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A smart platform for monitoring underwater noise

In light of recent concerns about the effects of both acute and chronic noise exposure on the marine environment, it is desirable to implement long-term, continuous monitoring of underwater noise levels in key locations. This monitoring may be used to provide impact assessment for specific anthropogenic noise sources as well as to provide insights into long-term trends in underwater noise levels. However, the potential volume of data produced during such monitoring is vast due to broad bandwidths and long timescales. Even with modern technologies, continuous direct storage or transmission of such data for prolonged periods may not be cost effective.

An underwater noise monitoring system is presented which addresses this problem by performing real-time analysis on acoustic data as it is acquired to compute third-octave sound exposure levels (SELs), peak pressures and other statistics for both continuous and impulsive noise. The results of this analysis have a significantly lower bit rate than that of the unprocessed acoustic data and so provide a more efficient format for data storage or transmission. They also provide a simple pathway to real-time impact assessment of underwater noise.

The presented system consists of a hardware platform and a software application. The hardware platform (UDAQ system) is a battery-powered embedded computer system with hydrophone input in a pressure housing suitable for underwater deployment. The software is designed for unattended operation, can be ran on both the UDAQ system and general-purpose computers and is to be released under an open-source license to facilitate standardisation of analysis and automated impact assessment methods.

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