**Table 1S.**

Summary of Software and Algorithms used for the LittleBeats Platform and in the Technical Validation Studies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paper section** | **Software/open-sourced ML model used** | **Purpose** | | |
| Device overview | Code developed in-house in C using Adafruit Libraries | | LittleBeats data acquisition |
| Device overview | Python code developed in-house | | To pre-process the data before running the ML/signal processing algorithms |
| Studies 1 & 2 | CardioPeak & Segmenter | | To extract IBI (also called R-R peaks) from ECG data for a given session or task |
| Studies 1 & 2 | CardioEdit v1.5 | To manually edit IBI data | | |
| Studies 1 & 2 | CardioBatch Plus | To extract respiratory sinus arrythmia (RSA) values from the IBI data files | | |
| Study 3 | Sklearn | To implement ML Algorithms | |
| Study 4 | Built-in clipfix function in Audacity software | To alleviate clipping in LB audio | | |
| Study 4 | sklearn | To implement LDA algorithm to perform SER | | |
| Study 5 | Wav2vec 2.0 | To perform ASR on Rainbow Passage | | |
| Study 5 | KenLM | To implement language modeling used in ASR inference | | |

**Figure S1.** Plots of aligned interbeat intervals (IBI) from LittleBeats™ (orange line) and BIOPAC (blue line) during (a) baseline, (b) puzzle task, (c) recovery, and (d) matrices task from an adult participant (Study 1). The X and Y axes each represent time in seconds.

1. Baseline

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1. Puzzle task

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1. Recovery

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1. Matrices task

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**Figure S2.** Plots of aligned interbeat intervals (IBI) from LittleBeats™ (orange line) and BIOPAC (blue line) during (a) baseline, (b) SFP play, (c) SFP still, and (d) SFP reunion episodes from an infant participant (Study 2). The X and Y axes each represent time in seconds.

1. **Baseline**

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1. **SFP play**

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1. **SFP still**

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1. **SFP reunion**

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