. The purpose of this work is to develop and evaluate the performance of a dedicated expert system for an Autonomous Underwater Vehicle (AUV) to inspect hydroelectric dams, focusing efforts on mechatronic project based on dimensioning structural elements and machinery and elaborating the sensory part, which includes navigation sensors and sensors of environment conditions, as well as its vision system to detect and measure cracks on hydroelectric dams. The integration of sensors in an intelligent platform provides a satisfactory control of the vehicle, allowing the movement of the submarine on the three spatial axes. Because of the satisfactory fast response of the sensors, it is possible to determine the acceleration and inclination besides his attitude in relation to the trajectory instantaneously taken, and geometry and depth of the cracks. This vehicle will be able to monitor the physical integrity of dams, making acquisition and storage of environment parameter such as temperature, dissolved oxygen, pH and conductivity as well as document images of the biota from reservoir lakes HPP, with minimized cost, high availability and low dependence on a skilled workforce to operate it.

Referen
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