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Liblsl.dart: A Dart native API for Lab Streaming Layer (LSL)

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Summary

The `liblsl` Dart package provides an API for Lab Streaming Layer (LSL) in Dart and Flutter applications. It enables real-time data streaming and synchronization across multiple platforms, including mobile (iOS, Android) and desktop (Windows, macOS, Linux). The package wraps the native LSL library (Stenner et al., 2023) using Dart's native build system, which affords high performance and low latency data streaming. Streamed data can be processed in real-time or recorded for subsequent analysis.

Statement of need

In academic research and industry settings, there is often a need to acquire, synchronize, and process data from multiple sources in real-time . For example, multimodal experiments, group research and electroencephalography (EEG) hyperscanning (Zamm et al., 2024) studies will often simultaneously record neural, behavioural (e.g. input and reaction times) and biometric (e.g. heart rate, skin conductance) data from multiple participants. In such experiments, ensuring recorded data is precisely time-synchronized across all devices can present a significant challenge (Dolmans et al., 2020), yet it is critical for valid analysis and interpretation. LSL is designed, and widely used for multimodal data acquisition and synchronization as a software-based alternative to bespoke or costly hardware solutions (Iwama et al., 2024; Kothe et al., 2025).

A Dart API for LSL allows developers and researchers to integrate LSL data stream production and consumption into Dart and Flutter applications, making it easier to build applications that run on a wide range of devices and platforms which lowers the barrier and cost of replicating studies across labs and in different contexts.

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