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Using a probabilistic model to infer target labels for unsupervised BCI recalibration

Stanford researchers have developed a system that addresses a critical challenge in brain-computer interface (BCI) technology: the need for tedious and lengthy recalibration procedures that disrupt daily use. It features a BCI cursor decoder that automatically adapts to the user's brain activity, eliminating the need for frequent manual recalibration.

The system records brain signals, translates them into commands to control a cursor, and enables users to perform tasks like checking email, browsing the Internet, and interacting with graphical user interfaces. Over time, it improves its accuracy by learning from the brain signals without requiring human intervention, making it more reliable and user-friendly for daily computer navigation.

Applications

- BCI cursor decoders using surface recording signals (EEG, MEG, fNIRS)
- BCI cursor decoders using intracranial approaches (ECoG, intracortical)
- Unsupervised retraining of cursor decoders for use in patient population

Advantages

- Automates BCI cursor decoder recalibration, eliminating tedious manual calibrations
- Improves upon BCI cursor decoder calibration stability over time
- Automatically adapts BCI cursor decoder to the user's brain activity

Patents

- Published Application: WO2024020571
- Published Application: 20260259606

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