Supplementary Information - Physiological Characterization of Electrodermal Activity Enables Scalable Near Real-Time Autonomic Nervous System Activation Inference

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S2 Appendix. Heuristic Refinement of $\boldsymbol{u}$. Similar to our previous deconvolution approaches [1–3], we perform a heuristic refinement to enforce a constraint on the maximum number of nonzero values in $\boldsymbol{u}$ and a minimum spacing between two consecutive impulses. In each iteration of the re-weighting step, we perform the following two steps for enforcing these constraints:

- Detect the nonzero values having time distance less than the selected minimum peak to peak distance Δ_p ($\Delta_p = 1$ second in our case). Retain only the largest impulses among the adjacent impulses within the Δ_p window.
- If $||\mathbf{u}^{(i,r)}||_0 > N_{\mathbf{u}}^{\max}$, select $N_{\mathbf{u}}^{\max}$ largest values of elements of $\mathbf{u}^{(i,r)}$ and set all other elements to zero.

We choose $N_{\mathbf{u}}^{\max} = N_{\text{peaks}} + 20$. N_{peaks} is the number of peaks detected on the raw SC recording using MATLAB *findpeaks* function with a peak prominance of 5×10^{-4} and a peak to peak distance of 1 second. Further, we have selected $u_{th} = 0.03$ in this study for thresholding.

References

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